

AMERICAN HORTICULTURIST

FEBRUARY/MARCH 1980



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ON THE COVER: February temperatures bring snow and ice, but also the promise of spring. Photograph by Jeff Crespi.



Fraises des Bois

It's Different...

At a meeting of mail order nurserymen, a speaker said of nursery catalogues, "When you have seen one, you have seen them all." He admitted not having seen *The Garden Book*, published by White Flower Farm for over 25 years. This catalogue is different—in many ways.

Descriptions in *The Garden Book* generally eschew adjectives, though you may find the word "lovely" somewhat overused. You are told, rather flatly, what you can expect of a plant; and what not to expect. Arrangement is alphabetical and common names are cross-indexed with botanical names, which are provided with phonetic pronunciation. This, of course, makes it easier to communicate with other gardeners—and to tell nurserymen exactly what you want. There is a Hardiness Zone Map and, far more important, every plant is given a hardiness rating, including the southern range when we know it.

Its illustrations, a few of which appear here, are by a fine artist. They have charm. In each edition, there is a portfolio of gardens which makes interesting landscaping points. The covers are in color.

The Garden Book is a catalogue of more than 1200 varieties of perennials, shrubs, and bulbs—some rare, many unusual. It really is a garden book because it has scores of essays and diagrams on cultural practices, simply told by professional gardeners. There are more words in the two editions about gardening than about the plants offered. No catalogue, anywhere, provides so much how-to-garden data.

White Flower Farm itself is different, too. It tells its customers to shop local nurseries and garden centers first for their needs. It uses traditional English packaging methods—which are superb and costly. Its production people, all plantsmen, are charged with never shipping a plant that they would not buy, and its packers never hesitate to return plants to quality control. The display gardens are extensive, over three acres, and, we are told, quite beautiful. In any event, many visitors enjoy viewing plants in a variety of settings and touring the nursery blocks and greenhouses.

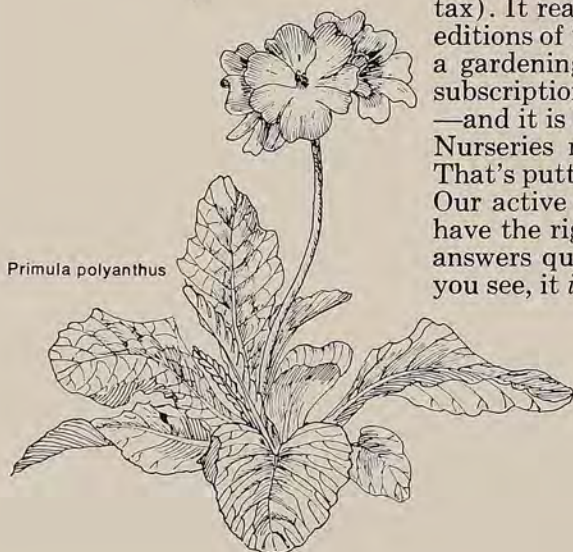
What kind of gardeners are attracted to White Flower Farm? Sophisticated ones and dedicated beginners. Besides their deep interest in unusual plants, the former use *The Garden Book* for quick reference; the beginners find it so helpful that they swear by it. Becoming a customer is almost like joining a club.

Why don't you join? The initiation fee is \$5 (to Connecticut, add sales tax). It really is a subscription to our Gardening Advisory Service: two fat editions of *The Garden Book* (Spring and Fall) and three issues of NOTES, a gardening reminder published Spring, late Fall, and Winter. With the subscription comes a \$5 credit, good for a year, on your first order of \$20—and it is hard to believe that any gardener can sample a nursery for less. Nurseries making similar offers indicate that their catalogues are free. That's putting pressure on a fine word. It's not free, nothing is, but it helps. Our active customers get annual subscriptions without charge. They also have the right to ask for service from one of our staff horticulturalists who answers questions (any) about gardening. Only *they* can get answers. So you see, it is a club.

Cordially, Amos Pettingill



Exbury Azalea



Primula polyanthus

White Flower Farm

P l a n t s m e n

Litchfield 7701, Connecticut 06759



Thomas W. Richards

A Case of Apples and Oranges

—or actually a case of okra, celery, peppers, tomatoes, carrots, cucumbers and first generation hybrids of any kind. The classical nonrelated comparison of apples and oranges is currently being used to discourage a proposed amendment to the Plant Variety Protection Act. In effect since 1970, the Plant Variety Protection Act allows developers of new plant varieties which come true from seed to protect their "inventions" in the same way an inventor of mechanical devices may patent his idea. New varieties of the six vegetables listed have until now been excluded from such legal protection largely because of industrial lobbying at the time the Act was first passed in Congress. The arguments were mostly economic ones and may or may not have been in the best interests of all of us. But that is not the point. Why should researchers who develop a new machine or a new variety of pea have the legal protection of international patent laws while the developer of a new cucumber does not?

Obviously logic was originally overridden by politics, but now an attempt is being made, in the form of an amendment to the Plant Variety Protection Act, to correct that inconsistency. The amendment (H.R. 2844) is being opposed on the basis that passage of the amendment and, in fact, the original Act itself will lead to a loss of genetic variability, which is needed to ensure a continued gene pool for plant breeders. Actually, the situation is exactly the reverse.

Let's look at an example with which we are all probably familiar. The Irish Potato Famine of 1845 to 1847 was brought about when a plant disease wiped out the potato crop. This happened for two reasons. The first was that nearly all the farmers were growing the same variety of potato, and it did not have any resistance to the disease. The second, and more subtle factor, was that there was not a research-oriented agricultural industry which could make available disease-resistant potatoes in any organized way. The argument that plant patents will lead to a uniformity of plant material that could result in another Irish Potato Famine is faulty. Farmers will grow the crops that produce the best harvest, and thus a certain degree of uniformity in the fields is inevitable. But farmers do not carry on the research which produces the varieties they need for current growing conditions. That is done by the seed companies. And the seed companies, like any other business, need economic incentives to continue with their research. Continued research leads to even better varieties, both in yield and in disease resistance.

Today we are well aware of the potential loss of genetic material through the abandonment of older varieties of cultivated plants and through the increasing rate of extinction in the wild. It is this variety of genetic resource that is the tool of the trade to the plant breeder. The availability of plant patents provides the incentive to maintain a broadly-based gene pool from which new varieties of plants may be developed—exactly the opposite conclusion that the opponents of plant patents would reach. Plant patent laws result in a greater variety of available plant material, not a reduced variety. The incentive is there to produce something new and better all the time.

The loss of the large gene pool is a separate problem from that of choosing which varieties will or will not be grown. Actually, the plant patent laws are one small way in which we can combat this loss. Under the Plant Variety Protection Act, a sample of all patented seeds must be deposited at the National Seed Storage Laboratory in Fort Collins, Colorado. Seed is stored there under ideal conditions and is tested periodically for viability. If germination tests indicate the need for a fresh supply of seed, the holder of a Certificate of Protection (a seed patent) is required to

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PRESIDENT'S PAGE CONT'D

provide a new supply of seed upon request during the period of the patent. Any failure to meet this request will void the patent.

This Act does not protect plant material in the wild from extinction, and this lack of protection is far more significant than the loss of older cultivars. It was from this wild source that our cultivated plants were developed in the first place.

Thus the plant patent laws ensure a viable supply of seed and a guarantee of continued availability of a genetic resource. No such guarantee or organized storage of nonpatented seeds exists. The National Seed Storage Laboratory contains many unpatented varieties, but it has to locate such material on its own. So, plant patents actually help to preserve old varieties, not lead to their loss.

This Act does not protect plant material in the wild from extinction, and this lack of protection is far more significant than the loss of older cultivars. It was from this wild source that our cultivated plants were developed in the first place; the loss of this original source material means that we can no longer reconstruct the plant breeding of the past and that we will lose the genetic resources that might provide the answer to future needs of the plant breeder, either for new and improved crops or for disease resistance.

Support of plant patent laws will help in part to guarantee future availability of a portion of our plant gene pool resource and will provide the incentives for an ever improving stream of new plant varieties. Personally, I am in favor of continued plant patent laws and the proposed amendments to the Plant Variety Protection Act. Let your legislators know how you feel. ☺

Gilbert S. Daniels

—Gilbert S. Daniels
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Portland Congress

Again Mrs. Kramer and I have had the privilege of enjoying a Congress of the Society in Portland, Oregon. Although we are only those who enjoy a home garden and all green growth, we always (this was our fourth Congress) learn from those who are in attendance and from the tours of public and private gardens and the many presentations and seminars offered at each one. The private gardens are of particular interest to us since they present ideas and plans that frequently can be incorporated into our own garden.

We are already looking forward to the next Congress. There is so much to be gained, and the Congress is always so well planned that all members of the Society should make plans to attend.

Ellsworth E. Kramer
Santa Barbara, California

African Violet Propagation

Since an article on African violet species appeared in your last issue, I thought readers might be interested in how we propagate and sell them. We grow them in five-inch pots under a bench. When someone is interested in a collection of them, we give them a roll of baggies and labels and let them take leaves from them. Periodically, we restart them from stem and leaf cuttings ourselves. We fill the pots about two-thirds full of soil and top them off with a mixture of vermiculite and perlite. A stem cutting may be put in the center of the pot and three or four leaves around the edge. We use a proportioner to inject fertilizer (15-30-15) into all the water we use for plants and cuttings (¼ teaspoon to one gallon), so the newly potted species will get fed at each watering. In a short time they are in bloom again.

Lyndon Lyon
Dolgeville, New York

Errata

I was pleased with the picture reproduction in my article "Bright Berries for Fall," [October/November issue] but must point out that some gremlin had a hand in the captioning of the photographs. One leaves out the genus—*Viburnum* belongs before

setigerum, and also leaves out the cultivar, 'Aurantiacum'. Plain *setigerum* is red. This yellow is an early color phase of 'Aurantiacum', which eventually becomes orange.

Next, two captions were switched. *Viburnum opulus* 'Xanthocarpum' and *Berberis gilgiana* belong in the opposite order.

Both herbals and Japanese gardens are loves of mine, so I enjoyed the issue.

Martha Prince
Locust Valley, New York

Editor's Note: Our apologies. We'd like to find out who that little gremlin was, too.

Suitable for Framing

Along with others, I agree that the new magazine layout is super. Am I alone in suggesting that your covers (repeated and reversed on the back cover) are, in many instances, "suitable for framing?"

In fact, if you would arrange to have the address label placed on the front cover it would be possible to use the back cover for just that purpose.

I enjoy the magazine very much.

John J. Shea
Kensington, Maryland

Editor's Note: A good suggestion deserves to be acted upon. We have written to our mailing service and have asked that they put labels only on the front cover beginning with the February/March, 1980 issue.

British Gardening Books

Dr. Daniels' editorial in the October/November issue of the magazine spotlights what has been an area of aggravation to me for many years. I could hardly agree more with his sentiments regarding the publication of books not suited to our country.

For several years I was a book editor for some excellent publishers, and as the garden and nature books editor I rejected many otherwise fine books because they did not take account of our needs, and I did not feel it ethical to take money from the public that way. The main trouble is that many publishers have editors in charge of gardening publications who are less than qualified to judge the merits of what foreign publishers offer—or American writers, either, for that matter. Hence the

spate of unworthy and expensive books offered.

Since I left regular work for book publishing, I have been writing my own books and articles, and on occasion editing for selected publishers and have acted as reader for a few, as well. I have kept off the market some books, unsuited to our American needs, but often the same book appears under the imprint of another American publisher with no changes.

Therefore I not only agree with Dr. Daniels but applaud his efforts. Perhaps reproductions of this editorial should be sent to all publishing houses which have garden books in print, addressed to the Editor-in-Chief, to let them know we are aware of the problem.

John Burton Brimer
Suffern, New York

Native Orchids

I am one of the scientists referred to in David Soucy's article, "Saving Our Native Orchids" [October/November, 1979]. The others include Cathey Vogt, Kent Kratz, Phil Davis, Dave Sanders, Steve Koenigsberg and Ellen Sutter. The reason we are working on native orchids, and even realized a problem, was due to the perception of Professor Emeritus L. H. MacDaniels.

Dr. Mac has crawled the bogs with students looking for protocorms and young seedlings, has written numerous articles on the plight of this plant and has grown and provided us with plant material for this research.

To really feel the vitality of this article, the reader should realize the drive and encouragement we all receive from this 91-year-old horticulturist. Appreciating this, it all fits together to make a beautiful story.

Robert W. Langhans
Professor of Floriculture,
Cornell University
Ithaca, New York

The Editorial Staff of *American Horticulturist* welcomes your questions and comments about articles which appear in this issue. Please send letters to The Editor, *American Horticulturist*, The American Horticultural Society, Mount Vernon, Virginia 22121. ●



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THE MALLOW FAMILY

*Who loves a garden still his Eden keeps
Perennial pleasures plants, and wholesome
harvest reaps.*

—Amos Bronson Alcott

Do hollyhocks grow on trees? Well, yes and no. That flower blooming high in the branches of a tree within the walls of a hotel on a tropical island looks for all the world like the hollyhock in the garden back home. What can it be?

It is, in truth, related to the hollyhock. Its name is sea hibiscus or seaside mahoe, *Hibiscus tiliaceus*. It is a member of the mallow family, Malvaceae, to which the hollyhock also belongs. The mallow family is an interesting and diverse group of plants, and there are some strange relatives among them.

All of the plants that are found in the genus *Hibiscus* are members of Malvaceae. The hollyhock is *Althaea rosea*, a well-known species among the 75 genera and more than 1,000 species comprising this cosmopolitan family, representatives of which occur over most of the world, except in the coldest parts. The family includes many ornamentals and some weeds, some food and fiber crops and perfume and oilseed plants as well.

Members of the mallow family are particularly numerous in the tropics, although the genus *Malva*, for which the family is named, is native to north temperate zones. Family characteristics include alternate leaves that are palmately veined and lobed, solitary or compound inflorescences, perfect flowers that are often tubular at the base, with five sepals (the outer part of a flower that "holds" the petals, collectively called a calyx), five petals and many stamens fused into a tube at the base. Showy flowers are common to many of the species. A characteristic of most genera is a ring of bracts (modified leaves) just beneath each flower. In most members the sap is sticky or mucilaginous, sometimes with an identifying odor. Seeds are often covered with fine hairs.

Hibiscus is the largest genus of the family. It is possible to make a southern garden of hibiscus—hibiscus in the landscape, hibiscus to wear, hibiscus to eat. Adding



some of the ornamental species will give a kaleidoscope of form and color.

The sea hibiscus (*Hibiscus tiliaceus*), already referred to, is a tree sometimes pruned as a shrub. Because of its tolerance of salt air, it is one of few hibiscus suited for seashore planting. In Hawaii its interlocking branches are sometimes trained over a lanai arbor. Flowers appear in profusion at the tips of branches; they open yellow on the first morning, during the day they change to orange, and finally they become dark red the second day and drop. The large evergreen leaves are coarse in texture.

Often pictured in travel brochures as an adornment of beautiful island girls is the Chinese hibiscus. This is *Hibiscus rosa-sinensis*, the state flower of Hawaii. It is

not hardy beyond Zone 9, but it is familiar to many northern gardeners as a greenhouse plant or as a container-grown summer ornamentation of the patio or balcony. Its bold red, white, pink or yellow single or double blossoms are favorites in tropical landscapes.

The fringed hibiscus, *H. schizopetalus*, has a dainty flower form with slender, gracefully curving stems and pendulous, fringed coral blossoms.

