

American

Horticulturist



Volume 54 Number 4 Late Summer 1975

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Gene Banks Need Deposits for Later Withdrawals

The origin of many of our plants has been confused through the centuries by the intentional intervention and manipulation of plant people.

We have taken plants from the wild, cultivated them, crossed, recrossed interesting forms; and selected variants of the original for special uses. Through generations of selection, many new characteristics have been uncovered. When a significant change occurs, only then do plant people attempt to propagate the mutant plant—trying to preserve in its progeny the unique, new characteristics.

Since many of our plants are woody perennials, asexual propagation methods have become the major way to preserve the desired plant form. The genetic variability of seedling-grown material is too great to warrant the large scale growing of the progeny. Only annuals and a few other types are grown from seed.

Many modern cultivars bear little resemblance to their progenitors. Individuals attempting to restore gardens for Bicentennial events have experienced great difficulties in finding plants that qualify as authentic candidates for a re-creation of Colonial gardens.

There are traditionalists among us who will tell you that, judged on performance, taste, or hardiness, old cultivators were so much better than the modern ones. Like most memories from the past, we tend to gloss over the failures that we experience. We forget to document the background of a plant's stability as a cultivar. We want to think that machine-produced plants are infinitely inferior to hand-tended leaves, roots, flowers, or fruits...that French, English, or Japanese inspired names are vastly superior to stable breeding lines with known potentials which permit us to create hybrids with desired characteristics.

The so called warring between the exotic named and the hybrid coded cultivars must end. We must seek ways to conserve and preserve as many plant varieties as possible and take advantage of their potential characteristics. The collection, identification, preservation,

and redistribution of the vast range of plant material must become a priority if we are to leave future generations a genetic base to create new plants. Many plants are now considered "useless," just weeds growing in the outreaches of our living spaces. These "useless" plants must be collected, identified, documented, and maintained in some form of germplasm bank if we are to have all of our natural resources available and ready-to-use if problems develop.

We can never tell when a new strain of a disease will appear and threaten to wipe out all susceptible plants. We can expect that an introduced insect will find a new host range and wipe out entire clonal varieties of economic plants. We must create centers to maintain our germplasm pools. To accomplish this—all aspects of horticulture will be needed. We must have every concerned plant person recognize plants occurring in our landscape which are new and useful variations of a well-known variety. Our plant societies must provide educational leadership.

There are still too many failures with new plantings. Plant people must find ways to become involved. We have come to expect the American Rose Society to publish a rose rating in their yearly handi-guide. We need experts in every plant society to quantify the potentials of their plant group.

We must urge responsible groups to maintain living collections of plants. This will mean that research funds must be allotted to plant-keeping activities. In certain areas, the use of tissue and seed banks will help reduce expensive operations of maintaining vast fields of plant materials.

We must utilize the full resources of the Plant Sciences Data Center, located at the AHS River Farm Headquarters to accumulate information of the occurrence and germplasm potential of all kinds of plants. The concepts for the functioning of this facility have been greatly expanded to meet this pressing need. H.M.C.

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OUR COVER PHOTO—Garden—Tulips, "Red Matador" and "Jewel of Spring," Hyacinth, "Perle Brillante."

Pretty Poiso

Author: Lorraine Burgess
202 Old Broadmoor Road
Colorado Springs, Colo.



Unfortunately, some of the handsomest flowers and plants contain poisons that can irritate the skin on contact, or produce leaves, roots, and fruit containing lethal properties. It is essential that you protect your children and safeguard yourself by being alert to these hazards in the garden and field.

Most persons know of the contact poisons found in poison ivy and poison sumac, but fewer realize the hazards in woodland lady slipper, stinging nettles, ragweed, and buttercups. All can produce a dermatitis of serious consequences in some individuals. We should all learn to avoid these culprits, and we should campaign to make known other truly lethal plant poisons.

The 'shady' reputation of the castor-oil plant, a striking annual foliage plant, is a case in point. Only of late do castor bean seed packets carry a cautionary warning. But this is not enough. Three of its beautifully-marked beans, when eaten, are sufficient to kill a child. The purple-black berries of the common privet, *Ligustrum vulgare*, popular hedging material, ripen in September.

They too can endanger a child.

The beautiful Golden Chain tree produces pods and kidney-shaped seeds that are attractive to children. The seeds contain cytisine, which has produced fatalities. The seeds and foliage of the delphinium and the wild larkspur are both poisonous. They contain delphinine, another killer. The delightful winter-blooming Christmas rose, *Helleborus niger*, contains a violent purgative and lethal poisons. The evergreen Yew, particularly *Taxus baccata*, produces leaves and seeds containing taxine, a deadly poison.

