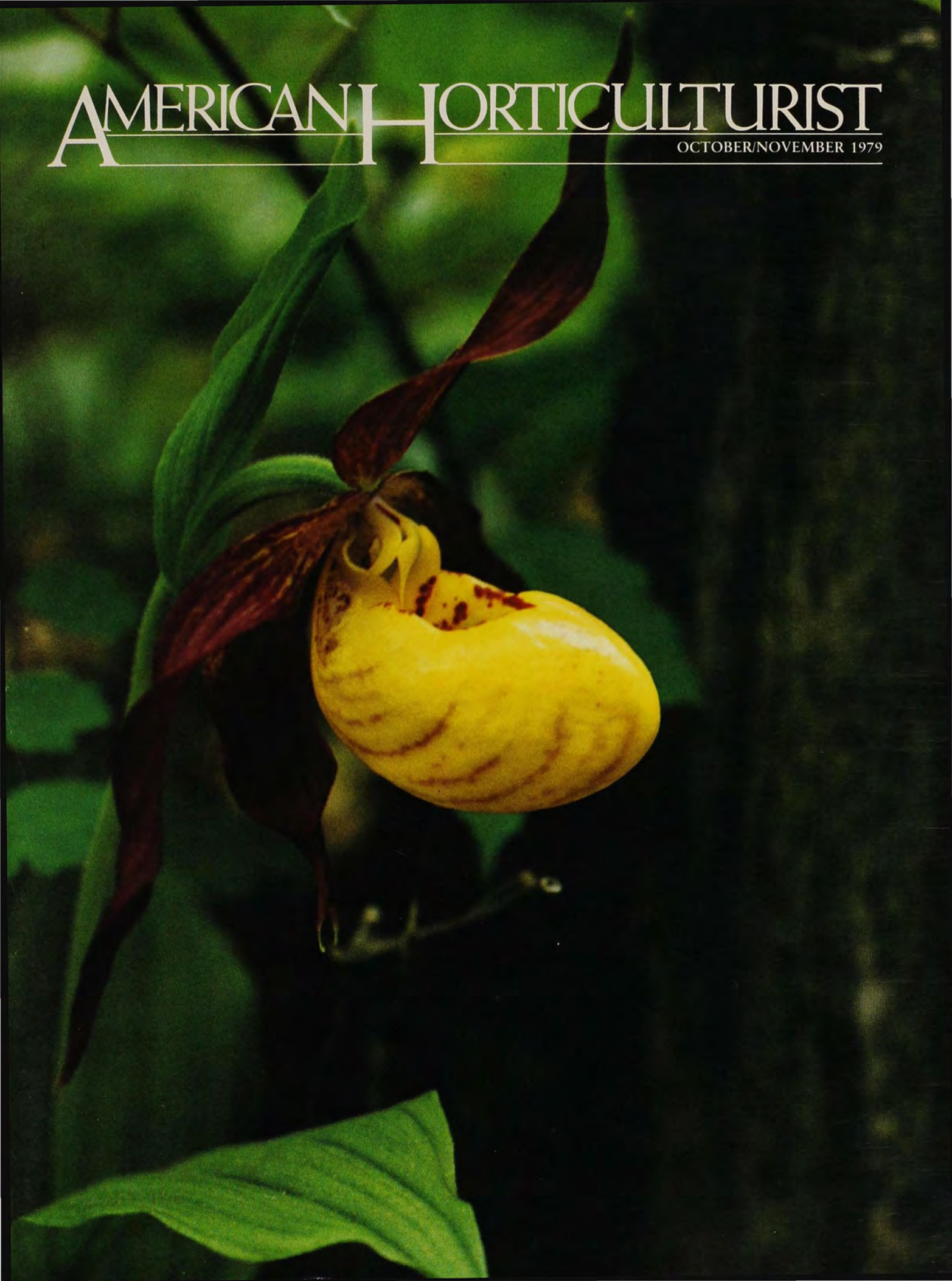


AMERICAN HORTICULTURIST

OCTOBER/NOVEMBER 1979





COMING IN THE NEXT ISSUE

Geraniums come in many sizes, shapes and varieties. They also come in many scents. There are lemon-scented, strawberry-scented and rose-scented geraniums, among others. One type even smells like champagne! Read about these special plants in the next issue. We'll also include recipes. Also coming in December: articles on *Saintpaulia* species, the Chelsea Flower Show in England and the art of vegetable dyeing. Special insert: the 1979 editorial index to articles which appeared in *American Horticulturist* during the year.

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ON THE COVER: *Cypripedium Calceolus* is one of this country's loveliest native orchids. Its future, however, is in danger. Find out what scientists are doing to save it on page 21. Photograph by T. Carrolan.

A GARDEN THAT DELIGHTS



Pam Harper

Whether your garden is on 20 acres or on a cheery windowsill, delighting in what grows there is what gardening is all about.

In every issue of the **new** *American Horticulturist* we hope to expand your knowledge and enhance your enjoyment of gardening. We'll show you how to grow new and unusual plants and we'll take you on pictorial tours of public and private gardens around the world. In one issue you may learn how to dry flowers that will last for years; in another you'll be able to peek behind closed doors—to find out what's happening in the backrooms of the U.S. Department of Agriculture.

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As a long-term collector of botanical and gardening books and as a plain dirt gardener in search of information, I am appalled at the number of foreign book publishers who continue to sell their wares under false colors to the American gardener. Gardening authors in Europe, and particularly in England, have a great deal of experience and knowledge which the American gardener is anxious to share; but this information should be correctly and knowledgeably edited for American use. The inclusion of a USDA plant-hardiness map does not fulfill this need. In fact, the presence of it in an American edition of a European gardening book is almost always a clear sign that this is where the so-called United States editing stops. We know our climatic variations. We don't have to be told over and over again. But we would like our gardening literature interpreted in terms of these climatic variations.

And it wouldn't hurt also to translate the books into our language. Aubergine and calabrese may mean something to some of us, but eggplant and broccoli would reach a much larger audience. While we are interested in growing new plants, we also have some time-tested restrictions on plants that won't do well in the average American garden. For most of the United States our summers are hot and only a very small portion of the Northwest ever approximates the more temperate climate of England. Also, our winters are cold and winter vegetable crops are almost impossible for most of us to grow no matter how hardy European varieties are claimed to be. Except for the West Coast and the extreme South, the majority of United States gar-

deners can't possibly carry a vegetable garden through the winter.

We are hungry for good gardening books, but I wish more book publishers would do their homework before rushing into print. If you have any pet peeves about gardening books that you would like to air, or if you don't agree with me, let's hear from you. Maybe a few published letters to the editor will help improve the American garden publishing scene.

We've been selling advertisements in our magazine for several years. Not only do these ads provide the Society with a modest income to help offset the cost of printing *American Horticulturist*, but they also provide a service to you. We like to bring new plants and plant products to your attention. Any advertisement, however, needs to be read to be effective. I urge you to browse through the magazine once just to read the ads. Don't forget the classified section. You may be surprised at the variety of offerings—or you may be disappointed. If so, let us know what you would like to see advertised in our magazine that does not presently appear. We want to draw more advertisers to *American Horticulturist*—the type you want to see.

Gilbert S. Daniels
—Gilbert S. Daniels
President

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HOW TO DRY FLOWERS

The art of collecting, drying and preserving flowers and foliage is an ancient one. Modern techniques and materials have refined this art and I encourage anyone with a fondness for home floral decorations to give it a try. Having fresh, cut flowers arranged in one's home is delightful, but if you find, as I do, that your time is limited and you would rather enjoy the flowers for a longer time in the garden than for a few days in a vase, try growing a few everlasting which, when well preserved, will serve to decorate your home all year round.

It is fun and easier than you think to bring nature indoors for your enjoyment. I started simply by air-drying a few favorite flowers in our attic. Yellow *Achillea filipendulina* is a superb example. It is drought-resistant, grows in poor soil, prefers sunlight and bears numerous yellow flowers profusely from June to September. Then, whenever we went to Maine in the summer, I would look for pearly everlasting along the roadside, as this is also an excellent and easy flower to air dry. Start in this fashion, looking for easy flowers to grow or for seed and fruit pods which are interesting to collect. As you become more involved in this art, your eye will become trained for other flowers to grow or to pick as you drive through the countryside.

The simplest method of drying flowers is to hang them upside-down in a warm, dry, darkened room in which there is adequate air circulation; an attic is usually a good spot.

For the best drying results the material should be gathered on a bright, sunny day. When cutting, the best technique generally is to cut the flowers just before they reach full maturity. However, this rule does have its exceptions, and the only real way to discover and achieve the effect you like is to experiment. Remove all the unnecessary parts from the stem so it will dry faster. If you wish to fashion a curve in the stem, shape the plant by wiring it while it is fresh. Group a small bunch together and tie it with elastic bands or twistems and then suspend the bunches from a rack or clothesline with string, allowing free air to circulate around each group. Some flowers, such as pussy willow and sumac, and



Dorothea Thomas

seed pods can be placed upright in a jar. After your material has completely dried (eight to 14 days) it can be stored in a covered box in a dry area.

Certain flowers like strawflowers and sunrays are much easier to work with later if you wire them before they dry. Simply cut off the stem next to the flowerhead, insert a florist's No. 22-gauge wire through the center of the flower, fold the wire tip back down and pull the wire firm, thus holding it in place. Then hang it upside-down to dry.

You will gradually learn to apply your own special techniques to different materials. Here are a few specific practical suggestions which I have found to be helpful. With bells-of-Ireland I always pull the tiny white center flower from the leaf axils and, also, all the leaves. Then with tweezers I pluck out the pure white corolla in the enlarged calyx, leaving only a lovely, delicate, green bell. With lunaria, or honesty, one must remove the outer covering of the fruit by gently rubbing it to leave a papery, satiny disc. Sometimes with rudbeckia,

when some of the yellow petals have dropped, I pluck all the rest of the yellow petals and wire the center, leaving a frame of the green calyx around the dark center. I always spray cattail and goldenrod with a clear plastic fixative to prevent the seed from flying all over the house. Sometimes with pearly everlastings which have been picked too late I pluck the center when it is starting to go to seed, leaving a lovely, pale-green-colored shell. If Queen-Anne's-lace is placed with the flowerhead flat on the floor with the stem leaning upwards against a box or board, it dries in a much more natural state. Otherwise, the flowerhead shrivels up. One can also press the whole flower and use it in that form.

When experimenting with blue hydrangea, I found that if it were picked right after it came into full bloom and was air-dried, the globular head shriveled to a completely different form but retained a perfectly lovely powder-blue color. When picked in early fall, after the tissues had changed, the large globular flower maintained its shape after hanging, and the

color deepened to a greenish-blue with fringes of rose.

Grasses, both ornamental and weed, offer different textures and forms that add flare and grace to a flower arrangement. They must not be overlooked. This group of dried material should also include wheat, barley, oats, rye and millet. Grasses air-dry so easily that it is wise to collect a variety throughout the seasons. In spring and summer the grasses have a soft-green color which can be retained if picked within two weeks of their development. If allowed to mature they take on a buff or tan color and sometimes even a pleasing white appearance. All parts of the country offer different easily-collected varieties.

Hang grasses upside-down, using the air-dry method, but place some upright in a jar if you wish to obtain a graceful curve in the stem.

Preserve leaves and flowers by pressing them. This method leaves the material flat but in most cases the color is unchanged. Pressing is an excellent way to preserve foliage and it is fun to experiment with your favorite greens. I particularly like to do *Filipendula* leaves and various ferns with an airy, lacy pattern and often attempt to bend them while green into a slight curve.

The pressing method of preservation involves placing the material between several thicknesses of newspaper or between pages of magazines printed on absorbent paper. Weight them down evenly and leave them for three to four weeks, at which time they are ready to be used.

As you become more interested in drying flowers and wish to preserve a wider variety of them, another very popular material to use is silica gel. Silica gel is a chemical

compound in powder form which absorbs moisture. Borax and sand also are often used and produce the same effect. Silica gel is expensive, but it can be used over and over again simply by drying it in the oven. When using such an agent the flowers do

Many flowers are ideal for drying. See the chart on the following page which suggests plants that are suitable and when and how to harvest them.

retain their brightness of color and beauty of form. It is important to process the flower before it has passed its color prime and to take it out of the agent at the right time or it will become too brittle to handle. As before, you will find that you will develop the appropriate techniques through experimentation.

Again, certain flowerheads, such as daisies, rudbeckias, zinnias and the like should be wired first before placing them in the agent, because their stems do not support the flowerhead well when dried. Some of the better-known flowers which can be dried successfully in silica gel or a similar material are: rudbeckia, chrysanthemum, daffodil, daisy, larkspur, marigold, pansy, rose, tulip and zinnia. By constantly experimenting with different flowers at various stages of development you will soon be thrilled with your successes.

Preserve the foliage of woody plants by the glycerine or antifreeze method. This often changes the color to brownish hues, but the leaves remain soft and pliable. It is

important that you select fully mature leaves which are perfect in form. Wash the leaves gently, scrape the bark at the bottom of the branch and then either crush or slash the bottom of the stem. Place the stems in a solution of one-third glycerine and two-thirds water or one-half antifreeze and one-half water. This method takes at least two weeks for most materials; some require a longer time. Leaves treated in this way will last for several years. Some of the following are well preserved by this method: barberry, beech, crabapple, forsythia, leucothoe, magnolia, oak and rhododendron.