H. moscheutos, the common rose mallow, is a European native that is widely distributed in the eastern United States. Improved forms of it have been adapted for garden use through selection and crossing with other species. These improved mallows are of easy garden culture. The plant becomes a many-stemmed shrub of three

to six feet in height and needs plenty of room. The six-inch broad rose, white or red flowers are spectacular.

H. syriacus, the blue hibiscus, is better known as the shrub althea or rose-of-Sharon; it comes from India and China and not Syria, as the name suggests. Many named cultivars of this old-time favorite have been introduced by arboreta and nurserymen. "Blue Bird" is a popular one, but white, red and rose forms are common.

The flowers of the genus *Hibiscus* are unique because they don't wilt for an entire day after picking. For travelers in the tropics, a welcoming gesture is often hibiscus strewn on the bedspread or arranged on the dresser. If needed for decoration at night, buds can be cut early and kept in the refrigerator. Whether on the bush or picked and laid out for all to admire, hibiscus remain fresh and beautiful until night-fall when they close and fade.

H. sabdariffa, better known in many parts of the world as roselle, is also called Florida cranberry bush because the sauce made from the calyces is a good substitute for cranberry sauce. According to *The Seed Pod*, the official publication of the American Hibiscus Society, there are many variations, but the true roselle of commerce has reddish stems, leaves and fruits and is a native of the West Indies. Its flowers are yellow with a red eye. The plant is an annual shrub that reaches from six to eight feet in height. It is started from seed and is obtainable from many local seed stores. The flower sepals or calyces continue to grow out and become pods resembling short okra pods. If allowed to dry out, they are succulent, and in this stage they are removed to make either sauce, jelly or pickles. Felice Dickson, in her book *Growing Food in South Florida* (Banyan Books, 1975, \$5.95), gives a recipe for Roselle Sponge, a fluffy gelatin dessert made from the calyces. She reports also that tender young leaves and stalks can be used in salads or as a potherb.

H. esculentus is another edible in the family. It is the vegetable, okra. Listed in many seed catalogs as an hibiscus, this annual plant is now correctly classified as *Abelmoschus esculentus*. It, too, is tropical; its funnel-shaped flowers, typical of the Malvaceae, are yellow with a reddish center and are followed by mucilaginous pods which are eaten before they become fully mature. It is a tall, rank-growing plant, and although tropical, it can be

grown along with cucumbers and tomatoes; however, to produce the best crop it must have much summer heat.

Rivaling the hibiscus in beauty are the flowers of still another genus of this family,

Must every family have black sheep? Among the mallows there are some weeds. In this category the best known and most widespread throughout North America is Malva rotundifolia, familiarly known as "cheeses."

Abutilon, the flowering maple or Chinese bellflower, from Brazil and Chile. *A. X hybridum* is a general name given to a number of large-flowered garden hybrids. The Chinese bellflower, with its small, pendant, red and gold blooms, is *A. megapotamicum*. It is an excellent colorful hanging basket plant for the greenhouse, conservatory or porch garden.

For selections from the mallow family for the annual flower garden we can choose among *Callirhoe* and *Sidalcea*, both native American wildflowers, and *Lavatera* from the Mediterranean region. All are suitable border plants with mallow-like flowers, their stature furnishing vertical emphasis to a planting design.

For the indoor garden, *Thespesia populnea*, the Portia-tree, an evergreen street tree in south Florida and also a member of the mallow family, has been suggested as an alternative to the ubiquitous schefflera. Its dark-green ovate leaves are leathery and long-stalked.

So far we have accounted for some ornamental and some food plants. However, did you note in the description of the family the mention of fiber crops and the fact that some seeds are covered with hairs?

In this diverse family the commercially most important genus is an annual shrub, *Gossypium*—none other than cotton. Gardeners in southern states are familiar with cotton's hibiscus-like blooms, white or pinkish-purple, which are favorites of bees. Ornamental cotton is listed in some garden seed catalogs; it can be grown as a curious pot plant. It will flower north of Zone 7, but it needs a long season and

much heat to produce a cotton crop. The seed case, or boll, contains black seeds wrapped in a mass of white fibers—cotton. Two of the most important types of cotton in the United States are sea-island cotton (*Gossypium barbadense*) and upland cotton (*G. hirsutum*).

Besides the uses of cotton as a fiber, cotton seeds are a source of oil valuable in the manufacture of lard and butter substitutes. Seed residue is used for fertilizer, stock feed, soap, oilcloth and putty.

It is notable that in addition to cotton, other useful fibers are obtained from members of the mallow family, especially in the genus *Hibiscus*. Kenaf or Deccan hemp (*Hibiscus cannabinus*) is a commercially important jute-like fiber. It has been cultivated for its fiber historically in India and more recently in other countries. In addition, its leaves are edible, and the seeds are used in certain sauces. Sometimes planted as a crop in Florida, it bears red or yellow flowers.

A silky fiber from the inner bark of sea hibiscus (*H. tiliaceus*) is used for ropes, net bags and tapa. A fiber obtained from stalks of roselle resembles jute.

As in the genus *Hibiscus*, many species of *Abutilon* have strong stem fibers which are made into cordage when derived from mature stems; fibers of softer young stems can be woven into fabrics.

Must every family have black sheep? Among the mallows there are *some* weeds. In this category the best known and most widespread throughout North America is *Malva rotundifolia*, familiarly known as "cheeses" from the shape of the fruit. It is an annual plant with a long taproot. The stems run along the soil surface, producing half-inch, pinkish flowers in the axils of the leaves. Hardly a gardener has not encountered this pest, one of our worst weeds.

Happily, in almost any place in the United States you can have the pleasure of the company of the mallow family to beautify your garden, indoors or out. And as you explore gustatory delights, you can treat your palate to shrimp-okra gumbo at your favorite Creole restaurant or search gourmet shops for roselle jellies, meanwhile remembering that the contribution of salad oil to your low cholesterol diet may be derived from the seed of cotton. At the same time, give a nod to the enormous place cotton has occupied in history and commerce through the centuries. ☉

—Jane Steffey

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March 1980

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PLANT SNOBS: A HUMOROUS LOOK AT STATUS-SEEKING GARDENERS

Plant snobs come in all genetic combinations, and I have met more than my share. Recently at a party I encountered a most fair lass who, it turned out, gardened in the fashionable East 70's of New York and in East Hampton, a summer resort for the young, rich and beautiful. We didn't have much in common otherwise, so the conversation turned to plants. After discussing the French Intensive method for growing shallots on a windowsill and the best organic ways to raise sorrel in chalky soils, we seemed to be getting along famously, and I even offered to refill her Perrier spritzer. We talked about perennials, which are having a resurgence of popularity in America. Then, somehow, I made the mistake of mentioning my fondness of sweet alyssum, an annual. A frown came to her face as if she had seen someone walking barefoot in seaweed. Her head snapped back so quickly I feared a whiplash injury. Retracting her eyeballs, she peered 30 inches down her nose and declared, "But no *experienced* gardener plants annuals." I had blown my chance for a garden party weekend in East Hampton.

Landscape architects can rank with the best of snobs, too. Some don't even acknowledge they are involved with plants; rather, they work with plant *materials*. A common conceit, undoubtedly promulgated by lazy design teachers, is to profess ignorance of plants by saying that it is the *form* that counts, not the plant. Therefore, one need not know many plants at all.

If one landscape architect meets another at a party the conversation is apt to start with, "I'm using only 50 kinds of plants these days." The other will respond, "That many? I'm down to 25. It contributes to a unified design, you know." If a third architect is present and he is skilled in gamesmanship, he will interrupt and say, "I'm designing only Japanese stone gardens now—Ryoanji types." The other two will give him an admiring glance and remember to add this information to their palettes.

My idea of purgatory is to sit next to a



Robyn Johnson-Ross

hemerocallis collector on a bus on the Long Island Expressway late on a Friday afternoon during a heat wave when the bus breaks down. Nothing against hemerocallis, or daylilies as we used to call them. In fact I am fond of them, but I don't want to hear about their infinite variety for three hours. After the first ten dozen kinds, what differences can there be?

A friend of mine collects hostas. (Note: our grandmothers used to know them as funkias or plantain-lilies, but it is not possible to play one-upmanship using either name, especially funkia.) He knows 200 cultivars by sight but, incredibly, has twin sons he sometimes confuses at the dinner table. Being caught at a banquet with a gesneriad buff, especially a collector of dwarf sinningias, is bad for the digestion.

If there is advanced myopia with the monogenus gardener, there are also the monogeneriphobes—people who can't stand particular kinds of plants. For years I have known the self-proclaimed president of the Anti-Salvia League of America, Inc. The wife of a well-known botanist, she is

normally a very pleasant soul, but she sees red when she spots salvia. So scarlet with rage at the sage is she that, when reminded there are perennial blue salvias, she says, "Piffle! I would just as soon grow a canna."

There is the Catalpa Society too, founded several years ago during a meeting of the American Association of Botanical Gardens and Arboreta. Catalpas haven't had a bad press in 75 years; in fact, they have had no press at all. So to honor one of the real canines of the tree world, a small number of undedicated catalpologists banded together to form a group that is unique in America today. There are no dues, no meetings, not even an address. All that is necessary is to stick one's tongue out at a catalpa from time to time.

The chief executive officer of the Catalpa Society is thought to be a respected plant breeder at a major eastern university, but he prefers to keep a low profile. A newsletter describing ways to pollard the dwarf umbrella catalpa is planned for 1981, and perhaps a checklist by 1983.

There is a search for new catalpas, including cut-leaved forms.

Some plants are so esteemed by true horticultural snobs that they are unknown to most gardeners, and meant to be. In Switzerland a farmer's wealth used to be gauged by the size of his manure pile. In certain New York suburbs today a gardener's degree of sophistication is judged by the grandeur of his clump of *Kirengeshoma palmata*. This is an autumn-blooming perennial with nodding, rather inconspicuous, yellow flowers. The foliage resembles a London plane leaf with fallen arches. *Kirengeshoma*, which of course has no common name, is almost a cult in Japan. It propagates very easily by pickax.

Strange things happen in the Japanese horticultural community, and there is even a group devoted to the culture of *Taraxacum*—the Dandelion Appreciation Society. Apart from the common sort on lawns there are 50 or 60 species of dandelion in the world, some of them alpine, and some that are hard to grow, which is a trait admired by good snobs everywhere. Also, to swell and confuse the ranks, a number of dandelions are apomictic (capable of producing viable seed without the pleasures of sex). Turf men everywhere have long suspected this anyway. A friend of mine was hiking a trail in the Himalayas last year when his guide took him miles out of his way to see a rare plant, a dandelion.

There are regional plant conceits, too. In the Deep South of the United States it is common to refer to "japonicas," in this case *Camellia japonica*, with the word camellia dropped. In New England, where camellias can't be grown out of doors except in a few coastal areas, "japonica" usually refers to the orange flowering quince. It helps to remember what part of the country you are in, but once in Delaware, a halfway point between North and South, a friend told me about her "japonicas" and, confused, I looked around for an orange camellia.

The way to put a stop to such nonsense is to refer to one's "maximewiczianas." "Japonica" is a species name (the botanist would call it a specific epithet) for hundreds of plants. Fortunately there are not nearly so many "maximewiczianas."

Rock gardeners are notorious. At a horticultural meeting you can usually spot them yards away. The men resemble the Duke of Windsor 40 years ago, even when

they are short, fat and bald. The women look like V. Sackville-West in riding pants. All speak in hushed, reverent tones of Sir Montague Scree, the latest visiting authority from Edinburgh or Kew, now on a speaking tour of the provinces. Typical openers: "I never used to grow a plant more than eight inches tall, but I found this a bit confining. Now my limit is twelve." "Would you believe that last week I met a gardener who had just seen a *Lewisia tweedyi* for the first time? Poor girl must have been brought up in a convent."

How to cope with plant snobs? Be gentle but firm. Avoid social contact with them except in winter, unless they are indoor-plantaholics, in which case summer is a slightly safer time. Stronger methods are sometimes needed. If a landscape architect starts to talk about his palette, tell him you thought this phrase went out with Whistler's grandmother. If he persists, ask him why the average schoolchild knows more plants.

The *Kirengeshoma palmata* snob can be dispatched with ease. If he asks whether you grow it, yawn and tell him you had to eradicate the plant a few years ago because it became weedy. Or casually mention that these days you raise only *K. sachalinensis* (which he never will have heard of), because it is a much rarer plant and one that is a bit "iffy" in cultivation. Should he call your bluff, show him an undernourished London plane and diffidently say what good culture can do.

A satisfactory put down for the hemerocallis snob when he asks how many cultivars you grow is to say you are interested only in the true species, the ones found in the wild, not the mongrels the plant hybridizers have created and given names like "Fluffy Ruffles." Since the average daylily snob has probably never seen more than one or two true hemerocallis species, you will be on safe ground. Should you be called, show him a narrow-leaved hosta, feign amazement, and tell him you can't understand why the daylily breeders have lost the grace of the wild species.

There are rougher techniques which occasionally must be resorted to, but bear in mind that most plant snobs are benign sorts, no more, no less demented than the rest of us and, in general, worthy of society's sympathy. If in doubt, take one to lunch someday. But don't talk about plants. ☉

—Frederick McGourty

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MAKE SPRING COME EARLY: FORCE SHRUBBERY TO BLOOM INDOORS

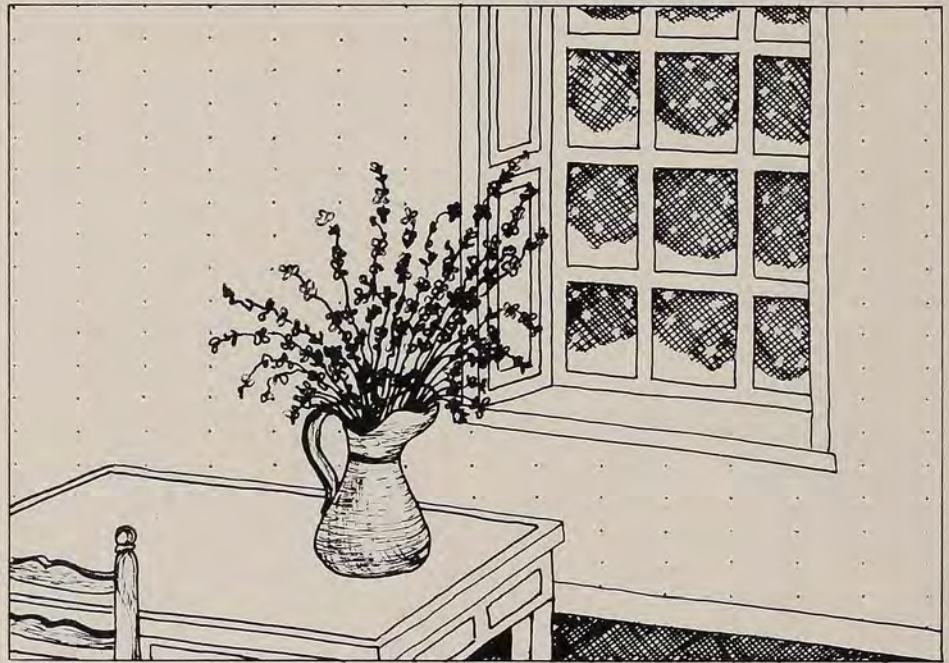
Forcing woody plant material to bloom indoors can bring a breath of spring into your home while the calendar still says "winter." It also will allow you to become acquainted earlier in the season with some of the flower blossoms of trees and shrubs that will later bloom in your garden. All that is required to force blooms is to bring the flowering woody plants out of dormancy.

