American

Horticulturist

Volume 53 Number 4 Fall 1974

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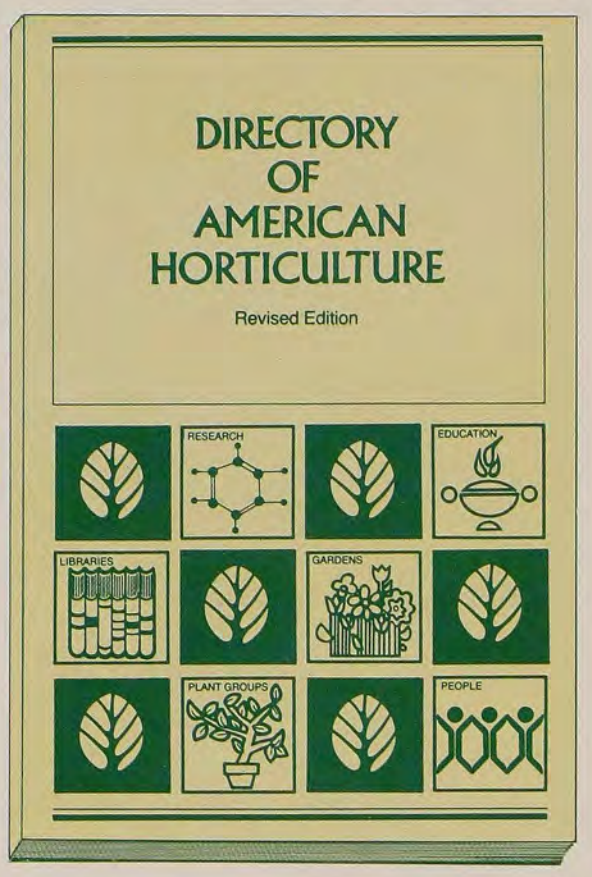

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an editorial. . . .

The Art of Gardening

Horticulture is a creative art. One thinks of the intricate design that creates the varied beauty of Central Park or the Strybing Arboretum. Great technical know-how was necessary to put pencil to paper and sketch the many elements of those two great pieces of landscape design, fitting the bits together, blending them so that every step along the graciously winding walkways opens new vistas. Horticulture also is a backyard art. Every homeowner can know the satisfaction of designing his own garden and of bringing his collection of plants to optimum beauty. The backyard isn't even essential; highrise dwellers create their own beauty growing exotic tropical species indoors and tougher plants on the terrace, balcony or the fire escape. One always can find a place to grow a plant.

As an art form horticulture is particularly satisfying. Botanists tell us that protoplasm is hard to kill. Plants have a built-in mechanism that demands that they stay alive. Given any encouragement at all, they grow and develop into objects of beauty. As much cannot be said of the piece of marble waiting for the sculptor's chisel or the piano waiting to be played. Who doesn't have a creative urge, perhaps deeply hidden? Who doesn't wish to make a thing of beauty—a thing he can look at and say "I did that"? The plant is a good place to start. Seed or seedling, cutting or nurseryman's stock, any plant can be brought to a state of soul satisfying beauty if it gets what it needs.

There's the crucial point. If it gets what it needs. How does one know what to do to make plants develop into the best possible specimens? It is a matter of technique. There seems to be two elements to great artistic ability; talent and technical ability. The truly great artist is born with artistic talent and he is trained rigorously in the techniques used to express his art. He needs to know about pigments, thinners, brushes, canvases and the thousand and one other facets of the painter's art. He needs to know theories of drama, methods of presentation, and all the difficult to define aspects of good theater. The horticulturist needs a thorough grounding in botanical science, in soil science, in plant chemistry, in methods of propagation, cultivation, pruning and more. Much more. All of this sounds frightfully intimidating to the non-technical person yearning for a floriferous geranium in the living room window.

That's where horticultural organizations come into the picture. The organization that knows its business makes information available to its members. It says, if you want to grow a geranium, keep it at such a temperature, give it this much light, try to maintain a relative humidity between here and here, apply water under these conditions and not under these, use potting compost A, and keep an eye out for the following pests and diseases. With that sort of factual aid, every untrained plant lover can become a successful horticulturist. The organization might even suggest that the geranium lover upgrade his knowledge slightly and learn that his plant really is a Pelargonium, relative to the true geraniums, and tell him why, and perhaps, even introduce him to the Geraniaceae, the geranium family, and then tell him all about true geraniums, erodiums, and pelargoniums. But that comes second. The first order of business is to help him to grow successfully the plant he already has.

The leadership of the American Horticultural Society is aware of this need to supply information to individual growers. The question is finding the best way or ways to get the job done. Our publications are one tool. The annual Congress is an exceptionally productive way to get information to the members from experts in horticultural fields. More ways are under consideration. Where they exist, A.H.S. tries to work with local horticultural organizations because local experts, conversant with local problems, are the best sources of local information. It is no easy task to give backyard gardening information that applies right across the country, east to west and north to south.

Then there is that other aspect; public relations. An organization such as A.H.S. is bound to encourage public horticulture at all levels; to promote hoticultural education for children, for horticultural workers, for professionals and for adults who need to know about plants so their lives will be brighter. It is a tremendous challenge, this business of getting people and plants together. But it is a satisfying one. Satisfying, perhaps, because while the gardener is learning how to grow his plant the plant is striving to stay alive long enough for the two of them to make a successful job of producing a beautiful flower.—**JPB**

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JOHN PHILIP BAUMGARDT, *Editor*

The American Horticultural Society, *Publisher*
Mount Vernon, Virginia 22121
703/768-5700
O. KEISTER EVANS, *Executive Director*

For United Horticulture . . . the particular objects and business of The American Horticultural Society are to promote and encourage national interest in scientific research and education in horticulture in all of its branches.

AMERICAN HORTICULTURIST is the official publication of The American Horticultural Society, 7931 East Boulevard Drive, Alexandria, Virginia, 22308, and is issued in March, June, September, and December of each year. Membership in the Society automatically includes a subscription to *American Horticulturist* and $1.50 is designated for each issue of this publication. Membership dues start at $15.00 a year.

Refer editorial matters to:
John Philip Baumgardt
American Horticulturist
P. O. Box 7163
Kansas City, Missouri 64113

Refer advertising matters to:
Publisher Services, Inc.
621 Duke Street
Alexandria, Virginia 22314

Address requests for reprints of articles to The American Horticultural Society,
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AMERICAN HORTICULTURIST is devoted to the dissemination of knowledge in the science and art of growing ornamental plants, fruits, vegetables, and related subjects. Original papers which increase knowledge of plant materials of economic and aesthetic importance are invited. For manuscript specifications please address the Executive Director, Mount Vernon, Virginia 22121.

Replacement issues of *AMERICAN HORTICULTURIST* are available at a cost of $2.50 per copy, but not beyond twelve months prior to date of current issue.

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IN THIS ISSUE

OUR COVER PHOTO—A photograph of an original Redoute painting, furnished by the Hunt Botanical Library for use in *American Horticulturist*. Refer to page 48 and the inside back cover of this issue for further information.

GRAPHICS: DOROTHY CHAISSON / PRINTING: GREINER-FIFIELD, KANSAS CITY, KANSAS

LYSIMACHIA

A Useful Native for Gardens

Vincent Joseph Coffey *

The genus *Lysimachia* (loosestrife) has approximately 200 species and is found on all the principal land masses of the world. The loosestrifes are members of the Primulaceae or Primrose family. Eighteen species of *Lysimachia* are native within the continental borders of the United States (Ray, 1956). Of these eighteen species, seven are grouped into the Section *Seleucia* on the basis of having five sterile stamens (observable with a 10X hand lens) which alternate with the five fertile stamens. All other species have ten fertile stamens.

I wish to review these seven species which have sterile stamens, the Section *Seleucia*.

My interest and enthusiasm in this group has developed and heightened in connection with my research into the classification, taxonomy, and evolution of Section *Seleucia*. From these studies I came to realize that loosestrife has potential as a garden ornamental.**

The loosestrifes belonging to the Section *Seleucia* are perennial herbs with smooth, erect or trailing stems, and opposite leaves. The flowers are found individually in the leaf axils, or clustered at the ends of the lateral branches. The petals are yellow, sometimes with a reddish splotch at the base. Floral parts (sepals, petals, fertile and sterile stamens) occur in groups of five, or occasionally in groups of four or six. Before the flower opens, each fertile stamen is enrolled by a petal along its long axis—a characteristic which is specific for the Section *Seleucia*.

Culture

The plants usually are extremely

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**In this endeavor I am deeply indebted to my major professor, Dr. Samuel B. Jones of the University of Georgia who suggested the problem, and to the following for providing financial aid in support of my field work: the University of Georgia, The Society of the Sigma Xi, and the National Science Foundation.

hardy, most of the species are adapted to moist soil conditions, and they do well in semishaded locations. A few grow better in well drained soils and sunny locations. The accompanying table presents information on the natural habitat and range of the seven species along with horticultural information. It is interesting to note that one or more of the species are found in all states except California and Nevada. Plants collected from throughout the United States were successfully transplanted to Athens, Georgia, where they survived for two full years.

I found that the best way to start plants for the garden is to dig rootstocks while the plants are in flower. The plants are easy to locate at this time. Care should be exercised when collecting rootstocks to disturb the natural population as little as possible, and to remove the rootstocks prudently, always leaving enough to maintain the population. After digging the rootstocks, remove soil, cut the stem near ground level, and place the rootstocks in moistened plastic bags until they are replanted. They may initially be planted in pots in a greenhouse, or put in a "nursery" area of the garden.

Plants also may be started from field collected seeds. Fresh seeds are dormant and will not germinate. Dormancy of seeds which have not overwintered may be broken in the following manner: (1) remove the seeds from the capsule, (2) soak the seeds for twenty-four hours in water, (3) remove the seeds from the water and blot or drain the seeds to remove excess water, (4) place the soaked, drained seeds in a closed container, and (5) maintain the seeds in the container at a temperature of 37° to 43°F (refrigerator) for two weeks. Sow the seeds one-quarter inch deep in potting soil, keep the seeds moist at room temperature, and germination will occur within two weeks.

All species are long day plants and require twelve hours of light to flower. Flowering occurs from May through September, depending upon the species, as indicated in the table. Plants may be forced to flower indoors during the fall and winter months by using artificial light to supplement normal daylight. The species are unable to self-fertilize, and must be cross pollinated. All species, except *Lysimachia tonsa*, exhibit rapid vegetative growth by rhizomes. The leaves stay green throughout the growing season and do not fade or yellow. Insect damage to foliage was minimal in both the greenhouse and the garden at Athens, Georgia.

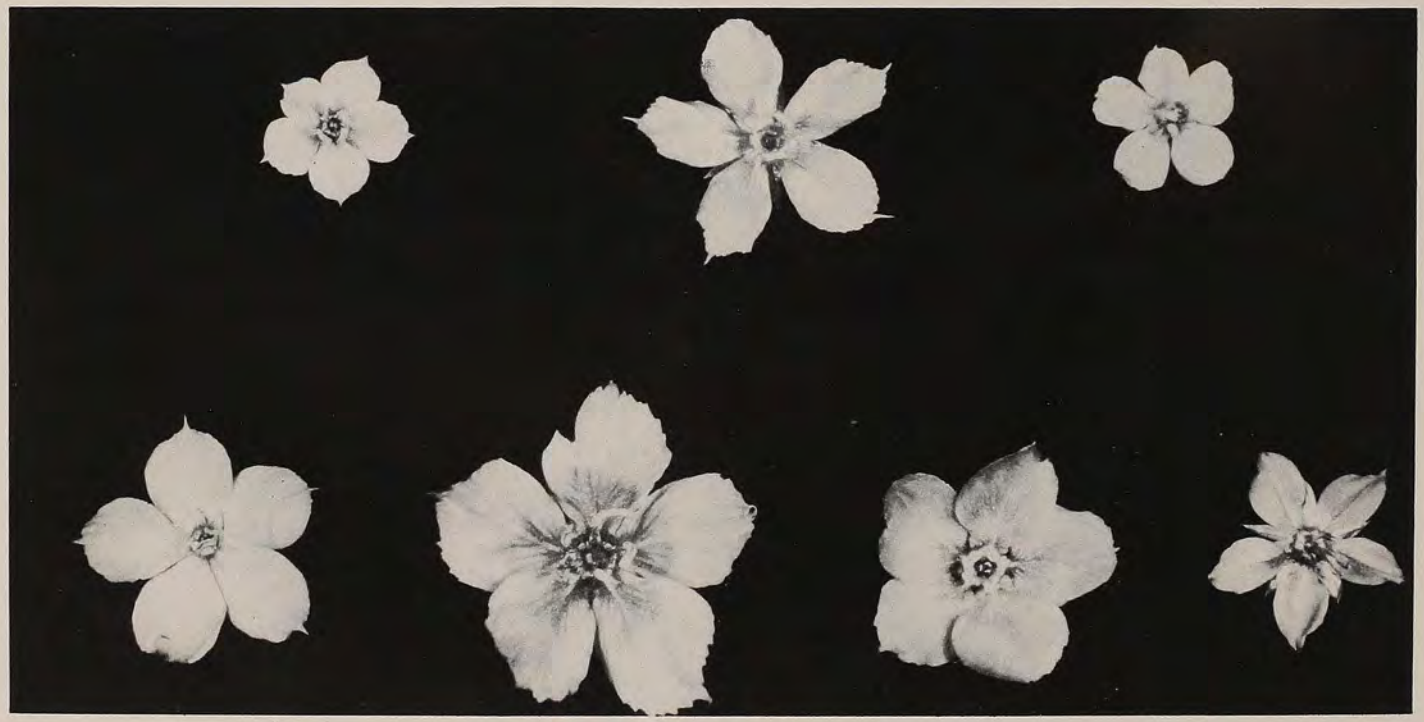
Three of the species show particular promise as ornamentals. *Lysimachia ciliata*, with many showy flowers and large, broad foliage leaves, presents the gardener with an interesting contrast of yellow and green. This species is widespread, easily transplanted, and forms dense stands. *Lysimachia lanceolata*, is a slenderer plant with showy flowers, and narrow leaves. This species does

Lysimachia ciliata.*

**The black lines in the background are 4 inches long; the scale of insert is 10 mm. or ⅜ inch.*

Native Species of *Lysimachia*, Section *Seleucia*, in the United States.