Nature provides not only beautiful flowers and foliage, but also interesting and distinctive pods, cones and nuts which can be dried. Again, the wayside, woods and fields abound with these specimens, and one only needs a trained eye to find them. When picking wild material, keep in mind the importance of conservation. Just cut the decorative piece you wish, shake any seeds to the ground and always leave some behind so the wild plants will be perpetuated.

It is interesting to note that at garden centers and floral shops there is a marked increase in the number of dried materials available, showing that many people are becoming interested in this phase of flower arranging. All of the methods mentioned here are used by florists as well as painting, dyeing, gilding and bleaching.

A comparatively new dried plant form is the contrived flower, which is made by fragmenting flowers, seeds and pods and reassembling them in various forms or designs. These are a challenge to identify, but with a little glue and wire they are a great joy to the amateur horticultural craftsman.

My initial approach to preserving flowers and foliage was to collect choice specimens in my flower garden, in fields and along roadsides and experiment with them. After a few successful results with arrangements, however, I decided to give up half of our vegetable garden and grow some of the easiest of the everlasting plants in rows for drying purposes. I adopted the Ruth Stout method of mulching with hay and found, to my delight, that this part of the garden takes care of itself all summer long. All I have to do is to cut and dry at the proper time. Now nature's beauty is preserved for our family and friends to use and enjoy indoors all winter long.

I fully realize the value of ornamental grasses and so have allotted a small section of my garden to growing a few species. Here are some noteworthy ones:

Common Name	Scientific Name	Height in feet	Annual	Perennial
Animated oats	<i>Avena sterilis</i>	3-4	x	
Feather grass	<i>Stipa pennata</i>	2-3		x
Fountain grass	<i>Pennisetum setaceum</i>	3-4		x
Foxtail millet	<i>Setaria italica</i>	2-4	x	
Hare's-tail grass	<i>Lagurus ovatus</i>	1½-2	x	
Job's tears	<i>Coix lacryma-jobi</i>	3	x	
Plume grass	<i>Erianthus ravennae</i>	12		x
Quaking grass	<i>Briza maxima</i>	2-3	x	
Tuber oat-grass	<i>Arrhenatherum elatius bulbosum</i>	4		x
Zebra grass	<i>Miscanthus sinensis 'Zebrinus'</i>	6-8		x

FLOWERS SUITABLE FOR AIR DRYING

	Height	Color of Flower (or Fruit)		Annual	Perennial	Flower used	Fruit used	Matures Spring	Matures Summer	Matures Fall
<i>Astilbe</i> hybrids, <i>Astilbe arendsii</i>	3'	W—white	WPR		●	●			●	
Barley, <i>Horedeum vulgare</i>	4'	G—green	Br	●			●		●	
Bells-of-Ireland, <i>Moluccella laevis</i>	2'	Y—yellow	G	●		●	●		●	●
*Butterfly weed, <i>Asclepias tuberosa</i>	3'	B—blue	O		●	●			●	
*Cattail, <i>Typha</i> species	6-10'	Br—brown	Br		●	●			●	●
Chinese lantern, <i>Physalis alkekengi</i>	2'	P—pink	O-R	●	●		●		●	●
*Clovers, <i>Trifolium</i> species	1-2'	Pu—purple	WPY	●	●	●			●	●
Cockscomb, <i>Celosia cristata</i>	3'	O—orange	RY	●		●			●	●
*Coralbells, <i>Heuchera sanguinea</i>	1-2'		PRW		●	●		●	●	
Cupid's-dart, <i>Catananche caerulea</i>	2'		B		●	●			●	
*Dock, <i>Rumex</i> species	1-6'		Br		●		●		●	●
*Dusty-Miller, <i>Centaurea cineraria</i>	3'		Gray foliage		●			●	●	●
*Elderberry, <i>Sambucus</i> species	8-30'		W		●	●		●	●	
*Galax, <i>Galax urceolata</i>	6-12"		W		●	●			●	
Globe thistle, <i>Echinops ritro</i>	2'		B		●	●	●		●	
*Goldenrod, <i>Solidago</i> species	1-4'		Y		●	●			●	●
*Grasses, many genera and species	1'-6'		G Br	●	●		●	●	●	●
Gypsophila, <i>Gypsophila elegans</i> , <i>G. paniculata</i>	10"-3'		WP	●	●	●			●	
*Heather, <i>Calluna vulgaris</i>	18"		WPR		●	●	●		●	
Honesty, money plant, <i>Lunaria annua</i>	3'		W-gray	●	Biennial		●		●	●
Hydrangea, <i>Hydrangea</i> species	5'-8'		WRB		●	●			●	
*Joe-Pye weed, <i>Eupatorium maculatum</i>	6-10'		Pu		●	●			●	
Lady's-mantle, <i>Alchemilla vulgaris</i>	9-12"		G		●	●			●	
Lavender, <i>Lavandula angustifolia</i>	2'-3'		WB		●	●			●	
Love-in-a-mist, <i>Nigella damascena</i>	1'		WB	●		●	●		●	
Love-lies-bleeding, <i>Amaranthus caudatus</i>	3'-5'		PU,RWO	●		●			●	
*Marigold, <i>Tagetes</i> , several species	6"-3'		YR	●		●			●	●
*Meadow rue, <i>Thalictrum</i> species	1'-6'		WYPuR		●	●			●	
*Millet, <i>Panicum miliaceum</i>	3½'		Br	●			●		●	
Monkshood, <i>Aconitum carmichaelii</i>	6'		B		●	●			●	
*Oats, <i>Avena</i> species	3'-4'		Br	●			●		●	
*Onions, <i>Allium</i> species	6"-3'		BrYPWPu		●	●			●	●
*Pearly everlasting, <i>Anaphalis margaritacea</i>	3'		W		●	●			●	●
*Peppergrass, <i>Lepidium</i> species	2'		Br	●			●		●	●
*Pussy willow, <i>Salix discolor</i> , <i>S. caprea</i>	20'		Gray		●	●		●		
*Queen-Anne's-lace, <i>Daucus carota</i>	3'		W	●	Biennial	●			●	
*Rudbeckia, <i>Rudbeckia</i> species	3'		CY	●	●	●			●	●
*Rye, <i>Secale cereale</i>	3'-5'		Br	●			●		●	
*Sea lavender, <i>Statice</i> , <i>Limonium</i> species	1'-2'		WBRP	●	●	●			●	●
*Silverrod, <i>Solidago bicolor</i>	1'-3'		W		●	●			●	
*Smartweed, <i>Polygonum hydropiperoides</i>	2'		PR	●		●			●	
Sorghum, <i>Sorghum bicolor</i>	7'-12'		Br	●			●		●	
*Spiraea, <i>Spiraea</i> species	1½'-5'		WPR		●	●		●	●	●
Strawflower, <i>Helichrysum bracteatum</i>	3'		OWRY	●		●			●	●
*Sumac, <i>Rhus</i> species	20'-30'		R		●		●		●	●
Sunrays, <i>Helipterum</i> species	1½'		PYW	●		●			●	
*Tansy, <i>Tanacetum vulgare</i>	3'		Y		●	●			●	
*Teasel, <i>Dipsacus sylvestris</i>	6'		Br		Biennial		●		●	●
*Wheat, <i>Triticum aestivum</i>	4'		Y-Br	●			●		●	
Winged everlasting, <i>Ammobium alatum</i> 'Grandiflora'	3'		W	●		●			●	
*Wormwood or sagebrush, <i>Artemisia</i> species	1'-6'		Gray Foliage		●			●	●	●
*Yarrow, <i>Achillea</i> species	3-4'		WPYR		●	●			●	●
*native or escaped										

Seeds of the plants mentioned in this article can be obtained from: *Burpee Seed Company*, Warminster, PA 18991—Clinton, IA 52732—Riverside, CA 92502 or *George W. Park Seed Company, Inc.*, Greenwood, SC 29647. ☉

—Dorothea Thomas

POINSETTIAS: MAKING THEM BLOOM AGAIN

Poinsettias have changed. Sophisticated genetics offer us new varieties that adjust well to average home environments, disproving their reputation for being among the more sensitive of house plants. Now passé are the old-fashioned, leggy, leaf-dropping plants of decades past. Plant physiologists have developed "growth regulators." One such chemical is CCC, commercially labeled Cycocel, which produces from cuttings a shorter specimen with fuller foliage of darker color and blossoms that are denser and more compact in form than untreated plants. These modern poinsettias are categorized as Standards, growing to 18 inches, or Pixies, disciplined to under one foot. A wider color spectrum also has evolved, broadening the color range from reds to oranges, dusty-roses and the long-lasting pastel pinks and whites, as well.

Growth-regulating formulas are not for the amateur, however. Many cultural factors are involved; among them the amount of concentration applied to differing soil types, the plant variety and ultimate height desired.

The primitive *Euphorbia pulcherrima* ("most beautiful" is its botanical meaning), a member of the spurge family, was discovered in subtropical Mexico growing to the ungainly height of 10 feet. What we see as flowers are, in the language of botany, really colored, modified leaves called bracts. The plant's true flowers are nubby clusters at the center whorl of these bracts. Coursing through the plant's tissues is a sticky white sap characteristic of the large *Euphorbia* genus, which also claims as members the crown-of-thorns and many other cactus-like succulents.

If these plants are properly cared for they can be a long-lasting addition to the indoor and outdoor garden. Success with poinsettias relies primarily on correct watering. Its first soaking, when the plant is brought into the house from the florist or nursery, establishes a rule of thumb for future care. Water until moisture seeps out, but do not permit the poinsettia to stand over one



Robin Johnson-Ross

hour in a water-filled saucer. Henceforth, water whenever the soil's surface feels dry; otherwise, a potful of soggy roots will result in leaf-drop, yellow foliage and withered flowers. If dryness of the atmosphere is the problem, rest your plant on top of pebbles in a water-filled tray to catch moisture evaporating from the tray.

Poinsettias favor a brightly lit location but not a sunlit window. In a sunny window temperatures usually range between 68° and 75°F, too warm to keep the plants healthy and blooming for a long period. Poinsettias also don't like drafts, either cold ones from open doors or an air conditioner, or the warm wafts coming from heat ducts. Its reaction, once again, is to yellow and drop its leaves.

Once the plants have done service as holiday decorations, you must decide if they should be kept in expectation of another season's bloom, or if they should be thrown away. Let me persuade you to keep them, for contrary to popular opinion, bringing a poinsettia's bracts into color is an adventure in plant growing.

After blooming, remove the plant to a

dry, dark basement or comparable location where temperatures are 45° to 60°F. Eventually the plant will lose all its leaves, but do not neglect giving your poinsettia a cup of water once a week through this dormancy period to prevent the roots from drying.

In May transplant the poinsettia to a pot one size larger than its present container. Use a humusy mix of 2 parts packaged soil, 1 part sphagnum peat moss or screened compost and 1 part sand. Prune the plant just above the third or fourth node (those latent bud-swellings found along each stem) and place it in a bright window. Water sparingly until signs of life appear, then increase the amount of watering the plant receives.

When spring weather is safe for the setting out of all tender plants, sink the poinsettia in a sunny garden border or plant it in a patio container. Maintain a moist soil and fertilize it with liquid plant food twice monthly through the summer.

No later than August, pinch away growth tips to encourage sturdiness. Pinch only once or bracts may not form. Clip all insignificant and weaker stems but leave the strongest three, five or seven branches for development of bracts, depending upon the plant's size.

Additional plants are propagated from cuttings taken at pruning-back time in the spring. Root them in soil used for repotting. Find a warm spot and tuck the container of plantlets under a moisture-conserving plastic tent, aerating when beads of condensation form.

Acclimate plants to their winter residence prior to turning up the thermostat. Bring them indoors during the first weeks of September in areas where frosts come early and place them in a sunny window sheltered from drafts, continuing the regimen of watering and feeding.

Euphorbia pulcherrima is a short-day plant. Those who monitor such phenomena have proved that poinsettias require 12 hours of uninterrupted darkness to form buds and stimulate bracts to color.

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THE INDOOR GARDENER CONT'D

Scientists also insist this no-light period is most critical between October 10 and Thanksgiving. A minute of artificial light shining during this time disrupts the blooming schedule.

In the past one would shield prospective bracts by carrying a poinsettia each evening from a lamp-lighted room to the darkness of a closet or similar cloister. Or one would fashion a cloche from a doubled grocery bag to cover the plant at sunset. Although my growing window was that of an unused room, nightly illumination from street lamps and passing headlights still affected the plant. Gardening under grow lights in a spot that would be in total darkness when the lights were not on seemed an ideal experiment for coaxing a poinsettia's bracts into color.

I selected a 150-watt broad-spectrum grow bulb, which costs about \$5 and fits any screw-type, medium-base socket. Though it is not a necessity, an automatic timer is a convenient accessory. By setting it to perform at the correct hours you eliminate all concern about flicking a plant light off and on.