Dormancy is defined as the time when a plant or parts of a plant are in a resting or nonvegetative state. During this period, the vital processes are halted for a time because of internal and external factors. Before a plant or its parts can break dormancy, it generally must be exposed to cold temperatures or chilling. In nature the cold period is followed by spring, with its warmer temperatures and longer days. These latter conditions must be duplicated in the home when attempting to force woody plant material into bloom.

When collecting woody plants to force into bloom, choose branches having well-formed flower buds that are beginning to swell. Buds that are completely dormant when cut probably will not produce good forced flowers. As a general rule, branches cut nearer to the date of normal out-of-doors bloom will force sooner and easier. However, forcing often reduces the size and the number of flowers on each branch.

In the northern states, February and early March seem to be the months best suited for cutting woody plant material for forcing; by then the outdoor temperatures should have begun to moderate. The thermometer should indicate above-freezing temperatures during the day when plant material is cut. Moderating outdoor conditions will reduce the shock when branches are brought inside to warmer temperatures to force into bloom.

Cut branches at an angle; they should be between two and three feet long. It is important that the cut end of the branch not be allowed to dry out. If drying should occur, a fresh cut should be made so the



Pam Geick

branch can absorb water. Some gardeners slit the stems of the branches anywhere from three to six inches from the bottom and/or peel the bark back about the same length. Another method is to crush the bottom inch or so of the stem. Both of these techniques aid the branch in absorbing water more easily.

Moisture is the most important key to unlocking life within the dormant branches. Immersing the twigs in a container or tub of *lukewarm* tap water for about 12 hours is an easy way to provide this needed liquid. An alternative method for branches too long to immerse in water is to give them a lengthy shower. Place these branches loosely in a pail and then set the pail and branches in the shower for the lengthy wetting.

Even after this initial soaking or drenching, be sure to supply additional moisture in ample quantity. The humidity level of the home is an important factor for success in this procedure. Heating the indoor forcing area generally reduces the humidity so that it usually ranges between 10 and 25 percent. This contrasts sharply

to the outdoor spring humidity of 60 percent or more. The desert-dry conditions of a house could cause the buds to dry and the twigs to fail to produce the desired flowers and leaves used in forcing.

To increase humidity, try one of these two procedures: wrap the branches in wet newspaper or clear plastic and place them upright in a pail of lukewarm water in a cool place for several days until color begins to show in the buds; or place the branches in a deep container of lukewarm water and set the container in a cool place—basement, garage or porch—where the temperature is always maintained above freezing.

After several days in one of these situations the branches should be ready for more exposure to light. The ideal spot is one that is well-lighted and cool. Don't place the branches in direct sunlight as this could dry the buds and cause them not to break dormancy. Mist these branches every day, preferably two or three times a day, with warm water.

During the forcing procedure, change the water in the container every day or two.

If this is not convenient, add a commercial floral preservative product to the water as is done to prolong the life of cut flowers.

It is interesting to note that the procedure for forcing branches into bloom varies in different countries and even within the United States. The Scandinavian practice is to place newly cut twigs in a bucket of loosely packed snow. The bucket is set in a cool, dark room for two or three days. The twigs are then placed upright in a container of cool water, which in turn is set in a sunny window of a warm room.

Some New Englanders put the twigs of the branches they wish to force in a container of cold water in a sunny window immediately after cutting.

All woody plants do not force with the same ease. Novices probably will be more satisfied with their efforts if they begin with the easier plants. Some of the easier-to-force shrubs are pussy willow, forsythia, spiraea and flowering quince. Additional plants considered to be moderately easy to force include magnolias, viburnums and some fruit trees, such as cherry, plum and apricot.

It is hard to specify the exact day blossoms will appear after a branch is cut for forcing. Many factors enter the picture, including the date of cutting, the date of normal out-of-door bloom and the environment in the forcing area. Regardless of when they bloom, the major goal of the forcing effort is to enjoy them.

Abeliophyllum distichum (Korean abelialeaf) has very fragrant small, white blossoms borne in dense clusters. These flowers bloom naturally in early spring and could be forced earlier than many other plants. The forcing process for this species takes about two to three weeks. The blossoms of *Amelanchier canadensis* (serviceberry) are white and appear in erect, spike-like racemes. Serviceberries bloom naturally in mid to late April and also can be forced into bloom earlier than some other plants. Forcing takes three to four weeks. Another plant that produces white flowers is *Aronia melanocarpa* (black chokeberry), which normally blooms in mid May and will therefore take a little longer to force if cut early.

Rosy-pink blossoms follow the reddish-purple bud of *Cercis canadensis* (eastern redbud). The redbud flowers are grouped four to eight together and bloom outdoors normally in mid April. Flowers of *Chaenomeles japonica* (Japanese flowering quince) are very showy. They vary from

orange-red to scarlet to red. They are borne alone or in clusters of two to four and force into bloom in approximately two to three weeks if cut in early February.

In the northern states, February and early March seem to be the months best suited for cutting woody plant material for forcing; by then the outdoor temperatures should have begun to moderate.

The true flowers of *Cornus florida* (flowering dogwood) are unimportant. The showy parts we admire are the four handsome white bracts. They bloom naturally in mid May outdoors and take longer to force if brought indoors too early in the season. *Deutzia lemoinei* (lemoine deutzia) also bears white flowers, but they appear in clusters. This plant blooms naturally toward the end of May and takes longer to force into bloom than many other plants.

Blossoms of the various types of forsythia range from pale-to deep- or golden-yellow. They often appear in two's and three's on older wood. This plant normally blooms in late March or early April and takes a relatively short period of time to force into bloom. Solitary blossoms, ranging in size from five inches to 10 inches in diameter, grace the *Magnolia soulangeana* (saucer magnolia). Flower color varies from white to pink to purplish; flowers are borne in nature from mid to late April and generally take about four weeks to force.

Malus species (flowering crabapple) produce fragrant blossoms in colors of white to pink and carmine to red to rose. The forcing time will vary since earlier blooming cultivars of a species will flower sooner.

Species of *Prunus* that are good for forcing include *P. sargentii* (Sargent cherry), with single pink blossoms; *P. tomentosa* (Manchu or Nanking cherry), with fragrant flowers that are pinkish in bud but changing to white; *P. triloba* (flowering plum or flowering almond),

with double, pinkish blossoms; and *P. yedoensis* (Yoshino cherry), with slightly fragrant single flowers ranging in color from white to pink. These species of *Prunus* normally bloom in late April and, if brought indoors in mid March, will force in about two to two-and-one-half weeks.

Azaleas, included in the genus *Rhododendron*, make good forcing material. The blossoms are from one to three inches across and are borne in clusters at the ends of the branches. Flower colors include white, pale-rose, rose, lilac-rose and bright rosy-purple. Normal blooming time varies with the different species, and forcing time varies from three to six weeks, depending on when the material is brought indoors and what species is used.

Greenish-yellow blossoms, consisting of 20 to 30 flowers in 1- to 2-inch inflorescences, are borne erect on the branches of *Ribes alpinum* (alpine currant). They will force normally in two to three weeks if cut in mid March. *Salix caprea* (goat or pussy willow) is treasured for its soft, large, male catkin flowers. Pussy willows force in 10 to 14 days if brought indoors in late February or early March.

Several *Spiraea* species are suitable for forcing. *S. prunifolia* (bridalweath) has white double flowers borne in flat-topped clusters. Late April is the normal blooming period; the flowers will force in one to two weeks if brought indoors in mid March.

The flowers of lilacs, members of the genus *Syringa*, are extremely showy and fragrant. The terminal panicles range in color from white to rosy-lilac to violet-purple. However, they take longer to force into bloom than many other species. The forcing period is sometimes up to six or seven weeks if brought indoors early in the season. Some of the species of *Viburnum* are good for forcing because their white or pinkish flowers are arranged in cymes that show an interesting pinwheel effect (created by the arrangement of their sterile and fertile flowers). However, they take longer to force since many of their normal blooming dates are in early to mid June.

Normal blooming date, forcing temperatures and light conditions all play a vital role in determining the number of days needed to force woody plants into bloom. However, by choosing plants with different natural blooming periods, you can expect to enjoy spring from February until May. ●

—Dr. James E. Klett
Iris Thoreson

Incarvillea Delavayi

BY CHARLES E. TUBESING

Incarvillea delavayi, also called hardy gloxinia, is a plant rarely seen in American gardens, yet it is an ornamental worthy of more extensive use as a specimen and border plant.

Incarvillea is a tuberous perennial, native to China, which was introduced into cultivation in this country in 1910. It is stemless and has leathery, dark-green leaves that grow in a rosette. Each leaf is borne on a thick, red petiole, reminiscent of rhubarb, and the leaf blade, which is lobed at the apex, but increasingly more divided toward the base, is rather ferny. Each leaf is 12 to 18 inches long, and as a result the whole plant can be as much as three feet in diameter. Here in central Indiana the foliage emerges in late April and remains until frost.

The genus *Incarvillea* belongs to the plant family Bignoniaceae, which includes both *Catalpa* and *Campsis*, and its flower is similar to those of these woody plants in both form and texture. The flower is trumpet-shaped, two to three inches long, with a flat face two to three inches wide. The flower face is pink, with a rose-colored ring in the center, and the throat is yellow. The exterior is a uniform pink. The flowers are borne on a scape, and mature plants bear multiple scapes. As many as 20 flowers are on each scape, which elongates as the flowering progresses.

The first flower opens at about one foot

from the ground, and up to three flowers are open at one time in a single scape. The last flower to open is at the tip of a scape, which may exceed three feet in height. The scapes are not produced concurrently; as the last few flower buds on the first scape are opening, they are joined by the first buds of the second. Hardy gloxinia may thus be in continuous bloom for a six-week period, which begins in late May in central Indiana.

Incarvillea delavayi is winter-hardy through USDA Zone 6a (Arnold Arboretum Zone 5), and may prove to be hardy in more northern areas. English gardeners warn that this plant should be placed in a protected spot and given a winter mulch if you hope to succeed with it, but I have one planted in an exposed site in Zone 6a which is not mulched, and it has shown no winter injury. *Incarvillea delavayi* should be planted in a well-drained, fertile soil at a location which receives at least a half day of direct sun. References emphasize that sharp drainage is necessary, but I have succeeded in growing this plant in a silty clay loam. If your soil has much clay, it would certainly be beneficial to work peat or compost deeply into the soil.

Propagation of hardy gloxinia is by division in the spring, and by seed. The slender tubers are planted vertically, with the foliar bud three inches below the surface of the

soil. Seed, which is produced profusely, germinates in seven to 10 days under standard conditions. Three years normally pass from germination to first flowering.

Tubers of *Incarvillea delavayi* are sometimes available locally at garden centers and variety stores in the spring, the proper planting time. Seeds and tubers also are available from a few mail-order seed companies. Those sources are listed below.

Incarvillea delavayi is a hardy perennial of reasonably easy culture, with a long blooming period and attractive foliage. Isn't there a place for this uncommon, charming plant in your garden?

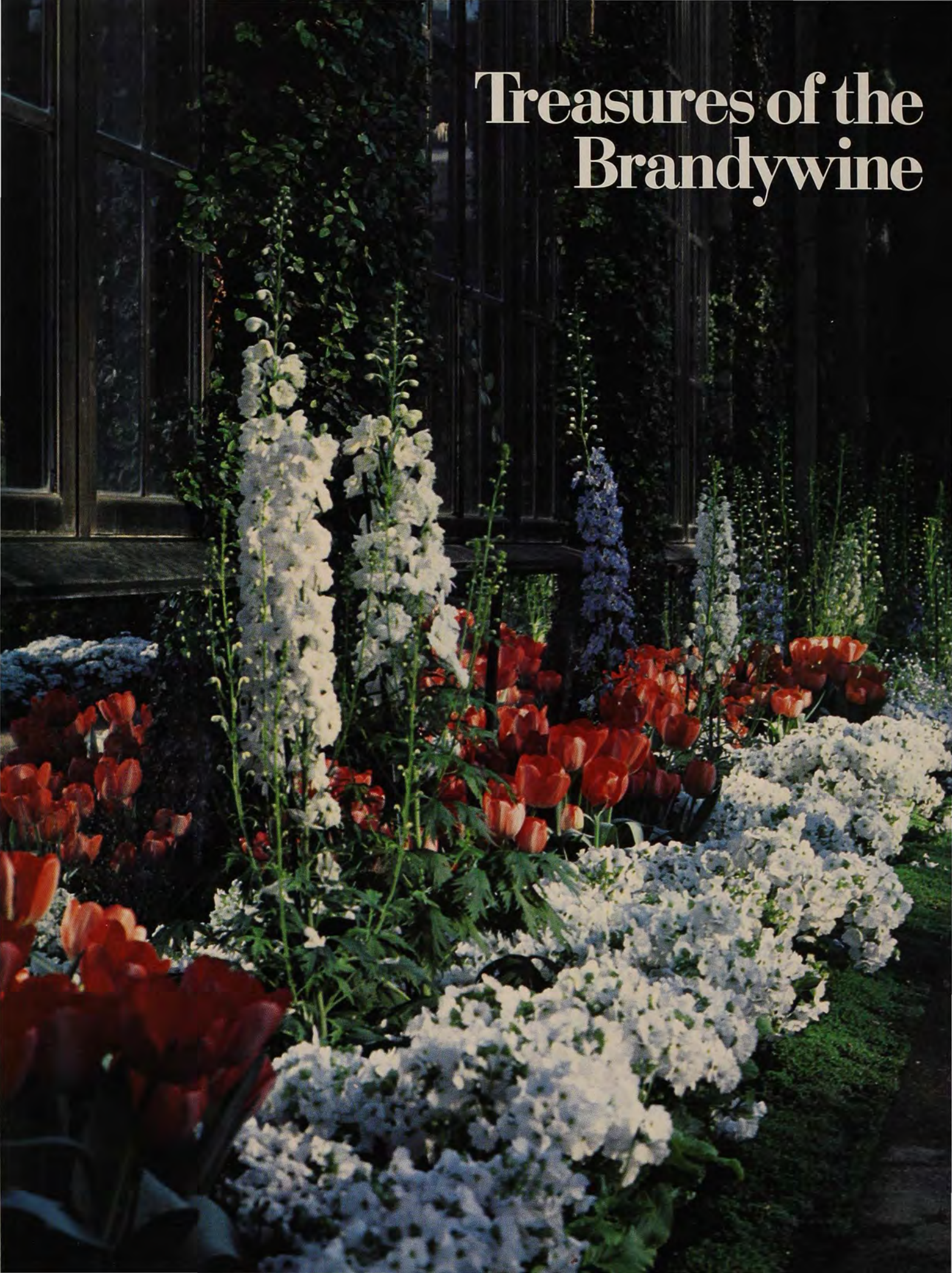
Mail-order sources include: Brecks, 6523 North Galena Rd., Peoria, IL 61632 (tubers); Wayside Gardens, Hodges, SC 29695 (tubers); George W. Park Seed Company, P.O. Box 31, Greenwood, SC 29647 (tubers and seeds); Gurney Nursery and Seed Company, Yankton, SD 57078 (tubers); and J.L. Hudson, Seedsman, P.O. Box 1058, Redwood City, CA 94064 (seeds).

Members of the Society will be interested to know that River Farm will incorporate hardy gloxinias into its perennial borders for the first time this spring. ☐

OPPOSITE: *Incarvillea delavayi*, commonly called hardy gloxinia, is a tuberous perennial that may bloom continuously for six weeks beginning in late spring.