Species	Geographical Distribution	Natural Habitat	Height (feet)	Flowering Season	Additional Comments
L. ciliata	New England southward to GA, westward to TX and WA	moist to dry woods, stream banks	1-4	May-Sept.	most abundant and widespread species, showy flowers, excellent ornamental
L. graminea	Northeastern AL	stream banks and creeks	less than 1	May-June	rare, should not be collected
L. hybrida	New England to FL, northwest to ND	swamps, wet meadows, pond margins	1-3	July-Aug.	wet soils, can tolerate standing water, weak stemmed, fair ornamental
L. lanceolata	PA to FL, westward to TX and MN	dry or moist woods, bluffs	1-3	June-Aug.	well drained or moist soils, plants slender, excellent ornamental
L. quadriflora	MA to GA westward to AR and ND	wet meadows, fens, pond and stream margins	1-3	July-Sept.	moist soil, showy flowers, good ornamental
L. radicans	Mississippi valley, westward to TX	moist woods swamps and shaded stream banks	1-4	June-Aug.	roots profusely at nodes, moist soils excellent ground cover or as ornamental in hanging baskets
L. tonsa	Appalachian region of GA, NC, and TN	open woods and dry ridges	1-3	May-Aug.	forms clumps (does not spread by rhizomes), well drained soil, showy flowers, very good ornamental



Blossoms of the *Seleucia* loosestrifes.

*Lysimachia lanceolata.**

Lysimachia radicans.

well under moist or dry soil conditions, and the short stature and slender nature of this plant make it excellent for forming borders. *Lysimachia radicans*, with long trailing stems and branches accentuated by many small yellow flowers, is especially well suited for hanging baskets.

Hybrids among all species can be found in nature, and artificial hybrids in every possible species combination were produced in my greenhouse studies. The F_1 hybrids are generally intermediate in appearance between the two parents, and they have a lower pollen fertility when compared to the parents.

I hope that this brief report will stimulate and encourage gardeners to try our native and neglected *Lysimachias* in their gardens. Most garden writers tend to discuss only species of *Lysimachia* which are foreign or introduced to the United States, but in my experience our native loosestrifes have great merit. With a minimum of effort the gardener will be rewarded with healthy, hardy, and handsome plants which will add to the total display of the garden, particularly in mid-summer.

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maintain a healthy and beautiful TERRACE GARDEN

*Linda Yang**

Hopeful gardeners place expensive woody plants on terraces, roof tops, and around penthouses year after year. Few of these plants continue to grow well or to flower and fruit freely season after season, even though they may have been chosen carefully with regard to available light and climate conditions. The disappointed owner may assume that the plants cannot take city life. It may never occur to him that these woody plants, trees, shrubs, and vines are faltering for reasons totally unrelated to air pollution or other urban ills.

I have found three reasons why terrace gardens sometimes fade:

Nutrient Depletion

A factor contributing to plant deterioration might be termed plant malnutrition. This is caused by a lack of available nutrients in the soil. The original potting mix may have been quite rich in plant nutrient elements. After several seasons of supporting plant growth, and with continuous leaching of nutrients from soil in the containers, few available nutrients remain in the potting mix and these residues may not be properly balanced for optimum plant growth.

Soil Compaction

Time and the elements work together to help compact the soil in containers. Potting soil that may once have been a friable, porous mix eventually becomes a too dense mass. There is no longer sufficient porosity for air to reach the plant roots or for good drainage.

Insufficient Water During Dormancy

A third factor contributing to the loss of outdoor container-grown woody plants, especially in cold climates, is insufficient soil moisture during the dormant period. Although their biological systems are slowed during winter, plants still require some available moisture when dormant. Highrise gardeners sometimes assume that nature is taking

**505 East 79th Street, New York City, N.Y. 10021*

care of the moisture supply but too often not enough soil moisture is supplied by rainfall or by melting snow to keep container-grown plants in a healthy state.

These factors, so closely related to each other, may also contribute to failure of plants growing in ground beds. In the restricted confines of even the largest terrace gardens, however, a more rapid decline occurs. This frequently is complicated by the fact that the owner is not even aware of the importance of adequate and continuous supplies of balanced nutrients and water as well as properly aerated and drained soil. If this is your situation, now is the time to take steps. In all likelihood, it is not too late to start a program which will remedy poor growing conditions.

During the autumn months, after most of the deciduous plants have shed their leaves, dig into the top few inches of container soils balanced, slow-acting, mineral and organic fertilizers which will properly restore essential nutrients required by your plants. A soil test run on a sample of your container soil by a technician in your local Agriculture-Horticulture Extension Service will reveal exactly which nutrient elements should be supplied and amounts will be indicated. But the addition of a balanced mineral fertilizer mixed with an organic fertilizer for slower release of nutrients often gets the job done. A really major soil reworking project should be scheduled for early spring—when the gardener is rested up after his own dormant period and can face the work involved.

Restoration of Nutrients

Begin by correcting the soil texture; with your trowel turn into the soil several trowelfuls of brown peat, rotted cow manure, leafmold, or compost. These soil amendments, so essential to productive soil in most cases, supply minimum amounts of nutrient elements, but they work wonders for soil texture, aeration, drainage, and the beneficial microorganism population. Usually these supply ample amounts of essential micronutrients.

Photos furnished by author.

Roses and a butterfly.

Now, consider the major nutrient elements. Nitrogen, the element which contributes largely to lush, leafy growth, is most often lacking in old soil. Organic fertilizers supplying appreciable amounts of nitrogen include blood meal, soybean meal, cottonseed meal, and fish emulsion. Inorganic forms of nitrogen include ammonium sulfate, ammonium nitrate, and various nitrate salts. Phosphorus, involved in almost all cellular activities of plants, contributes to strong root growth, good flowering, and fruit set. It is found in substantial amounts in bone meal, the superphosphates, oyster meal, and in rock phosphate. Potash (potassium) is necessary for sturdy, resistant plants with good root formation, and is supplied by various inorganic salts such as potassium sulfate as well as potash rock, wood ash, and seaweed.

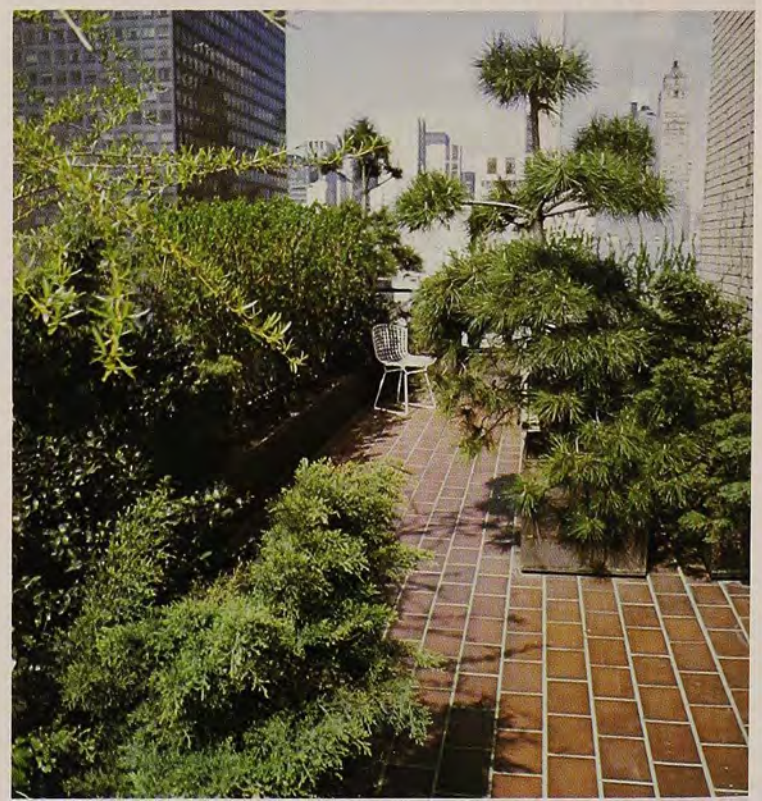
Most of these nutrients are available in small packages at garden shops and nurseries. I keep on hand more than one source of each nutrient element in

A small corner serves as a storage place.

Too many seasons without deep soil cultivation resulted in this totally potbound shrub.

Healthy woody plants will flower and bloom for years on terrace gardens: 'Pfitzer' juniper, tulips, weeping willow, and *Pieris japonica*.

Japanese black pine, juniper, holly, and privet.



order to alternate fertilizers from one application to the next. Recommendations for quantities to be applied may be found on the labels. Probably you will find that your hardy woody species require smaller amounts of nutrients than those suggested for tropical species. You can easily determine acceptible applications if you compute the square footage of your containers. Multiply length by width for rectangles and squares, multiply diameter by itself by 0.7854 for a circle to determine surface areas of containers. Generally speaking, a top-dressing of three to five ounces of dry fertilizer per square yard of surface makes a reasonable application for commonly available balanced fertilizers.

A soil Test Determines Acidity

An inexpensive soil testing kit suffices to help you determine whether the pH value (acidity) of your container soil should be altered. If the soil acidity is too far from the neutral point, plant nutrient elements become "locked" in an insoluble form in the soil and remain unavailable to your plants. I have found that the soil on my terrace tends to become too acid for some of my plants and I have to add a light dressing of lime periodically.

Restoration of Soil Porosity

In digging the soil to cultivate in fresh fertilizers you will be on your way to alleviating the problem of soil compaction. If you find that your soil is quite dense, dig in several trowelfuls of perlite or vermiculite. Purchase these at garden shops. Perlite and vermiculite are porous soil amendments which help to reduce soil compaction. They are light-weight and inert so far as plant nutrition is concerned. I avoid using builder's sand as an amendment for correcting drainage and aeration even though it often is used in garden soils. Sand is unnecessarily heavy, and many upstairs gardeners are concerned about the weight of their containers.