Equipment in hand, I withdrew to a dim corner and installed the bulb in a goose-necked fixture positioned 30 inches above the poinsettia's top-most leaves. The spread of light measured a diameter of 36 inches (and not a glimmer was wasted since I used the defused halo at the periphery of the lighted circle to grow ferns, peperomia, palms and sansevieria). At this distance the poinsettia plants were maintained at approximately 70°F; a closer range provided 80°F temperatures needed to root cuttings. Temperatures in the spare room, when the lamp was off, dropped 5° to 8°.

Using my area's shortest day as a calibrator, I set the timer beginning October 1 for nine hours of supplemental light. My plants did experience leaf loss at the base of the stems with this treatment (due to the lessening of light intensity reaching toward the pot's rim), but this, to me, was not a drawback since the sparseness could be camouflaged by a complimenting bow. And who was to notice when the largest bract on my poinsettia measured 11¼ inches and the smallest eight inches! By Thanksgiving most of the bracts of my plants were well-colored with green bud clusters just beginning to yellow in readiness for the holiday season. The cycle was to begin again. ☺

—Judith Hillstrom

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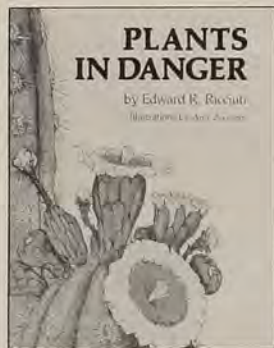
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BOOK REVIEWS

PLANTS IN DANGER. Edward R. Ricciuti. Harper and Row, Publishers, New York, New York, 1979. 86 pages, hardcover \$8.95. Available to members of the Society at a 20 percent discount plus \$1.25 for postage and handling (\$8.41 total).



This children's book can be recommended as required reading for anyone interested in the preservation of endangered species. In fact, it ought to be mandatory reading for anyone *not* interested. In clear and simple language the manner in which the world's plant populations are threatened by man's expanding civilization is made readily understandable, but more important, the way in which this destruction in turn endangers man is sharply brought to the reader's attention. Without the polemics which so often detract from the story being told, the very present danger of plant extinctions and their ultimate consequences is clearly told.

TREES, SHRUBS AND VINES FOR ATTRACTING BIRDS. Richard M. DeGraaf and Gretchin M. Whitman. University of Massachusetts Press, Amherst, Massachusetts, 1979. 256 pages, hardcover, \$12.50. Available to members of the Society at a 20 percent discount plus \$1.00 for postage and handling (\$11.00 total).

Although intended primarily for the northeastern states, the descriptions of plants, and the birds that are attracted to them, are applicable to suggested garden plantings throughout a much wider portion of the United States. In addition to a good description of each plant and its outstanding landscape features, good information is given on cultivation and propagation. A table of bird visitors for each plant lists those portions of the plant used for food (where applicable), as well as whether or not the plant is used for cover or nesting by each bird species. This well-written book

provides a means of selecting landscape material which can make your garden attractive for its bird visitors as well as for its plantings. Strongly recommended for the more imaginative homeowner.

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TWO ON LANDSCAPING

NEW BUDGET LANDSCAPING. Carlton B. Lees. Holt, Rinehart and Winston, New York, New York, 1979. 162 pages; paperback \$5.95; hardcover \$10.95.

New Budget Landscaping is intended to help the homeowner better utilize his outdoor living space. Presented simply and clearly, it not only gives basic principles of landscape design, but it also offers many examples of yard and garden design applicable to the average home. A brief appendix of 20 pages gives lists of applicable plant material for many situations. For the homeowner who wants something more imaginative in landscape design than the typical tract house symmetrically framed by a few evergreens, this is an excellent primer.

PLANTING DESIGN. William R. Nelson. Stipes Publishing Company, Champaign, Illinois, 1979. 186 pages, spiral bound \$9.00. Available to members of the Society at a 10 percent discount. Postage will be paid by the publisher (\$8.10 spiral bound or \$12.60 hardcover when the hardcover becomes available). *Planting Design* is an introductory text for the future landscape architect, but basic principles are explained in a manner easily understood and assimilated by the less experienced amateur. The real value of this book, however, lies in the nearly 100 pages of suggested plant material.

Lees' book is a better guide to home garden design for the amateur, but the longer and more descriptive list of suggested plant material in Nelson's book makes these two a good working pair for the homeowner seriously interested in creating a better living space around his home.

ALL ABOUT AFRICAN VIOLETS. Montague Free (revised by Charles Marden Fitch). Doubleday and Company, Inc., Garden City, New York, New York, 1979. 255 pages, hardcover, \$10.95.



This newly revised and expanded edition of an older classic (first published in 1949) is a complete guide to growing, propagating and caring for your African violet. Unfortunately, only 30 pages are devoted to the description of species and cultivars and, although this section is thoroughly up-to-date, it is much too general to be of any value to the specialized hobbyist.

HOW TO GROW FLOWERS FROM SEEDS. Elvin McDonald. Van Nostrand Reinhold Company, New York, New York, 1979. 236 pages; paperback \$4.95; hardcover \$9.95. Available to members of the Society at a 20 percent discount plus \$1.25 for postage and handling (\$4.21 paperback or \$9.21 hardcover total).

How to germinate seeds and grow seedlings of all sorts of flowering plants.

THE HEALTHY GARDEN BOOK. Tom Riker. Stein and Day Publishers, New York, New York, 1979. 224 pages; paperback \$7.95; hardcover \$11.95. Available to members of the Society at a 25 percent discount plus \$1.25 for postage and handling (\$7.21 paperback or \$10.21 hardcover total).


Insect pests and diseases arranged by host plant name, but no specific recommendations on how to deal with them.

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—Gilbert S. Daniels

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<p><i>GENTIANS</i> Mary Bartlett</p>  <p>This book is filled with everything you need to know about these lovely flowers, including 21 full-color plates. \$6.95 retail, \$4.87 to members of AHS.</p>	<p><i>LEXICON OF SUCCULENT PLANTS</i> Hermann Jacobsen</p>  <p>Over 8,500 species are covered in this text. Information on morphology, countries of origin and points of identification is arranged as a dictionary in one volume. \$25 retail, \$17.50 to members of AHS.</p>	<p><i>CACTI</i> Professor J. Borg</p>  <p>First published in 1937, this famous book is still the standard work on cacti for amateurs. \$12.95 retail, \$9.07 to members of AHS.</p>

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FLOWER BUD COLD-HARDINESS

With the arrival of spring our gardens burst forth with a bountiful array of flowers. Many of these flowers, such as yellow forsythia or white dogwood, are valued for the lovely additions they make to the landscape. Others, such as the strawberry and apple, are not only beautiful, but their blooms also mean that one additional step toward harvesting the luscious fruit has been reached. These flowers of spring survive the hazardous road through winter in spite of many obstacles. Much of the success of their journey depends upon their degree of cold-hardiness.

Whether or not a plant is cold-hardy depends on many factors. Certain cultivars are inherently more cold-hardy than others, but fall and winter temperatures and the time at which a plant initiates flower buds are often factors affecting survival. Temperate zone woody plants, for instance, usually initiate their flower buds during the late summer or autumn of the growing season prior to blooming. This is particularly true for spring- or early summer-blooming plants. Apple flower buds, for example, are initiated when summer growth slows down, but the bloom doesn't appear until the following spring. Likewise, forsythia, dogwood, lilac and strawberries start their flower buds in late summer.

Yet within the same plant family and geographical location a wide variation in time of initiation of flower buds may occur. Take the case of four different members of the rose family: in Michigan it was found that *Spiraea thunbergii* and *Prunus glandula* initiated flowers near the end of vegetative growth in late summer and early autumn. Early stages of *Pyracantha* flowers, on the other hand, developed in October, but differentiation of individual florets occurred in spring after stem growth started. Among garden roses the flower buds are initiated in early stages of spring growth. (These flower buds don't overwinter, but winter injury to the stem can slow spring flower development.)

Flower buds that develop during summer and fall in the temperate zone usually are inactive over winter. They are dormant or "resting." Even warm weather won't make them bloom; several hundred hours



Robin Johnson-Ross

at low temperatures are required to break this dormancy before further development occurs. For this reason, many such flowers may fail to open properly near their southern geographical limit after an exceptionally mild winter because they didn't have enough cold.

Generally, mature buds will not begin to grow during winter warm spells until after they have been exposed to sufficient cool weather to satisfy the rest period. Sometimes this inhibition is overcome by unknown environmental conditions, perhaps a period of dry weather in late summer. Then the flower buds begin to open on some mild autumn or early winter days. Subsequent freezing temperatures usually will kill them.

Even properly maturing buds may be harmed when unseasonably warm temperatures occur during mid or late winter. After the rest period, some plants may begin to sprout, resulting in injury when seasonably cold temperatures return. A Japanese study of *Forsythia viridissima* showed that six weeks of temperatures near freezing during October and November were needed before flower buds

would force but after January, no chilling was needed. Mild temperatures at this time would force the buds.

To complicate matters, scientists also know that the rate of cold-hardiness development in the fall may differ among cultivars or even from year to year for the same cultivar. In our Vermont research, flower buds of *Rhododendron* cultivars 'America' and 'Lee's Dark Purple' were injured in November and December at laboratory temperatures equal to or even warmer than record low outdoor temperatures by these dates. 'Roseum Elegans', 'Boule de Neige', and 'Catawbiense Boursault' were only injured when temperatures were colder than has ever occurred by these dates. But they, too, were killed in other locations where temperatures reach -35°F in January.

Since flower bud cold-hardiness is partly dependent upon weather conditions in the autumn, the same cultivar also may have more injury in one geographic area than another, even though the minimum temperature was lower when the uninjured plant grew. Flower buds of peaches growing in Vermont, for instance, may tolerate lower temperatures in December than the

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SEASONABLE REMINDERS CONT'D

buds on the same cultivar in New Jersey. But there is an inherited limit to the temperatures each cultivar can tolerate. In this case, peach buds are killed during most Vermont winters.



Some flower buds are naturally protected from freezing by a natural process known as supercooling. This is the cooling of water below its freezing point without ice formation. Ice formation within plant tissues is generally necessary for injury, thus supercooling allows water in some tissues to reach temperatures well below freezing before ice forms. Tissues vary in their ability to supercool for reasons that are not known. In Minnesota, supercooling protected deciduous azalea buds to -41°F . Supercooling protection of flower buds has been observed for numerous other plants such as peach buds, apricot, European and Japanese plum, sweet and sour cherry and blueberry.

Still another complicating factor is that not all parts of a plant develop equal cold-hardiness. Although the roots of most plants are the least winter hardy, these are generally not exposed to severe cold temperatures. Flower buds are often the least cold-hardy of the above-ground portion of a plant. In controlled laboratory studies, *leaves* and *stem tissues* of *Rhododendron* 'Lee's Dark Purple' and 'Boule de Neige' survived -22°F in December. On the other hand, *flower buds* of 'Lee's Dark Purple' were injured at 5°F and those of 'Boule de Neige' at -13°F . *Forsythia* and *Chaenomeles* flower buds are often killed during winter in northern states with little or no injury to stems. This is also the case with many of the fruit plants.

Most people think that injuries caused by low temperatures only occur during the winter, but damage can happen anytime from fall through spring. Flower buds of P. J. Mezzitt (P.J.M.) rhododendron often survive the winter in Vermont where tem-

peratures reach -35°F and are then killed by spring frosts as they begin to expand.

In cold regions one should select cultivars or species known to be flower-bud hardy. For example, in northern states *Forsythia ovata* will often flower over the entire bush while *F. intermedia* only flowers below the snow line. Providing some means of cold protection also can help prevent damage. For low-growing plants such as strawberries, a covering of straw mulch in the late fall usually improves flowering and fruiting the next spring. The mulch should not be applied too early or cold acclimation will be slowed, resulting in increased chances of injury. In Vermont the plants don't begin to harden until early October. Mulch should be applied by mid November.

For garden roses, late November is soon enough to apply mulch in northern states. In our research, rose canes unmulched until early December were more cold-hardy than those mulched in either October or November. However, in northern states December temperatures may be cold enough to injure unprotected rose canes. Even though flower buds don't form until spring, healthy, vigorous canes will encourage flower formation.

Artificial mulches such as straw lose their insulating value when they become matted down and filled with ice. In studies with straw mulch on strawberries, we found that the mulch protected plants in early winter and late winter, but if matted down or filled with ice in midwinter, the protection was lost.

Winter protection of shrubs and trees against flower bud injury is generally impractical. Straw-wrapped stems afford only a few degrees temperature moderation which is usually insufficient protection in midwinter. For early flowering types, planting on north slopes, on the north side of a building or other cool places will often delay flowering a few days, perhaps avoiding a cold spell. For mulched perennials and strawberries, delay mulch removal until just before growth starts. This will delay flowering which may avoid the last spring frosts.

In spite of man's best efforts, winters often play unexpected tricks. A flower bud's trip through winter continues a gamble. Perhaps it is this bit of mystique that deepens our appreciation for spring floral beauty. ❁

—Norman Pellett and Bertie Boyce

LETTERS

I don't like to carp, but sometimes I must. The picture on page 10 of Volume 58, Number 2 is not of *Iris pumila*. This species is essentially stemless. It looks to me like something in the *I. chamaeiris* group, probably a hybrid seedling or named variety from the 1920's or 30's. *I. pumila* is not as easy to grow except in climates that get good snow cover all winter and/or have fairly heavy soil. The *I. chamaeiris* group and its hybrids are better for general use in most of the USA.