Treasures of the Brandywine





TEXT BY JANE G. PEPPER
 PHOTOGRAPHY BY PHILIP S. CARRELL

Some of the Brandywine Valley's most beautiful gardens and museums will open their doors to members of the American Horticultural Society in early May. The dogwoods should be at the height of their glory, creating a white and pink canopy beneath the pale-green expanding leaves of tulip trees, oaks, maples and beeches. Below the dogwoods, azaleas should be ready to provide yet another layer of wonderful colors.

At Eleutherian Mills visitors will become acquainted with a gardener who left a horticultural legacy in the Brandywine Valley. When E. I. du Pont settled on the banks of the Brandywine River in 1802, condi-

tions were primitive. Du Pont was homesick for the cultivated gardens of France, and as he built his new home he began to develop a garden. His love of botany and horticulture spread through the family and later three of his great-grandsons would create some of America's finest gardens.

The design of the first du Pont garden was simple. From old drawings we see the formal parterres. From the volumes of du Pont correspondence we learn about the seeds this botanist purchased in France and the plants which friends and business associates brought to Eleutherian Mills from many parts of America.

After his death du Pont's garden was maintained by his family until the house was abandoned and the garden became part of a sheep meadow. The parterres that

had been planted with flowers, herbs, fruits and vegetables remained under grass until the late 1960's, when the mansion was opened to the public and archaeologists began to uncover the buried garden.

Visitors to the restored garden at Eleutherian Mills can wander beneath the arbor of neatly trimmed lady apples and between the parterres planted with species that existed in du Pont's garden between 1802 and 1864. Modern varieties of annuals and vegetables are used, but old varieties of roses, tulips and fruit trees are planted when available.

LEFT: The Longwood Conservatory, built by Pierre du Pont in 1920, is alive with color during the spring. ABOVE: The du Pont residence at Eleutherian Mills, the first du Pont family home in the Brandywine Valley.



tall, pink royal azaleas (*R. schlippenbachii*) may be at their peak, or the Chinese snowballs (*Viburnum macrocephalum* 'Sterile') near the sundial garden may be covered with gigantic blossoms. From early March the gardens at Winterthur are full of wonderful surprises, so it will not matter whether spring is ahead or behind schedule for the American Horticultural Society visit.

Fortunately for garden lovers, each of E. I. du Pont's horticulturally-minded great-grandsons had very distinct tastes in garden design. Henry developed an informal garden. His cousin Pierre Samuel du Pont of Longwood created a totally different kind of garden, which he used as a setting for formal garden parties.

When Mr. du Pont first bought the property in 1906 his intention was to save the old trees in the abandoned Peirce Arboretum from being converted into raw material for a sawmill. Gradually he developed an elaborate garden with enormous fountains, large conservatories and beautiful horticultural displays.

At first Mr. and Mrs. du Pont held their parties on June afternoons in the flower garden. This May visitors will find a mass of tulips, foxgloves and pansies in this area. Later du Pont built an outdoor theatre and invited guests to an evening of drama followed by a fountain display from water jets built into the stage.

In 1920 Pierre du Pont began construction on the Main Conservatory, which would be the scene of many indoor garden parties. Longwood now has four acres under glass, and these gardens will be a highlight of the tour. The Main Conservatory will be filled with yellow marguerites, astilbe, petunias, canterbury bells, caladiums and calla lilies. In the adjoining Azalea House the central pond will be surrounded by a mass of cymbidium orchids. Visitors also will have a chance to study Longwood's newest "Example Garden."

In February the Longwood staff will erect a simulated town house duplex under glass to demonstrate the endless possibilities for living with plants in the city. A narrow sideyard will be landscaped, and a conventional greenhouse will be converted

LEFT: Rhododendrons and cherry trees in bloom at Winterthur Gardens. OPPOSITE: Nemours, built by A. I. du Pont, contains a formal Colonnade, built as a memorial to the first du Ponts who emigrated to America. Here, it is framed by hundreds of tulips.

Nestled in a valley five miles from Eleutherian Mills is a huge house full of treasures. Surrounding the Winterthur Museum are hundreds of stately tulip trees, spreading beeches and old oaks. In May there will be a carpet of Italian windflowers (*Anemone appennina*), white trilliums, Virginia bluebells and sweeps of azaleas blooming beneath the forest giants.

The owner of this beautiful woodland was Henry Francis du Pont. A seemingly disastrous circumstance led E. I. du Pont's great-grandson to develop the Azalea Woods, for which the Winterthur Gardens are now famous—shortly after the turn of the century the dreaded Chestnut Blight swept through Delaware. By 1920 there

were large open spaces in the previously dense cover in the Winterthur Woods, and du Pont began to propagate azaleas to fill the gaps. Many of the azaleas came from 17 plants which he purchased at the San Francisco Exposition in 1915. The original azaleas were Kurume hybrids, derivatives of *Rhododendron obtusum*, and developed by breeders in Kurume, Japan. The most widely-known Kurume cultivar is the brilliant crimson 'Hinodogiri'. At Winterthur many cultivars with more subtle hues have been massed in vast sweeps throughout the woods.

In early May visitors are almost certain to find plenty of bloom in the Azalea Woods. Less certain is what will be in bloom in other parts of the garden. The



into a solar greenhouse. Two window greenhouses will be double-glazed. Plants will be hanging from skylights in the kitchen, in the stairwell and in niches lit with fluorescent lights. City and country gardeners alike should return home from Longwood bursting with new ideas for gardening in small, difficult spaces.

Many years after the other gardens of the Brandywine Valley had been opened to the public, Nemours remained closed and inaccessible behind the huge wall that surrounds the 300-acre estate. Inside the wall was a formal garden patterned after the French gardens of the seventeenth century.

Unlike the simple French-influenced garden of his great-grandfather, A. I. du

Pont's garden at Nemours was large and elaborate and something of a mini-Versailles. From the terrace, today's visitors gaze down the main vista to the Colonnade, a huge limestone facade built in 1926 as a memorial to the first du Ponts who emigrated to America. Pin oaks, horse chestnuts and cryptomeria (*Cryptomeria japonica* 'Lobbii') frame the vista. Beyond the Colonnade are the Sunken Garden and other areas designed by, among others, Mr. du Pont's son Alfred Victor du Pont, a graduate of an architectural school in Paris.

At Nemours bulbs are used extravagantly. Last fall 50,000 tulips were planted for the 1980 spring display. The color scheme this year will be mostly pink and white with some deeper wine-red varieties. Daffodils, squill and iris also will be in

bloom, and the large potted citrus trees will have been taken out of their winter storage in the orangerie and will be on display on the terrace. Their wooden containers are patterned after planters designed by Le Notre, Louis XIV's garden architect, who designed Versailles and Vaux Le Vicomte.

The gardens of the Brandywine Valley are diverse in design styles and plantings. An added dimension is that all four gardens were created by members of one family. Great riches were made by the du Pont powder mills on the banks of the Brandywine River; great riches have been left for visitors to enjoy today.

For more information about our Spring Seminar, "The Treasures of the Brandywine," write Florence Bayliss, AHS, Mount Vernon, VA 22121. The seminar is scheduled for May 7-11, 1980. ☛



KIWIFRUIT

BY DANIEL C. MILBOCKER

The kiwi: it looks like an egg-shaped, hairy coconut, although the shell is not as hard; it grows on vines in clusters like grapes; it has more vitamin C than citrus; and its lovely, bright-green meat is filled with tiny seeds like those in a banana.

If this description doesn't ring any bells, that's not surprising. Few people know about this delectable fruit, even though more and more food stores are beginning to carry it. Perhaps the high price tag discourages would-be buyers. After all, what could be so good about a fruit that looks like a hairy egg? Those who've tried it know the answer. Kiwifruit is delicious. It has a pleasantly sweet flavor which resembles the taste of gooseberry and its surprising color appeals to the appetite. Kiwifruit can be eaten fresh, or it may be frozen, canned or preserved. It can be baked into pies and also makes a delicious ice cream or sherbet flavoring. Commercial producers like it because it keeps so well that it can be shipped to distant markets around the world. This attribute now accounts for its increasing popularity. If you've ever eaten a kiwi, it probably came from California or New Zealand. Now you may be able to grow it yourself.

Known botanically as *Actinidia chinensis*, the kiwi is one of approximately 36 species in the genus. All are twining, woody vines; *A. chinensis*, with its 25-foot vines, is one of the more vigorous types.

Members of the genus *Actinidia* are natives of Eastern Asia. While several species are found in Japan, Manchuria and Korea, *A. chinensis* grows primarily in the mountainous regions of the upper Yangtse Valley in the Hupei and Szechwan provinces of China. There it intertwines through trees or grows as tangled masses in the open.

Plants of the genus are described as

alternate-leaved with leaves ranging in size and shape from those resembling leaves on an apple tree to the five- to eight-inch rounded cordate leaves of *A. chinensis*, which have pubescent lower surfaces. The young pencil-sized new shoot of this species is covered with stellate hairs and, in some plants, is a deep but bright red and is unusually attractive.

Flowers open in late May on new shoots grown from the previous season's spur growth. Spurs are short branches with close internodes of less than two inches as compared to the main vine, which has three- to five-inch internodes. Flowers of *A. chinensis* are one to two inches in diameter. They are fragrant, five-petaled, white blossoms which yellow with age to resemble those of the wild rose. Other species have much smaller flowers. Each flower has multiple pistils or large numbers of yellow stamens similar to the camellia, to which it is related. Individual plants are dioecious and produce only one type of flower (male and female flowers are produced on separate plants). One or more inflorescences are located in the axils of the leaves.

The kiwifruit, also known as the yangtao or Chinese gooseberry, has only recently been domesticated. The genus is not mentioned in older taxonomic literature. The Englishman Robert Fortune first described it in 1847, but it wasn't until 1900 that seeds of the fruit were distributed outside the plant's native habitat. E.H. Wilson collected seeds and distributed them in England, France and the United States. English and French seedlings fruited in 1911.

Plants grown in the United States were male (staminate flowering). Not realizing their dioecious character, David Fairchild succeeded in pollinating *A. arguta* with *A. chinensis* pollen, from which a hybrid was derived in 1923. James McGregor, while visiting China, also collected seeds and gave them to Alexander Allison of New Zealand. His seedlings fruited in 1910. *A.*

(Continued on page 34)

The odd-looking exterior of the kiwifruit belies the appetizing appearance of the meat inside. Grown commercially in New Zealand for many years, kiwifruit is fast becoming an important American crop.

James Connolly

A Green Garden

"Where the copsewood is the greenest,
Where the fountains glisten sheenest,
Where the lady-fern grows strongest,
Where the morning dew lies longest:
Hie to haunts right seldom seen,
Lovely, lonesome, cool, and green."

Sir Walter Scott

Icy February weather may have the gardener trapped indoors, longing for spring. Think ahead yet another season—to summer. On a hot and sticky day what could be more wanted than an illusion of coolness somewhere in your garden? A bit of woodland spread with ferns or a shaded corner carefully planted with a few clumps of cool greenery is almost an essential refuge for some of us. Hot August sunshine is something I, personally, want to escape!

If you would like to plant a fern garden for this year, now is the time to plan and order. You have an immense variety from which to choose; there are both large, stately ferns and tiny rosettes for tucking into crevices of rock. There are airy, lacy ferns and simple, sturdy ones. The fern families are some of our most interesting.

The ferns (and their "allies," the mosses and liverworts) were the earliest of the higher plants to evolve, long preceding the flowering ones. Even our present-day fern forms were established before the Cenozoic Era (prior to 65 million years ago), for modern ferns are to be found frequently among fossils of that long-ago time. A friend gave me a small piece of shale she had found near a coal mine in Pennsylvania. Imprinted in the smooth, dark-gray surface are the tips of three fern fronds (leaves), perfect in every slightest detail. When I hold it in my hand I can only feel great wonderment. These little ferns, as fresh in texture as though picked five minutes

before, could be sixty million years old! I cannot be sure of the species, but even the fragments are identifiable as *Polypodium* of some kind.

Fern reproduction may not be of immediate practical use to the gardener, but it is always interesting to know more about the plants we grow. Ferns do not produce seeds for the gardener to plant; their system of propagation is quite different—and older. Ferns produce spores. You have no doubt noticed round brown spots on the underside of some fern fronds. These are called sori (singular, sorus), and are clusters of sporangia, or spore cases. This is only one of the many arrangements for spores to take, but what happens to the spore is always the same. When a spore ripens, it leaves the sporangia and falls, or is blown, to some nearby spot. If, luckily, the landing place is moist, rich and suitable, the spore grows into a flat little heart-shaped object called a prothallium. The "cut" end (the u-shaped notch at the top of the heart-shaped structure) grows the female parts; the tapered end, the male ones. If all goes well a bit of rain or dew accomplishes the fertilization, and a new fern begins. Such, simplified, is the life cycle of a fern. The gardener may find new ones popping up in surprising places.

OPPOSITE: Japanese painted fern, *Athyrium goeringianum* 'Pictum'. INSET: The crozier (fiddlehead) of the Christmas fern, *Polystichum acrostichoides*.

TEXT, PHOTOGRAPHY AND ILLUSTRATION BY MARTHA PRINCE



Of course ferns can spread in other ways. Some ferns grow long stolons (propagative shoots that root at the apex) and send up fronds at many intervals. The “clumps” of fern produce new



growing tips and merely get bigger and bigger until they need division. One, the walking fern (*Camptosorus rhizophyllus*), produces a new growth when a frond tip touches the earth. (To me, walking ferns seem to be engaged in a game of hop-scotch, rather than walking.)

The gardener generally leaves the fascinating secret life of the fern unexplored and buys ferns from a nursery. It is by far the most convenient way to both start and develop a garden. And, if you want that garden any year soon, buying plants is the only way.

I will mention 10 or 12 thoroughly hardy and reliable ferns for use in any ordinary garden which has some moist shade available and a generally acid soil. However, it would be quite possible to select ferns suitable for a garden with a neutral soil. Completely alkaline soil would be a problem, except for a specimen planting. The fern family is an enormous one, and I am limiting myself to hardy natives, plus one Japanese fern that is entrancing and hardy.

First, here are some large ferns for ground covers in suitable areas, or for accents. Some readers may know the town of Seal Harbor, Maine. In one section of this fashionable summer resort almost all the huge, old gray “cottages” (the cottages are of 20 rooms and more) have no “gardens” at all, in the usual sense. Instead, one sees acres of ferns under openly spaced spruce and birch trees. No spring or fall gardens are needed, and the ferns give a feeling of quiet all summer long. Most of us can’t let ferns be all we grow, but the effect has a special charm of its own.

Among the most common large ferns are some of the osmundas. One is the cinnamon fern, *Osmunda cinnamomea*. The sporangia are clustered on separate fronds and are of a cinnamon color (hence the name). Another very similar fern is the interrupted fern (*Osmunda claytoniana*). It differs from the cinnamon fern only in that the fertile fronds are not separate, and the clumps of sporangia are located in the middle of otherwise green blades, leaving what I find to be rather unattractive gaps. A small animal might have encircled the fern, nibbling neatly away the center of the fronds. Both species are tall and luxuriant in growth, wanting a moist, acid woodland soil. Neither these nor any other fern wants “cultivating;” ferns thrive on being left alone.



My favorite member of the *Osmunda* genus is the royal fern (*Osmunda regalis*). It is a little smaller than the two above and has a simpler, more stately look. Once more, the sporangia are differently arranged. This time, they grow in panicles at the top of the otherwise fertile green fronds, as though they were spikes of small brown blossoms.

Wood ferns are also large. Goldie’s wood fern (named for a man, not a color) is an attractive one to use. Botanically it is *Dryopteris goldiana*. The genus *Thelypteris* has several possibilities that do well. Beech fern (*T. phegopteris*) has a triangular blade, and the New York fern (*T. noveboracensis*) a rounded one, tapering at top and bottom.