A Word About Cutting Roots

Too often the terrace gardener is afraid to deeply work and restore soil in his containers because he worries

Light-weight Potting Mixtures for Container Gardening

All Purpose Mixture

6 pecks Topsoil
3 quarts Leafmold
3 quarts Brown Peat
5 quarts Perlite
5 quarts Vermiculite
½ cup Bonemeal
1 tbsp. 5-10-5 Fertilizer

Alkaline Reaction Mixture

6½ pecks Topsoil
2 quarts Leafmold
6 quarts Perlite
4 quarts Vermiculite
1 cup Agricultural Limestone
½ cup Bonemeal
1 tbsp. 5-10-5 Fertilizer

Acid Reaction Mixture

6 pecks Topsoil
1 peck Brown Peat
2 quarts Oak Leafmold
3 quarts Perlite
3 quarts Vermiculite
½ cup Cottonseed meal
¼ cup Copperas (Iron Sulfate)

A Plant Nutrient Guide for Terrace Gardeners*

Content and Reaction of Fertilizers Supplying Nitrogen

Fertilizer	Per Cent Nitrogen	Reaction
Urea	46	Acidic
Ammonium nitrate	35	Acidic
Ammonium sulfate	21	Acidic
Calcium nitrate	17	Alkaline
Sodium nitrate	16	Alkaline
Ammonium phosphate	12	Acidic

Content and Reaction of Fertilizers Supplying Potash

Fertilizer	Chemical Name	Per Cent Potassium Oxide
Muriate of Potash	Potassium chloride	60-62.5
Sulfate of Potash	Potassium sulfate	48
Potassium nitrate	Potassium nitrate	44-46.5
Potassium metaphosphate	Potassium metaphosphate	40

Terms Relating to Soil Reaction (pH)**

pH	Soil Comment
Below 4.5	Extremely acid
4.5-5.0	Very strongly acid
5.1-5.5	Strongly acid
5.6-6.0	Medium acid
6.1-6.5	Slightly acid
6.6-7.3	Neutral
7.4-7.8	Mildly alkaline
7.9-8.4	Moderately alkaline
8.5-9.0	Strongly alkaline
9.1 and higher	Very strongly alkaline

Content and Reaction of Fertilizers Supplying Phosphoric Acid

Fertilizer	Per Cent Phosphoric Acid	Reaction
Phosphate rock	30-40	Alkaline
Superphosphate	14-20	Neutral
Ammonium phosphate	45-50	Acidic
Double Superphosphate	40-45	Acidic

Approximate Nutrient Content of some Organic Fertilizers

Fertilizer	Per Cent Nitrogen	Per Cent Phosphoric Acid	Per Cent Potash	Reaction
Wood Ash	0	2.0	5.0	Alkaline
Blood meal	13.0	2.0	1.0	Acidic
Bonemeal, steamed	2.5	25.0	0	Alkaline
Cottonseed meal	7.0	3.0	2.0	Acidic
Fish meal	9.5	7.0	0	?
Kelp (Seaweed)	2.5	1.5	15.0	?
Linseed meal	5.5	2.0	1.5	?
Cattle Manure (not composted)	2.0	1.5	2.0	Alkaline
Sheep Manure (not composted)	2.0	1.5	3.0	Alkaline
Soybean meal	7.0	1.5	2.5	Acidic

These charts were included by American Horticulturist as an aid to terrace horticulturists.–Editor

***pH. The hydrogen ion concentration in a solution (such as soil solution) determines its acidity. The hydrogen ion concentration usually is expressed in terms of pH values, which are negative logarithm numbers. pH values lie between 1 and 14, and for soil solutions, mostly between 4 and 8. A pH value of 7 indicates a neutral reaction. Acidity increases as pH values lower from 7 and decreases (alkalinity increases) as pH values rise above 7. Because pH numbers are logrithmic, soil solution with a pH of 5 is ten times as acid as one having a pH of 6 and one hundred times more acid than a soil solution of pH 7.*

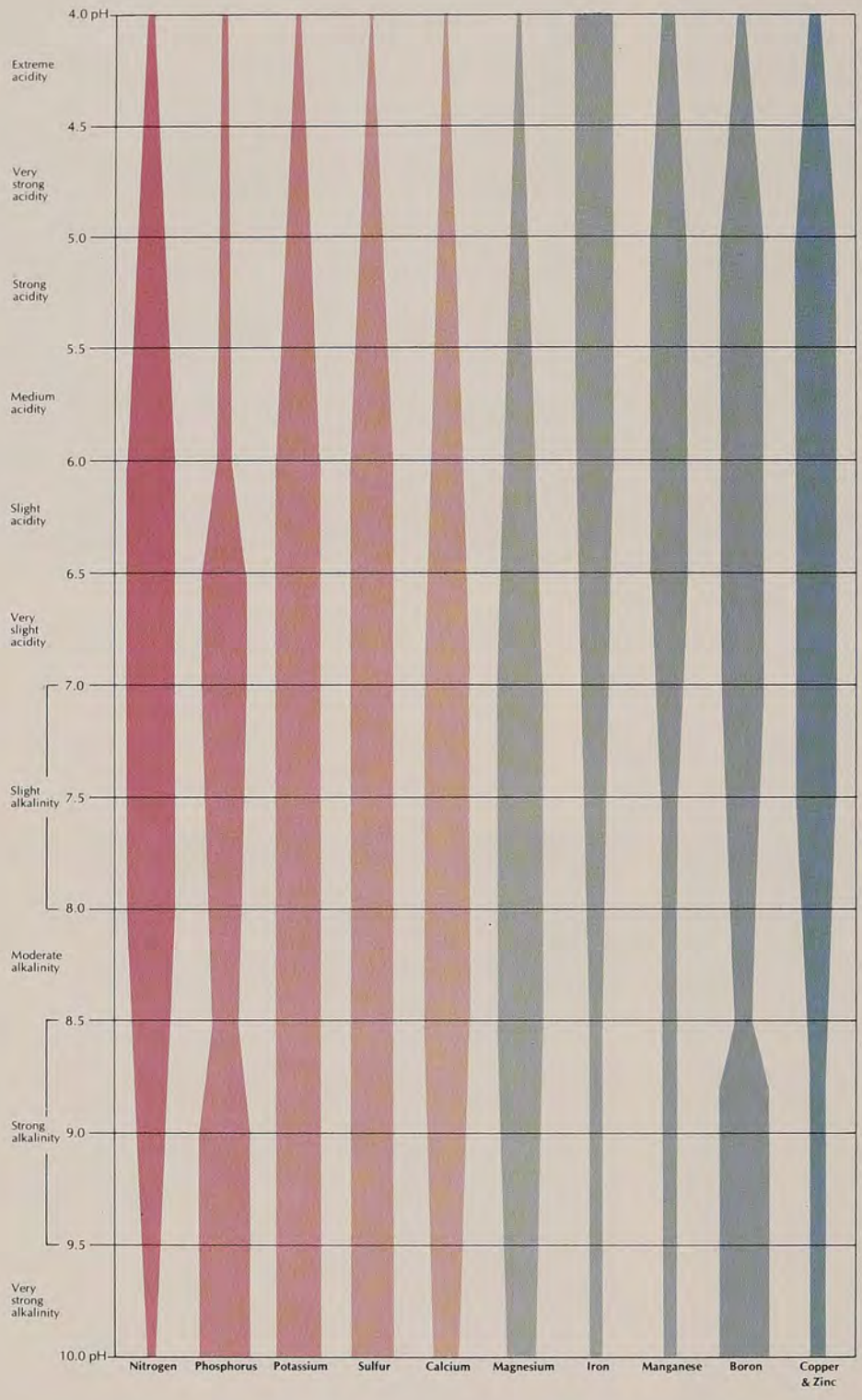
Tub-grown deciduous azalea.

Flowering crabapple blossoms.

In the autumn, when the deciduous trees have lost their leaves, begin your program of reworking the soil.

Dormant terrace plants may derive only limited moisture from winter snow.

Plant Nutrient Availabilities at Various pH's



about damage to plant roots. Such apprehension is unjustified. Even the smallest woody terrace plant often has yards of roots. If you require a practical demonstration of the advantages of cutting or pruning roots, study the cultural techniques used in growing bonsai plants.

The roots of these trees and shrubs of restricted stature are routinely cut back every few years, and many of the plants outlive their owners. A prime factor, of course, is that bonsai growers compensate for root loss by removing a proportionate amount of top growth (branches and leaves). They base their top pruning decisions on classic styles. The terrace gardener may base his top pruning style on space and plant beauty. The point is, so long as you compensate for root damage by top pruning, you need have no qualms about digging among the roots of your container-grown plants. If you need an excuse for top pruning, the limitation of available growing space on a terrace should be good enough.

Supplemental Winter Watering

While normal winter rain or snowfall may supply sufficient moisture for dormant plants growing in the ground, too often it is not enough for plants in containers. With no wilting leaves or drooping flowers to remind you, it is hard to remember that your winter-bound container-grown plants may be suffering from lack of soil moisture. If the rain or snowfall has been light and if you want your plants to survive you will have to do some supplemental watering in mid-winter. Never mind that your neighbors think you are engaged in a peculiar activity. The task is best carried out on the morning of a day when the temperature is expected to remain well above freezing.

Dealing with problems of depleted soil nutrients, soil compaction, and insufficient soil moisture, during winter is relatively easy. There is no reason why the trees, shrubs, and vines on your terrace should not become more beautiful and continue to bloom more profusely year after year. With a minimum of effort you can maintain a long lived, healthy, and beautiful terrace garden.

#1

TV Home features

PLANTS IN CANDY JAR

Prepared by Dr. Henry M. Cathey, Leader, Ornamentals Research Laboratory, U.S.D.A., Beltsville, Maryland. Made available upon request to television stations.

Have you ever tried to grow plants in a jar but couldn't figure out how to get the plants into the jar? A horticulturist at the U.S. Department of Agriculture, who believes every home should have live plants, says you make the garden outside the jar. Then you put it into the bottle. It's the same principle used by model ship builders.

#2

Start with any clean jar...A candy jar looks great. You need fresh cuttings from house plants and a piece of foam, the kind florists use. Soak the foam in water until all bubbles cease then cut the foam to fit the bottle.

#3

Use a pencil to make holes in the foam and insert the cuttings. Wind the long cuttings around the foam.

#4

Turn the bottle on the side and slowly slide the foam and cuttings into the container. Use a twisting motion to avoid pulling any of the cuttings out of place. It's a slow process, so be patient!

#5

When the foam and plants are in the bottle, arrange the leaves to face out. Then pour water into the bottle, shake to cover all surfaces. Turn the bottle upside down to let any excess water drain away.

#6

Place the top loosely on the bottle and locate your terrarium anywhere in the home. Keep it away from direct light or drafts from heating or cooling systems. If water condenses on the bottle sides, take off the top and let moisture evaporate for a few hours. Then replace the top.

Some arrangements are short-lived. Others, if you fertilize them regularly, can grow and thrive for many months. Do clean and wash the bottle occasionally....and remove the dead leaves.

Photos furnished by author.

Drosera dichrosepala **Turcz.**

Drosera adelae **F. Muell.**

Photo by Takayuki Kondo.

Two New Sundew Introductions for Growers of Carnivorous Plants

*Katsuhiko Kondo, Tokuyoshi Konda, and Josef Bogner**

On a plant exploration trip to Australia in 1966, the senior author collected many living clones of carnivorous plants and sent them to the Kondo Collection in Nagoya, Japan.**Among the carnivorous plants collected at that time were two sundews. They have since been successfully propagated and dispersed on an exchange basis to growers throughout the world. Recently these sundews have become increasingly popular as ornamental, indoor plants. Since many amateur horitculturists grow them without knowing their source, an introduction to these handsome and interesting plants should be beneficial.

Before discussing these two specifically, a look at their relatives is necessary. The scientific name of the sundew, *Drosera*, is appropriately derived from the Greek word "*droseros*," meaning much dew. Consisting of approximately ninety species (about sixty of which grow in Australia), *Drosera* are most often found in moist pinelands and sandy roadside ditches in savannahs. They thrive in locations with acid soil (pH 3.5 to 5.0) and high humidity both in the soil and in the air. Sundews appear to adapt well to regions with barren soils, as they can obtain organic nitrogen directly from victims such as small insects. As a carnivorous plant, the sundew has active bird limes or flypaper traps, features which are named for their obvious similarity to human devices [after Lloyd: *The Carnivorous Plants* (1942)].

The *Drosera* have active glandular hairs and leaves which move, twist, hold, fold, and roll victims to the center of the leaves. An interesting discussion of these movements can be found in Charles Darwin's famous text, *Insectivorous Plants*, written in 1875. The glandular hairs consist of a tapering stalk topped by an oval gland. The stalk arises as a mass of tissue from the leaf surface and includes all the elements of leaf structure—epidermis, parenchyma, and vascular tissue. When a victim is caught, the leaf rolls back on itself from the apex toward the base. Capable of such movement, which leaves them bent like a bow, the glandular hairs are well studied for trapping prey. In addition to the stalked glands, there are numerous, small sessile glands—the origin of which are purely epidermal. Only those sessile glands of the concave leaf surface are capable of absorption. Those on the dorsal surface are small and have usually lost their terminal cells. During the absorption of nutrients, the active glands display cytoplasmic changes.

The process begins when the prey is caught on the edge of a leaf blade.

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***Details of this trip have been previously reported in three publications: "Notes on Australian Carnivorous Plants," in Report for Tokyo University of Agriculture (1967) and in Collecting and Breeding 29 (1967); and "Australian Carnivorous Plants–Report of an Australian Plant Exploration Trip" in Shin-Kaki 57 (1968).*

Then the long, marginal glandular hairs start bending and carry the prey slowly to the center of the blade. This movement causes the entire surface of a victim to be covered and subsequently digested by enzymes from the glandular hairs and sessile glands. Formerly, the protease in carnivorous plants was thought, because of its pH range, to be pepsin-like. Present research, however, reveals a difference from pepsin. The acid protease, *nepenthesin*, is the common digestive enzyme in carnivorous plants.