Peg Edwards
Massapequa Park, New York



Author Pam Harper replies: I don't call this "carping." Such letters are welcome and valued. My own "pumila" iris were grown from seed so labelled and I found them easy in sun and light soil, snow infrequent (Maryland). Does Ms. Edwards live further north? The plant in the picture was photographed in Connecticut. Can other iris fanciers identify it?

The artwork and publication of my *Magnolia* 'Caerhays Belle' piece was excellent. I was very pleased. The response in calls and letters has been almost overwhelming and I am sorry not to have plants enough to furnish our avid readers. We are propagating as fast as possible. The color photos in your magazines are just marvelous. Thank you again for your kind efforts.

James Gossler
Springfield, Oregon

The photo by Pam Harper of 'Kwanso' is indeed handsome, actually more so than the flower deserves. We grew it for many years but found it too invasive. A friend still has it growing on her farm.

The "Daylily Handbook" (*American Horticultural Magazine*, Spring, 1968), on page 98, lists it as being "very common in gardens." I would suspect many of your readers are familiar with it.

Inge Ramthun
Rockford, Illinois

I've been wondering for years about the "double daylilies" shown in the attached slide and was delighted to see the article, "The Forgotten 'Kwanso'" by Beryl and Vivian Munday in the June/July, 1979 *American Horticulturist*. At first glance, my lily and the one in the magazine appeared to be the same. Upon closer examination there appears to be some difference in the center of the blossom.

These blossoms appeared some years ago in a bed of ordinary daylilies that had grown from a few plants I had transplanted from my mother's garden. Her garden had been planted by the previous owner. The house was built in the early 1900's, so the plants may have been there for quite some time.

Two years ago I removed the "double flowering" plants from the others in my bed and planted them in a separate bed for observation. I am anxiously awaiting the blooming season to see if all of the blossoms are double and to compare them with the photo in your magazine.

Dianne L. Sims
Rockville, Maryland

I enjoyed the article on 'Kwanso' daylilies. The history and the hint of mystery about it made me immediately order a price list of daylilies with a question on the availability of the plant.

For the price of a stamp I got a very extensive price list (300+ daylilies, 200 iris, 100 hosta) from Mrs. N. Jernigan, Route 5, Dunn, NC 28334. It is best to include any questions on variety wanted as she has at least 200 varieties in the process of either being phased in or out. 'Kwanso' was not on her list, but she has it available for \$1 per plant plus postage. I asked her why it was not listed. She said that she had many others that were double and in nicer colors. She also warned that 'Kwanso' should be kept in a container since it rapidly "spreads like a weed" in the garden.

I hope the above will be of help to other readers.

George Johnson
San Francisco, California

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Trees for Small Spaces

TEXT AND PHOTOGRAPHY BY T. DAVIS SYDNOR



6

Carolina silver-bell, *Halesia carolina*

Rising land costs and skyrocketing interest rates have combined to dramatically increase the cost of single-family residences. As a result, builders have been forced to offer smaller and smaller homes on smaller and smaller lots to the consumer. The incidence of multi-family residential construction also has increased. These changes make for dramatic differences in the way the landscape is designed. Gone are the

days of rolling lawns and expansive shade trees. Here are the days of enclosed patios, commonly-shared exterior spaces and scaled-down plantings to complement the scaled-down outdoors.

What we are denied in terms of sheer size in the way of plantings we make up for in quantity, however. It is now common to see many plants *inside* the home, even in the office. Large shade trees may no longer

be practical, but small trees are. One attractive alternative is the use of shrubs trimmed as trees.

If your space needs now require that you give up the notion of growing a spreading chestnut tree, consider instead one of these "shrub trees," which, with minimal pruning, can grow for about 20 years without exceeding a height of 25 feet and can add beauty to your small-space garden.



14

Scarlet fire thorn, *Pyracantha coccinea*

White fringe tree—*Chionanthus virginicus* (1)

This small tree grows along the Eastern Seaboard and exists in its native habitat as an understory tree. It is shade tolerant. In fact, it requires less maintenance in shade since full sun promotes sucker growth at the base. Forsythia-like white flowers appear during the early part of June above the expanding foliage. The sexes are separate. Male flowers are usually slightly larger than the female, thus the male white fringe tree is considered by some to be the more desirable. The female plant does bear a blue-black berry that is attractive in its own right. In addition to possessing flowers and a small stature, this plant also features excellent yellow fall color. It is one of the last plants to leaf out in the spring, causing many people to think the plant is dead until they become familiar with this characteristic.

Chinese Dogwood—*Cornus kousa chinensis* (2)

This dogwood has many of the ornamental features which we have come to know and enjoy in the native flowering dogwood: horizontal branching, attractive flowers, showy red fruit and excellent fall color. The Chinese dogwood, however, is a smaller, more shrub-like plant, reaching a mature height of about 20 feet. It flowers about three weeks later than the native flowering dogwood and its white bracts, like those of the flowering dogwood, are the showy portion of the inflorescence.

Cornelian cherry—*Cornus mas* (3)

The Cornelian cherry is an excellent small dogwood with very attractive exfoliating bark. The flowers blossom in earliest spring before the leaves are present. This species does not have showy bracts as does the flowering dogwood, thus the visual impact is of the myriad, yellow flowers themselves.

The flowers are followed in August and September by a bright red fruit one inch long and three-quarters of an inch wide. The fruit is edible and can be used in tarts and pies. Another asset of the Cornelian cherry is that it is relatively insect and disease resistant. This is an uncommon but desirable trait.

Gray Dogwood—*Cornus racemosa* (4)

Gray dogwood is a shrub which is normally grown with multiple stems. This

plant suckers freely at the base, which may be a maintenance problem but no more severe than the problem which would be created by using some of the freely-suckering flowering crabapples. White flowers appear in early to mid June. The flowers are displayed above the foliage, making an attractive show. Berries change to a very pale-green or white before maturing during the month of August. This dogwood, unlike the native flowering dogwood, is useful for some problem landscape sites because it will tolerate poorly-drained soil. The gray dogwood also has excellent fall color.

Winged euonymus—*Euonymus alata* (5)

Winged euonymus, or burning bush, is well-known for its excellent fall color. No other plant flaunts such a bright, vibrant red. Over the years dwarf-growing cultivars have been promoted. Larger-growing cultivars will reach a height of nine to 15 feet, however, and can be used as small trees. This plant will tolerate light shade. The flowers are not showy and may be a detriment. Like the other *Euonymus* species, they are pollinated by and attract a great number of flies. The fruit is certainly less showy than most other *Euonymus* species, but it is attractive at close range during late summer. Fruiting is enhanced when the plant is grown as a small tree and not pruned heavily. Winter twigs are also an attribute when the plant is viewed at close range. *Euonymus* twigs and bark are highly regarded as food for rodents during winter, which may prove to be a detriment when the plant is grown as a small tree in areas subject to regular snow cover of six inches or more.

Carolina silver-bell—*Halesia carolina* (6)

The Carolina silver-bell is a native Appalachian mountain tree. The foliage obscures the flowers, thus the floral display is not as showy as it could be. A far better reason for growing the Carolina silver-bell is its rounded form, small size and striped bark. Place this tree near a well-traveled walk for the maximum enjoyment of the bark during the winter. The fruit is rather curious—four-winged and brown in color—and provides interest during the dreary winter months. The autumn color is yellow, but it is not particularly outstanding. One characteristic which is enticing to

today's gardeners is the fact that it is relatively insect and disease free.

Common witch hazel—*Hamamelis virginiana* (7)

This large shrub is native to the eastern United States in moist woodlands, but it will tolerate dry sites as well. Witch hazel grows as an understory tree or shrub and thus is shade tolerant. The yellow flowers appear during the months of October and early November after the foliage has fallen. When no hard frost occurs during the flowering period, this plant can make a reasonable floral display because the flowers are not hidden by the foliage, and they do not compete with other plants for attention. When grown in full sun and limbed up, witch hazel will sucker freely from the base and will require some maintenance. However, it remains less than 20 feet tall and is insect and disease resistant.

Shrub althaea—*Hibiscus syriacus* (8)

Rose-of-Sharon, or shrub althaea, is considered by many to be an old-fashioned shrub, but its habit of growth makes it better suited as a small tree. It usually grows in a vase shape with little or no foliage close to the ground. The rose-of-Sharon is the most cold-hardy member of the *Hibiscus* family. It flowers for a protracted time in mid to late summer. The flowers are quite large and showy and are usually between two and four inches in diameter. The single or double flowers range in color from white, through pink to blue. The brown fruit persists throughout the winter months to add interest to the winter garden scene. This plant is a favored host plant for Japanese beetle, however. Other plants may be preferred where these insects are particularly severe. Recent introductions of the rose-of-Sharon have been primarily dwarf forms, so be sure to select a tall-growing cultivar for use as a showy patio tree.

Peegee hydrangea—*Hydrangea paniculata* 'Grandiflora' (9)

The peegee hydrangea, like the rose-of-Sharon, is a coarse-growing shrub that is probably better adapted for use as a small tree. It is valued for its white, midsummer flowers. As the bloom dries on the plant, it changes color from white to pink. The dried tan flower panicle remains through-

out the winter months to add some interest. The peegee hydrangea was very popular during the Victorian era but has since fallen into disfavor because of its rapid growth and coarse texture.

Foster's holly—*Ilex X Fosteri* (10)

In general, the hollies make excellent small trees even though, through much of the United States, they are used as shrubs. I have chosen Foster's holly for this list be-

cause it is slightly smaller in stature than many varieties and grows well as far north as southern Ohio, although it does require some winter protection in a Zone 5 landscape. Foster's holly, like the Japanese holly, has few toothed leaves and many bright-red berries which last throughout the winter months unless the fruit is eaten by birds. In addition to the red fruit and the evergreen foliage, hollies also have attrac-

tive, smooth, gray bark. The bark alone might be reason enough to grow this plant as a patio tree since it is every bit as pretty as beech bark.

Amur privet—*Ligustrum amurense* (11)

The amur privet is one of the more cold-tolerant privets. This attribute is particularly important if the plant is to be grown as a small tree, since it takes time to limb up



and change its configuration. Privet, like holly, has enchanting, smooth, gray bark. This is rarely seen when the plant is grown as a shrub, but as a tree you are in for a treat. Other attributes of the amur privet tree are its floral and fruit displays. The fragrant white flowers in terminal panicles bloom in mid June, followed by blue-black fruit in the fall. The berries are enticing to a number of bird species and can be used to

lure birds such as the cedar waxwing into the garden for a closer look. Suckers will have to be controlled, as will seedlings, but the fine-textured foliage is certainly in proportion with limited space gardening. Other forms of *Ligustrum* will do as well and would be preferred in warmer climates. *Ligustrum japonicum*, which is pictured here, for example, is ideal where temperatures do not drop below zero.

Amur honeysuckle—*Lonicera maackii* (12)

This plant is one of the tallest growing of the honeysuckles. In addition, it has one of the most attractive summer-to-fall fruiting displays of any of the honeysuckles. Its vase-shaped habit of growth also makes it well-adapted for use as a small tree, but a little bit of pruning will probably be necessary. The flowers perfume the May air, but



because of their small size, they are not particularly showy. The fruit is a dark, translucent, red berry, which is effective from midsummer until late November unless the fruit is eaten by birds or other wildlife. The summer foliage is dark-green and an excellent background for flowers and fruit. This plant is relatively shade tolerant and can be used in an area getting as much as 75 percent shade. Flowering and fruiting will be reduced as the amount of shading is increased.

Sweet bay magnolia—*Magnolia virginiana* (13)

The sweet bay is a native of moist woodlands throughout the Eastern Seaboard and is, of course, relatively shade tolerant. The plant at the southern limits of its range is almost evergreen, but further north the plant becomes a deciduous shrub or tree. This small tree can attain heights considerably in excess of 25 feet but it is relatively slow growing and would maintain a height less than 25 feet for 20 years or more without excessive pruning. This magnolia blooms in June after the foliage is fully mature. In fact, a smaller number of flowers are born throughout the summer. The flowers are quite fragrant and relatively large (two to three inches in diameter). The flowers are then followed by a peculiar, cucumber-like fruit which splits to expose the red seeds. The fruit and floral displays are so sporadic that neither is a particularly outstanding feature. The most outstanding traits of the sweet bay are its form and its leathery, light-green foliage which remains on the tree until late autumn.

Scarlet fire thorn—*Pyracantha coccinea* (14)

Scarlet fire thorn, or pyracantha, is an extremely popular shrub at the present time. It is often used as a barrier plant because of its thorns, but because of its size, it may be better suited for use as a small tree. Pyracantha flowers blossom in great profusion and thus are very attractive even though the flowers themselves are only one-quarter-inch across. The flowers are white and appear in May. They are followed by fruit which, when unaffected by disease, is orange-red in color. This bountiful, brightly colored fruit is the primary reason pyracantha is so popular today. The foliage is held throughout the winter months and takes on a bronze cast most of the season.