Our native lady fern, or *Athyrium filix-femina*, is often cast aside as invasive, but if you have a contained place for it, lady fern is one of the largest, really lacy ferns.

In our garden, we use it in a rather formal way, to “face down” and soften the edge of a curved yew hedge which borders 20 feet or so of our informally shaped lawn. It looks pretty, and there is no special planting in the area for it to intrude upon.

An interesting contrast to the laciness of the lady fern is the netted chain fern (*Woodwardia areolata*), the pinnae (leaflets) being wide, flat and plain. This fern, too, can get somewhat out of hand in certain plantings. (Note to myself for next season: “Pull some out before it gets into the rock garden.”) Here, the fertile fronds are entirely separated. In our garden, these fronds seem to be of a different fern altogether, growing next to, but not with, the other fronds. The fertile ones have long, narrow green pinnae (sori on the underside), and appear rather late in the season.



Now for the ferns of medium size. The tough, mostly evergreen Christmas fern (*Polystichum acrostichoides*) is a favorite standby for most gardeners. The outer, sterile fronds are still glossy and useful for holiday centerpieces. To mention still another arrangement of sporangia, the center fronds are the fertile ones, but have sori on only the upper portion of the blade. These die down around November in cold areas.

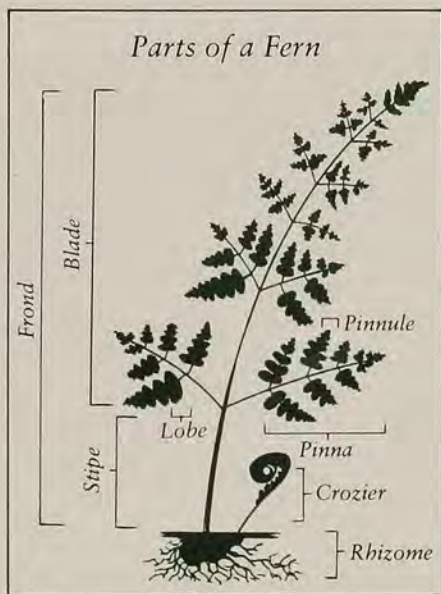
A real contrast to the sturdy-looking Christmas fern is the delicate-looking maidenhair (*Adiantum pedatum*). All gardeners recognize this dainty plant, with its floating, curved blades. It is not as fragile as it looks! This is one of the nonacid-loving ferns, but as it is most often used in accent clumps, don't worry about the chore of changing the pH. To add the needed calcium carbonate, if your soil lacks it, sprinkle crushed limestone (*not* hydrated lime) on the soil near the roots. Do *not* work it in!

You will probably want some smaller or accent ferns, unless you are just filling a large area. I often remember three alliterative words from a poem by Walter de la Mare, "the forest's ferny floor." Doesn't that create a lovely image? But few gardeners have forests to carpet, alas.

I mentioned our native lady fern above, among the larger ferns. Another member of the genus *Athyrium* is a much smaller charmer called the Japanese painted fern (*A. goeringianum* 'Pictum'). The pinnae seem to have had a dash of gray paint, while the petioles (leaf stalks) were dipped in purple. We started with one clump 16 or 17 years ago and have divided it many times. The clumps are low and compact, not at all like their American cousins. It deserves a special "setting" before a rock, perhaps by the garden steps or in front of a wall. We have one in an island garden at the base of an oak tree, with such companions as creeping azaleas, miniature ivies and other treasures. A set of twin clumps face each other at the top of our garden stairs.

Rock cap fern (*Polypodium vulgare*) I would like to grow, as I admire it perching on gray rocks in many of my favorite woodlands; however, I have difficulty getting it started. Don't let my lack of success discourage you. It wants rocks or old logs, not ground-level soil. As an oddity, more than anything else, we had one walking fern (*Camptosorus rhizophyllus*), but that, too, was finicky. If you have a rock garden, give it a try.

Far easier to grow, among the small treasures, is the ebony spleenwort (*Asplenium platyneuron*). On open ground, some of the fronds may reach a foot in height, but it is a nonacid-loving



plant and can be tucked into a limestone niche, where it tends to be quite dwarf. It invades masonry, which means that our crumbly old brick steps (in our Georgia garden, not our New York one) are sprinkled with dainty bits of greenery and look delightful. For a nonlimestone or nonmasonry niche, a bit of ground limestone should make it quite at home.

The maidenhair spleenwort (*A. trichomanes*) is naturally tiny, but it seems more difficult to grow and doesn't like limestone or crumbled mortar. It is hard to have calcareous and noncalcareous rocks in one garden, without spending a fortune on trucking. But as this jewel deserves a setting, if you can't provide one, forget it. It is too tiny for a ground-level fern.

You should really post a "Keep Out" sign for one group of ferns, the brackens. Our particular species is *Pteridium aquilinum* var. *latiusculum*, but there are many. It is tough, coarse and quickly invasive, spreading by stolons into everything. It matters not whether the soil be moist or dry, rich or poor, shaded

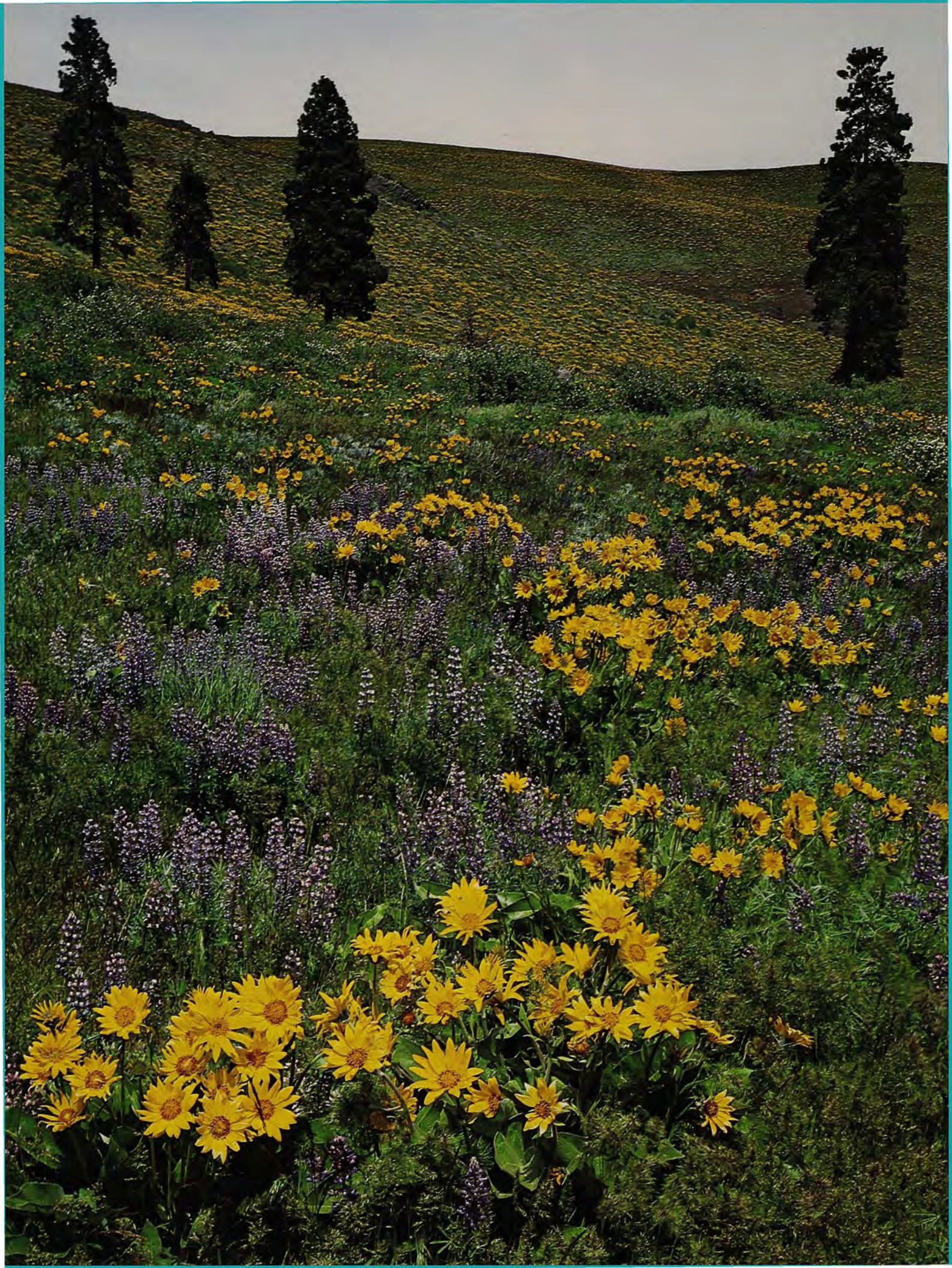
or sunny. Actually, I have a sentimental attachment to it. The romantic poetry and novels of my girlhood, such as "Lady of the Lake," are full of references. Scotland must have as much bracken as heather. Each spring my husband and I fight a Battle of the Bracken; he wants it *all* eradicated, and I want just a few fronds left. By the way, a very well-known nursery on Long Island advertises it in their catalogue—at \$4. Despite my sentiments, that is about as inexcusable as selling dandelions.

There is a very practical side to ferns—the young, curled fronds, called croziers or fiddleheads, are edible. I would never go around scalping the ferns in my garden, and I do not know which species are used (some are big and woolly). The fiddlehead, however, is a really gourmet vegetable. Simply steamed and served with butter, it tastes somewhat like young asparagus. I've never had it except in Canadian restaurants—a fact I cannot explain.

If you have not previously thought of adding ferns to your garden, I hope you will. To me, they are a lovely necessity. They have a unique ability to seemingly change the "climate" of a garden and are really no trouble, if you choose the easy ones. The only tool ever required for them in our garden is a kitchen teaspoon, to spread a little ground limestone where needed. The reward for so little effort is tremendous. ♣

1. Simple fronds like these are found on the walking fern, *Camptosorus rhizophyllus*.
2. More delicate bipinnate fronds are found on the royal fern, for example.
3. Yet another type, the tripinnate frond, is found on the lady fern.
4. The Christmas fern is an example of a fern with pinnate fronds.

Recommended Books: Wherry, Dr. Edgar, *The Fern Guide*, available by mail from the Morris Arboretum of the University of Pennsylvania; Hoshizaki, Barbara Joe, *Fern Growers Manual*, published by Alfred Knopf, New York (This book covers indoor and greenhouse ferns as well as garden ones.).



Wildflowers of the Columbia River Basin

TEXT AND PHOTOGRAPHY BY PAT O'HARA

Many people associate wildflowers of the Pacific Northwest with evergreen forests and alpine elevations of the mountains. Early in spring, when the higher country still lies dormant under its thick blanket of snow, the Columbia River Basin east of the Cascade Mountain Range in Washington and Oregon has thawed. From March to May the rolling hills come alive with a profusion of wildflowers, and the air fills with the fragrance of sagebrush. Outstanding floral displays provide opportunities for observing and studying the colorful wildflower communities.

The Columbia Basin lies in the rain shadow of the Cascades. As coastal air masses move inland from the Pacific Ocean they ascend the western slopes of the mountains. The air cools during this ascent, and condensation of moisture normally occurs in the form of rain or snow. This is referred to as orographic lifting and precipitation. By the time these masses crest over the mountains most of the moisture is depleted; consequently, the amount is greatly reduced on the eastern slopes and Columbia Basin.

The shrub-steppe vegetative zone in the Columbia Basin extends from sea level to as high as 2,400 feet in elevation. Plants such as sagebrush and bunchgrass are the dominant species surviving under the arid conditions of hot, dry summers and astringent winter temperatures. Annual precipitation, most of which comes during the winter months in the form of snow, is traditionally less than 10 inches at the lower elevations.

The ponderosa pine vegetative zone flanks the shrub-steppe in most areas.



LEFT: Balsamroots and lupine growing near the Yakima River in Washington. ABOVE: *Hesperochiron pumilus*.

Precipitation in this zone ranges from 14 to 30 inches annually, depending greatly upon elevation. Extremely hot and dry summers prevail. There is usually a blending of vegetation near the perimeter of the shrub-steppe and ponderosa pine zones. In some localities sagebrush, bunchgrass and ponderosa pine are found growing together.

Climate is the prevalent environmental factor affecting the types and distribution of flora found growing here. Variables such as solar insolation, length of day, precipitation, temperature and windspeed collectively influence distribution of wildflowers and associated plant life.

Soils also play an important role in the evolution of vegetative patterns. The coarse soils are rocky, gravelly or sandy in many of the areas in the Columbia Basin, and this characteristic results in

minimized moisture retention due to expedited drainage. Evaporation usually depletes much of the soil moisture by June on the sagebrush flats. On the flats the soil is also alkaline, thus additionally affecting the distribution of wildflowers throughout the area.

Species existing under extremely dry climatic conditions have evolved physical adaptations to survive in habitats with a limited water supply. For example, the prickly pear cactus and the hedgehog cactus have developed large succulent tissues which allow these plants to survive in their drought vulnerable habitats. Not all are succulent however. Many plants in arid areas are low-growing, resulting in less exposure to the dehydrating climatic elements. These usually have elaborate root systems to capture the small amounts of water available during short and critical periods.

Transpiration from these plants is greatly reduced by other physiological modifications. Short, linear and succulent leaves, as well as other streamlined shapes with a diminished surface area, are more wind resistant and this quality reduces evaporation. Additional structural peculiarities are the presence of fine hairs to insulate the stems and leaves and to reflect sunlight. These assist in maximizing water retention. Some leaves are thick and fleshy with a waxy-like cuticle coating to help prevent water loss. Other plants curl their leaves to reduce evaporation.

Rising in elevation from the shrub-steppe, there is an obvious change in the types and sizes of vegetation. This is directly correlated to the change in climate due to the rise in elevation. As the



ponderosa pine zone is approached, the habitat's complexion changes substantially. At the higher limits, near the mountains, the vegetation is more influenced by the spillover of the maritime fronts which lift over the Cascade crest.

River systems supply a constant source of cool water and humidity to the lower drier lands, creating an oasis effect. Greenbelts parallel the waterways, which contrast to the surrounding arid landscape. Indicative of this habitat is the appearance of northern black cottonwood trees, chokecherry, wild rose and red-osier dogwood. These greenbelts have an intrinsic value as permanent sanctuaries sheltering many birds and mammals.

Modification of the plant life through the introduction of foreign species for

cultivation and livestock forage has unavoidably released many flowering species like the towering tumbled mustard. These now grow wild in great numbers throughout the Columbia Basin. Sagebrush, bitterbrush, bunchgrass and other indigenous plants have been eradicated in many areas to provide space for irrigated agricultural fields.

Wildflower blooming periods differ greatly from one year to another. This annual fluctuation is totally relative to the climatic situation. Some years' conditions are conducive to the early blooming of some species. For instance, Ginkgo State Park near the Columbia River at Vantage, Washington is the paternal guard of the spring whitlow grass. Under the proper climatic circumstances dainty white flowers are born during the latter part of February.

This small, but visually profuse, species is generally superseded a few weeks later by the rock balsamroot and the death camas. From then until late spring the hills are transformed into vibrant gardens of flowing color. Subsequent blooming progresses to the higher elevations as the climate warms.

The sunflower family is the most prolific in the Columbia Basin, adapting well to the arid climate. Other common species of the drier areas belong to the pea, buckwheat, parsley and phlox families. Moist habitats host ornate species in the lily and iris families. There are literally hundreds of flowering species growing in the Columbia Basin, representing numerous plant families.