The two species of sundews to be discussed are *Drosera adelae* F. Muell and *D. dichrosepala* Turcz. The former was gathered in a tropical, evergreen forest in the Seaview Mountain Range of northern Queensland, with the help of the University College of Townsville. The latter was collected in the southwestern suburbs of Perth, with the aid of King's Park and Botanic Garden. Since that time growers have been fascinated with these plants. It is possible that different strains of the two species have been imported into the United States recently. Unfortunately it is hard to say whether they are actually different strains of the original two species collected or not. This is due to the fact that for almost seven years the two species have been propagated and strains have been sent throughout the world, thus creating the possibility that these cultivated strains may have been intermixed with unintroduced strains of the species even in their native country of Australia.

Drosera adelae is a very primitive species in the genus and has large, fern-like leaves of ten to twenty-five centemeters when mature. If kept in a climate with a temperature of 20° to 25°C (68° to 77°F) and a humidity of higher than ninety per cent, the plant is in good shape. Since this sundew thrives in a shady environment, it grows best under a plant shelf in the greenhouse. Think of where your ferns thrive and that is where this plant belongs. In contrast, if this species is raised in too sunny environment, its leaves will be thicker and have a reddish color and it will be shorter.

Fresh sphagnum mosses can be successfully used for potting in the first year as they provide the high moisture and acidity (pH 3.5 to 5.0) in which the *Drosera adelae* thrive. When watering this plant, acid or neutralized water must be used. Alkaline water is harmful and in places like California, where water is alkaline, neutral water must be artificially produced for watering cultivated carnivorous plants. Though the type of water used is important, there is usually no bad effect from overwatering. The optimum condition, however, can be reached by watering until the surface of the sphagnum mosses are wet to the touch and maintaining that amount of moisture. To control this, a pot with drainage is helpful. As you might suppose a terrarium is an excellent microenvironment for this plant also.

Drosera adelae reproduces both vegetatively and sexually. If planted in a wide, large pot with sphagnum mosses its roots grow both downwards and up close to the surface. The shallow, horizontal roots often produce adventitious buds. These later become new plants. This type of vegetative reproduction occurs rapidly during the summer. Older, mature leaves are also capable of reproducing. When they fall and touch the wet surface of the sphagnum moss, numerous adventive buds are produced along the leaf veins. These buds takes about one year to mature in the environment described above. When the moisture is very high, the flowering scapes of this species may also produce adventive buds on their surfaces.

During the winter season, cultivated plants of *Drosera adelae* show a high degree of sexual reproduction through flowering and setting seeds. *Drosera adelae* forms approximately fifteen to thirty flowers on each scape. These flowers are both insect- and self-pollinated. Under cultivation self-pollination prevails. After about one month, the capsules ripen and dehisce, and then the numerous seeds are dispersed. Close to one hundred per cent of the seeds are viable in this species when cultivated.

These reproductive mechanisms can be used for artificial propagation. Se-

lect fresh, mature leaves, black-colored roots, or scapes, and clip them off. Place them on the surface of fresh, wet sphagnum moss. To ensure sufficient contact with the sphagnum moss, press the cuttings gently down. You may want to spread a light cover on the clippings. Be careful, however, as too much sphagnum moss may cause the cuttings to decompose or may allow only a few adventive buds to grow. Root cuttings need to be at least two centimeters long and, since scapes produce adventive buds around the nodes, the entire scape should be used for propagation. If seeds are used in propagation, fine grained sphagnum moss or commercial fine grained peat should be used in the plant bed. The microenvironment should be the same as described above for the mature plant. Sow the seeds on the flat bed and do not cover them with sphagnum moss powder. Do not water the seeds from the top until seedlings grow up to approximately one centimeter tall, as the seeds and the tiny seedlings would be easily covered by sphagnum moss or peat. Seedlings take one to two years to mature. No fertilizer should be used at either the young or mature stages, for fertilizer changes the soil pH causing algae and molds to invade and decompose sphagnum moss. Seeds can be stored for two to three years in a cold, dry room. The plant needs to be repotted once every year during early spring soon after sexual reproduction.

Drosera dichrosepala is placed in the Western Australian group of sundews. It is a tiny, handsome plant consisting of a tight rosette covered by long, white hairs at its base and acentrically peltate leaves with long petioles which contain chlorophyll. Each scape has from two to seven large, white flowers. The natural habitat of the species, south of Perth, Western Australia, is in sandy and swamp areas. This Mediterranean-like climate is also the home of *Eucalyptus, Banksia, Nuytsia,* and *Anigosanthos. Drosera dichrosepala* usually grows on the southern, sunny side and requires little air moisture, but is used to a high amount of soil moisture in the summer.

Photo by Josef Bogner.

***Drosera adelae* F. Muell.**

The distinguishing feature of this species is the formation of gemmae or propagules providing for a unique, vegetative asexual reproduction. This will be explained as it is very useful for the propagation of this species under cultivation. These plants will sometimes stop growth and leaf production during a resting season. At this time they form brood bodies containing an abundance of fat and starch. The brood bodies produce gemmae (hundreds at a time). They float and are dispersed by water, eventually setting minute buds which give rise to new individuals. These buds take about one year to grow.

The plant's roots are tiny and tapering. They are not thought to reproduce vegetatively. The leaves can be a vegetatively reproductive organ. Sexual reproduction takes place in the *Drosera dichrosepala* between October and January. After seed capsules of the species mature, they dehisce and disperse numerous seeds.

The two main reproductive mechanisms of *Drosera dichrosepala* are both used for propagation under cultivation. The asexual reproduction is especially productive as gemmae are formed two or three times a year. Since its reproductive potential is so great, younger generations are constantly maintained even though individuals may have a short life period under cultivation.

This species should not be grown in high moistened greenhouse or terrarium because it does not thrive in high air humidity. Use fresh sphagnum mosses as soil and plant this species in wide flat pots. The technique of cultivation given for *Drosera adelae* may be followed, except this species likes a sunny area and little moisture in the air. After a year, the plants begin to grow taller. It then becomes necessary to repot them and put the leaf level or rosette level back to the soil level.

Both of these sundews are unique, interesting and ornamental plants. *Drosera adelae* is fast becoming a favorite, indoor plant and with appropriate care thrives under these conditions. These plants are by no means the only carnivorous plants that are being newly cultivated and we will soon introduce others. ⟡

Mainland American gardeners know the ornamental gingers only as florist's specimens, from conservatory collections, or when viewed in a sub-tropical garden. Professors Watson and Theobold have prepared a pictorial review of several of the most ornamental gingers as a guide for recognition of these fine tropical garden plants. American Horticultural Society members will enjoy viewing landscape plantings of these and other ginger species in 1975 during the A.H.S. Congress in Hawaii.

The ornamental gingers mentioned in this article originate in various tropical areas. Few are easily adapted to house culture in the North Temperate zone, but most can be grown in a warm, humid, greenhouse. Some remain evergreen the year round, others require a dormant period after flowering. Brief suggestions for the culture of these are:

Temperature: night, 62° to 65° F.; day, 80° to 85° F.

*Humidity: high for all listed genera (*Costus *and* Zingiber *are tolerant of humidity as low as 30%.)*

Light: diffuse for most listed genera, but bright for Nicolaia.

Soil: two parts brown peat, one part each loam and sand, for Alpinia, Globba, Hedychium, Nicolaia, Tapeinochilos, *and* Zingiber. *Rich, sandy loam with a trace of peat for* Costus. *Peat and leafmold with a small amount of loam for* Curcuma. Zingiber officinale *may require less peat than indicated.*

Water gingers generously as growth becomes strong; Curcuma *and* Hedychium *may be grown wet as shoots and blossoms develop, others moist. Water somewhat less after flowers fade.* Curcuma *and* Zingiber officinale *require a dormant period, water almost entirely withheld, following the flowering period.* –*Editor*

ORNAMENTAL GINGERS IN HAWAII

*Donald P. Watson and William L. Theobold**

The fragrance of the yellow, kahili, and white gingers *(Hedychium)* is truly a Hawaiian experience, long celebrated in song:

"White ginger blossoms cool and fragrant, sweeter than the rose, fairer than the moonlight, white ginger blossoms from the mountains fill the thirsty air with exotic fragrance rare" (R. Alex Anderson).

While ginger usually brings to mind the common spice obtained from the underground stems of *Zingiber officinale* Roscoe, this is but one of over a thousand species in the family Zingiberaceae (*sensu lato*, including Costaceae). Many of the other species are among the most beautiful tropical and subtropical garden flowers.

As a result of their beauty numerous species have been introduced into the Islands in the past 100 years. One begins to think of them as native to the area. Some provide valuable accent foliage; none is unattractive. In the gardens of Hawaii, we find the following members of the family commonly grown for their ornamental value, cut flowers, or for leis.

**Professor of Horticulture and Professor of Botany, (respectively) University of Hawaii, Honolulu, Hawaii 96822.*

Common Ornamental Gingers in Hawaii

1/ *Alpinia purpurata* (Vieill.) K. Schum.	Red ginger
2/ *Alpinia zerumbet* (Pers.) Burtt & Smith	Shell ginger
3/ *Alpinia mutica* Roxb.	Orchid ginger
4/ *Alpinia calcarata* Roscoe	Miniature ginger
5/ *Alpinia sanderae* Sand.	Variegated ginger
6/ *Costus speciosus* (Koenig) Sm.	Crape ginger
7/ *Costus spicatus* (Jacq.) Sw.	Indian head ginger
8/ *Costus igneus* N.E. Br.	Orange ginger
9/ *Curcuma domestica* Valeton	Tumeric
10/ *Globba schomburgkii* Hook. f.	Dwarf ginger
11/ *Hedychium gardnerianium* Roscoe	Kahili ginger
12/ *Hedychium coronarium* Koenig in Retz.	White ginger
13/ *Hedychium flavescens* Carey in Roscoe	Yellow ginger
14/ *Nicolaia elatior* (Jack) Horan.	Torch ginger
15/ *Tapeinochilos ananassae* K. Schum.	Malaysian ginger
16/ *Zingiber zerumbet* (L.) Sm.	Shampoo ginger
17/ *Zingiber officinale* Roscoe	Jamaica ginger

1/ Common Name: **Red Ginger**
Hawaiian Name: 'awapuhi-'ula'ula
Scientific Name: *Alpinia purpurata* (Vieill.) K. Schum.

As one of Hawaii's most popular gingers, this species is grown locally for its ornamental value both as a garden plant and as a cut flower. The pink colored and the multiple headed forms also are especially prized. The inflorescence consists of a cylinder of deep red bracts on an axis up to a foot in length. Each bract envelopes an inconspicuous white flower developing in sequence from the base of the inflorescence towards the tip.

Under good growing conditions the plants will reach a height of fifteen feet with two rows of alternating leaves in one plane. It flowers at all times during the year and one can often find new plants germinating and developing among the flower bracts of inflorescences that have finished blooming sometime earlier.

Red ginger should not be confused with the "Torch Ginger" *Nicolaia elatior* (Jack) Horan. *(Phaeomeria magnifica)* which looks less like the flame of a torch.

Photos furnished by authors.

2/ Common Name: **Shell Ginger**
Hawaiian Name: 'awapuhi luheluhe
Scientific Name: *Alpinia zerumbet* (Pers.) Burtt & Smith

This very popular species was until recently commonly known as *Alpinia speciosa* and this is the name under which most references will be found. It bears bell-shaped, waxy-white flowers closely clustered on an arching inflorescence. In fact "luheluhe" refers to this attractive drooping flower cluster. The persistent waxy-white bracts and petals with red tips which resemble small shells make this ginger popular as a cut flower and ornamental plant in the garden.

The flower stalks are borne on long stems often twelve feet in length with the typical *Alpinia* characteristic of two rows of alternate leaves all in one plane. In this species the edge of the leaf is hairy as contrasted with the miniature ginger which has a smooth margin. After flowering a characteristic red, ridged fruit forms.

3/ Common Name: **Orchid Ginger**
Hawaiian Name: 'awapuhi-'okika
Scientific Name: *Alpinia mutica* Roxb.

Sometimes called the small shell ginger, it is an attractive plant bearing flowers similar to but smaller than *Alpinia zerumbet*. The fruit is orange to red, persistent, and felt-covered, excellent for dried flower arrangements.

4/ Common Name: **Miniature Ginger**
Hawaiian Name: none
Scientific Name: *Alpinia calcarata* Roscoe

The miniature shell ginger is less than five feet tall with flowering stems less than six inches long. It is slender with narrow leaves eight to twelve inches long. In contrast to the true shell ginger the inflorescence is upright with greenish-white flowers that have a red and yellow lip.

5/ Common Name: **Variegated Ginger**
Hawaiian Name: 'awapuhi-kioki
Scientific Name: *Alpinia sanderae* Sand.

Variegated ginger is one of the several species grown primarily for its foliage rather than its inflorescence which is made up of small orange-pink bracts covering inconspicuous flowers. In general the plants are small with short shiny green leaves obliquely striped with white. These are usually less than eight inches long and one inch wide. It may be a form of *Alpinia rafflesiana* from Malaysia.