All parts of the autumn crocus, *Colchicum autumnale*, are poisonous, particularly the corms, which are sometimes mistaken for onions. The flowers and leaves of the rhododendron contain andromedotoxin, which can cause vomiting and death. The leaves and sap of the wild Pasque flower, *Anemone pulsatilla patens*, and the windflower, *A. quinquefolia*, contain anemonin, another poison. A favorite garden biennial, the foxglove, produces leaves in its second year that yield digitalis, an

ns

Left—Golden Chain tree, espaliered on fence, *Laburnum*, contains cytisine. Seeds can be fatal.

Center Clockwise—The Common Privet, *Ligustrum vulgare*. They are poisonous enough to kill.

The Maudiae orchid, more commonly known as *Cypripedium*, is a greenhouse lady slipper. Somewhat poisonous on contact.

Datura cornucopia, better known as the Angel's Trumpet.

Autumn Crocus—*Colchicum autumnale*, entire plant toxic

Right—Pink Rhododendron in lush bloom in the George Berky garden, Carmel Point, California



oft-prescribed cardiac stimulant that becomes lethal when taken in overdoses.

The lady slipper is a *Cypripedium* of the orchid family. Its threat is moderate. On contact the cyp is on occasion somewhat poisonous. Black or deadly nightshade, *Solanum nigrum*, is a dangerous garden plant. Its black berries, as tempting as cherries, are deadly. The sap of the atropa yields two drugs, atropine and belladonna. Half of one berry is enough to kill a human though foraging rabbits find the plant harmless.

Poison hemlock (*Conium maculatum*), and the brew of Socrates, is a biennial herb of the carrot family. It grows in the wilds near streams, and is sometimes mistaken for cow parsnip (*Heracleum*) or wild carrot. It paralyzes the respiratory system.

We must teach our children to recognize and avoid this and all other hazards of the field. If any of the above poisons are encountered, seek prompt expert help at the first sign of pain, headache, vomiting, drowsiness, or convulsions. Knowledge of the poison encountered, and

if possible a specimen of the plant involved, can help the doctor in his treatment. This is no time for home remedies. Antidotes are sometimes as dangerous as the poisons themselves, and should be administered only by physicians.

Some poisons, such as that found in the Death Cup mushroom, have no antidote. Deadly mushrooms are difficult to distinguish from edible ones. As evidence, amateur attempts to make this distinction result in deaths every year.

Some harmful plants seldom cause trouble because they look, taste, or smell disagreeable. The most dangerous ones have attractive flowers, tempting berries, or enticing leaves. The ever-popular lily of the valley has leaves that contain three constituents that depress the heart, much like the foxglove. A good rule to learn and to pass on to the next generation for their safety is "When in doubt, don't eat it. When unsure, don't touch it."

Boxwood around the Lincoln Memorial

Roland M. Jefferson

Botanist, U.S. National Arboretum,
Agriculture Research Service, USDA,
Washington, D.C. 20002

One of the best collections of boxwood in the Nation's Capital is located on the grounds of the Lincoln Memorial. These beautiful plants, many over 150 years old, growing among large specimens of magnolias, hollies, and yew, blend pleasingly into the surroundings of one of the Nation's best known monuments.

The collection of boxwood is even more remarkable when one considers the difficult growing conditions it has endured over the years and the variety of sources from which it came. Although many of the boxwood have thrived in this location, others have not and have had to be replaced.

An example of the problems of growing boxwood in this planting can be found with the hedge of English boxwood (*Buxus sempervirens* L. cv. *Suffruticosa*) that once lined both sides of the Memorial's entrance walk. Due to many losses, this hedge had to be replanted twice within the first 25 years after planting. Consequently, dwarf yew (*Taxus cuspidata* Sieb. & Zucc. cv. *Nana*) was used as a more successful replacement. The common (*Buxus sempervirens* L.) and American (*B. sempervirens* var. *arborescens* L.) boxwood grew better throughout this planting, although several of them have also died or were transplanted because of disease and sun scald.

Most of the early problems were caused by poor drainage and unsuitable soil conditions. Drainage problems were decreased when subsurface tiles were installed over coarse gravel to remove excess water. But to understand why other unsuitable soil con-

ditions existed, one should consider the origin of the ground on which the Memorial stands.