Pyracantha scab is responsible for discoloring much of the pyracantha fruit in the eastern United States. This disease is rather difficult to control by spraying and is perhaps better controlled by growing resistant cultivars such as 'Mojave'. One other problem in growing pyracantha as a small tree rather than as a shrub is the fact that when grown in full sun, it suckers and watersprouts very freely. The University of California in recent years has been doing research with growth regulators to overcome this particular problem.

Alder buckthorn—*Rhamnus frangula* (15)

Alder buckthorn is a plant that has attained considerable popularity in recent years. Cultivars such as 'Tallhedge', introduced by American Garden Cole, Inc., have been extremely popular for their upright habit of growth. This plant is primarily grown for its excellent dark-green foliage and the cultivars for their upright habit. The flowers are unobtrusive, and the fall color is not particularly good. Fruit is black in color and attractive to birds. This plant is easily pruned as a small tree and is rather easy to maintain in this configuration. Alder buckthorn is susceptible to nematodes, however, which has caused many nurserymen and scientists considerable concern.

Rhododendron—*Rhododendron* hybrids (16)

Where this plant grows well it can make an excellent small tree. Of course, rhododendron is rather demanding in its soil requirements—soil must be moist, acid and well drained for this plant to perform properly. The flowers may be extremely fragrant and are available in a wide range of colors, from white through pink to purple and red. The tall, lanky-growing cultivars are well adapted for use as small trees. A cultivar of which I am particularly fond is 'America', one of the "ironclad hybrids" that are more tolerant of various soil conditions than many newer cultivars. 'America', because of its rapid and lanky growth, can be used as a small tree with less maintenance than trying to grow the plant as a shrub.

Pussy willow—*Salix discolor* (17)

The pussy willow is another coarse, fast-growing shrub that is perhaps better used as a small tree. It is well-known for its cold tolerance and fuzzy, gray catkins which

appear in earliest spring before the foliage is present. Male and female flowers appear on separate plants with the flowers of the male plant considered by many to be the showiest. This willow is easily rooted from cuttings; it has a vase-shaped habit of growth, an excellent growth habit for a small tree. While the pussy willows are short-lived, they grow rapidly and can be expected to give a number of years of satisfactory service in a landscape situation. Rooting a branch will replace this plant when the parent plant begins to decline.

Japanese tree lilac—*Syringa reticulata* (18)

The Japanese tree lilac flowers later than most of the commercially available lilacs, usually in early to mid June. This small tree is rather insect and disease resistant, an unusual trait considering the fact that it is indeed a lilac. The flowers are fragrant and quite showy, the panicle being more than a foot long and about eight to nine inches across. Another outstanding characteristic of the tree lilac is its cherry-like bark, which is a delight in the winter garden, especially when the plant is grown as a tree.

Japanese snowball—*Viburnum plicatum* (19)

The Japanese snowball is often seen at abandoned homesites as a small tree. Its appearance there in this form is living testimony that it will function quite well when left on its own. Its habit of growth adapts it quite nicely. The flowers bloom in June and appear in horizontal tiers. They are typically sterile and thus no fruit is formed. The lack of fruit can be considered as either an asset or a liability, depending upon your point of view. A number of other viburnums also can be used as small trees if the fruit is desired.

Black haw—*Viburnum prunifolium* (20)

The black haw is a native American understory tree. In the garden, however, it is more commonly grown as a shrub. The white flowers unfold during May and are followed by fruit, which changes from green to white and then on to black as it matures. The fruits are showy and can be used to attract birds and other wildlife. One of the primary reasons for growing black haw is its deep scarlet-to-wine fall foliage color. This is truly a charming small plant. ❁



Saving Our Native Orchids

BY DAVID S. SOUCY

It is quite a thrill to find a showy lady's-slipper or a yellow lady's-slipper blooming in a bog or a damp, wooded area. The showy lady's slipper (*Cypripedium reginae*) is the largest of all northern orchids. Its white sepals and petals are a striking contrast to the rose-mouthed pouch. The yellow lady's-slipper (*Cypripedium calceolus*) is a smaller orchid with a yellow pouch sprinkled with brown. Both of these native orchids can be seen in the spring and early summer, on long stems one to three feet tall, growing above large, light-green leaves. They usually are found in most northern states and Canada, but they also can be found in the South at higher elevations.

Sightings of these lovely plants are becoming less common every day, however. The sad fact is that native orchids like these are almost extinct. The reason is twofold: because these orchids are so beautiful when in flower, gardeners cannot resist digging them up and taking them home. Many nurseries have even begun to remove large quantities of them from native stands in response to growing demand, but these wildflowers seldom survive the shock of transplanting. Combine this practice with the encroachment of civilization on natural orchid habitats, and it is likely the plants will disappear entirely from our woodlands unless steps are taken to prevent their demise.

One possible solution, which has worked well with other plants, including many of the tropical orchids, is laboratory propagation. Two rather similar methods used are tissue culture and seed germination on a nutrient medium. Scientists at Cornell University are currently using the latter procedure to propagate *Cypripedium reginae* and *C. calceolus*. If their project succeeds, sufficient quantities can be made available for all uses: conservationists can reestablish large numbers of plants in areas where populations have been reduced, and commercial growers will no longer need to remove them from the wild.

Tissue culture propagation is a simple procedure. It is based on the principle that each plant cell contains all the genetic information necessary to grow an entire plant. Tissue from a plant is placed in a nutrient solution. It is nourished by the solution in a controlled temperature and light environment and grows into a tiny cluster of plantlets which, when mature, are generally identical to the original plant.

Simple as the procedure is, though, it is not without pitfalls. Scientists attempting


(Continued on page 43)



Cypripedium calceolus (at left) and *Cypripedium reginae*, (above), two of this country's cherished native orchids, are presently being propagated by means of laboratory culture in hopes of saving them from extinction. Even nurseries have been guilty of removing them from the wild. Unable to withstand the hardships of transplanting, the orchids soon die.

Francis M. Greenwell





Notes from the Orient

TEXT BY LEONORE BARONIO

PHOTOGRAPHY BY HAROLD EPSTEIN

On November 1, 1978, 31 members of the American Horticultural Society traveled to the Orient for a horticultural exploration of Japan, Taiwan and Hong Kong. The author of this article was among those members on the trip. What follows are her fond recollections of the plants and gardens of these countries and her impressions of the Oriental's special feeling for growing things.

We arrived at the Palace Hotel in Tokyo after a 12-hour flight from San Francisco, losing one day on the way over that we will gain back upon our return. The hotel is lovely, conveniently located near the Imperial Palace gardens so that we share a view of the garden's quiet moat surrounded by weeping willows. Such serenity in the heart of the city!

From the dining room of the hotel we can see a peaceful dry garden, a typical Japanese creation lined with raked, small gravel and a few interesting boulders and planted with evergreens. The garden also contains a tsukubai, which is a water basin outfitted with a bamboo pole dripping water. The total effect of a garden like this is one of timeless serenity, all in an area measuring only about 100 feet by 40 feet.

This morning we toured seven memorable private gardens, all tucked away be-

hind walls, fences and shrubbery that act as sound buffers against the noise of the city. All of the gardens were lovely, but three were especially beautiful.

The first of these three gardens was dominated by a handsome black bamboo fence. A large cobblestone path, flanked by a border of smaller stones, led visitors inside. (The diversity of paths, fences, lanterns and walls in Japan will always be of continual amazement to me!) This garden, designed to be viewed from within the house, was small. Three trees provided focal points—a crape myrtle, Ternstroemia and uno plum. There was, of course, the ever-present tsukubai, dry water bed and a bridge made from a large, rectangular stone.

The second garden was designed for moon viewing, a charming Oriental custom. There are two moon-viewing days, August 15 and September 13, according to the lunar calendar. Moon viewing is less popular today than it was 20 years ago, but it is still a welcome way in which to bring family and friends together for an evening. According to custom, food (usually a sweet potato, rice cake or pastry) is placed on a rock for the moon as an offering for the new season. Friends are invited to sit on the veranda of the tea house to enjoy this aesthetic experience and usually a tea ceremony follows.

The third garden was on a hilltop. Trails, hidden rest areas, viewing areas, pagodas, rocks and various trees and

A garden in Kyoto.



A wondrous sight to behold—a hillside lined with huge Cryptomeria indigenous to the region and almost as tall as our giant redwood!

azaleas curving in and out dramatically enticed the visitor with promises of garden wonders yet to come. Sasanqua camellias in white, rose and pink, chrysanthemums, maples in all their autumn shades of pink and red, and nandinas covered with red berries lent vibrant color to the surroundings. During the spring there would be cherry and plum blossoms and azaleas and iris.

A small pond, a running stream, 25 stone lanterns of unusual and varied sizes and shapes, and an extensive bonsai collection were also part of this garden setting. A skilled specialist maintained the bonsai plants twice annually. We were told the soil was completely changed every two to three years and each bonsai plant was watered at least twice daily; more often in summer.

Today we spent a full day in Angyo and Omiya, two towns outside Tokyo that are known for their nurseries, most of which carry a vast array of plants and exquisite bonsai. At one suburban nursery we saw a 1,000-year-old bonsai

plant. Each of the plants was in a beautiful container on a stand that had the appearance of a log but was, in actuality, a skillful replica in concrete. The stands were designed to revolve so that each part of the bonsai plant could be appreciated.

At one nursery we saw *Ligularia japonica*, a plant which is in bloom in many Japanese gardens in November. It is about 18 inches tall and has yellow, daisy-like flowers with low, round leaves. The plant resembles *Galax* or glossy ginger. We also saw *Selaginella* in many exotic varieties, all in shades of red, brown and gold. They looked like tiny, six-inch-tall cypresses. In addition, there were dwarf achilleas, *Bergenia* and a very special dwarf, cascading *Leucothoe keiskei*, a small version of *Leucothoe axillaris*, but bearing flowers that are the largest in the genus.

There were 48 hairpin turns on our bus ride up to Nikko National Park, but the journey was worth it. Here we saw a col-



orful array of maples and unusual Cryptomeria, birch and bamboo (there are over 300 varieties of bamboo in Japan). Then a wondrous sight to behold—a hillside lined with huge Cryptomeria indigenous to the region and almost as tall as our giant redwood. They were full, dark and lush, a contrast to the same winter-damaged trees in our Northeast.

Throughout the train and bus ride which led us to Nikko and on other cross-country trips, we viewed many rice fields. Only 16 percent of the land in Japan is arable, we were told; 8 percent is under cultivation for rice. The seeds are grown in flats and pots and transplanted in May and June, then harvested in October and November. In dormant rice fields I saw harvested plants artistically draped over poles to dry.

Off to the seaport of Yokohama, then to see the Great Buddha in Kamakura and finally a stop at the Hakone National Park. Here we saw an unmistakably distinctive Japanese moss garden. What a

soothing effect this garden had upon its visitors—moss in open-wooded areas everywhere! Two women gardeners were picking up small maple leaves and seeds by hand as we approached. They were putting the seeds in bags to keep them from sprouting in this solely moss-covered world. A great variety of mosses was growing there in different shades of green and at different heights on the ground so that they formed an undulating and varied pattern on the earth's floor.

The bullet train is all everyone said it would be: the fastest, smoothest 251-mile ride in the world, and at the unbelievable speed of 125 miles per hour. This was how we came to Kyoto. During our four-day stay there we saw the Imperial Palace gardens with their twin bridges, islands and pond, and carefully pruned and manicured native pines. Many of the temple buildings had interesting roofs, about 12 inches thick, made of 40 layers of native cedar bark. The roofs had a sod

look. They were dark and understated but charming with the brown and tan buildings. Completely fresh cedar bark is used and is replaced every 20 years.

At Kyoto's Heiana Shrine garden we saw beautiful, winding plantings of Iris kaempferi growing in low, wet areas. They were lovely even out of bloom, but judging from photographs, they promised to be perfectly splendid in June.

Some of the plant material that we found thriving in these gardens was nandina in fruit, fatsia in bloom (of huge size, usually eight to 10 feet tall), Podocarpus trees and crape myrtle and other trees which we grow in our southern states. Pieris japonica, commonly called lily of the valley bush in our coun-

LEFT: A chrysanthemum display at Hirakata, outside Kobe, site for the famous Chrysanthemum Show. ABOVE: A moss garden in Gora. Workers pick up small leaves and seeds by hand to prevent them from sprouting on the moss-carpet floor.



To the Japanese, rocks are as artistic as sculpture and should be skillfully handled to catch the eye and stimulate the spirit.

try, is indigenous. Large, healthy specimens covered many hillsides. It is evident that nature has been generous to Japan, providing her with the geographical diversity of beaches, flatlands, hills, mountains and waterfalls.

On the longer bus rides through this area, our guide Toshi entertained us with many wonderful stories about the Japanese attitude toward gardens and gardening. One story was about the old custom of leaving a poem behind after a visit to a garden. Each guest, it seemed, was to leave a little note to his hostess describing how much the garden had meant to him. Another story was about a farmer gazing with pride at his many small plots, ideal for growing vegetables. The farmer knew he had 10 such possessions, nine of which he counted with deep satisfaction one bright morning. But one was missing. He tried counting again and again, but with the same result. Bewildered, he suddenly smiled. The tenth plot had been found. He had been standing on it all along.