6/ Common Name: **Crape Ginger**
Hawaiian Name: none
Scientific Name: *Costus speciosus* (Koenig) Sm.

Like all other species of *Costus*, crape ginger is characterized by a spiral leaf-arrangement with a dense spike of cone-like inflorescence terminating the stem. Both the bracts and the lip of the flowers form the conspicuous part of this structure. In this species these dense flower heads are two to six inches long and made up of large stiff, red-purple bracts enclosing the base of a tubular flower with three whitish petals and a conspicuous white, crape-like lip. This lip surrounds a central, shorter, petal-like stamen. The flowers are not often used as a cut specimen, but instead heads are used in dry arrangements.

The plants are eight to ten feet tall with spirally-arranged smooth green leaves. With six to eight square feet of space the plant makes an attractive shrub.

7/ Common Name: **Indian Head Ginger; Spiral Flag**
Hawaiian Name: 'awapuhi-'Inikini Po'o
Scientific Name: *Costus spicatus* (Jacq.) Sw.

This particular ginger has several common names but can readily be recognized and remembered by the presence of a dense cylindrical cluster of dull-red, smooth, over-lapping bracts about two to four inches long. At any one time a solitary or pair of narrow yellow flowers is found extending from these bracts.

The inflorescences are borne at the end of six to eight foot, smooth, often ungainly stems. However, the plant can be attractive if it is grown where there is plenty of room for its natural development.

Several other so-called spiral flags are grown in Hawaii but they differ only in bract and flower color.

8/ Common Name: **Orange Ginger**
Hawaiian Name: 'awapuhi-alani
Scientific Name: *Costus igneus* N.E. Br.

Compared to the "Crape" and "Indian head" species of *Costus*, orange ginger is much smaller, being rarely more than one foot tall. The inflorescence is short, relatively inconspicuous, and surrounded by a rosette of smooth, green leaves. The overlapping bracts are yellowish-orange and the flowers orange-red with a somewhat tubular lip which encloses a conspicuous orange stamen. This species makes an attractive low garden plant both when vegetative and when in flower.

9/ Common Name: **Tumeric, Olena Ginger**
Hawaiian Name: 'olena
Scientific Name: *Curcuma domestica* Valeton

Both tumeric and the shampoo ginger were used by the early Hawaiians in various ways and were probably brought here by them on their early migrations. The tumeric plant is distinctive with a stemless or short-stemmed cluster of leaves arising from the underground stem in the spring of the year. Later a cylindrical flower head which consists of large, pale-green, pouch-like, curved bracts appears from among the leaf bases. Two or more pale yellow flowers are found among these bracts. The upper bracts of the head are much larger, flowerless, and pale-green to pinkish in color. The cluster of leaves on the adjacent flowerless stems is superficially similar to a ti *(Cordyline)* in appearance. All in all, the entire plant is very attractive.

Although the ground rhizome (tumeric) is important as a condiment and as an ingredient in curries in other parts of the world, this was not the case in Hawaii. Instead it was used ceremonially mixed with sea water to purify objects, things, places, and people and was used medicinally and as a dye for tapa. The latter is also an important use in other parts of the world.

10/ Common Name: **Dwarf Ginger**
Hawaiian Name: 'awapuhi peke
Scientific Name: *Globba schomburgkii* Hook f.

Globba schomburgkii produces exquisite small yellow flowers borne in a red terminal pendant panicle with red bracts adjacent to each flower. It is readily distinguished from the other gingers on this basis. The plants grow up to three feet tall with two rows of alternating leaves in one plane. Bulbils can be harvested in the fall of the year from the axils of the green basal bracts of the inflorescence. These can be germinated in the spring.

11/ Common Name: **Kahili Ginger**
Hawaiian Name: 'awapuhi kahili
Scientific Name: *Hedychium gardnerianum* Roscoe

Hedychium (sweet snow) is so named because of the delightful fragrance of the flowers of its species. The kahili ginger has inflorescences that superficially resemble the red and yellow Hawaiian ceremonial kahilis that were made of bird feathers. The inflorescence is terminal, about one foot long, and made up of widely separated, non-overlapping bracts. Each bract contains two yellow flowers with long red stamens. The flowers are smaller than those of the yellow and white ginger but the overall habit and inflorescence makes this an attractive garden species. The plants grow up to six feet tall with two rows of alternate leaves all in one plane.

12/ Common Name: **White Ginger**
Hawaiian Name: 'awapuhi ke'oke'o
Scientific Name: *Hedychium coronarium* Koenig in Retz.

White ginger is used widely as a cut flower, garden plant, and for lei making. In fact, the term *coronarium* refers to its use in making garlands. The spike-like terminal inflorescence consists of numerous, tightly overlapping green bracts. Two or three white flowers are found in the axil of each bract. These are made up of one large and two smaller petals as well as a large butterfly-shaped, notched lip with a pale heart-shaped spot on the lower end of the mid-vein. In addition there is a pair of petal-like sterile stamens.

Flowers appear over a long period developing from within the bracts from the lower toward the upper end of the inflorescence. They are harvested in the bud stage for making leis.

The plants grow up to six feet tall with two rows of alternate leaves all in one plane. It was introduced into Hawaii in 1880, along with the yellow ginger and both have become widespread in the wild as well as in cultivation. It thrives in damp open forests, partially shaded gardens and flowers from near sea level to higher altitudes where the weather is cooler.

13/ Common Name: **Yellow Ginger**
Hawaiian Name: 'awapuhi melemele
Scientific Name: *Hedychium flavescens* Carey in Roscoe

Yellow Ginger is superficially very similar to the white ginger and appears to differ only in color. However, there are usually three to five pure creamy yellow flowers per bract with a darker yellow shading on both sides of the mid-rib. The lip is slightly smaller and the stamen a little longer but it is otherwise similar to the white ginger. It was also introduced in the latter part of the last century and is now found both wild and in gardens.

14/ Common Name: **Torch Ginger**
Hawaiian Name: 'awapuhi ko'oko'o
Scientific Name: *Nicolaia elatior* (Jack) Horan.

Most people will know this very attractive ginger by its former scientific name *Phaeomeria magnifica*. The large, beautiful rose-red, cone-like inflorescences are borne on heavy naked stalks up to six feet tall and as a result they are prized for their ornamental value. These tall stalks are found scattered among the vegetative, leafy stems. The flower heads consist of large, showy, wax-like red bracts with a narrow white margin. The lowermost bracts are greatly enlarged, wavy, flowerless, and form a collar or nest for the upper portion which is made up of smaller, closely overlapping bracts containing small flowers. The only conspicuous part of the flower is the red lip which has a narrow orange-yellow margin. Unfortunately the flower cluster is heavy and not long lasting after it is cut.

The vegetative, leafy stems reach a height of twenty feet and are made up of two rows of alternate leaves all in one plane. As a result this species is only suited for large garden areas.

A smaller pink-flowering clone is better suited to smaller gardens and for flower arrangements.

15/ Common Name: **Malaysian Ginger**
Hawaiian Name: 'awapuhi Malae
Scientific Name: *Tapeinochilos ananassae* K. Schum.

This attractive costoid-type ginger has relatively large rusty-red inflorescences consisting of spirally arranged, crisp-textured bracts and small inconspicuous flowers with a narrow, non-petaloid filament. The specific epithet refers to its pineapple-like structure. These inflorescences are borne on short, leafless stems. Unfortunately they are not long lasting as a cut flower. The leaf stalks bear spirally-arranged leaves and conspicuous nodes which give the stems a bamboo-like appearance which may reach fifteen feet in height.

16/ Common Name: **Shampoo Ginger**
Hawaiian Name: 'awapuhi
Scientific Name: *Zingiber zerumbet* (L.) Sm.

This and the tumeric ginger *(Curcuma domestica)* were the only gingers present in Hawaii prior to the time of Captain Cook. Consequently, to Hawaiians it was the original "'awapuhi", possibly brought here in the early Hawaiian migrations to the islands. It is found naturalized in the mountains and gets its common name from the presence of a sudsy, slimy juice that is exuded from the flower cluster. This exudate was used by Hawaiians as a hair shampoo and thirst quencher on mountain journeys.

Like the torch ginger the naked flower stalk is separate from the leafy stem. The flower stalk is short, about one foot, and bears a conical or club-shaped head of spirally arranged dull green bracts suffused with red. Small, inconspicuous yellow flowers are found among the bracts.

The leafy stem is one to three feet tall and made up of two rows of alternate leaves all in one plane. The underground stem was dried and powdered as a perfume for tapa cloth and the stalks were placed in imus to flavor cooked pig.

17/ Common Name: **Jamaica Ginger, Edible Ginger**

Hawaiian Name: 'awapuhi Pake

Scientific Name: *Zingiber officinale* Roscoe

Jamaica ginger is grown primarily for its underground stem which is valued as a condiment. It was introduced into Hawaii by the Chinese and hence its Hawaiian name "'awapuhi Pake," "'awapuhi" meaning ginger and "pake" meaning Chinese. Like the the shampoo and torch gingers the flower stalks are separate from the leafy stems. The flower stalks are one to two feet tall or less and bear a conical or cone-shaped head of light green closely overlapping bracts. The flowers are inconspicuous, yellow-green and purple.

The leaves are long, smooth, narrow, and in two alternate rows in one plane. The white roots (underground stem called hands) are harvested after the leafy stems wither and in Hawaii are used fresh for flavoring, especially in Chinese food and in ginger ale. In Jamaica large quantities are grown, dried, and exported for use throughout the world.

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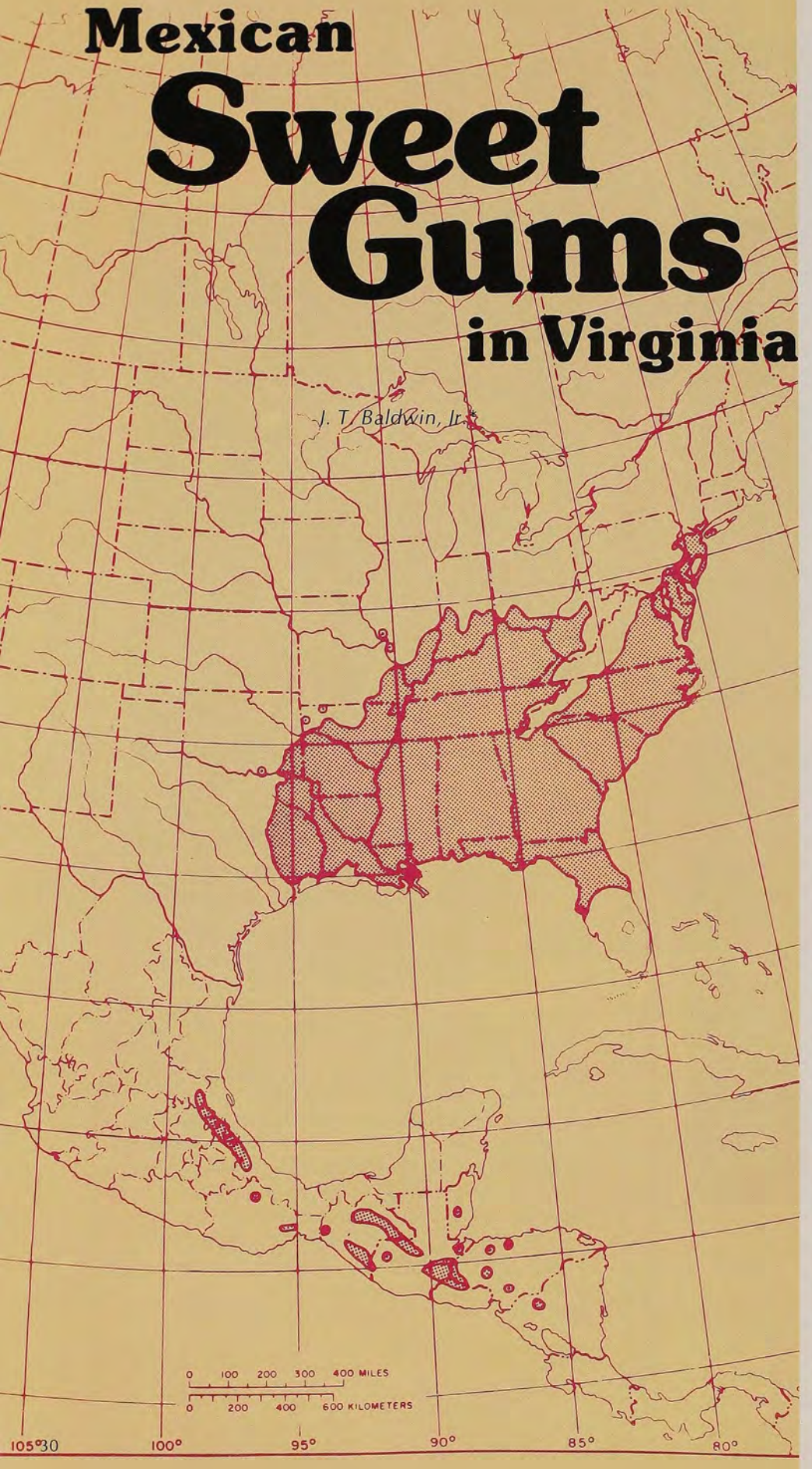
Mexican Sweet Gums in Virginia

J. T. Baldwin, Jr.*



A most urgent and obvious need is to test in our latitudes the performance of plants from the southern termini of their distributions, especially representatives of those species ranging from the eastern United States into the highlands of Mexico and Guatemala.