Through the latter half of the 19th century, the part of Washington comprising the Lincoln Memorial region was a tidal swamp area of the Potomac River. Known as "Kidwell Flats," this marsh land was formed by layers of silt and debris washed into the Potomac from upstream erosion and earlier grading work done on the streets of Washington. During this period, the flats frequently flooded from the rising river and were covered with willows, cattails, and other types of swamp vegetation. Though the area was near the White House, it was still generally considered one of Washington's least desirable locations.

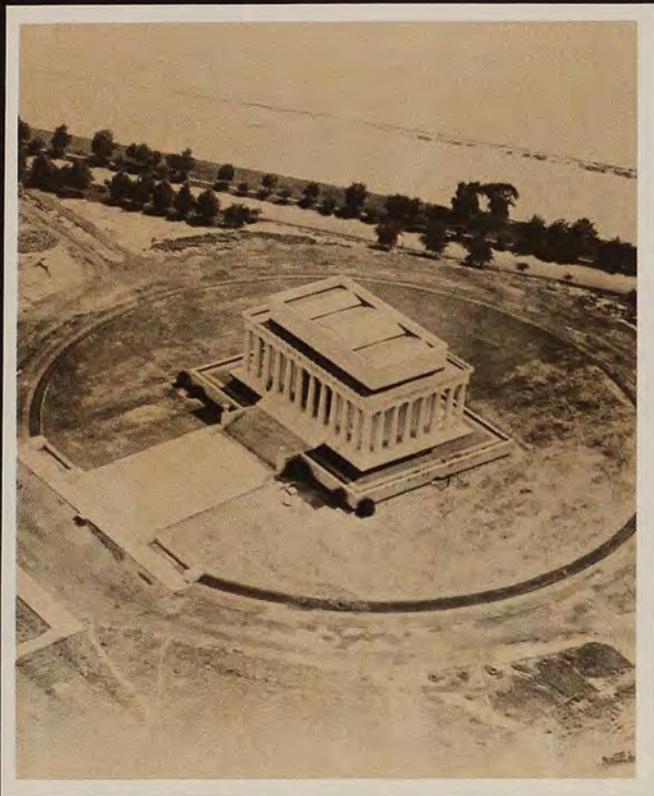
To make the silted Potomac more navigable, a major engineering project was initiated by the U.S. Army Corps of Engineers in 1870. As a part of this effort, a long retainer wall was built along the river banks. Silt was dredged from the river and deposited on "Kidwell Flats" and other sites along the Potomac. These land fills established the grounds for the Lincoln Memorial, Haines Point of East Potomac Park, and the Tidal Basin. Completed in 1907, this operation raised the area around the Lincoln Memorial well above flood level.

In addition to elevating the land with dredged silt from the Potomac, fill from Washington construction and excavation sites was also deposited on "Kidwell Flats." Clean fill was requested by the authorities; however, clean fill was not always sent; parti-

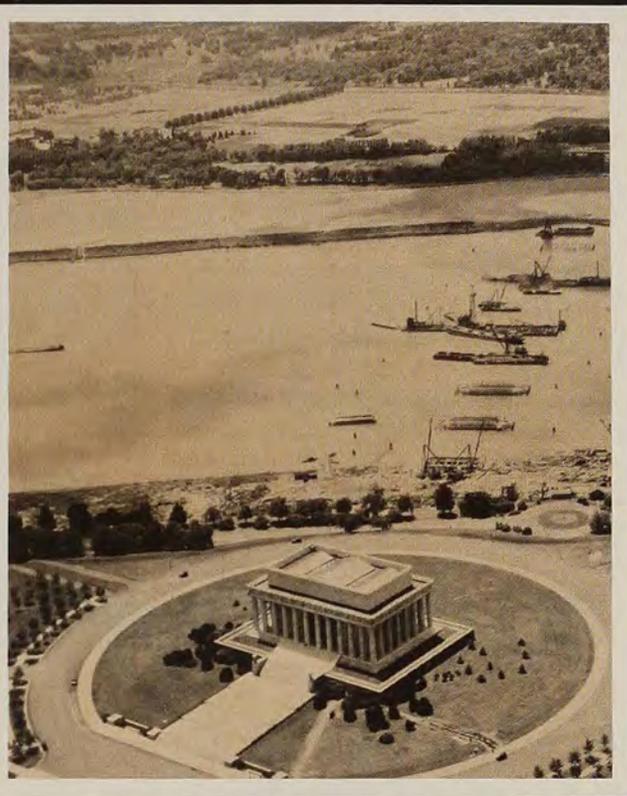
cles of construction waste, some toxic to plant life, have since been unearthed. This debris, combined with fresh or decaying organic matter dredged with silt from the river, comprised the soil surrounding the Lincoln Memorial.