The gigantic chrysanthemum show outside Kobe was fascinating. It was an

elaborate and impressive presentation of many chrysanthemum varieties massed in clever displays. The most unusual display was made up of a number of scenes of life-size dolls depicted against interesting backgrounds and portraying historical events. Over 100,000 young chrysanthemum plants were flown in, grown specially and changed weekly to be used to make jackets, hats and other apparel for the dolls. We watched a skilled artisan with his knife and raffia working with the live plants to fashion them into costumes with great dexterity.

Back in Kobe we visited more private gardens. On this tour, as previously, we heard apologies for the lawns. A dry, hot summer had been responsible. That sounded familiar. But the lack of rain didn't seem to me to be much of a problem since Japanese gardens do not have many large lawns. For grass they are practical and use mostly zoysia. It browns in fall but blends harmoniously with all the greens and browns of their plantings. Gardeners here put their efforts elsewhere. We were told by one of our hostesses that for about an acre of grounds she employed three gardeners,



five days a week, and more specialists for the pruning done in spring and fall.

Many gardens were visited here used *Juniperus chinensis* 'Forulosa' as thick hedges, azaleas pruned to low, undulating ground cover and hedges, or quantities of abelia in bloom. We also had the opportunity to taste some fall fruit—pear-apples, persimmons and sweet tangerines.

Fruit is quite a delicacy in Japan, judging from the price. I noted melons cost as much as \$20 each. Part of the expense must come from the care with which Japanese fruit growers tend their trees. As the fruit ripens, workers cover each individual specimen on a tree with a bag to protect it from bugs and other possible damage. Their aim is to present perfect-looking produce to grocers.

Our next stop was Kurashiki. Here the shadow of ancient times still lingers. I will treasure forever the indelible memory of moonlight on the canal bordered by floating, wispy, softly-pruned weeping willows which stood only about eight to 10 feet tall.

In Kurashiki we visited Ohara's

museum which faced the canal. An old, white-bearded curator introduced us to the museum's masters' collection of ancient crafts. Fabrics, furniture, bottles, dishes—all from the 16th to 19th centuries—make up the collection. The museum guide book claimed that "one important property of folk craft is usability." To the Japanese usability equals beauty. Folkcraft is a teacher of life itself. The real crafts do not run after beauty, but beauty results from fine craftsmanship. On the roof of another museum building the curator showed us his own garden. It borrowed the background of the hillside for visual interest. In Japan this practice of incorporating a natural hillside or background into a garden is called "borrowed scenery" or shakker.

By ferry we traveled to Takamatsu on Shikoku Island. There we saw the large, public garden, Ritsurin. It is one of Japan's three dominant gardens and contains 500-year-old pine trees and very interesting rock formations. Many rocks looked soft and light enough to toss around. They are a treasure in Japan. In most parts of the country there are rock

centers, similar to our garden centers, where rocks may be purchased. The rocks vary in shape, color and markings depending upon the mountains and hillsides where they are found. Some gardens display them with complementary low, spreading evergreens or specimen trees. Other dry gardens make them focal points of a design. To the Japanese, rocks are as artistic as sculpture and should be skillfully handled to catch the eye and stimulate the spirit.

At Ritsurin I also noted a gardener working with wet bamboo strips. He appeared to be curing them so that they could be easily fashioned into low, decorative fences. Such fences edge many areas in this garden and others throughout the country.

Hong Kong. Soon after our arrival we were driven to a junk awaiting us in the
(Continued on page 42)

LEFT: A moss and sand garden at the Zen Temple in Kyoto. ABOVE: Hakone Museum's garden in brilliant fall colors.

A History of Old Herbals

BY ELIZABETH PULLAR

Herbs that describe plants and their practical uses—largely medicinal—are called herbals. They have been written for centuries and usually were compiled by men learned in plant lore. Often these early authors were either physicians or monks. Scholars tell us that one of the earliest herbalists on record was the Egyptian physician-priest Imhotep, who, around 2700 B.C., was noted for mixing healing medicines from the herbs growing in his temple garden. As far back as the 7th century B.C. an Assyrian herbal is said to have appeared with descriptions of over 900 plants, many of which had curative properties.

Years later remote Greek culture produced scores of temples where each priest worked in his herbularis (physic garden) and evaluated the remedial merits of individual plants. Hippocrates, the father of medicine, was a student at the Cos temple school where he tended more than 200 herbs, pinpointing their value as cures for specific diseases. Theophrastus, born in 370 B.C., was a pupil of Aristotle and wrote several accounts of his experiments with restorative botanical specimens. In fact, his *History of Plants* served as a guide for other herbals written well into the Middle Ages. Claudius Galen, born in 130 B.C., produced his own herbal, *De Simplicium*, which, like the work by Theophrastus, listed



title page of American Flora

contemporary herbs together with their medical significance. In the first century A.D. the erudite Greek physician Dioscorides compiled his *Materia Medica*, a manuscript of such brilliance that it influenced the field of medicine for the next 1,400 years.

With the advent of Christianity, European monks continued the study of herbs. Many monasteries contained walled gardens where the monks could grow and experiment with herbs. In those early abbeys and priories there was time to concentrate on the practical value and uses of indi-

vidual plants. This occupation produced authorities who quite naturally took to recording their findings for the benefit of others. Historians relate that the botanical writings of the religious at that time were influenced by the work of Pliny who had pilfered much of his information from the renowned herbal of Theophrastus.

Later, secular writers took an interest in this field. A number of such herbals began to be published in Europe toward the end of the 16th century. They were more or less based on the older

observations of the classical scholars Aristotle, Theophrastus, Galen and Pliny, with pertinent individual additions. Practical uses of each herb were described as either medicinal (simples from the physic garden) or culinary (flavorings from the kitchen garden).

Outstanding from the 16th century and still a popular volume to examine with curiosity, wonder and admiration today is the herbal written by John Gerard, which was printed in 1597. Gerard was an English "chirurgion" as well as an acknowledged botanist who lived from 1545 until 1612. His 600-page *General History of Plants* is illustrated with many quaint woodcuts.

In 1633 his original book was enlarged with many more plant descriptions and woodcuts by Thomas Johnson, then a pharmacist and physician in London. Johnson had the reputation of being the best herbalist of this time. The material he added to Gerard's volume has made it one of the greatest herbals ever written in the English language.

Anyone, whether horticulturally inclined or not, will find Gerard's herbal fascinating. The charming and accurate woodcuts add interest and reality to the text. The title page is an alluring engraving which includes the likenesses of Theophrastus and Dioscorides, along with that of Gerard himself. Lively comments on the medicinal value of plant

parts, together with entertaining Elizabethan wisdom will prompt the reader to investigate Gerard's appraisal of his own favorite and familiar herbs.

A quick sampling provides these amusing insights: of anise

Gerard wrote, "Being chewed it maketh the breath sweet . . . and if it be eaten with bitter almonds, it doth help the old cough." Later Gerard tells us that angelica "cureth the bitings of mad dogges, and all other venemous beasts." Also, it "will abate the rage of lust in young persons." Carrots, on the other hand, "helpeth conception" and cucumber, we are told is "good for . . . red and shining fierie noses."

Dover Publications has issued an unabridged reproduction of Gerard's herbal. It has over 1,700 pages and weighs 9½ pounds! This volume, being an exact copy of the rare original, constitutes an appropriate first acquisition for a collection of less celebrated but more easily obtainable antique herbals that can be acquired today with a little patient search.

No report on early herbals would be complete without mentioning the name John Par-



Rosa centifolia

kinson. He was a London apothecary and, like others in this related profession, was well-versed in botany. In 1629 his well-known *Paradisi in Sole* (an amusing play in Latin upon his name) was published. In 1640 it was followed by *Theatrum Botanicum*, an herbal describing the therapeutic properties of plants as he knew them. There were others, too—some physician-botanists—who sought to spread the word concerning the healing virtues of herbs. William Turner's 1568 herbal and Henry Lyths's translation of Rembert Dodoen's *Herbal* printed in 1578 are familiar books to people who know about herbs.

The New World had its own share of *materia medica*, too. But before considering the charm and beauty of these early American herbals, some background information is in order.

During the first 150 years of our country's history, the colonists were much too absorbed in becoming a nation to write many books. Comparatively few physicians were graduated from the early universities, and leisure for experimenting with herbs and recording new findings was nearly non-existent. Since disease and minor illnesses that beset men in the old world were prevalent in the new settlements as well, coping with the problem of curing ailments fell into the capable hands of colonial housewives.

Stillrooms were the settings for concocting medicines from her-



Wild turnip

baceous plants in large homes or on estates. Dried herbs gathered in their prime were hung from the rafters and stored, as was the equipment necessary for preparing homemade remedies—the distilling apparatus, measures,

bottles, graters, crockery and mortars and pestles for pounding fragrant herbs to powder. Still-rooms were generally supervised by the mistress of the manor who taught her staff of female workers the fine details of making remedies. She knew the correct herb or combination of herbs to mix into suitable medicines for most of the common illnesses she encountered.

Smaller homes did not have special stillrooms for preparing medicines, but there usually was at least a table available to hold paraphernalia ready for quick use when needed. The equipment was similar to that found in still-rooms but on a smaller scale. Curative herbs were brought from the attic or storage room to be reduced to powders in the

mortar. Water, honey, vinegars or spirits were selected to blend with the proper herb. The housewife knew how to make poultices, tonics, soothing teas, liniments, salves, emetics, tinctures and healing syrups from the leaves, flowers or roots of her precious herbs. To lessen the discomfort of children's colds, bright scraps of colored calico were made into little "sniffing" bags and filled with the pleasant scents of lavender, mint, costmary or other savory plants.

It is unlikely that many of these colonial housewives had copies of old-world herbals to consult, but they must have been familiar with most diseases and their treatments. Hearsay and established custom guided their choice of the simples gathered from dooryard gardens to meet the challenge of whatever symptom might appear.

Garden books in the early years of our country were published by nurserymen or amateur horticulturists, but they were not strictly herbals. It was not until around the 19th century that educated men dedicated to both botany and plant medicine began to publish their own versions of herbals. Like their predecessors, these old American herbals have a charm and beauty worthy of the attention of those who normally have no interest in horticultural subject matter. The diversified texts are often quite whimsical and include remedies for some discomforts that fortunately

seem to have escaped our modern times. Physicians are frequently the authors of the 19th-century herbals and admit to preparing their work, not so much for the medical profession as for individuals interested in using herbs for healing their own indispositions.

One of the early American herbals (1845) was Good's *Family Flora*, a *Materia Medica Botanica* published in book form after having originally appeared as a periodical. Peter P. Good, A.M. was the principal of the Housatonic Institute in New Milford, Connecticut. He took over and enlarged the medical notes of his uncle, John Mason Good, M.D. The latter had intended to publish an herbal before the year 1815 but never did, so his medical advice in manuscript form became the inheritance of his scholarly nephew. Peter Good recorded many plants in his book and included botanical analysis, natural history and, in some detail, the chemical and medicinal properties of each plant listed. The book includes charming, delicately-colored engravings "of original drawings taken from nature," all of which are protected by thin tissue sheets.

Humorous comments fill the pages of most of the early Ameri-





"Agrifolium. The Holly Tree"

can herbals. For example, in Good's discourse on watercress he advocated using the utmost care in cleansing all herbs before use. By way of reason he cited the plight of a young girl who had eaten cress and developed a most uncommon sensation in her stomach. She complained of feeling that something alive was moving inside her. The chimera proved to be a fully-grown, living toad. It had been on the cress she had eaten while in the spawn state!

American Flora, written by A. B. Strong, M.D., made its appearance in 1846. It was an extensive herbal that described the medicinal properties of local plants, together with the diseases which they were employed to cure. In the preface of his book, Dr. Strong, a botanist as well as a physician, emphasized that one purpose of his work was to portray the botanical specimens in such a thorough manner that each could be recognized correctly in nature before being gathered for medicinal use.

The title page for Volume I of *American Flora* is a stunningly simple chaplet of various blossoms drawn on stone by D. W. Moody and produced as a delightful colored lithograph. A butterfly, dragonfly and two bees enliven the garland, which is a very choice precedent for a host of other colored engravings within the book. No wild strawberries in a June meadow could be more appealing than those in the Moody colored engraving in Volume II. Here, too, insects are seen on the plant stems as would

very likely be found in nature. Oddly enough, the strawberry is the only plant for which the author omits any curative value, stressing only its worth as a fruit. Gerard, on the other hand, reports that among the "vertues" of the strawberry is its ability to make "the heart merry" and to "take away spots and to make the face fair and smooth."

In 1875 Dr. O. Phelps Brown, a New Jersey physician, published a book called *The Complete Herbalist or People Their Own Physicians by the Use of Nature's Remedies*. In his book he listed the curative qualities to be found in the "herbal kingdom." Each plant was treated with a description, history, property and uses, together with recommended doses in whatever form he suggested—fluid, solid, extract, infusion, tincture, decoction, powder or pill. Instructions for compounding cures from various plant parts were included. Many of the botanical specimens were illustrated with dainty black and white sketches. Dr. Brown was a firm believer in nature's cures, and the book reflects his wholesome philosophy in the detailed advice for preparing and administering medicines for troublesome disabilities. For example, he advises his readers that magnolia "will break the habit of tobacco chewing" and, helpful information, indeed, parsely seeds will kill vermin in the head.