While roaming and exploring these flowering communities one usually has opportunities to observe wildlife in their



natural habitat. Mule deer and elk still browse at the lower elevations during early spring. Occasionally, wandering coyotes are spotted or a solitary bald eagle is seen soaring over the basalt cliffs. Small mammals like the yellow-bellied marmot and beaver live along rivers. During the warmer months rattlesnakes are active.

There are hundreds of thousands of acres of public lands and recreation areas in the Columbia Basin and on the eastern Cascade slopes of the Pacific Northwest, and during the spring months they are alive with color. 🌱



LEFT: Balsamroots and other spring wildflowers growing along the banks of the Columbia River. ABOVE RIGHT: Hedgehog cactus, *Pediocactus simpsonii*. RIGHT: Purple sage, *Salvia dorrii*.



Carol Schmeidel

How to Grow Bonsai Chrysanthemums

BY RONALD W. MEYER

The chrysanthemum, probably native to China and Japan and cultivated there for hundreds of years, has been adopted worldwide for its showy and long-lasting flowers. An almost infinite number of varieties has been developed, but types used in producing bonsai are primarily restricted to dwarf varieties developed by the Japanese.

The characteristic features which make these varieties useful for dwarfing into bonsai styles are small leaves, compact growth form and an attractive dainty flower in scale with the rest of the plant. There are a few dwarf forms that have been developed by European nurseries, particularly the British, which also show considerable promise.

The following list represents a compilation of varieties grown and trained by the author into a bonsai style with a passable measure of success: 'Akita'* (white daisy); 'Attu'* (gold short-petal daisy); 'Baby Grand' (purple button); 'Benikagami' (yellow daisy edged with red); 'Chidori'* (white daisy); 'Hakuzan No Hikari' (white daisy); 'Hatsune' (yellow button); 'Hokuto No Aki' (copper daisy); 'Ho Ryu'* (yellow daisy); 'Kokinran'* (intense red daisy with yellow edge); 'Koshi No Yuki' (white short petal daisy); 'Mischief' (lavender daisy); 'Red Mischief'* (red daisy); 'Ringdove' (white daisy); 'Pink Ringdove' (pink daisy); 'Sen-Sin' (white daisy); 'Skikibu' (lavender daisy); 'Shiro Futaye'* (white short-petal daisy); 'Shodo' (yellow daisy); 'Tsubake Hime' (red, yellow-splotted daisy); 'Yukari'* (pink daisy).

This list is by no means complete. It is intended only to help the reader choose a suitable and locally available variety. The names followed by an asterisk (*) represent cultivars the author has had the greatest success in training into a bonsai form. Many of these cultivars can be purchased from reputable nurseries in the United States. A brief list of nurseries known to stock many of these or other cultivars is at the end of this article.

The chrysanthemum has, regrettably, been given less than its share of attention as a bonsai subject. The plant's initial modest cost, its easy propagation by means of rooting stem cuttings, and the ease with which it is grown are three good reasons to choose it as a bonsai subject. Other features make the choice

even more alluring. A bonsai chrysanthemum can be produced in one growing season, while many woody species trained as bonsai are seldom considered suitable until they are at least 10 or 12 years old. The chrysanthemum produces flowers, unlike most other species chosen for bonsai. Since the chrysanthemum produces its flowers in autumn, when spring and summer flowers are withering or gone, the floral display is even more appreciated.

All recognized styles of bonsai can be achieved with the chrysanthemum, from a formal upright to a descending, cascaded plant. Readers unacquainted with basic bonsai styles should check out an assortment of books on bonsai from their neighborhood library. Do not, however, follow the instructions in these texts since these will not apply to the chrysanthemum. Its unique character requires the use of special techniques and training.

The chrysanthemum is a robust, vigorous plant. Training it into a tasteful bonsai, however, requires patience and skill. Competence in achieving an outstanding bonsai will improve with experience. The beginner is advised to grow several plants on the principle that there is safety in numbers.

Begin by choosing a variety developed specifically for bonsai growth. These plants are sold usually as rooted cuttings and are shipped bare-root in moist vermiculite in water-tight plastic bags. Occasionally they can be purchased more cheaply as unrooted cuttings. Root these cuttings by planting them in damp, coarse sand.

After the cuttings arrive, plant each one separately in a roomy, oversize pot. Clay or plastic pots with at least an eight-inch diameter are fine. Metal cans are also suitable; use a one-gallon size or larger, making sure there is a drainage hole. Avoid those made of aluminum since this metal is toxic to plants. Use a moist, sandy garden loam for potting—heavy clays will slow down growth—and spread out the bare roots as evenly as possible to attain good root development. Cover the roots with additional soil to a depth of 1 to 1½ inches and tamp in gently but firmly. Gently water them from the top and allow the water to drain. Place all the transplants in an area receiving light but not direct sunlight. Water daily but do not fertilize for the first two weeks after planting. Newly transplanted root systems are extremely sensitive to salt solutions until renewed growth and recovery have taken place.

In about two weeks the root system will be established, and

All recognized styles of bonsai can be achieved with the chrysanthemum, from a formal upright to a descending, cascaded plant.



Photos by Author

There are many cultivars suitable for training into bonsai style. Shown here, (clockwise from above left) 'Attu'; 'Red Mischief', trained on an old grape trunk; and 'Hokuzan No Hikari'.

greatly reduced. Such damage is a particular problem with the chrysanthemum since early woody development causes it to become brittle. Daily watering is usually sufficient; only on rainy days is it permissible to skip watering.

Fertilizer requirements will depend upon the soil mixture used. In many cases no fertilizer is necessary. The use of fertilizer on container-grown plants always involves a measure of risk. Most container plants are intolerant of excess fertilizer concentrations and the chrysanthemum is no exception. Unless you notice a yellowing chlorosis of the leaves, assume the plant is getting all the minerals it requires from its soil. If you simply *must* fertilize, do so with great caution. Dilute the fertilizer mix to *one-tenth* the strength suggested on the container.

As the bonsai chrysanthemum continues to grow and produce side branches, study it with an eye toward shaping it in a flattering bonsai style. Study the bare bones, the skeleton, of the growing plant; concentrate on the main stem or trunk. The trunk will largely dictate what bonsai style to adopt. This study will take time and thought. Look at pictures of bonsai styles again and again. Place the plant at eye level and rotate it slowly to find the position which gives you the best features of the plant. Make this position the front of the plant and mark it by scratching the pot or placing a stick into the soil, then set the plant aside and do the same for the others. The next day or the next weekend, re-examine your decision. Was that *really* the side exhibiting the best features of the plant? If not, re-mark it and set it aside.

When satisfied with a decision, study the plant to find out which branches are interfering with the design. In bonsai it is the trunk that takes precedence over all else; next in importance is the placement of the major branches. The leaves and flowers are lowest in priority. Generally these fill in naturally by the end of summer.

The beauty of the bonsai chrysanthemum lies in its simple, but readily seen, lines. The styling of the plant is an art. And for most of us, art is elusive and difficult. You will find that some branches do not fit. Remove them by cutting them off flush with the trunk. New cambium will form to fill in the old scar with "bark" to make the scar barely discernible.

It is wise to accept the shape and bend of

the plant can be gradually exposed to full sunlight. Do not leave the plants in a shady location or they will develop into tall, gangly plants with unattractive, spindly stems and widely-spaced, oversized "shade" leaves. To obtain the compactness of foliage, the smallness of leaf and the thickness of main stem that will represent the basic "trunk" of the plant, exposure to full sunlight is absolutely essential. Under these conditions growth will soon be evident.

As the plant begins to grow, it is natural to want to transfer it to a bonsai container, but the chrysanthemum, if confined to a small pot at this stage, will grow hardly at all. Its foliage will become yellow and chlorotic, many leaves will brown and shrivel, and the plant will produce few or no flowers by autumn. It is extremely important to keep the plant growing vigor-

ously throughout the summer, because only active growth will permit the main stem to increase in diameter and develop corkiness and the illusion of a weathered, thick trunk. At the same time it is desirable to keep the plant compact and the foliage dense so that the end product is not a scraggly weed.

Some growers begin the future bonsai in a small flower pot, then replant it into successively larger pots as it grows. This method will also yield good results. The alternative method suggested earlier, that of planting the rooted cutting in an oversized can or pot, gives equally good results, with no risk of setting the plant back by repeated transplantings or of neglecting to transplant at the optimal time. In this latter "lazy man's" method, the danger of branch or stem damage incurred by too-frequent handling of the plant is also

the trunk; wiring it and attempting to bend it to another shape often results in breaking the brittle wood. The same is true for branches, although to a lesser degree.

If the trunk absolutely must be bent, do not twist wire around it to reshape it. The wire inevitably digs into the soft bark and often girdles and kills the plant before the new shape has been established. Instead, place the wire flush against the trunk and bind the trunk and the wire together with soft cotton twine, tying the twine near the base of the trunk and snugly winding it around in a spiral fashion to the top of the plant. Now bend the trunk cautiously; any major bending must be done over a period of several days, a little at a time. After the plant is bent to its desired shape, allow it to harden into its new, forced shape for two to three weeks and then remove the string and wire.

Shaping branches is a little easier. As they increase in length, most of them will tend to grow upwards. This tendency must be corrected to a horizontal or even a slightly descending position to suggest old age. Sometimes this can be accomplished by gently flexing the branch downward while it is still young and pliable. When this method is ineffective, a more stubborn branch can be pulled down and held horizontally by tying a thread to it, then tying the other end of the thread to the trunk or to some lower branch as you would a guy-wire. Place sufficient tension on the thread to force the branch into the desired position. The best size of branch to work with in this way is one about the diameter of lead in a pencil. It is best to do this job sequentially, first working from the lowermost branches when they are of the optimal size, then gradually working upward as the branches immediately above reach their optimum a week or two later.

Your efforts now require further refinement. Old trees develop a triangular symmetry, and your chrysanthemum is probably not symmetrical at all. Study the plant again and decide how long the lowermost branch should be from the trunk for the most natural effect. Find a node with a growing bud and leaves that approximate this length, and remove the excess length by pinching or cutting off the undesirable portion flush with the bud chosen to be terminal for each lateral branch. Continue this operation upwards. The plant should be broadest at its base and tapered to a

rounded apex at the top. This pruning should be done by midsummer or soon after.

From then on your major task will be daily watering and possibly an occasional dose of fertilizer. The buds on the branches you have shortened will begin to grow, both at the branch tips and behind. Continually nip back excessive growth as it occurs by pinching out the leading bud from vigorous, elongating shoots, leaving only a leaf or two remaining behind the portion removed. This will force growth from the axils of the remaining leaves. As this growth elongates, pinch it back by removing all but a leaf or two from this new branch. The plant will now begin to look quite handsome.

Little more alteration will be possible after late summer except for continued tightening of the foliage by tip-pinching and removing oversized leaves. This will stimulate production of small compact leaves and, by September or October, the initiation of tight, tiny flower buds. Once flower initiation has begun, fertilization and pinching of the tip growth should be discontinued.

Now find a suitable bonsai container to complement the style of the plant. Shallow rectangular pots complement most styles; oval or round shallow pots also give a pleasing appearance. Deep pots are most suitable for cascade or semi-cascade styles. The size of the pot should also complement the height of the plant. Ignore the problem of fitting the plant into a smaller, shallower bonsai pot—this problem will be presently resolved.

When the flower buds are quite swollen and it appears they will open in two to three days, remove the plant from its growing container with a minimum of disturbance to the rootball, doing everything you can to remove the root mass and its adhering soil in one piece. Try dampening the soil to capacity and allowing it to drain an hour before removing it to help this process along. Use a sharp butcher knife and cut the soil and the roots slightly smaller than the length, width and shallowness of the bonsai pot. As long as the major mass of roots coming from the stem of the plant and the soil they are growing in stay together in a solid mass, the loss of large quantities of peripheral roots causes no discernible setback to the aerial part of the plant.

Now place the plant into the bonsai container. If you find that the plant is not in the precise position to feature its best points, this is the time to effect a change by cutting and reshaping the rootball. The angle of the plant is also critical; adjust it by removing or adding soil at the bottom of the rootball, leaning the front of the chrysanthemum slightly forward toward the observer for all erect bonsai styles.

Once the plant is in place, add soil to fill in the vacant corners, sides and top of the arrangement. The overall effect will be enhanced if soil placement gives the effect of a single plant in nature growing on a hill. Tamp in additional soil with chopsticks or any thin stick. Water the plant and soil mass with a gentle spray until it is thoroughly wetted and drained. Place it in a shady location away from the wind for a week and water daily.

Once flowering begins, bring your plant indoors to enjoy and remember to water it to draining capacity daily. After the bloom period, return the plant to the cool outdoors to induce dormancy. In locales having severely cold winters, place the plant and its root mass in an oversized pot and store it in some protected area, such as a shed, unheated basement or garage. Keep the plant there until the following spring. Remember to water it periodically to maintain a damp, but not soggy, condition.

It is the nature of the upper portion of most dwarf chrysanthemum varieties to die back to the roots, so don't be surprised if the well-shaped bonsai expires over the winter. Sometimes a portion of the old stem may survive. If it does, it will send out a number of shoots, one of which can be selected as a continuation of the main stem, while the others may be considered as possible side branches if they occur in the proper locations. Even if the entire old stem dies, the root system will survive and form new sprouts later if you have not forgotten to water it through the winter. This renewed sprout growth will be the source of new bonsai plants. ♀

Below is an abbreviated list of nurseries that offer bonsai varieties of chrysanthemums: Huff's Gardens, Box 267, Burlington, KS 66839; King's Chrysanthemums, 3723 E. Castro Valley Blvd., Castro Valley, CA 94546; Sunnyslope Gardens, Dept. W. 8638 Huntington Drive, San Gabriel, CA 91775.

(Continued from page 21)

chinensis, while not distributed outside of China before 1900, was distributed to several locations throughout the world at approximately the same time.

Interest in kiwifruit waned, probably because of the plant's large size and tangle of untrained vines, but several horticulturists in New Zealand and at the USDA Plant Introduction Station at Chico, California continued to experiment with its development. In 1940 several small plants at the Bay of Plenty in New Zealand came into production. From this planting promising seedlings were selected, named and planted. Much of this early improvement was accomplished by Alexander Allison, Bruno Just and Hayward Wright, hence 'Allison', 'Bruno' and 'Hayward' are the names of three leading New Zealand varieties.

R.L. Smith of the Chico Plant Introduction Station was also promoting kiwifruit in California. He released the Chico variety and distributed plants to interested growers. Culture and processing research was used to promote acceptance of this new crop, and in 1960 acceptance was enhanced by the introduction of imported fruits to the western United States. Shortly thereafter, California-grown kiwifruits became a reality. In 1974, 2,000 acres of kiwifruit were grown and gross incomes reached \$12,000 per acre.

Today the market for fresh kiwifruits remains unsatisfied. New Zealand supplies fruits during our summer and California supplies them during the winter. The demand for plants is great as growers continue to expand their acreage. Considering that a potential processing market exists but has not been exploited because of the shortage of fruit, the future of kiwifruit production is, at this time, without limit. Current interest in kiwifruit production is primarily agricultural, but, depending on where you live, it is relatively simple to adapt these growing instructions so that you can grow kiwifruit yourself.

Growing Instructions

Actinidia chinensis, one of the less hardy species of the genus, is more hardy than the orange but less hardy than the peach. All species are deciduous and will grow in temperate to semitropical areas. Acceptable climates in the United States are the southern, western and southeastern border states (Zones 7-9). The more hardy species grow as far north as Zone 4.