As the earlier plantings of boxwood died around the Memorial, others were acquired to replace them. Where did these plants, many over 150 years old, come from? To answer this question, it will be necessary first to relate how boxwood was selected to be one of the principle plants for landscaping the Lincoln Memorial.

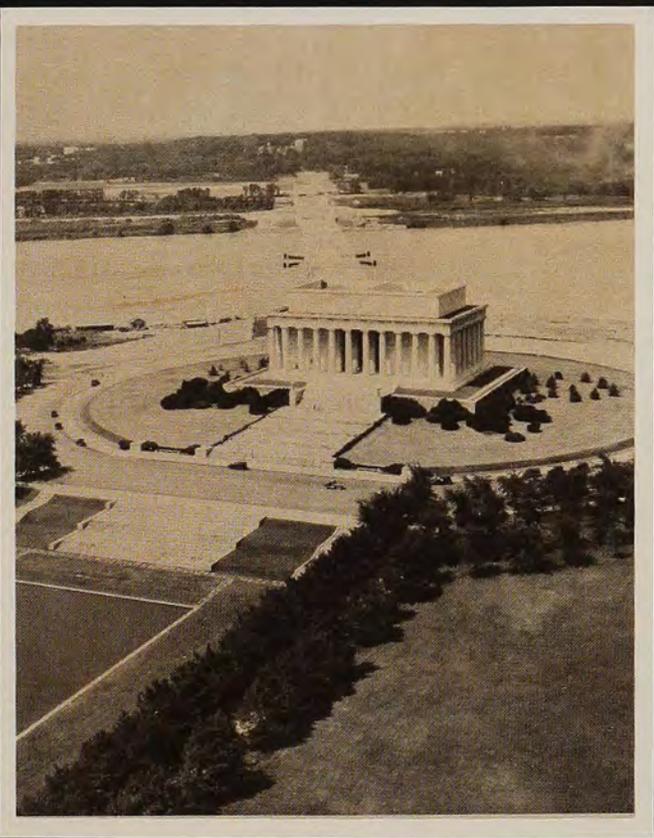
On September 19, 1919, at the request of Governor Calvin J. Coolidge of Vermont, a committee of The Commission of Fine Arts went to New England to review plans for improving various areas of that region. While in New England, they stopped in Cornish, New Hampshire, to observe some of the statues of Sculptor Herbert Adams, who was a Commission member. Landscaping plans had been drawn up by Landscape Architect Irving W. Payne of the Office of Public Buildings and Grounds, Washington, DC, for the newly constructed Lincoln Memorial. These plans were discussed by the Committee while in Cornish. Attending this meeting, were Herbert Adams, Sculptor; Charles Moore, Chairman; Charles A. Platt, William Kendall, and John Russell Pope, Architects; J. Alden Weir, Painter; James L. Greenleaf, Landscape Architect; and C. S. Ridley, Secretary. The Committee decided that pines, hollies, and magnolias, along with



Planting of boxwood about 1920 on the reclaimed ground of the Lincoln Memorial.



The planting as it appeared in 1927, five years after the Memorial was dedicated on May 30, 1922.



English boxwood hedges on both sides of steps as they appeared in 1931 before being replaced by dwarf yew.



Truck load of boxwood possibly from The Eastern Shore, Maryland, being unloaded onto the Lincoln Memorial grounds in 1936.

large specimens of yew and boxwood, should be the principle plants around the Memorial. Various opinions were voiced about the planting and the site. Some opinions, as taken from the meeting's minutes, are as follows:

Mr. Greenleaf stated: "Here is one of the great Memorials of the World; I think it is going to be one of the World's greatest monuments, a magnificent thing as I see it, and it seems to me the question of planting it ought to be approached with a great deal of study and consideration for proper effect. I have no doubt it is the case, that funds are limited. Consider for a moment: the country has spent millions of dollars in building the Memorial and is expecting those who have the responsibility of placing the grounds in condition to produce a proper effect with a mere pittance. As I see it that planting ought to be handled with \$30,000 at least to do the work adequately and in the way we would like to see it done. Around the foundation and platform terrace there should be bold, strong masses of evergreen of rounded outline, which do not spire up restlessly against the masonry, but form groups of big, broad outlines. This can never be done with hemlock for instance. The planting should be begun right, in a small way if necessary, but preferably with large material. I would suggest starting this planting with the English yew and the box. The foregoing list of Mr. Payne, which we considered, is, I think, an excellent one to start with. On this list are shown half-dozen or more big yew and some large box bushes—quite an interesting list of things."