To illustrate this thesis I report here my experience with *Liquidambar styraciflua*. I rather suspect that we are concerned with two species of sweet gum, but as of now taxonomic botanists do not accept this interpretation that the plants in Mexico and in Virginia, for example, are specifically different. So, for the present discussion, we consider a single species to be involved.

The accompanying map (Elbert L. Little, Jr., 1971, *Atlas of United States Trees,* Vol. 1, U.S. Dept. Agric., Forest Service, Miscell. Publ. 1146.) shows the distribution of *Liquidambar styraciflua*.

From seed collected by Marshall C. Johnston, December 1960, in a cloud forest *ca.* 3500 feet elevation, four miles above Xilitla, San Luis Potosí, Mexico, we have established five trees in Williamsburg, Virginia, and from them as parents have grown other seedlings.

The trees of Mexican parentage leaf out at least a week before those native to the Williamsburg area: this is apparent in photographs taken April 8, 1974, and the Mexican trees hold their leaves three to four weeks later in the fall than representatives indigenous here.

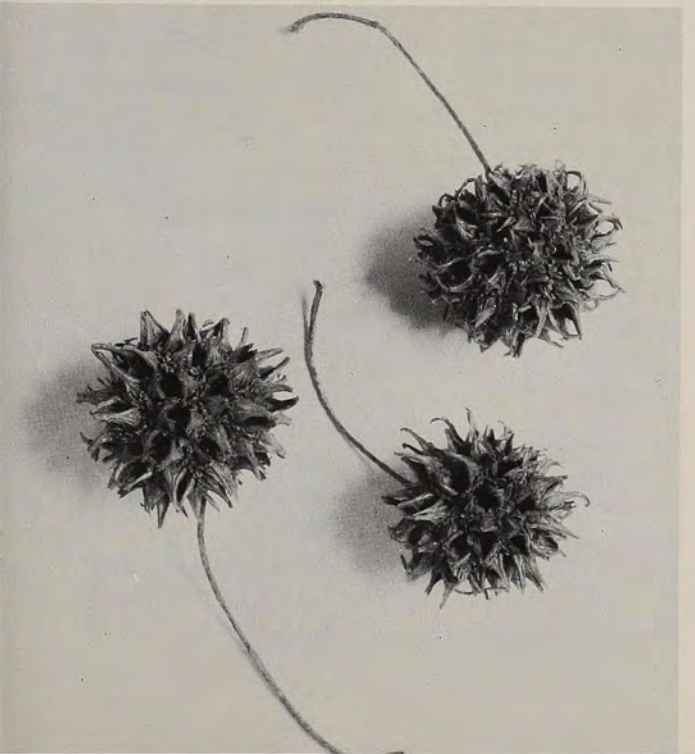
Precise analyses of comparative dry weights are demanded for determination of the wood-producing efficiency of trees of different geographic origins. But, surely, present observations suggest photosynthetic periods with potentials of considerable economic magnitude. ◈

*College of William and Mary, Williamsburg, Virginia 23185

Liquidambar styraciflua, **Virginia plant.**

Photos by Lyle Rosbotham, April 1974.

Liquidambar styraciflua, **Mexican plant.**



Photos by M. Jean Cox.

Our Horticultural Heritage

29th AMERICAN HORTICULTURAL SOCIETY CONGRESS

Stouffer's National Center Inn

OCTOBER 9-12, 1974/WASHINGTON, D.C.

Photo courtesy of Virginia Department of Conservation and Economic Development.

Gunston Hall.

Wednesday, October 9

Day-long private Pre-Congress tours of some of the most magnificent private gardens in Georgetown, Washington, D.C. and gardens of Federal Period homes in Old Town Alexandria, Virginia. These homes are not available for public inspection and provide a unique opportunity to see the "private gardens" of some of Washington's prominent personalities. Luncheon included.

Tours include the gardens of:

Mr. and Mrs. Armistead Peter, III—"Tudor Place"
Capt. and Mrs. Peter Belin—"Evermay"
Mrs. Christian A. Herter
Mr. Joseph W. Alsop ..... *Georgetown*
Mr. and Mrs. Howard W. Smith, Jr.—"The Lafayette House"
Dr. and Mrs. Arthur J. Mourot
Col. and Mrs. Wilfred J. Smith
Mr. and Mrs. Royce F. Ward
Old Town Alexandria

Thursday, October 10

9:00 a.m. - 12:00 noon—Tour of the new A.H.S. Headquarters at River Farm, which was originally one of five of George Washington's plantations along the Potomac. The Estate now serves as the National Center for American Horticulture. Tours of the house, its extensive gardens, and a special colonial plant exhibit will be featured. Refreshments will be served.

12:30 p.m.-2:00 p.m.—Keynote luncheon featuring Senator Howard Baker, member of the A.H.S. Board of Directors and noted horticulture enthusiast.

3:00 p.m.—A relaxing Potomac boat ride past the new A.H.S. Headquarters at River Farm to Mount Vernon for a private tour of George Washington's home and gardens, including a reception on the grounds.

Evening Open

Friday, October 11

9:00 a.m.-5:00 p.m.—All-day tours and educational programs including visits to:

Dumbarton Oaks—the great estate now owned by Harvard University which houses a fascinating pre-Columbian art museum and truly magnificent gardens.

The Hillwood Estate—the famed property of the late Marjorie Merriweather Post. Mrs.

Post's 25-acre property, featured in "Great American Homes," is lauded as one of the most beautifully landscaped gardens in Washington, D.C. Hillwood has never been open to the public.

The National Arboretum—The National Arboretum has over 7,000 varieties of trees and shrubs and is home of the Gottelli Collection of over 1,500 naturally dwarfed conifers—the world's finest collection.

The Agricultural Research Station at Beltsville, Maryland, is the hub of a nationwide research effort by the U.S.D.A. Eighteen plant scientists will provide a remarkable educational experience with displays and lectures on such subjects as the effects of pollution and artificial light regulators on plants; research techniques used to produce new varieties of ornamentals; the protection of plants from insects, viruses and root rot; new breakthroughs in vegetable planting; and a look at the hybridization and care of dwarf fruit trees. Highlight of the tour will be a view of over an acre of the New Guinea Impatiens that are currently being hybridized for release to commercial growers. Cuttings of these breathtaking plants will be available at the A.H.S. plant sale and auction. Lunch will be served at the Research Station.

6:30 p.m.—Cocktail reception

7:45 p.m.—Film Festival and Awards Banquet

Saturday, October 12

8:30 a.m.-9:30 a.m.—Dr. Henry M. Cathey, A.H.S. First Vice President, will report on the results of "HORT-U.S.—*Living and Learning*" an environmental symposium held at River Farm in early May.

9:30 a.m.-10:30 a.m.—A.H.S. Plenary Session

Mount Vernon.

10:30-12:00 noon—Horticultural "Three Ring Circus" featuring educational sessions and workshops.

12:30 p.m.-2:00 p.m.—Luncheon.

2:00 p.m.-5:30 p.m.—Tours.

Gunston Hall—Originally a 5,000 acre plantation owned by Virginia's first Governor, George Mason. Built in 1755, it is one of the most exquisite examples of a Federal Period home. The gardens contain some of the most superb boxwood in America.

Woodlawn Plantation—Created from 2,000 acres of the original Mount Vernon. Woodlawn was given by George Washington to his foster daughter and nephew as a wedding gift. This truly magnificent home features gardens of old-fashioned roses and fascinating nature trails.

Pohick Church—Originally built in 1769 from plans drawn by George Washington and constructed under the direction of George Mason. Pohick Church is steeped in American history. Although destroyed during the Civil War, it has been completely restored with the original Washington family pew in place. During the A.H.S. tour, the church will contain many beautiful floral displays crafted by amateur and professional flower arrangers.

6:30 p.m.-7:45 p.m.—The always fun and exciting rare and unusual plant auction. A.H.S. with the assistance of the National Arboretum, will supply unique plant material to be auctioned to the Congress.

8:00 p.m.—President's Banquet featuring guest speaker Frederick W. Case "Gifts From the American Wilderness." The highest award in horticulture, the Liberty Hyde Bailey Medal, will be presented during the banquet.

POST-CONGRESS TOURS
Sunday & Monday
October 13 and 14

One and two day tours along the nationally famous Skyline Drive with its magnificent fall foliage to historic Williamsburg; Monticello, Charlottesville, Virginia, the home of Thomas Jefferson; the beautiful James River area; the historic Williamsburg-Yorktown-Jamestown area. Another tour possibility may be to visit beautiful Longwood Gardens in Kennett Square, Pennsylvania.

1974 A.H.S. Congress Chairmen:
Mrs. Erastus Corning, II
Mrs. John M. Maury

Program Advisors:
Miss Rachel Snyder
Dr. Henry M. Cathey

DECK THE HALLS . . . with Winterberry Holly

*Christopher Boylan and Harold Davidson**

Christmas is the time of the year to deck the halls with holly. But have you ever considered using the common Winterberry as the holly?

Winterberry, *Ilex verticillata,* Gray, also known as Black-alder, Coonberry or Michigan holly is a much neglected shrub that is indigenous to bog sites and has great potential as the Christmas berry of tomorrow. Winterberry can be spectacular in late fall and early winter with bright red fruits, massed in such large quantities that they conceal the stem.

A few decades ago many people were familiar with this brilliantly fruited plant. Wild plants were often cut to the ground by persons eager to use its showy branches to deck the halls with holly, with some making a portion of their livelihood by harvesting the branches and selling them to florists. But in recent years landowners have been reluctant to permit trespassers on their property for any reason and in many states *Ilex verticillata* has been placed on the protected list. Thus, its popularity as a Christmas berry declined.

Presently, interest has been revived in the value of Winterberry. Research workers in the Department of Horticulture at Michigan State University see potential for making selections from wild populations, cultivating the plants as a plantation crop, similar to blueberries, and harvesting the fruited branches for the Christmas season.

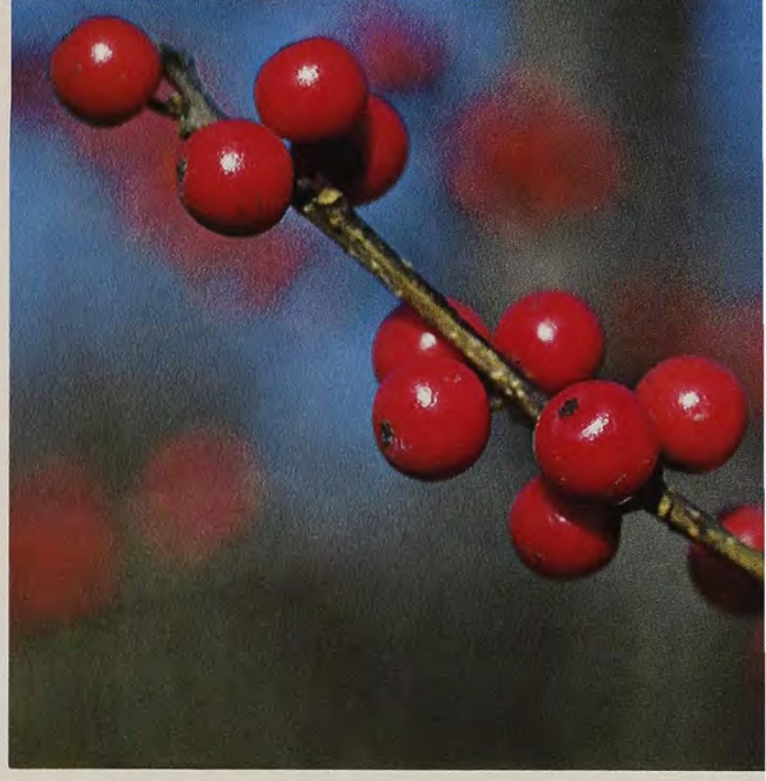
Ilex verticillata, considered worthy of the Award of Merit by the Royal Horticulture Society in 1962, is native to North America. Its distribution ranges from Nova Scotia to Western Ontario, south to Florida and west to Missouri. It is one of the hardiest of the hollies, which becomes evident during the winter months when the bright red berries of the Winterberry contrast strikingly with the snow-covered landscape.

**Ilex verticillata*, Department of Horticulture,*
Michigan State University

***Ilex verticillata*, female flowers.**

Photos by Clarence E. Lewis.