The 20th century is not without its own contribution to the herbal bibliography. In 1939 Jethro Kloss privately published *Back to Eden*. "This book con-

tains tried, safe and inexpensive remedies which are the result of my own experience of nearly forty years," wrote Kloss. Recipes for preparing cures are a feature of the book. The author was not a physician, but his work illustrates a remarkable knowledge of both herbs and diseases to

be cured by them. The advice in his book, like those of earlier works, may amuse us, armed as we are with more sophisticated medical knowledge. For Jethro Kloss, stuffing a pillow with hops was just as effective in getting rid of insomnia as our sleeping pills, and rosemary, far less expensive



"Abies The Firre Tree"

than the rates charged by psychiatrists, was "helpful in cases of insanity."

The charm of old herbals lies in their reliance on nature. Their pages are filled with curious, fascinating, and sometimes delightfully humorous descriptions of many herbaceous plants and their uses. The beauty of old herbals is self-evident. Yellowed pages, outdated typography, quaint drawings and exquisite prints all contribute to their aesthetic appeal. Surely such volumes should have a place of honor in any bookcase.

Possible Sources for Old Herbals

As to sources where old herbals may be found today, one must be patient and prepare for an absorbing search. Antique shops dealing in 19th-century books may very well have some of the old herbals and they doubtless will be high priced. Sales of old household estates, if they include books, may bring to light a few botanical volumes and possibly a true herbal. Bookstores with inventories from the bookcases of old homes may have interesting herbals grouped under the heading of garden books. There is also an international magazine about herbs and herbalists published quarterly by Whitchappel's Herbal, Box 272 E. Peterborough, New Hampshire 03458 that might be a lead for finding a volume for a collection. "For sale" advertisements in any of the antique publications are worth looking over, too. Search for old herbals in any group of old books. They often turn up where least expected. ♣



Washington hawthorn



Euonymus americana



setigerum



Berberis gilgiana



Viburnum opulus



Clerodendrum

Bright Berries for Fall

TEXT AND PHOTOGRAPHY BY MARTHA PRINCE



Cornus kousa



Callicarpa



Viburnum opulus 'Xanthocarpum'



Ilex verticillata



Sorbus americana

*The morns are meeker than they were,
The nuts are getting brown;
The berry's cheek is plumper,
The rose is out of town.*

—Emily Dickinson*

The poet was not thinking of the berries we eat, or even of “berries” in the strict botanical sense. Neither am I. A few lines further on she says she, too, will “put a trinket on.” What a happy way to think of the brightening trees and shrubs! I can see them merrily adorning each other in gypsy beads and earrings for the year’s last party.

“Berries,” “pomes,” “drupes,” and “achenes” are some of the botanically correct words, and all are fruits containing seeds for the continuity of the species. They are not an end of a floral season, but a beginning of the next. Botanists and taxonomists are more scientists than poets in the use of language. The shining, luscious-looking pendant fruits of the *Viburnum opulus* are, properly, “drupes.” Drupe translates from the Latin as “over-ripe olive.” How ugly, and how inappropriate. “Bright berries” mine will stay.

I can write here of only a dozen or so plants I find unusually attractive in autumn, and which aren’t used as often as they should be. Few gardens lack some species of *Cotoneaster*; every garden, and even suburban shopping centers, seem to have *Pyracantha* (fire thorn). We finally chopped down a huge one near our terrace, for a piratical catbird yearly ate every single berry as it turned orange. I don’t begrudge birds dinner; I feed them all winter, and they are welcome to whatever else they find in the garden. That *Pyracantha*, however, was ornament, not lunch. Many of the plants I mention are bird food, and as they do not seem as delicious to the gluttonous catbird, that is a virtue. As a matter of fact, I intend to mention but one “people food,” and that is used only for a pretty jelly.

Should I arrange the plants by color? There are reds, yellows, purples, whites, blacks and multi-colors with which to bejewel your garden. Perhaps it would be wiser to proceed alphabetically by genus, for some come in more than one color (usually adding a white or a yellow form).

First, *Berberis gilgiana* (wildfire barberry). Many of the barberries are fine for the fall parade, but I especially like this deciduous Chinese one for its hanging clusters of elongated bright red berries. It should be hardy at least through Zone 5.

Callicarpa (beautyberry) is a small genus of shrubs, the handsomest of which is our native American (*C. americana*). The berries are in large showy clumps right along the stems. The color is a unique purple; there is also a white form, lactea. The hardiness rating is only Zone 7, so New Yorkers (and others) must use the Chinese, Japanese or Korean species which are

smaller-berried but still interesting.

Clerodendrum trichotomum (called harlequin glory-bower) is a shrub which lives up to its common name in spectacular fashion. Blue-black berries, the size of green peas, are centered in flower-like calyces of bright red. This Chinese and Japanese native elicits a startled "What on earth is that?" from anyone unfamiliar with it. "Exotic," with all its connotations, is the right word!

Cornus immediately brings to mind our lovely native dogwood, *C. florida*, and its familiar red berries (there is a yellow-fruited form 'Xanthocarpa', for variety), but more showy for autumn is the Japanese dogwood, *C. kousa*. The handsome small tree becomes covered with large, round, deep-pink "raspberries," with the little bumps on the surface that name might lead you to expect. By the way, *C. kousa* blooms after *C. florida* and prolongs the season.

Crataegus is the hawthorn, and in the genus are many handsome small trees, usually with pretty white (occasionally pink) flowers. Both at flowering time and in fall transformation, my favorite is a native Southerner, *C. phaenopyrum*. It does beautifully on Long Island, despite its origin. Jelly made from "haw apples" was a standby in the country when I was a little girl, and is quite good.

You know *Euonymus* in so many forms you may wonder at my mentioning it at all. The common name of my favorite, alone, would endear it to me. It is hearts a'bustin with love. How is that for a real gingham-and-calico name? The species? *Euonymus americana*. The autumn fruit is a large, lumpy, five-lobed ball, which bursts open to dangle what I suppose are five drops of love; the warty case is strawberry-red, and the seeds are brilliant orange and glossy. (To say this correctly, the fruit is a five-lobed capsule, dehiscent, and each seed is imbedded in an aril.)

I am deliberately avoiding the evergreen hollies, a subject of its own. (Eight or nine of my photographs of various hollies appeared in the Winter, 1975 issue). The American wildling, *Ilex verticillata* (winterberry), is a deciduous beauty and can make quite a splendid showing of the red berries, which hold on well into winter. It should be hardy anywhere in America. (Don't forget that hollies are dioecious, needing both male and female plants.)

Nandina domestica is a southern favorite, and I am puzzled why no one in the Northeast seems to grow it. It is listed as Zone 7, true, but I grow it on Long Island and the Planting

Fields Arboretum here grows it, too. So far as I know, nandina is the common name also. This Oriental shrub has red fruits held upright in rather open clusters six to eight inches in length. If picked at their reddest, and held upright in a waterless vase, they dry perfectly. I have some that are more than a dozen years old. I bring them out for Christmas use every year.

Rhodotyplus scandens is a shrub which seems to have dwindled in popularity in the last 20 or 30 years. The common name, jetbead, is a perfect description for it in autumn. It is not exactly showy when it blooms, but it holds its single, four-petaled flowers quite daintily. The shiny black beads will last the winter.

Sorbus americana, the American mountain ash, is quite neglected here in favor of its European "twin," *Sorbus aucuparia*. Ours is a smaller tree and certainly as handsome. It is also as hardy (Zone 2—what more could one ask?). The flat-topped clusters of white blossoms are attractive in late spring, and the huge clusters of orange-red berries can be really glorious. According to country tradition, or legend, the display is finest before a hard winter. The best natural displays I know are in the mountains of North Carolina. (I don't know a commercial source and am growing them from seed.)

Viburnum is a diverse genus with many fall color possibilities. Berries can be red, yellow, orange, dark blue, black. I will choose but two favorites for you. First, *V. opulus* has spectacular red berries, glossy and almost translucent. When autumn leaves have finally disappeared, there they remain, shining in the winter sunlight. In *V. opulus* 'Xanthocarpum', the effect is repeated in yellow. They really look delicious, but I have tasted them and they are very sour, indeed.

My second *Virburnum* choice is *V. setigerum*, either in its usual red form, or the yellow-orange 'Aurantiacum'. Strongly veined ovate or oblong leaves distinguish this plant easily from *V. opulus* (lobed leaves). The autumn leaves are a fine winey-red—a burgundy, perhaps. The species is known as the Tea Viburnum and comes from China. Cheerful is the word for its pendant berry clusters.

Somewhere in this plant list I hope you will find gay "trinkets," to quote Emily Dickinson, that you may want to try. Gardeners often forget that bright fall gardens can be designed with more than leaf color, alone, in mind. ☉

* from *Poems by Emily Dickinson*, edited by Bianchi and Hampson, Little, Brown and Company, Boston, 1957.



David Hansen

INDOOR PLANTS:

What Their Roots Will Tell Us

BY JANE PRICE MCKINNON

They all started outdoors somewhere! Plant geography can be a great help in clearing a path through the jungle of greenhouse displays. Outdoor plants are not quite so confusing. American gardeners generally expect palms to grow in Miami or Los Angeles and spruce in Maine or Wisconsin. But it is quite likely that a beginning gardener could select African violets, maidenhair fern and old man cactus to grace the same table top or window sill even though each requires different care. Not all current publications are useful. There have been beautiful magazine illustrations of English ivy trailing from the top of a ceiling-high corner bookcase, pots of golden chrysanthemums at the edge of a blazing hearth and green spikes of yucca in a dim corridor. Plants with no future are expensive and frustrating as decoration. It is far more rewarding to cultivate curiosity about plant origins in order to combine horticultural necessities with effective interior design.

The environmental factors of plant growth, as expressed by Jules Janick in *Horticultural Science* are:

Soil, which provides nutrients and moisture in addition to mechanical support,

Radiant energy in the form of heat and light, and

Air, which provides both carbon dioxide and oxygen.

Every green plant in the world must have these things in some measure. The fascination of gardening is to learn differences from species to species, and how they may be adapted to environments halfway around the world with reasonable success. Keen gardeners have often been intrepid explorers, from the time European 18th-century gentry botanized and sketched, to the present when garden tours are enthusiastically filled. But not everyone can hie away to Japan or South Africa, so the nearest library is a magical place to begin world travel. A comfortable armchair can substitute for a trek to collect orchids in Mexico or impatiens in New Guinea if the goal is learning what each plant needs to be a handsome addition to pleasant living spaces.

We know green plants must have light, but we are not always sure how much. Norfolk Island pine is a favorite that troubles Minnesotans. People in St. Paul and Minneapolis love needle-leaved evergreens, and Norfolk Island pine is popular as an indoor reminder of the north woods they dream of all year. But each winter as

days darken and shorten, many potted trees droop, lose color and develop slowly and thinly. Thankfully, their owners are not as unlucky as the felons who traveled by sailing ship to the Australian penal colony on Norfolk Island in the 1800's. Old stories tell how the first sight of the prisoners' place of exile was the dark line of forest, crowned by towering pines (*Araucaria heterophylla*). These 200-foot trees grew in the open South Pacific sun-

Dealers in commercial mixes could help amateur gardeners considerably by labeling potting soils with the same detail now required for fertilizers and pesticides.

light, blown by sea breezes, rooted in sandy, rocky soil. Is it any wonder that the trees have trouble adapting to dark situations in our homes today? Some of the handsomest indoor specimens are set in bay windows or against glass patio doors and are summered outside in filtered light to regain their perky vigor.

By contrast, people who do not live in glass houses can select indoor greenery from the familiar philodendrons. Plant collectors found them in tropical American forests, climbing or creeping under the tree canopy in dim jungle light. Although *Philodendron selloum*, the self-heading species, stands in Louisiana sun on New Orleans boulevards, vining selections are spread all over the world in shadowed places. Some are growing indoors in rather dim rooms, others outside in warm climates. There are South American philodendrons climbing high in trees shading Calcutta gardens. No wonder they are often the first plants indoor gardeners choose to grow. Recently breeders have enriched choices of leaf color and size and have developed selections even more adaptable indoors, but the philodendron's tropical forest evolution has allowed plant culture in apartments and offices inhospitable to more demanding genera.

Radiant energy requirements for plant growth also include appropriate temperature ranges. For instance, directions for culture of the popular devil's ivy (*Epipremnum aureum*) include optimum day temperatures of 80°F (26°C) and 65°F (18°C) at night. These warm requirements

are not strange when we learn that the plant's native home is the Solomon Islands, known too well by Marines during World War II as a hot, steaming jungle environment. Mean maximum temperatures in the Solomons are 88°F (30°C) in December; mean minimums are 76°F (24°C) in August. Average humidity is 82 percent. In a climate like that, perhaps devil's ivy is appropriately named. Reading Caroline Mytinger's *Headhunting in the Solomon Islands* (a light-hearted account of an anthropological expedition) can convince an indoor gardener that devil's ivy should be the vine at the top of a warm room rather than *Hedera helix*.