Mr. Greenleaf suggested that the planting in front of the Memorial should be simple and that a half-dozen kinds of plants should be sufficient.

Mr. Platt called the Committee's attention to the large number of old boxwood plants in the Chesapeake Bay area from which train carloads have been removed. There were many left, he said, however, and a "firm" (landscaping company) might possibly procure them.



Several very old magnificent boxwood specimens and other mature broadleaf and needle evergreens as they appear today around the Lincoln Memorial.

Mr. Moore said that Mr. Henlock (Head Gardener for Public Buildings and Grounds, Washington, DC) should be asked to see if any of the plants suggested as suitable for the Memorial grounds were available in the District of Columbia and could be supplied through Col. Ridley's office.

"Mr. Platt suggested that Lewis and Valentine might come down on their prices in furnishing plants for these grounds in view of being identified with the work."

Before the meeting ended, the Committee recommended that Irving W. Payne's landscape plans be redrawn to conform with the Committee's desires. Subsequently, Irving Payne redrew his plans for the Memorial and submitted them to the full Commission of Fine Arts for further study. These revised plans specified locations for the following plants:

- *1. *Ampelopsis quinquefolia* var. *engelmannii*—14 plants
[(now *Parthenocissus quinquefolia* f. *englemannii* (Rehd.) Rehd.)]
- 2. *Buxus sempervirens*—62 plants
- 3. *B. sempervirens* var. *suffruticosa*—333 plants

(now *B. sempervirens* L. cv. *Suffruticosa*)

B. sempervirens var. *suffruticosa*—594 Lin Ft

- *4. *Euonymus carrierei*—28 plants
[(now *Euonymus fortunei* var. f. *carrierei* (Vauvel) Rehd.)]
- *5. *Euonymus vegetus*—3 plants
[(now *Euonymus fortunei* var. *vegetus* (Rehd.) Rehd.)]
- *6. *Hedera helix*—N/N
- 7. *Ilex crenata*—N/N
- 8. *Ilex opaca*—10 plants
- 9. *Magnolia grandifolia*—N/N
- 10. *Pinus mughus*—14 plants
(now *P. mugo* var. *mughus* (Scop.) Zenari)
- 11. *Taxus baccata* var. *adpressa*—75 plants
- 12. *Taxus brevifolia*—70 plants
- 13. *Taxus cuspidata*—85 plants

N/N—no number given
(Payne noted that 42 *Buxus sempervirens* plants were available in various public, private, and federal plantings in Washington, DC, but the remainder were to be purchased.)

*These items were vines that were removed in 1928 at Chairman Charles Moore's request.



Payne's new drawings were officially approved with the following notation:

"This planting plan as approved by the National [sic] Commission of Fine Arts of July 27, 1920, is to be followed—with the understanding that it be used mainly as a guide to the placement of the large mass relations of the proposed planting scheme that the proposed flexible arrangement of heights, species and varieties of plant material used be varied commensurate with the requirements of good taste in the use of texture and color of material as an aid to successful planting.

"Plants are therefore to be adjusted at the site when planting thus carrying out the proposed scheme as shown on the 'East Elevation Showing Proposed Planting' for the Lincoln Memorial as approved by the National [sic] Commission of Fine Arts on July 27, 1920."

Several months after the Cornish meeting, James L. Greenleaf wrote E. F. Conklin, Assistant Officer, Office of Public Buildings and Grounds, the following letter regarding boxwood for the Lincoln Memorial:

"April 28th, 1920.

"Mr. E. F. Conklin, Assistant Officer,
"Office of Public
Buildings and Grounds,
"1729 New York Avenue, N.W.
"Washington, D.C.

"Dear Mr. Conklin:

"I received your letter of the 26th inst., inquiring about box bushes that I mentioned to Mr. Payne in connection with the Lincoln Memorial and asking that I define exactly the variety desired.

"Speaking broadly there are two varieties of box that you have to deal with, one is the *Buxus suffruticosa* (dwarf box) the other is the *Buxus sempervirens* (tree box). The tree box if in old specimens is generally tall and open, while the dwarf box is more compact.

"Large specimens of both kinds are suitable for use at the Lincoln Memorial, but the tall open specimens of tree box if used should preferably be for back-ground, generally speaking. The fine compact irregular forms of old dwarf box should be grouped according to circumstances in masses of interesting contour. Most of the

filling out and development of form in the box planting at Lincoln Memorial should be with the old specimens of the *suffruticosa*.