***Ilex verticillata*, male flowers.**



Fruits of *Ilex verticillata*.

When mature, *Ilex verticillata* attains a height of ten to fifteen feet and most often consists of a dense mass of stems which originated as root suckers. When young, the stems are green and glabrous but with age they become downy and grey. It develops a massive root system which extends horizontally and anchors the plant firmly in the ground.

Being deciduous, Winterberry loses its leaves in the fall. This process can be quite dramatic following a heavy frost. The leaves quickly blacken and persist for a short time; hence, one of its common names Black-alder. The alternate leaves are simple and obovate to oblanceolate in shape with an acuminate tip. They vary in size from one and one-half inches to three and one-half inches long by one inch to one and one-half inches wide, having short serrations along the margins. The upper surface may be glossy and the midrib is depressed; the midrib is raised on the lower surface and pubescence occurs on both the midrib and the veins. The species does have stipules but they are caducous, dropping from the leaves before the buds open.

Small, white, inconspicuous flowers are present in late May or early June. Since the species is dioecious, only male or female flowers are found on individual plants. A few authorities indicate that some plants are polygamodioecious which may explain the phenomenon of isolated plants found heavily fruited. The male flower clusters are larger and more branched than the female, having from three to twenty-five simple or compound cymes on prominent peduncles. Flowers on the female plant consist of one to three flowered cymes on

Photos by Harold Davidson.

Black-alder, *Ilex verticillata*, growing in the wild.

inconspicuous peduncles. The female flowers have a prominent ovoid pistil. Anthers are present in these pistillate blossoms but they are small and the pollen sacs are empty. The staminate (male) flowers have an ovary but it is rudimentary and nonfunctional. The anthers are oblong globose containing pollen grains in the thecae. The reflexed petals, four to six in number, are obovate in shape and united only at the base.

Fruits develop from the superior ovary of the fertilized female flowers. Color development commences with the onset of short days and cool temperature in September. At first, small orange-red areas appear but later the green color completely disappears and the reds dominate. The attractive fruits are bright red, globose, and about the size of a large pea. The fruit can be borne on a solitary infructescence which is characterized by its occurrence on current season's growth. But a more common fruiting habit is the verticillate type, which is recognized by three fruits borne in a simple cyme with a short peduncle. When fruitful, as plants most often are, brilliant red berries completely cover and conceal the twigs.

Controversy exists as to the classification of holly fruit. Terms variously used to describe it are pyrene, drupe, and berry. It is not a pyrene or a drupe such as a cherry because it contains more than one stone. It is really several pyrenes, each covering a single seed. Because of its hard endocarp, it cannot be classified as a berry. However, it is unlikely that holly fruit will ever be called by any name other than berry. Classification of the seed also is debatable. Names such as pit, stone, nutlet and pyrene have been used in the literature. The seed as we know it is a true seed plus an endocarp. Seeds are elliptic in outline, trigonal in cross section and approximately three millimeters by one and one-half millimeters in size. The embryo is immature at the time of fruit maturity.

A number of varieties have been described based on fruit size and color, leaf type and plant size and shape. Red or orange-red is the predominant fruit color. The cultivar 'Aurantiaca' has orange fruit and 'Chrysocarpa' has yellow. 'Polycarpa' is said to have larger than average fruits. 'Tenuifolia' has thinner leaves, 'Fastigiata' is an erect form and 'Nanum' a dwarf selection. Some hybrids between *Ilex serrata* and *Ilex verticillata* also have been reported.

The most common site for Winterberry is in a swamp. Often the most colorful specimen, full of bright red fruit, is in the middle of a marsh submerged in water, usually about a foot deep, where the soil is organic with a low pH. Many specimens fruit heavily in such circumstances at the expense of vegetative growth. But, drier ground is adequate. Although plants growing in drier areas have

been observed to produce more vegetative growth with less capacity for fruiting, there is no proof that this species requires a great deal of water for successful fruiting as other factors such as temperature and soil pH are determinant. It often grows in association with *Vaccinium corymbosum,* highbush blueberry, and demonstrates a similar susceptibility to late spring frosts.

Winterberry can be propagated by either seeds or cuttings. Seed germination is rather difficult, however, due to an immature embryo which requires a period of warm temperature, followed by a chilling period to release dormancy. Hardwood or softwood cuttings are used for asexual propagation, the advantage being uniformity of plant material. Hardwood stem cuttings have been found to root slowly with a low percentage of rooting. Therefore, the softwood cutting method is recommended. Terminal cuttings approximately four to six inches long taken in late June or early July, treated with a rooting hormone such as indolebutyric acid, and inserted in a peat or a peat-sand media under intermittent mist or high humidity will develop roots within a period of two months.

Winterberry is relatively free of pests and with selective use of modern pesticides none are serious. Damping-off has occurred in propagation beds but with proper sterilization it need not be a problem. Mildew of the leaves can be prevented or at least controlled with Karathane. The bud moth *(Rhopobota naevana illicifoliana)* may trouble plants occasionally. The eggs overwinter in the buds and the larvae appear at bud break. They spin webs which encircle the tip ends of the branches and then eat the leaves and apical buds within. The adults emerge and a second generation can attack in late summer if not controlled. Diazinon or Malathion sprayed when the larvae first appear has been effective in controlling the bud moth.

If you are not already acquainted with Winterberry, consider planting it in your landscape. Massed alongside a pond and in association with white birch and stately evergreens, it can be a bright spot in the fall and early winter landscape. Also, the bright red fruited branches can be used to add a touch of Christmas cheer to indoor arrangements. Deck your halls with holly—Winterberry holly. ◈

Christmas arrangement with *Ilex verticillata*.

'Keshar' The Gold Medalist Mango of Gujarat, India

*A. J. Dhaky**

Almost mature fruit of the 'Keshar' mango.

India is famous for delicious mangos. Uttar Pradesh, Andhra Pradesh, West Bengal, Bihar, Mysore and Gujarat, each State has its famous Mango varieties. Here, I wish to present history and description of the Gujarat famous gold medal mango 'Keshar' the pride of Sorath.

Mangos (fruit of *Mangifera indica*) must have been cultivated in Saurashtra as early as the days of Chandragupt Mourya (325 B.C.) to whom the Asokan epigraph explicitly refers and with whom the early history of Saurashtra begins. Literatures of those days and even earlier, indeed, refers to mangos elsewhere in India. This is further corroborated by sculptures of Bharat and Sanchi (250 B.C.) which depicts trees and fruit. It is not unlikely, therefore, that in those days, Saurashtra with its prosperous capital Girinager (Junagadh) was aware of mango culture. In fact, both soil and climate of lower Saurashtra are highly congenial to the cultivation of mangos from remotest days.

More evidence is obtained in the 12th Century, A.D., in a sculptural representation of Devi Ambika in the Jain Temple at Somnath Patan. Bards speak of extensive mango plantations in the days of Ra's of Junagadh, and some old mango trees grown in Dharagadh are ascribed to them. This is undoubtedly wrong, since these trees appear to be at the most a hundred years old.

Mango 'Keshar' originating in Sorath proper is the top variety and is deservedly esteemed for the superior quality of the fruit. As it is not so well known in other states of India or abroad I wish to describe it fully here.

'Keshar' (Salebhai-Amdi) is by far the best known and most extensively cultivated commercial variety in Saurashtra and now widely spread in Gujarat.

History

In recent years commercial cultivation of mango 'Keshar' has spread in many parts of Gujarat States. Salehind,

**Horticulturist, Porbandar, (Gujarat, India).*

an Amir, presented some seedling mangoes to Saikh Husein Miya of Mangrol. He liked the mango fruits very much and planted the seedlings in his garden "Lalbhagh" near Mangrol. From Lalbhagh the seedlings were sent to Rahij and other places and then the variety spread in the coastal area from Madhavpur to Una-Delvada. The late Mr. Inger, Garden Superintendent of the Junagadh State, purchased the Salehbhai Amdi grafts and planted them in the newly begun Dudheswar plantation near Girnar Mountain, an area with virgin red soil.

Owing to the change of climate the color of the mango fruit's skin and flesh changed and the beak became smaller. Shri Inger named the variety 'Keshar'.

On the occasion of Shivrati Mela, Shri Inger proposed a horticulture display booth and there the 'Keshar' mango grafts were sold to the farmers. Thus the variety spread in different Mahals and Talukas of the Junagadh State, as well as in other states of Saurashtra.

After the merger of states in Saurashtra, the garden department of Junagadh sent samples of 'Keshar' to the Western Zone mango exhibition at Bombay in June, 1955. Shri M. A. Dhaky, research Assistant, publicized and widely promoted the variety. In the Table Varieties Class 'Keshar' won the first prize and a gold medal was given to the Agriculture Department of Saurashtra for the best 'Keshar' mango.

Photos furnished by author.

***Mangifera indica*, Mango.**

Description

The tree of 'Keshar' is of medium height, with spreading branches. The clustered flowers are delightfully fragrant. The fruits are oblong-oval, slightly beaked and thin skinned. When ripe they are golden yellow with a faint rose tinge toward the top as they ripen in June. The color of the sweet, fiberless flesh is toward the orange side of yellow.

'Keshar' is a mid-season mango of finest eating quality and with average keeping quality.

Thanks to the creation of mango research stations at various centers in India very many old and recent varieties of mangos will be properly studied and evaluated. An exchange between stations of superior sorts already is possible. The next step will be a hybridizing program aimed at combining high quality with high production and beauty. Defects in known strains may be eliminated. New mangos of a quality presently unknown soon should be available. ◈

Coventry Cathedral—awarded the Gold Medal for the best floribunda in the fourth trial in New Zealand (1972-1974).

Sam McGredy IV in New Zealand

*Pamela Morrah**

Sam McGredy, one of the most famous of world rose breeders, and fourth in the family line to have made a career in roses, is now settled in St. Heliers, Auckland, New Zealand. His frequent visits from his Portadown, Northern Ireland, home to New Zealand since 1963 had shown him the tremendous possibilities of New Zealand as a hybridizing country.

Sam has over 100,000 seedlings this year—his first New Zealand batch which will, he hopes, give him a handful of top varieties to put on the market when they've been thoroughly tried out, something which could take seven years or more. He says it's grand to be working at close quarters with his roses again. In Ireland he was managing director of a large concern and was becoming more and more involved with the business side of things, here in New Zealand he is a "one-man band—typist, office boy, barrow boy and breeder." He says he is really enjoying "doing his own crossing," that is, marrying this rose with that to get the varieties with just the qualities he is looking for. These top roses are not merely accidental finds made by rose breeders. Improved varieties are the result of years of observation, research and skill, with a few Irish-Kiwi hunches thrown in!

The breeder is looking for those same characteristics which you as a gardener demand in your roses—disease resistance, vigorous growth, good clear color, abundant flowers which will last when picked for the vase, attractive foliage and fragrance, and roses which will age gracefully, a tall order!

Processing the Seedling Crop

First comes the initial round of culling when seedlings prone to disease or with lack of vigor are removed. Then comes further weeding out when other undesirable characteristics—perhaps unstable color or a short flowering period, perhaps thin petals (hopeless in a hot climate with strong sun), or leggy

**27 Palm Avenue, Palmerston North, New Zealand.*

growth or too many thorns all make a seedling an unmarketable proposition.

Those which look promising are grown on, and later sent to the nurseries of the McGredy agents overseas to be tried out there in a variety of soils and climates. Then the very best are sent to the world trials to see how they fare in competitions with the top roses from other breeders. Trials in New Zealand, Britain, Germany, Holland, France, Spain and the United States, all with widely varying conditions for growing roses, have won for Sam innumerable medals and awards and as a breeder of "repeat" flowering garden roses he is second to none. 'Orangeade,' 'Irish Mist,' 'Piccadilly,' 'City of Leeds,' 'Evelyn Fison,' 'Mischief,' 'Lady Seton' and 'Paddy McGredy' are of the favorites flourishing in gardens from Canada to Tasmania.

And as far as recurrent climbers are concerned, Sam McGredy's contribution to hybridizing has been a large one. Thinking Kordes' shrub rose 'Heidelberg' might be a good parent, he has used it many times with spectacular results. 'Swan Lake,' 'Handel,' 'Galway Bay,' and the new red 'Grand Hotel,' are all progeny, the enchanting cream and pink 'Handel' being outstanding. Jack Harkness, the successful English Breeder, says "'Handel' is probably the best climbing rose in the world today." It is the top repeat flowering climber in the latest rose analysis published by the Royal English National Rose Society, and it certainly performs well in New Zealand.

In yet another field, Sam has introduced another strain which is the novelty all hybridists hope for—a strain to catch the eye of the buying public—something which is entirely new. Seeking health and vigor, he used a German rose, 'Frühlingsmorgen,' for breeding. Nothing of value came from generations of seedlings, but in time came 'Jose,' a red rose with a white edge to its petals. Generations later, after many crossings, including germplasm from the species, *Rosa macrophylla*, he has a completely new break in rose breeding—the "hand painted" series.