The species tolerate a wide range of soil types, but *A. chinensis* prefers a well-drained, friable, sandy loam soil and will not grow well on poorly drained soils. When planting, space the plants at least 10 feet apart; 15 feet is preferable. Plant the vines 15 to 20 feet apart in the row depending on trellis type. Single wire trellises require wider spacing. Rows are commonly shallow-cultivated or mulched, and permanent and regularly mown grass or clover sod is grown between the rows.

The nutritional requirements of *A. chinensis* have not been well researched,

but general recommendations have evolved. Mix one pound of organic fertilizer (two to four ounces of a slow-release fertilizer) with the soil at planting and follow at the end of the growing season with the application of another one-half pound of a complete fertilizer such as 10-10-10, or 15-5-8 as recommended in New Zealand. Thereafter apply fertilizer twice per year with approximately twice as much applied before new growth as is applied after fruit set in June. Increase the rate of one-half pound on newly planted vines to three pounds per plant by the third year.

Growing Kiwifruit—One Man's Experience

Of all the plants we grow on our farm in Dawes, Alabama, the most prized are our kiwi vines.

We became interested in the kiwi after reading about it in a local newspaper. We wrote to the California grower mentioned in the article; he advised us to contact the U.S. Agricultural Station in Chico, California for more information. The brochure we received from them indicated that the kiwi could be grown in the Deep South.

The brochure also stated that the Chinese gooseberry, as the kiwi is often called, is a member of the family Actinidiaceae and is unrelated to the true gooseberry. In 1906 a New Zealand nurseryman recognized its potential as a new fruit crop. Seed introduced from China, its native home, became the basis for a small but expanding industry there. The fruit was first imported for marketing in this country in 1960, and the importer renamed it kiwifruit.

The fruit is not attractive—it is about the size of a hen's egg, brownish-green in color and "fuzzy" to the touch. However, when the fruit is sliced the flesh is light green and has a unique flavor. The fruit also can be held in cold storage for more than three months.

A California nursery sold us four vines, one male and three female. We planted the vines 15 feet apart in sandy, loamy, well-drained soil and in full sun. Support for the vines was provided by an eight-foot-high hog-wire fence. The vines have been on the same fertilizer and spray schedule as our grapes and fruit trees. Pruning, which must be severe due to the vigorous growth of the plants, is done after the plants drop their leaves. The plants appear to be resistant to insects and diseases with one exception, powdery mildew. Dormant sprays such as lime sulphur have kept this problem under control.

The plants break their dormancy in mid March. The new growth is rapid and shades from pale green to pink to vivid-red. The small, camellia-like blooms appear on the new growth at the end of April. Unfortunately, these blooms do not have a pleasant odor, and the older the blooms the more unpleasant the odor becomes.

The small fruits become evident by June 15 and continue to grow slowly until fully ripe, usually between December 1 and 15. Unusually wet and humid weather seems to cause some fruit drop. To date I've detected no problem with birds feasting on berries. Temperatures have ranged from 22° to 98° F with little or no effect upon the vines.

Patience plays a great role in the growing of the Chinese gooseberry. The vines grow rapidly but produce no blooms until they are four or five years old. No fruit is evident until the vines are eight years old. However, everyone in my family agrees the fruit is delicious, as well as nutritious, and is well worth the wait.

—Alvin W. Mosher

These larger amounts should be well distributed over the entire root system to prevent root injury.

Actinida chinensis has few pests. The most unusual of these, and one which is not serious, is the cat. It is attracted to the aroma of bruised roots which result from transplanting. Cats may become a nuisance and occasionally may attempt to dig a newly set plant in search of the aroma. Spider mites thrive on greenhouse-grown plants but seldom require control on plants grown elsewhere. Japanese beetles also feed on the foliage but prefer other plants.

The roots of *Actinidia* are fleshy and subject to nematode invasion. Planting in badly infested soil is not recommended even though infected plants have not been observed to be reduced seriously in vigor. No diseases have been reported that cause serious problems. Commercial growers have developed a light spray program for insect control, but small growers may not need any pesticide control program until pests adapt themselves to this new plant.

The selection of varieties has been relatively recent and few have been well tested in the United States and then only in California. The prominent varieties in New Zealand are 'Allison', 'Abbott', 'Bruno', 'Monty' and 'Hayward'. 'Abbott' and 'Bruno' are early flowering as compared to 'Monty' and 'Hayward'. 'Hayward' has become a favorite among growers because of its large fruit size and superior keeping qualities. 'Chico', a variety introduced in California, is either 'Hayward' or a nearly identical selection.

Even though recent improvements have been made, planting seedling populations is discouraged. Fruit size and quality is variable and often inferior when compared to named varieties. In addition, one half of the plants grown will be males, many more than are required for pollination, and these cannot be identified until they flower.

Match male pollinators with the fruit-bearing variety to ensure flowering at the same time. In New Zealand, 'Matua' is commonly grown with early-flowering varieties, but may pollinate all of them and 'Tomuri' with 'Hayward' and 'Monty'. California growers prefer 'Matua' and a male named 'Chico'. Good pollination has been observed in plantings of eight to nine fruit-bearing plants to one pollinator, and the pollinator may be grafted to fruit-bearing plants.

Grow seedlings for grafting by storing

the fruits under refrigeration and planting the seeds immediately after maceration of the fruits. Seeds kept in dry storage are difficult to germinate and require at least two weeks of cool (40° F), damp stratifica-

Kiwifruits reach mature size by midsummer, but they require the remaining season to develop their mature texture and flavor. Prematurely picked fruits wither before softening.

tion followed by daily temperature changes of 50° nights and 70° days until germination occurs. Seedlings respond quickly to warm temperatures of 70° to 80°, full sunlight and adequate water and nutrients. Because of their vigorous growth, fertilize and water the plants fairly frequently, but otherwise treat them like any other garden plant. Space root stock rows at least 30 inches apart and plant vines 18 inches apart within the row to accommodate the first season's growth.

These seedlings are sufficiently large for late summer T-bud grafting when the trunk reaches one-half-inch in diameter. Dormant seedlings may be whip grafted before spring growth begins. Scions also may be grafted to root sections as is done for apple grafts. Grafting must be completed before spring sap runs if it is to be successful. The sap runs profusely in *Actinidia* species, and early grafting can result in failure. Softwood and root cuttings are also propagated, but excessive callusing is common and may restrict root development. Be sure root sections are taken from a plant that has not been grafted to ensure propagating the true variety.

Build trellises before or soon after planting to accommodate the rapid growth of plants. These can be similar to grape trellises but must be stronger. Posts should be four to six inches in diameter to support plant and fruit weights and eight to nine feet long. A post should be located at each plant and set two to three feet deep to prevent winds from tipping the trellised row over. Space one or two galvanized steel (eight- to 12-gauge size) wires, one at the top and the other midway below it. Brace the end post securely and stretch the

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wires to 300 pounds of tension for adequate support of vine weights. Or build six-foot-high pergolas as alternatives to trellises. These allow vines to grow in a horizontal plane with easy access to fruits hanging from the underside. Be sure the trellis is sturdy. A common failure is the construction of inadequate trellises for supporting the weight of heavy fruit crops.

Train the first season's growth vertically to reach the top of the trellis. Train later growth along the wires to form permanent arms. Branching vines grow outward from these arms and support spurs from which flowers and fruit develop.

The vigor of *A. chinensis* requires special pruning practices, which include both summer and winter pruning. For summer pruning, rub off basal suckers and strongly vertical growth when it is only a few inches long. Remove the terminal of all current season branches from permanent arms at seven to eight buds from their base. Waiting until unwanted shoots are several feet long before removing them results in unnecessary weakening of the plant.

The objective of winter pruning is to balance fruit production with vegetative

growth. Remove approximately one third of the limbs growing from the permanent arms each year. Preferred limbs for removal are the three-year fruiting branches (those which have finished their second year of fruiting), damaged wood and the tortuously twining current year's growth. Shorten the remaining current year's limbs from the permanent arms sufficiently so that when laden with fruit they will not touch the ground. Older branches will have short branches with short internodes (spurs). These bear flowers and fruit and should not be removed. Shorten older spurs to within two to four buds of the position of last year's fruit, since only these buds will bear flowers and fruit in the coming season. This procedure will eliminate much of the tangle experienced with growing kiwifruits by other methods and ensure a strong, heavy, fruit-bearing plant.

Kiwifruits reach mature size by mid-summer, but they require the remaining season to develop their mature texture and flavor. Prematurely picked fruits wither before softening, and more nearly mature fruits soften with various amounts of tartness and with other peculiar flavors. De-

termine full maturity by picking a fruit, allowing it to soften for a few days and tasting it for favorable flavor. When suitably sweet and flavorful, pick all fruits and refrigerate them until a few days before they are needed. Removal from refrigeration initiates softening and the development of the kiwi's final sweetness and flavor. Fruits are easily damaged by frost and should be picked before damage occurs. If no danger of frost exists, leave the fruits on the vine throughout the dormant season. Fruits will gradually soften as the dormant season ends.

The dormant vine will withstand freezing to approximately 5° to 10° F. Bark splitting along the trunk, especially on young plants, is a symptom of light freezing damage. Hard freezing destroys the vascular system and results in brown discoloration under the bark. With protection from the warmer earth, especially when mulched, the root and crown will survive and regrow in areas too cold for fruit production.

Being semitropical in character, kiwifruit has a short cold-season dormancy requirement before spring growth begins.

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Early spring growth is susceptible to freezing temperatures and wind damage. The first tender shoots bear the flower buds and if frozen or broken, the crop is destroyed for that season since later growth is vegetative. Consequently, kiwi-fruits are commonly grown in areas protected from spring frosts and bordered by windbreaks. Frost protection is also necessary in the fall since immature fruits can be damaged by hard frosts, and approximately 150 days are required for fruit maturity.

Improvements in the Species

Improvement of *A. chinensis* and other *Actinidia* species is a worldwide effort. New Zealand is searching for greater variation from native Chinese populations of *A. chinensis* and other species. They have found a short internode dwarf with possible value as a dwarfing rootstock; some sparse-fruited male plants for developing self-pollinating varieties; and several improved fruit characters. Research also is being performed in France, Bulgaria and Russia. Self-pollinating *A. kolomikta* selections have been reported from Russia as well as improvement of *A. polygama* as a fruit crop.

The USDA Plant Introduction Station at Chico was closed in 1974, but research is continuing in the United States under R.L. Smith and others in California, North and South Carolina, Virginia and possibly in other states. When the Chico Station closed, several varieties, species and a seedling population from cross-pollination of Fairchild's hybrid were sent to the Virginia Truck and Ornamentals Research Station. Now in their fifth year, these plants are bearing fruit.

In addition to learning that *A. chinensis* fruit will grow and mature in eastern Virginia, the Fairchild progeny are being searched for improved fruiting types. *A. arguta*, one of the parents of the original hybrid, has small fruits of no commercial value but is much hardier, earlier and bears smooth fruits. Combining these characteristics with *A. chinensis* types would improve their hardiness, permit earlier harvest and improve the appearance of fruits.

Early evaluation has shown that characteristics of an individual parent completely dominated several plants of the population. Hence, *A. arguta* type plants contained no improved fruit types. Intermediate types remaining in the population were slower to flower and at this time no



ABOVE: Fruits of the Chico ('Hayward') variety of *Actinidia chinensis*, as compared to muscadine grapes. LEFT: Foliage of *Actinidia chinensis*.

Photos by Author

true evaluation has been accomplished. Successful combination of beneficial *A. arguta* characteristics with those of *A. chinensis* should result in cultivars that will grow and mature fruits over a greater range of temperatures and therefore diversify this new and promising crop.

Because improvement has just begun, early research is expected to yield much larger improvements than were gained from research on older and extensively improved crops currently grown. Now little more than a wild plant and causing intense interest, improved varieties should favorably compete with common fresh fruits and lead to the opportunity for developing a new market for the kiwi. ♀

Plant and Seed Suppliers for Kiwi—Eastern suppliers of plants: Bountiful Ridge Nurseries Inc., Princess Anne, Maryland 21853; Lakeland Nursery Sales, 340 Poplar St., Hanover, Pennsylvania 17331; Wayside Gardens, Hodges, South Carolina 29695.

Midwest supplier of plants and seeds: Mellinger's Inc., 2310 W. South Range Road, North Lima, Ohio 44452.

Western supplier of *Actinidia arguta* and *A. kolomikta* seeds: Lawyer Nursery, Rt. 2 Box 95, Plains, Montana 59859.

Western suppliers of plants: Alkop Farms, Route 1 Box 475B, Chico, California 95926.

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CONTRIBUTORS

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Frederick McGourty has served as Editor of *Plants & Gardens*, the Brooklyn Botanic Garden Handbook series, since 1969. He joined the BBG staff in 1966 as Associate Taxonomist after receiving his BA from the University of Pennsylvania and MA from New York University. Along with his wife Mary Ann, Fred is an active gardener, especially with perennials, container plants and vegetables. Their country garden in the Litchfield Hills of Connecticut has been the subject of feature articles in *American Horticulturist* (June/July 1979) and *The New York Times* (July 15, 1979) by, respectively, Pamela Harper and George Taloumis.

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Martha Prince is an artist, writer and lecturer who gardens on Long Island. One-person exhibitions of her flower paintings have been held at Callaway Gardens, Planting Fields Arboretum, the Horticultural Society of New York, the National Arboretum and at the American Horticultural Society's headquarters at River Farm. Her articles and illustrations have appeared in many publications, including *Living Wilderness*, *Horticulture*, the *Quarterly* of the American Rhododendron Society and *American Horticulturist*.

Jane Steffey is a graduate of Hood College with a major in botany. She is the current horticultural advisor to the American Horticultural Society, handling member inquiries. A long-time gardener herself, she has recently specialized in indoor plants and for a number of years wrote "The Indoor Gardener" for the *Washington Post*.

Iris Thoreson has an undergraduate degree in journalism and is presently completing a Master's degree in journalism with horticulture as a supporting field at South Dakota University.

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THE GOURD BOOK. Charles B. Heiser, Jr. University of Oklahoma Press. Norman, Oklahoma. 1979. 248 pages; hardcover, \$14.95. AHS discount price, \$12.55 including postage and handling.



According to the author, gourds may be man's oldest cultivated plant. Used for decoration, containers, pipes, musical instruments, water jugs and many other things, the variety of applications is exceeded only by the variety of shapes found among the various species of gourds. Well written and well illustrated, this book deals mainly with the ways in which gourds have been put to use around the world. A final chapter tells how to grow them yourself. For something very different in the garden, try a gourd.

PRUNING. Christopher Brickell.

PLANT PROPAGATION. Philip McMillan Browse.

Simon and Schuster, New York, New York. 1979. 96 pages each; spiral bound, \$7.95 each. AHS discount price, \$7.61 including postage and handling.

Two well-written and well-illustrated how-to-do-it books published in cooperation with England's Royal Horticultural Society. There are undoubtedly a few good ideas included in these books, even for the advanced gardener. For the beginner these books will provide a wealth of useful instruction.

EMBROIDERED GARDENS.

Thomasina Beck. Viking Press, New York, New York. 1979. 144 pages; hardbound, \$17.95. AHS discount price, \$15.61 including postage and handling.

A large format, beautifully produced book which reviews embroidery with a gardening theme from the 16th century to the present. Not only an historical review but

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also a how-to-do-it book and the ideal gift for those who like to combine work with the needle and the hoe.