"Replying to the question as to where such material may be secured, I would suggest as follows:

"There are several firms that look up and do transplanting of old box bushes. I believe Mr. Small, a florist of Washington is one, another is Louis & Valentine of New York, Roslyn, still another is Smyth of New York City used to do this work.

"Hoping that the above answers your inquiries, I am,

"Yours very truly,

"(signed) James L. Greenleaf

"(a copy for Mr. Payne)"

Correspondence reveals that, in or about 1927, the Small Co. hired Arthur Elliott of Arlington, Virginia, who told of touring private estates in Virginia and the Carolinas, seeking boxwood for the Lincoln Memorial. Evidence has been found, upon search in the U. S. Archives, that in 1924, Arthur Elliott did indeed supply from two and possibly more sites in Virginia some of the early boxwood for the Memorial planting. Official records indicate that he sold approximately 248 linear feet of English boxwood that he had bought for \$975. Sources from the Carolinas were not recorded.

In addition to Mr. Elliott's contribution, other individuals during the 1920's sold, donated, or offered to sell large old boxwood plants to the Office of Public Building and Grounds officials for the Memorial planting. Wilbur S. Richardson of Richardson & Co. (Gardeners), Leesburg, Virginia, bought several boxwood from various estates and sold them for the Memorial planting. Two of his sales included \$380.00 for seven plants of Common and English boxwood from Carbon Run, Virginia, and \$95.00 for a single boxwood plant from the Presbyterian Church in Leesburg, Virginia.

Not all of the boxwoods were provided by professional collectors. Some came from private citizens. Emma J.

Fry, then of Washington, DC, is one of several who sold boxwood to the Government and signed a contract binding the agreement. Her contract states:

"October 30, 1922

"Lieut. Col. C. O. Sherrill,
"Officer in Charge,
Public Bldgs. & Grounds
"1729 New York Avenue
"Washington, D.C.

"Dear Sir:

"Replying to your letter of October 28, 1922, regarding previous verbal arrangement with your representative, Mr. Irving W. Payne, I, the sole owner, agree to sell you a specimen plant of Dwarf Box, approximately 6-1/2 feet in height by 6 feet spread, located in my front yard, for the total sum of fifty (50) dollars, payment to be made after the removal of the plant at your expense; and the excavated soil, not included in the ball of the plant, is to be replaced free by your office. Plant is to be removed within six months or earlier from date.

"The above plant is not encumbered in any way by liens of any kind, and is free of any claim by any other parties.

"As per your request, the undersigned party is retaining the carbon copy enclosed in your letter.

"Yours very truly,

"Mrs. Emma J. Fry (signature)

"319 New Jersey Ave. SE

"Washington, D.C."

Probably the first published account of boxwood being donated for the Lincoln Memorial planting, a little less than 3 months after Irving Payne's plans were approved by The Commission of Fine Arts appeared in the (Washington) Evening Star, p. 7, on September 17, 1920. This article reported the gift of seven very old boxwood for the Lincoln Memorial planting and appeared thus in part:

"The oldest trees in the District of Columbia are in process of being transplanted to the Lincoln Memorial grounds in Potomac Park. The seven trees, which are box, were probably first planted long before President Lincoln was born, according to Charles H. Heitmuller, from whose place on Sargent Road in Brookland (a section in northeast Washington, DC) the trees are being taken. Mr. Heitmuller moved to this house more than sixty-five years ago, and says the box were then well-sized bushes....

The trees have been allowed to grow without trimming, have attained graceful shapes and should be a great adornment to the grounds around the Memorial."

One particular plant worthy of comment is the very old plant that once grew in the garden of the Corcoran House at 1611 H Street N.W., Washington, DC. It was probably the largest boxwood to be moved to the Lincoln Memorial grounds. Unfortunately, many of its lower branches died after transplanting, and smaller boxwood had to be planted close to its base to improve the appearance of the area.

A very large old boxwood from the house of Civil War General John A. Logan in the District of Columbia was offered for sale by his daughter, but authorities felt that it was too risky to transplant, because it required a 13-ton ball to be moved, and would suffer the same fate as the Corcoran plant.

Although many large and very old boxwood plants were established around the Lincoln Memorial during the 1920's, exact placement records were not kept, and it is impossible to determine the origins of the various plants. However, even though history does not permit us to know the origins of the earliest Lincoln Memorial boxwood, many of these plants are still outstanding specimens and, as such, are fitting memorials to President Abraham Lincoln.

Editor's Note: An interesting sidelight to this story concerns several boxwood presented to the Commission of Fine Arts by a wealthy lady from South Carolina. She intended the plants be used to help green-up the nation's capital. Upon hearing that her "contributions" were to be used "around the Lincoln Memorial," Southern pride caused her to refuse the transaction.