Temperature requirements can be contrasted by a quick investigation of the pickaback plant (*Tolmiea menziesii*). This useful, small-scaled foliage plant comes from an entirely different climate. Along the shaded paths in San Francisco's Golden Gate Park, pickaback plant grows luxuriantly. It has evolved in outdoor temperatures up the north Pacific coastline all the way to Alaska. No wonder it dies in hot rooms during a Midwestern winter. As thermostats are turned down to save heat, pickaback plant will be far more successful; it will flourish in cool plant rooms where fuchsias, geraniums and English ivy thrive.

Soil and nutrition factors for indoor gardening become more complex as artificial mixes, commercial potting soils, slow-release fertilizers, trace elements and systemic pest controls replace old recipes for mixtures of sand, loam and leaf mold. Again, an armchair session with an encyclopedia, a geography book and a plant manual can furnish clues. Deserts may suggest sterile sand to many of us, but dry land areas may be rich in minerals, needing only water and a turn of the season to burst with plant life. Cacti and sedums native to deserts of Mexico or southwestern United States need not only granular, porous soil, but also fertilizer during growing seasons. Limestone is often added to potting mixes to simulate the pH (alkalinity measure) of desert soils. Bright, dry landscapes and mossy stream banks may be hundreds of miles or continents apart. Florist's azaleas are often grown in straight coarse-grade acid peat, kept constantly damp and fertilized with added iron to counteract any lime content of available water. Anyone who knows the wild flame azaleas of the American Gulf Coast growing in leaf mold and iron-red sand along a shady, black-bottomed creek will understand directions for potting azaleas.



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Dealers in commercial mixes could help amateur gardeners considerably by labeling potting soils with the same detail now required for fertilizers and pesticides. The admonition seen in many garden publications to add something to potting soils makes no sense if the components already in the mix are unknown. One of the best ways to put the correct growing medium under the correct plant is to buy the same mix used by a reputable greenhouse grower for the particular plant being grown. Neither is it useful to insist that gardeners "READ THE LABEL," and then tell them to use fertilizers packaged for house plants half or one-fourth strength, unless the exact product is named.

If we attempt to describe requirements for plant growth as separate factors, discussion of water relations makes explanations almost impossible. All plant needs are indispensable and functions are interrelated. But perhaps my clearest recognition of watering complexities occurred in a sun-swept professional office where a magnificent candelabra tree (*Euphorbia ingens*) stood in a corner formed by glass walls at the southwest point of the building. I complimented the owner on his vigorous plant. He replied that culture was quite simple since he read the weather news every morning. When it rained in Arizona, he watered his plant. I could not resist telling him that he was reading the wrong paper, he needed one from Cape Town.

The extreme change from plants needing only a little rain are those blessed species evolved on the sides of warm streams. Nothing is more useful for an undrained heirloom jardiniere or antique porcelain bowl than the umbrella plant (*Cyperus alternifolius*) from Madagascar. Alfred Graf reports that he has also seen this plant along the Athi River in Kenya. Both this *Cyperus* and its close relative *C. papyrus*, the bulrush that sheltered Moses, are native to wet shores of slow-moving African rivers. The ability of *Cyperus*, *Syngonium* and many of the aglaonemas to extract oxygen needed for roots in saturated soil explains why they do not wilt and die in watery pots (as impatiens do). No plants are better for the householder who cannot resist watering plants every day.

Atmospheric conditions in homes are usually accepted by plants because oxygen and carbon dioxide are not limiting where plants and people live together. Greenhouse growers sometimes enrich their controlled atmosphere with carbon dioxide for production of some floral crops. They also provide good ventilation, not only to reduce temperatures at times,

but also to reduce humidity as a means of controlling certain fungus diseases. Directions for growing golden barrel cactus (*Echinocactus grusonii*) often admonish the homeowner to provide an airy room. Basal rots that can collapse such desert plants are favored by steamy air in busy laundry or bath rooms.

Beginning indoor gardeners need not feel embarrassed to search for clues to plant culture in geography books. Commonly grown house plants often adapt to less-than-perfect conditions, even if appearance and growth declines. But commercial growers look to scientists for precise schedules and researchers study original environments. Recent research in Europe and at the University of Minnesota is improving methods of growing the delightful winter-flowering freesia. This plant needs an approximation of South African temperature sequences to produce its fragrant spikes of flowers for the after-Christmas doldrums. Cape of Good Hope temperatures are 25° to 30°C (77° to 86°F) with extremes of 40°C (104°F) between December and March. This is the time of dormancy for freesia corms. As the weather begins to cool for the South African winter, beginning in June, hormone changes occur. Sprouts begin at about 18°C (65°F). After seven leaves or so appear, bloom spikes begin when temperatures are at 10°C (50°F) during the day and 4°C (40°F) at night. These temperature conditions must be simulated in the northern hemisphere by heat treatments followed by cool greenhouse conditions to bring crops into flower, even though northern seasons are reversed. Unfortunately, their precise temperature and light requirements, plus the large size of freesia plants, make house plant culture impractical. Home greenhouse owners, however, will be interested in research reports now in preparation from the work of Drs. Terry Gilbertson Ferris and Harold Wilkins of the University of Minnesota. Similar work has been done with the Chilean native *Alstroemeria* to produce its cool-weather blossom in the reversed seasons of Minnesota.

Home gardeners, scientists and commercial florists will continue to search for information about the plants we bring under our roofs. All of them know that we can never learn enough. Explorers may take their curiosity to the nearest library or a far-away safari. But no one need feel frustrated by bringing the plants of the desert, jungle, forest, mountains or swamp indoors to grow. ●

CONTRIBUTORS

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Martha Prince is an artist, writer and lecturer who gardens on Long Island. Her special interest is wildflowers, with emphasis on rhododendrons and our native azaleas. A graduate of Piedmont College in Georgia, she also studied art at the Art Students' League in New York. Exhibits of her work have appeared at many galleries, gardens and arboreta. A selection of her paintings was recently chosen for purchase by Hunt Botanical Institute. "Bright Berries for Fall" is the seventeenth article Ms. Prince has written for *American Horticulturist*.

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(Continued from page 27)
 harbor. Off we sailed to see the sunset and all the tall buildings that appear to be climbing up the hillsides. They seem to glow like millions of small lights as darkness approaches. What a spectacular sight!—the harbor, the tall buildings, the sunset, the lights and boats of all kinds, including sampans, on which some people live for a lifetime, often never coming to land.

In Hong Kong, as elsewhere, we visited private homes and gardens. These were owned by wealthy Chinese families and to see them emphasized for me the great contrast between desperate poverty and dazzling wealth and luxury in this part of the world. There were lovely terraced gardens and beautiful collections of bonsai to see everywhere.

Our last day in the Orient. We toured the Kadoorie Experimental and Extension Farm and Botanic Garden. It seemed to me a fitting finale for our trip. There

we learned what horticultural and agricultural benefits can come from mutual cooperation.

The farm and garden were started by the brothers Kadoorie in 1950 when, following World War II, many new and destitute farmers crowded into Hong Kong. Joining the Kadoories were Messrs. Wright and Woo of the Government Agricultural Department. Their project's aim was, and still is, to provide agricultural assistance and encouragement in the form of individual aid, not charity, to all the people of the area.

Through this project a mountain has been tamed and terraced, roads have been built to climb those mountains by foot or small mini-buses, bridges and wells have been constructed and miles of irrigation dams have been built. The result is truly an engineering miracle. Research has brought about improvements in livestock and food production and the 312,000 people of the area have now benefited for a generation from learning

about many new and more efficient gardening and livestock procedures.

How can I sum up my marvelous memories of this trip to the Orient? I have asked myself many times why the gardens were the most memorable sights on my tour, even though the trip included many other kinds of cultural experiences as well. What was it about Japanese gardens that made them so special to me? Was it perfection of detail? A great sense of design? Elegant simplicity? Craftsmanship? Perhaps, in the last analysis, it was the Oriental's love of nature, a love that transcended aesthetic feelings to reach spiritual ones, which drew me to the gardens. Western gardens, in contrast, are often a beautiful display of good design and expert growing knowledge, but the deep religious alliance with nature, the rich, inner spirit of the Oriental is missing there.

Even beautiful photographs cannot transmit the special oneness one feels with nature in a garden in the Orient. ☉

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(Continued from page 21)

to propagate native orchids by this means have encountered several problems. Some have been solved, while other difficulties still hinder progress.

One problem is the presence of fungi and bacteria on the tissue. Because the nutrient solution (in this case, a nutrient-agar solution, which has the consistency of soft gelatin) makes an excellent growth medium for unwanted pathogens, fungi and bacteria literally go wild and overgrow the slow-growing orchid tissues. Researchers prevent this growth by working under sterile laboratory conditions. These practices greatly reduce the chance of contaminating the orchid tissues.

In tissue culture, vegetative parts, apical meristems or even flower parts can be used for propagation. A very similar technique is the germination of orchid seed on a sterile nutrient medium. In the case of native orchids, germination of seed was found to be the best method to use. There are many thousands of dust-like orchid seeds contained in one seed pod. When germinated by conventional means, only a few seeds survive, but when germinated on a sterile nutrient medium better than 70 percent survive.

But here, too, the problem of bacterial contamination arises. Ripe seed pods are difficult to use. The damp, bog-like conditions in which seed pods open are unacceptable because fungal infection readily occurs. If seeds are merely exposed to the air, they may be contaminated by pathogens. Sterilization of the seed was attempted, but it often failed due to the net-like seed cover which these orchids possess. Bacteria and fungi can become imbedded on this irregular surface, making disinfection very difficult. To solve this problem, the seed pods are presently collected *before* they start to open. By using green pods, researchers have reduced the chance of infection almost entirely.

Researchers also have discovered that the seed reacts to light intensity. To acquire satisfactory results, seeds are grown in total darkness. This mechanism in the seed is probably the result of adaptation to its environment. Tropical cypripediums don't require this dark treatment because, in their natural habitat, they can germinate and grow year around. If an orchid of temperate climate had seeds that began to grow in late summer, the small plants would not survive the winter. Thus a blanket of snow

might be nature's own dark treatment.

Another big obstacle has been formulating the proper growth medium. Ideally the solution should contain, in precise amounts, all of the major and minor nu-

Sightings of these lovely plants are becoming less common every day. It is likely the plants will disappear entirely from our woodlands unless steps are taken to prevent their demise.

trients required for optimum plant growth. Plant hormones also must be incorporated into the medium. Their amounts are only a minute part of the total solution, but the plant requires a specific amount of these hormones to grow. Since little previous research had been done with these orchids, scientists could not consult books for information. The levels of nutrients and hormones were finally established through trial and error by testing results obtained from using different combinations of these growth regulants. Once the best growing medium had been attained, researchers were able to proceed with propagation.

Scientists continue to use sterile laboratory culture in spite of these obstacles because the advantages of this type of propagation far surpass the disadvantages. Conventional methods of propagation—seeding, cutting and division—just aren't practical. Seeds germinate poorly when sown in soil. Cuttings do not survive. Division is much too slow, producing only one or two plants a year. None of these methods produces plants fast enough to save the orchids from extinction. Growing the number of plants necessary to fill the needs of both conservationists and commercial operators is possible only through laboratory culture.

Germination of seed has another advantage over asexual propagation: it guarantees genetic variability. When vegetative plant parts are used for reproduction by tissue culture, progeny exactly like the parent are produced. Because the plants are identical, if one plant is susceptible to a disease, then all plants produced by tissue culture from that plant will also be

susceptible to it. Seeds, on the other hand, carry specific genetic information; they are the products of pollination between *two* plants. The offspring produced when they germinate represent all possible combinations of the genetic potential of the parents.

All this research sounds very promising, but the work is far from over. Scientists must continue with propagation, dividing and redividing plantlets, until enough plants are acquired for experimental outdoor plantings.

Presently, the work is slow and tedious. A tiny cluster of plantlets takes at least one year to be grown from seed. After dividing them, another year must pass before a second cluster is produced, and so on. Once they grow to a suitable size, the orchids will be transplanted outside in selected areas. The process does not stop here; the work must continue. Of the many cypripediums, probably only a small percentage will live. It will be the healthiest survivors that will serve as stock for further propagation. Finally, the offspring produced from these plants will be placed outdoors again. If these specimens are successful in surviving, the chances that future generations will be able to enjoy these beautiful orchids are very good.

The one catch is that time is running out. Experiments must be done while there are still enough orchids left, but numbers are steadily decreasing.

This is where you, the gardener, plant enthusiast or nurseryman can help. The next time you see *Cypripedium reginae* or *Cypripedium calceolus* growing in the woods, leave them there. Admire their beauty, take a picture, but don't take a plant. Laboratory culture may be able to save our native orchids—with continued success in experiments, your help and a little luck from Mother Nature. ●



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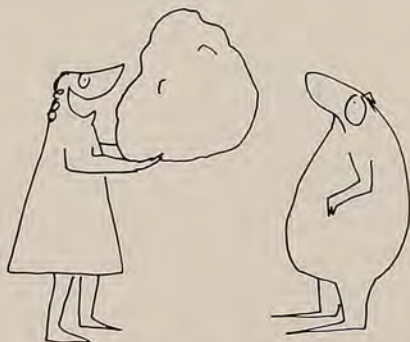
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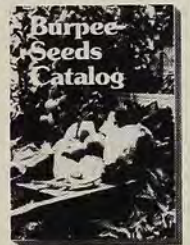
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