ORCHIDS AND THEIR CULTIVATION (revised edition). David Sander (revised by Wilma Ritterhausen). Sterling Publishing Co., New York, New York. 1979. 177 pages; hardbound, \$19.95. AHS discount price, \$13.97 including postage and handling. See book display ad on page 38.

A well-written and well-illustrated (67 color, 24 black and white photos) introduction to growing orchids by the head of one of England's oldest and best-known orchid nurseries. Special instructions for all the most popular orchid species, both indoors and out.

GARDEN FLOWERS IN COLOUR.

Brian and Valerie Proudley. Sterling Publishing Company, New York, New York. 1979. 200 pages; hardbound, \$8.95. AHS discount price, \$6.26 including postage and handling.

An introduction to the English flower border. Well-illustrated growing guide to easy annual and perennial flowers. Published in England, so a little interpretation of growing conditions is required for the American user. Full of lots of good ideas for plant material.

THE COMPLETE BOOK OF HERBS AND SPICES. Sarah Garland. The Viking Press, Inc. New York, New York. 1979. 288 pages; hardcover, \$25.00. AHS discount price, \$21.25 including postage and handling.

Take five parts description, one part history, two parts gardening, three parts cooking and three parts household hints; mix them all with hundreds of excellent illustrations, and you have the recipe for a delightful new book on growing and using herbs. The descriptive section is beautifully illustrated with water color paintings of

each herb, and the description itself includes not only the correct botanical name and the characteristics of the plant along with helpful cultural notes, but also information on the uses of each plant. The gardening portion includes how-to-do-it recommendations on herb gardens as well as suggestions for growing herbs in less specialized parts of the garden—as a lawn or ground cover for example. The recipes are mouth watering and imaginative, and the household hints cover everything from the usual herbal remedies and cosmetics to dyeing wool and making scented candles.

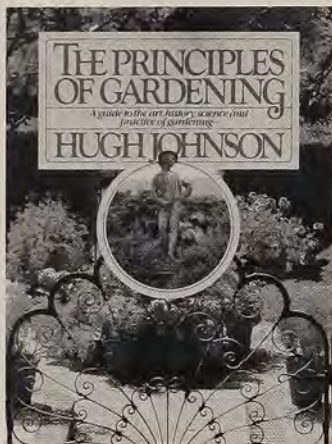
JAPANESE MAPLES. J. D. Vertrees.

Timber Press, Forest Grove, Oregon. 1978. 178 pages; hardcover, 39.50. AHS discount price, \$30.89 including postage and handling.



An authoritative and beautifully illustrated work on a group of garden plants with tremendous variety, this book is actually even more than the title intimates. Not only are all of the cultivars of *Acer palmatum*, the Japanese maple to most of us, described and illustrated in color, but all of the other species of *Acer* found in Japan are also included, along with many of their cultivars. Anyone familiar with Japanese horticulture cannot help but be aware of the long history of selection and maintenance of cultivars which has taken place in the cultivated plants of Japan. The more than 250 cultivars of *Acer palmatum*, plus the many cultivars of the other Japanese species of maple, have long needed a clear treatment for identification of the many forms found in our gardens. The author not only provides a guide to this great wealth of cultivated plant material but has also written a text which is enjoyable reading whether or not you grow his favorite plant. A beautiful and valuable book.

THE PRINCIPLES OF GARDENING. Hugh Johnson. Simon and Schuster, New York, New York. 1979. 272 pages; hardcover, \$29.95. AHS discount price, \$25.21 including postage and handling.



An English gardening book published in the United States, this exception to the usual rule makes no attempt to claim it is an American edition. In a rather unusual format consisting of a series of two-page spreads, various topics in gardening are treated as individual illustrated essays, bringing the best of a long tradition of English gardening to the American reader. While a few of the topics such as botanical illustrations and plant collecting are historical, the majority of topics relate directly to gardening. Such treatments of shrubs, bedding roses, the early border, alpiners and rockeries, ponds and streams and Italian gardens, to mention only a few, are a gold mine of gardening ideas. The text is well written and the color illustrations are superb. An educational and informative book, ideal for winter reading and planning next season's garden.

FLOWERING PLANTS OF THE WORLD. V. H. Heywood, editor. Mayflower Books. New York, New York. 1978. 336 pages; hardcover, \$17.95. AHS discount price, \$15.86 including postage and handling.

To many gardeners, the mystery of plant taxonomy (classification) and the scientific names of plants are petty annoyances. For the advanced gardener, an understanding of the relationships among various plants and an understanding of that portion of the relationship which is revealed by the scientific name is a key to a more meaningful enjoyment of plants. The presentation of the organized way in which botanists look

at plants is generally offered in such a complex way as to discourage the amateur botanist or the plain dirt gardener. This book is a notable exception. Each of the plant families is described and most are illustrated. The colored illustrations are beautifully executed, and a distribution map clearly indicates where in the world the genera of each family can be found. The major genera of each plant family are discussed, and the differences and common features are pointed out. Plants of economic importance in each family are mentioned individually, and their ornamental use is also included. While some technical terminology cannot be avoided, an excellent illustrated glossary explains all such terms used in the book. For the gardener who wants to know more about how plants are classified, this book is definitely recommended.

ROSE BOOK SERIES. Earl M. Coleman, New York, New York. 1978.

THE BOOK OF ROSES (facsimile of London, 1838 edition). Catherine Frances Gore. 434 pages; hardbound, \$25.00.

THE ROSE MANUAL (facsimile of Philadelphia, 1844 edition). Robert Buist. 182 pages; hardbound, \$12.50.

THE ROSE GARDEN (facsimile of London, 1848 edition). William Paul. 177 pages; hardbound, \$27.50.

OLD ROSES (facsimile of New York, 1935 edition). Ethelyn Emery Keays. 222 pages; hardbound, \$19.50.

OLD GARDEN ROSES (facsimile of London, 1936 edition). Edward A. Bunyard. 163 pages; hardbound, \$25.50.

HISTORY OF THE ROSE (facsimile of New York, 1954 edition). Roy E. Shepherd. 264 pages; hardbound, \$17.50.

While there can be no dispute that modern hybridization has produced an even better rose with each advancing year, there are among the tens of thousands of cultivars produced in the last 200 years many which are still worthy of space in our gardens. Interest in growing old roses can be frustrated in two ways: the availability of the plants is very limited, although a number of nurserymen and botanic gardens have, over the years, maintained many of the better cultivars, and the literature describing these old roses is generally unavailable. Towards solving this latter problem, Earl M. Coleman has published a set of six fac-

simile books which represent a core library of English language classics in the history of the rose and the descriptive listing of old roses.

The three older works originally published in the first half of the 19th century have the advantage of reporting from a contemporary point of view on the richness of rose cultivars that were available at the time. The three more recent works have the advantage of temporal perspective, which allows them to look objectively at old roses with a full knowledge of what has been developed in the modern rose. For the gardener interested in growing old roses, these facsimile publications are a gold mine of information. For the serious rosarian interested in the history of the rose and in detailed descriptions of many old varieties that have long since been lost, these books are invaluable reference sources. Beautifully reproduced in matching bindings, these six works (and we hope more will follow) should be in the library of any serious rosarian.

TWO FOR WESTERN GARDENS

NEW WESTERN GARDEN BOOK (4th Edition). Editors of Sunset Books and Sunset Magazine. Lane Publishing Company, Menlo Park, California. 1979. 512 Pages; softcover, \$9.95. AHS discount price, \$9.21 including postage and handling.



TREES AND SHRUBS FOR WESTERN GARDENS. Gordon Courtright. Timber Press, Forest Grove, Oregon. 1979. 239 pages; hardcover, \$42.50. AHS discount price, \$33.12 including postage and handling.

Gardening in the western United States is unique not only for the special growing

conditions involved but also for the tremendous variety of plants which may be successfully grown there. Both of the books listed above are invaluable for their encyclopedic coverage of this vast amount of potential plant material for western gardens.

The *New Western Garden Book* is the essential hardbound, basic reference work for the western gardener. The scope of the work has been expanded from previous editions to now include Montana, Wyoming, Colorado and New Mexico. This means that plant material covered often includes species that will grow anywhere in the United States, although the majority of plants described are mainly intended for the more temperate regions of the country. Actually, the book is an excellent reference for the southeastern states as well as for the West.

Illustrations are limited to small line drawings, which are too sparse to be useful for identification and usually are limited to only a portion of the plant so that the total effect of the plant in the landscape is also missed. Cultural information is excellent, and long lists of cultivars with descriptions are particularly useful. This is a basic reference work for anyone who has even an occasional contact with subtropical plants.

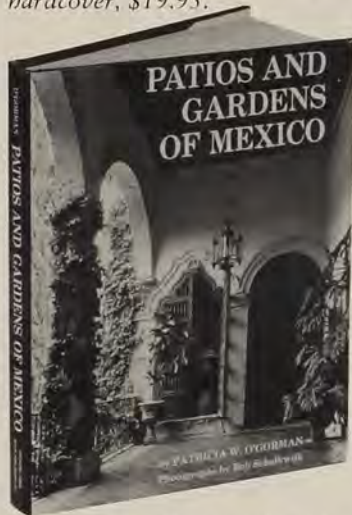
Trees and Shrubs for Western Gardens is a collection of 771 color photographs and brief descriptions and concise cultural information for each species. In every case, the complete plant is shown so that the illustrations can readily be used to plan a garden or a landscape. Trees and shrubs are grouped by their mature height, which is also helpful in planning the landscape. This work provides the visual input lacking in the *New Western Garden Book*. The photographs are clear and the color printing good. This is a valuable work which belongs on the library reference shelf and in every landscape designer's office.

THE BOOK OF TULIPS. Tom Lodewijk. *The Vendome Press* (distributed by Viking Press). New York, New York. 1979. 128 pages; hardcover, \$14.95. AHS discount price \$13.21 including postage and handling.

Gardening information is secondary to the history of the tulip and the tulip industry in this well presented story of the past, present and future of one of our most popular spring bulbs. The history of tulips, both natural and political, is treated in a reada-

ble and informative manner. For pleasant reading and a good background story of a favorite garden flower that has had a remarkable effect on the development of western civilization, I can recommend this book to anyone interested in flowers.

PATIOS AND GARDENS OF MEXICO. Patricia W. O'Gorman. *Architectural Book Publishing Co., New York, New York.* 1979. 254 pages; hardcover, \$19.95.



Abundantly illustrated with excellent photographs, this book looks at gardens and garden architecture. Both fascinating in their own right and as a rich source of ideas, these views of Mexico's gardens will not only make you want to visit our neighbor to the south, but they will also give you a broad spectrum of ideas for use in your own garden. While particularly applicable to gardeners of the Southwest, there are many ideas that will fit in anywhere in the United States.

VISITING THE GARDENS OF EUROPE. Harriet Bridgeman and Elizabeth Drury. *E. P. Dutton, New York, New York.* 1979. 330 pages, paperback \$9.95.

A handy pocket guide to more than 1,000 gardens open to the public in western Europe.

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- Temperature
- Relative Humidity
- High Intensity Light



ENVIRONMENTAL GROWTH CHAMBERS
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Division of Integrated Development and Manufacturing

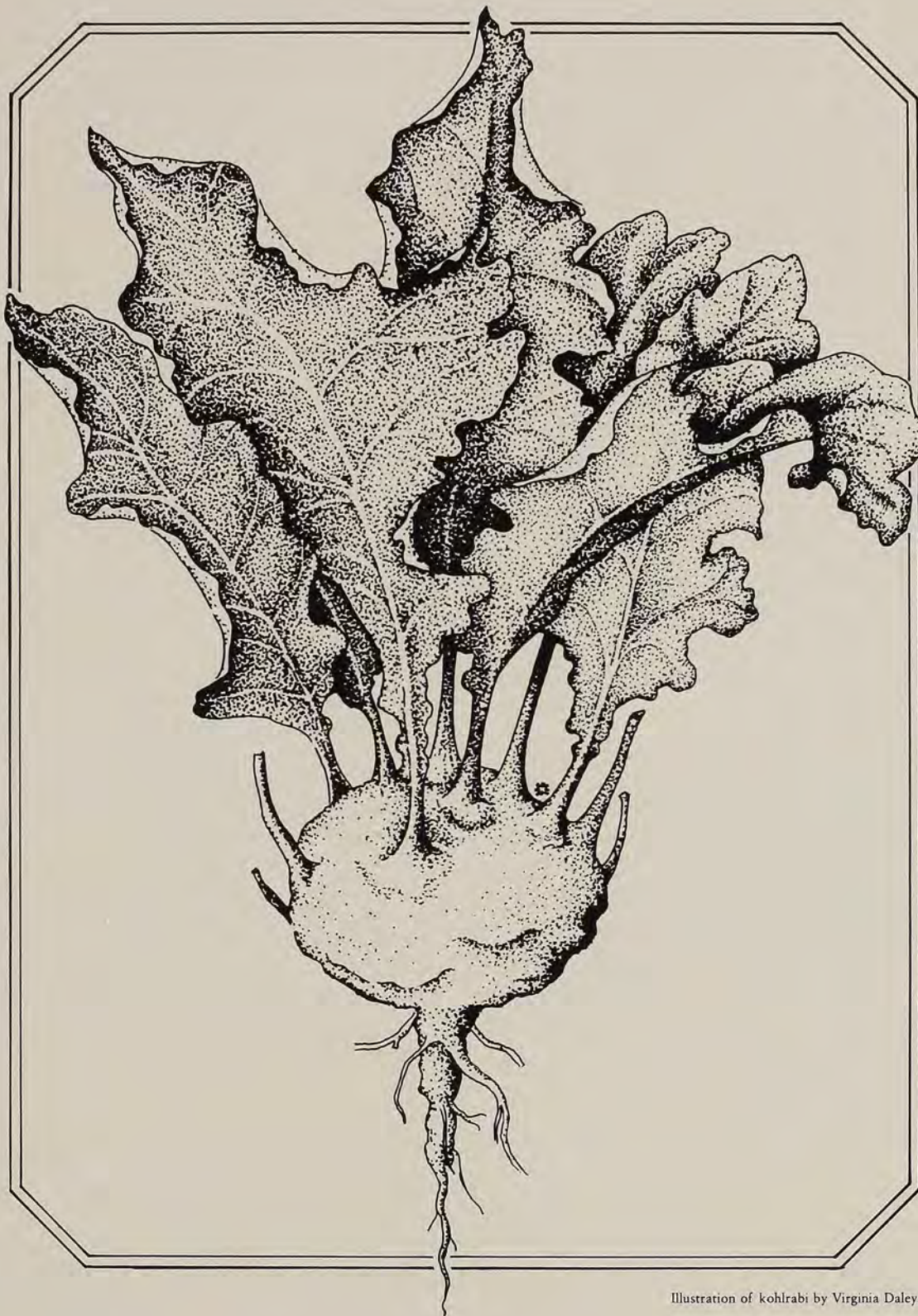


Illustration of kohlrabi by Virginia Daley.

COMING IN THE NEXT ISSUE

With the arrival of spring, you will be busy reviving the landscape after its winter rest. Stock up on new ideas for the garden or new ways to deal with old gardening problems by reading the April/May, 1980 issue. Look for Jeannette Lowe's article on new trends in vegetable gardening; R. J. Hutton's article on exciting new roses; Dr. Michael Dirr's suggestions for good plants for shade gardens; Barbara Emerson's pictorial coverage of our most common weed pests and tips on how to get rid of them; and lovely color coverage of the Kingwood Center in Mansfield, Ohio and the Lake Mohonk Gardens in the Catskill Mountains of New York by Frederick Roberts and Linda Yang, respectively.