Malcolm Matheson, Sr. purchased the plants from her for his River Farm estate. The property has since become the Headquarters of the American Horticultural Society. The boxwood still thrive at River Farm. M.C.K.



A grouping of boxwood, probably over 150 years old, as they appear today on the Lincoln Memorial grounds. The hollies and magnolias serve as background plants.

Cans and can'ts for canners

Ruth N. Klippstein
Associate Professor
Cornell University
and

Lola Prichard
1974 Yearbook of Agriculture



Midsummer is a favorite time of year for home gardeners. The work of Spring is over and harvest either is or soon will be in full swing. Many first time gardeners are faced with decisions about what to preserve and what method to use. Preservation requires effort, know-how and dollars. Some thought now will save hours and possible disappointment later.

Food preservation has evolved through continuous research until it has revolutionized man's eating habits and thus his diet. Research continues to make canned food nutritious, convenient, safe—and sometimes more economical than its counterpart in other forms. Whether home canned or commercially prepared, canned foods continue to be a popular money saver in the food budget.

Before the canning season, make a food conservation plan. The daily food guide, size of your family, its food likes and dislikes, the number of non-productive months, and your food budget should be considered in the plan. Numerous studies indicate that families who produce and conserve their food supply are better fed than those who do not, regardless of income.

Check your canning equipment and supplies early. Money may be saved by comparing prices on canners, jars and supplies from various sources—and often by buying them “out of season.”

Jars are usually purchased in one-half pint, pint, and quart size. Inspect used jars for nicks and cracks. Since lids will seal only once, always use new ones.

Test pressure canners periodically for accuracy. The gauge is a vital part since this registers the internal pressure and thus temperature. If the gauge is off two pounds or less, you should be aware of it and make adjustments accordingly. If the inaccuracy is more than two pounds, you need a new gauge if proper internal temperature is to be maintained. Accuracy in time and temperature should be your canning watchword.

Variety, maturity, method of canning and storage affect the quality of the product. Canned foods will be no better than the raw products you begin with and the procedures used. If canned foods are defined broadly as those foods treated with heat in hermetically sealed containers, three methods are used today in home canning. The method recommended is determined by the pH of the food plus the treatment prior to canning.

Foods in their natural state are classified as acid or low-acid. Tomatoes (generally) and fruits, except figs, are acid foods with a pH ranging from 3.0 to 4.4. Because of their acidity, or low pH, these may be safely processed by the boiling water bath method. A temperature above the boiling point is excessive and unnecessary. No foods can be safely processed by this method if the pH is above 4.5 (see chart).

Meats and vegetables, except tomatoes, are low-acid

Recommended Vegetable Preservation Methods

Vegetable	Canning	Freezing	Pickling	Storage Without Processing
Asparagus	+	+++	0	0
Beans, Lima, Fresh	+	+++	0	0
Beans, Snap (Green & Wax)	+++	+++	++	0
Beets	++	+	+++	0
Cabbage	0	0	+++	0
Carrots	+	+++	++	+
Cream Style Corn	0	++	0	0
Whole Kernel Corn	++	+++	++	0
Cucumber	0	0	+++	0
Onions	0	+	++	+++
Peas, Green, Fresh	+	+++	0	0
Potatoes	0	0	0	+++
Spinach (Greens)	+	+++	0	0
Squash, Summer	0	++	+	0
Squash, Winter	++	+++	0	+++
Sweet Potatoes	0	0	0	+++
Tomatoes	+++	+	++	0

+++ Superior ++ Good + Acceptable 0 Not acceptable

foods with a pH ranging from 4.6 to 6.3. These must be processed at a temperature higher than can be obtained in boiling water. Therefore, need for using the pressure canner or retort is evident.

In home canning of meats and vegetables, a pressure of ten pounds yielding a temperature of 240° F is recommended because of the safety factor. Commercially, under controlled conditions, a higher temperature—shorter time process is often used. The amount of time the food must be processed depends on such factors as pH of the food, heat penetration rate, size of the jar, and type pack. Under no conditions should you either lower the processing temperature or shorten the time that has been established through reliable research.

A pressure saucepan may be used for home canning if it (1) has a false bottom; (2) is tall enough so steam can circulate around and over jars; (3) has a gauge that will maintain ten pounds pressure; and if (4) 20 minutes are added to the processing time.