'Picasso,' top floribunda for the third New Zealand International Trial, is the first of the set on the market, and Sam says the next in line, "already in the fields but not yet available, will make 'Picasso' look like nonsense."

McGredy entries have done well in the New Zealand Trials. This trial ground is comparatively new, and the only one of its kind in the southern hemisphere. It was established in Palmerston North in 1969 and there have been four trials to date. About 100 new roses, from both commercial breeders and amateurs, are entered in each two year trial, and Sam McGredy says by world standards it is a first class trial for gardeners wanting roses to suit a temperate climate.

His bright red floribunda, 'City of Belfast,' and the shaded pink hybrid tea 'Pania,' were the top winners in the first trial from 1969-1971. 'Courvoisier' won the fragrance award in the second, his novelty cherry-red "hand-painted." 'Picasso' won in the third, and his floribunda 'Coventry Cathedral' has just won the fourth trial. Its glowing vibrant coloring has an almost neon effect. This is a rose destined to stay in the catalogs for a long time, one would imagine by observing it during the trial. Bred from ('Little Darling' × 'Goldilocks') × Irish Mist,' it has shapely salmon-flame flowers which deepen attractively as they age—a quality not all roses have. The plant is compact with even growth and is exceptionally healthy.

His shrub rose, 'Liverpool Echo' in salmon, 'Kerryman' in warm pink and 'Bonfire Night' in orange-scarlet, have all been outstanding in the trials. All of these are what Sam calls the "Carefree" roses—the kind which encourage their owners to go off to golf or to the beach for the weekend as they're healthy enough to need only minimum garden care.

And the McGredy roses of the future? Will there be more hand-painted roses like the cherry and white 'Picasso' with different color combinations? The recent results from the R.N.R.S. English trials at St. Albans show seven trial ground certificates for Sam McGredy, for roses all still under number and not

Sam McGredy, (on the right) receiving an award at the New Zealand International Rose Trial Award party, 1973, from Mr. Brian Ellwood, mayor of Palmerston North, N.Z.

yet named—carmine with a silver eye, orange-vermilion with a silver eye, carmine-pink with a white eye. . . . One anticipates that these colorings could be carried through to the climbers, and miniatures, and that their novelty will induce many other breeders to use them as a basis for new horizons in their hybridizing.

Hybridizing to improve the performance of the miniature, to make it flower longer and to make it bushier for borders and ground cover; breeding for purity of color in all roses—Sam says "the rose has a long way to go before it reaches the purity of a dahlia or a begonia in color;" to create a good red hybrid-tea—something healthy, prolific, shapely, velvety and fragrant as well; to create roses for a variety of purposes—shrub roses, climbers, ground cover roses for landscaping or low-growing border, "cushion" roses for small gardens, and to produce in all bush-type roses, from the miniature to the specimen shrub, a kind of compact growth which bears its flowers right to the ground and for the longest possible period—all these are aims in the McGredy breeding program now coming to fruition in his new varieties coming on the market today. ◈

BOOKS

The following books have been sent by the publishers to The American Horticultural Society.

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Exotic Mushrooms. Henri Romagnesi. Sterling Publishing Co., New York; 1971 26 pp. and 160 colored plates.

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500 Plants of South Florida. Julia F. Morton. E. A. Seeman Publishing, Miami; 1974. 176 pp.

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Down To Earth–A Guide to Successful Indoor Gardening. Wes Gorham. Penguin Books, Inc., New York; 1974. 109 pp. paperback.

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Tomatoes–The Multi-plant Method. Leopold Klein. The William-Frederick Press; New York; 1974. 90 pp.

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The Concise Herbal Encyclopedia. Donald Law. St. Martin's Press, New York; 1974. 266 pp.

Plants Under Lights. Jack Kramer. Simon & Schuster, New York; 1974. 90 pp.

The Complete Flower Arranger. Amalie Adler Ascher. Simon & Schuster, New York; 1974. 288 pp.

Handbook for the Home. U.S.D.A. Yearbook for 1974. United States Department of Agriculture, Government Printing Office, Washington; 1974. 388 pp.

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Ten-Minute Field Trips–A Teacher's Guide. Helen Ross Russell. J. G. Ferguson Publishing Co., Chicago; 1973. 173 pp. paperback.

The Reluctant Weekend Gardener. Carla Wallach. MacMillan Co., New York; 1974. 215 pp.

The Complete Book of Terrarium Gardening. Jack Kramer. Charles Scribner's Sons, New York; 1974. 146 pp.

Philodendrons. Jack Kramer. Charles Scribner's Sons, New York; 1974. 87 pp.

A Herb for Every Ill. Audrey Wynne Hatfield. St. Martin's Press, New York; 1974. 200 pp.

Recognizing Flowering Wild Plants. William Carey Grimm. Hawthorn, New York; 1974. 348 pp.

Azaleas. Fred Galle. Oxmoor House—Southern Living Books, Birmingham; 1974. 96 pp.

Flora Boreali-Americana. Andre Michaux. Hafner Press, New York; 1974 reprint. 2 vols. 330 pp. and 340 pp.

Dwarf Rhododendrons. Peter A. Cox. MacMillan Publishing Co., New York; 1973. 296 pp.

The Complete Herbal Guide to Natural Health and Beauty. Dian Dincin Buchman. Doubleday; 1973. 221 pp. Paperback.

The Saturday Morning Gardener Revised Edition. Donald Wyman. MacMillan Co., New York; 1974. 382 pp.

BOOK REVIEWS

THE WORLD OF CARNIVOROUS PLANTS
by
James and Patricia Peitropaolo
Published by, and available from, the authors
c/o Peter Paul's Nurseries
Canandaigua, New York 14424
1974
$6.30 postpaid

This 128-page paperback on an ever popular subject covers primarily those species which are native to the United States. Excellent descriptive material and cultural directions put it on the top of the list for anyone interested in growing insectivorous plants. The species descriptions are clear and contain the minimum of technical botanical terms. A fascinating section for each genus discusses at great length the method used in the capture of the plant's prey. The authors, both botanists, have done a fine job in producing a book which will satisfy the needs of both the high school student and the advanced grower.

Gilbert S. Daniels

A HISTORY OF LANDSCAPE ARCHITECTURE
by
G. B. Toby
American Elsevier Publishing Company, Inc.
New York–1973
$17.50

The development of gardens, city planning, and land utilization from prehistory until 1970 is the subject of this fast moving and easily read work. For the gardening-oriented individual, it is also a pleasant way to get an overview of the history of western civilization. The function of gardens from the early economic and political uses through the development of the purely aesthetic estates of the 17th and 18th centuries leads to the present day needs of an expanding urban society. Comparisons made between such different designs as the Versailles of Louis XIV and Colonial Williamsburg make fascinating and instructive reading. Although apparently intended as a college text, this book is highly recommended for leisure reading to any gardener with an interest in history.

Gilbert S. Daniels

HANDBOOK FOR THE HOME
The 1973 Yearbook of Agriculture
Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402
$5.70

Past Yearbooks of Agriculture have been extensive studies in depth on some particular subject within the area of responsibility of the Department of Agriculture. This year's product is an attempt to be a jack-of-all-trades but only succeeds in being a master of none. The average article is about four pages in length, and the subjects covered range from home budget planning, consumer awareness, and home safety to handicrafts, gardening, home furnishings, selection of luggage, and solid waste disposal problems in the community. If your Congressman gives you a free copy, it might be worth browsing.

Gilbert S. Daniels

HOUSE PLANTS

FLOWERING HOUSE PLANTS, MONTH BY MONTH
by
Jack Kramer
Cornerstone Library
New York–1973
$1.95

HOUSE PLANTS ARE FOR PLEASURE
by
Helen Van Pelt Wilson
Doubleday and Company, Inc.
New York–1973
$7.95

THE NEW YORK TIMES BOOK OF HOUSE PLANTS
by
Joan Lee Faust
Quadrangle/The New York Times Book Company
New York–1973

For the windowsill gardener, all three of these books have something to offer. Jack Kramer's little paperback is an excellent series of suggestions for plant material which will bloom in the home. Chapters are organized by the month of blooming, and within each chapter plants are suggested for warm rooms, cool rooms, basket growing, and "lots of room." Two additional categories, "For a Challenge" and "From the Florist," will be particularly helpful for the beginner.

"How to Grow Healthy Plants for Home Decoration" is the sub-title of Helen Van Pelt Wilson's book and is a good description of the content. Although many types of plants are discussed, the major accent is given to where and how to successfully use plants in and about the house.

Joan Lee Faust's *Book of House Plants* is the most elaborately produced of the three works. The instructions on plant culture are particularly good, and the reasons for doing things are made quite clear. It has many excellent "how to do it" illustrations as well as colored pictures of eighty-five selected house plants together with cultural directions. All three of these books contain appendices with lists of sources for house plants and supplies.

Although there is considerable redundancy among these three books, each presents a different point of view for the house plant fancier. The three books together would make a good introductory library for the beginning grower.

Gilbert S. Daniels

INDOOR LIGHT GARDENING BOOK
by
George A. Elbert
Crown Publishers, Inc.
New York–1973
$10.95

Although this book is intended as a guide to growing plants under artificial light, it has a great deal to offer indoor gardeners in general. Directed toward the non-technically oriented amateur, excellent chapters are offered on equipment, growing conditions, and plant material suitable for use indoors under artificial lights. A minor shortcoming of this book is the author's lack of tolerance for those things which he has either not researched thoroughly or does not understand. Specifically, he takes issue with the "experts", usually in reference to research in lighting technology or horticulture, whose results differ from his own opinion. This can, perhaps, be considered as lending spice to the author's writing rather than limiting the usefulness of this otherwise excellent work for the amateur indoor gardener.

Gilbert S. Daniels

FLORA OF THE PACIFIC NORTHWEST
by
C. Leo Hitchcock and Arthur Cronquist
University of Washington Press
Seattle–1973
$25.00

Hitchcock and Cronquist's five-volume *Vascular Plants of the Pacific Northwest* was published from 1955 to 1969. An outstanding regional flora, it was characterized by excellent keys and illustrations. The present book is a one-volume condensation. Descriptions have been very much shortened, but all species of the geographical region are described and numerous illustrations clarify the important features needed to differentiate between the species. The descriptions are given in the form of keys, and while the terminology used in the description is of necessity technical, an excellent glossary is offered at the beginning of the book. Many abbreviations are used in order to save space, and these may present some difficulty to the non-botanist. Although a list of all the abbreviations is included, they are not always obvious since no punctuation has been used to show that the word is an abbreviation. Notwithstanding some difficulties in use which the non-botanist will have to overcome, this is certainly the best book in recent years for identification of the native plant life of the Northwest.

Gilbert S. Daniels

GARDENER'S MARKETPLACE

Begonias

Rieger Elatior Begonias, 24 varieties. Send .20 for list: Begonias & Exotic Plants, Dept. H, 42 Candee Ave., Sayville, N.Y. 11782.

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Hydroponics

Hydroponics Plus by Maxwell Bentley, Ph.D. $9.95 post paid, 232 pages, approximately 150 color plates, Ms. A.H. Gilbert, P.O. Box 630283, Miami, Florida 33163.

Miscellaneous

Hand Coloured Lily Plates 22"x15" by Lilian Snelling from Elwes Monograph of the Genus Lilium, suitable for framing, $10.00 each postpaid, three for $25.00. LOTH LORIEN LIMITED, Wadhurst, Sussex, England.

Orchids

Quality Orchids—Seedlings, Species, Hybrids from $1.00. Free price list. ANN MANN'S ORCHIDS, Rte. 3, Box 202, Orlando, Florida 32811.

Rhododendrons

Rhododendrons-Azaleas—Free Catalog. Rhododendrons—wide variety. Azaleas—hardy Glenn Dale and Gables. THOMAS HENNY NURSERY, 7811 Stratford Drive, Brooks, Oregon 97305.

Specialists in Rhododendrons—both species and low-growing hybrids. Exbury azaleas, other rare plants. Fall catalog 25c. THE BOVEES NURSERY 1737 SW Coronado, Portland, Oregon 97219.

Wildflowers

WILDLINGS—Nursery Grown Wildflowers for Gardeners, Nature Lovers. Catalogue listing wildflowers (Eastern and Western kinds) unusual plants, stories, nature lore, growing tips, etc.—All for just $1.00. Jamieson Valley Gardens, Rt. 3-D, Spokane, Wash. 99203.

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- To give it a more meaningful and relevant direction;
- To make the practice of horticulture a more expanded and understood activity—a deeper learning experience;
- A discipline with greater impact on the environmental crisis;
- A greater help to non-horticulturists whose concerns and activities touch on areas where horticultural knowledge is of direct significance.

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