All low-acid foods are potential carriers of *Clostridium botulinum*, a type bacterium that exists in both a vegetative and heat resistant spore form. The vegetative form is easily killed by moist heat at 212° F; however, some spores may survive that temperature for five to six hours.

Clostridium botulinum is a rod shaped bacterium found in some dust and common to soil all over the world. Some plants grown in soil containing this organism could carry the bacterium. In addition, meat from

animals that have eaten contaminated plant life could be a carrier.

This bacterium is harmless under aerobic conditions (the presence of oxygen); however, it multiplies under anaerobic conditions (absence of oxygen) producing a toxin extremely lethal to man. Anaerobic conditions suitable for growth and multiplication of this bacterium prevail in vacuum sealed jars or cans. Thus, a can or jar of low acid food improperly processed could provide these conditions.

It is true that low-acid foods, even though contaminated with *Clostridium botulinum* toxin, may be made safe by boiling them in a container at least ten minutes before eating. But the risks are too great in terms of time, money, and safety. Consider the homemakers who "just taste" to be sure the food is good; or the ones who decide to make a cold bean salad.

In home canning, one-half inch head-space should be left for most fruits and vegetables. Very starchy foods, such as corn, require one inch. Generally, the jar is filled with solids and liquid added to fill spaces and cover the product.

Most fruits and vegetables may be canned either hot or raw pack, depending on individual preference. There is a tendency for some foods, especially fruits, to float when the raw pack method is used. This floating does not indicate spoilage, but the product may be low in esthetic value. The hot pack method of canning vegetables generally insures a better fill. This is because air and moisture are released from the plant cells during heating.

The third method of canning is a pasteurization process. Pickles, relishes, preserves, jams, conserves and marmalades are packed hot in hot sterilized jars, sealed, and processed in a hot water bath at simmering temperature (about 200° F) for ten minutes. Since they are naturally acid foods or have vinegar added, this mild treatment is effective. The procedure sterilizes head-space and expels air from the jar. If the vacuum seal is retained, growth of aerobic microorganisms such as molds is prevented.

Jellies are not generally pasteurized in the home, but a thin coat of paraffin is added. (Paraffin may be reused). This does not prevent mold, but retards its growth. Should mold appear because of long and/or damp storage, discard the product in its entirety.

Foods properly canned require no preservatives, although some may be used. When sugar is added to fruits and salt to vegetables, they serve to improve flavor, but in nominal amounts they are not regarded as preservatives. If these ingredients are used in large quantities as in some pickles and preserves, sugar and salt may then become preservatives.

It is not recommended that combinations of foods,

Freezer Storage Equivalents

(based on the loss equal to that experienced at 0° F. for 1 year)

Temperature	Sensitive Fruits and Vegetables ¹	Other Fruits and Vegetables ²	Turkeys and Cut-up Chicken ³
0°F.	1 year	1 year	1 year
5°F.	5 months	5 months	—
10°F.	2 months	6 weeks	6 months
15°F.	1 month	3 weeks	—
20°F.	2 weeks	1 week	3 months
25°F.	1 week	2 days	—
30°F.	3 days	1 day	—

¹Where discoloration occurs, such as in peaches and cauliflower.

²Where discoloration is not as critical, but does occur and flavor changes take place.

³Whole chicken is more stable than turkey.

These data are from results of a continuing research project on Time-Temperature Tolerance of Frozen Foods, in part supported by The Refrigeration Research Foundation, and conducted by the Western Utilization Research and Development Division of the U. S. Department of Agriculture's Agricultural Research Service in Albany, California.

such as vegetable stew, be canned. Usually they contain a mixture of meats, corn, tomatoes and some other vegetables. If safe to eat, the product would have to be processed at 240° F for 85 minutes, the highest temperature and longest time required for any ingredient. Texture and flavor would be altered for ingredients requiring less time and/or lower temperatures for processing. Foods, properly canned and combined at the time of use, give a superior quality product.

Before canned foods are stored, they should be checked carefully. When a jar is properly vacuum sealed, the top is slightly concave. Any lids that bulge out indicate a gas has formed inside the can and this suggests spoilage.

Canned foods, whether commercially done or prepared at home, should be stored in a cool, dark, dry place. Color, flavor, texture and some nutrients are preserved best under these conditions.

Write to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 for these publications:

	Price
<i>Home Canning of Fruits and Vegetables</i> G-8.	45¢
<i>Home Canning of Meat and Poultry</i> G-106.	30¢
<i>How To Make Jellies, Jams, and Preserves at Home</i> G-56.	40¢
<i>Making Pickles and Relishes at Home</i> G-92.	35¢
<i>Home Freezing of Fruits and Vegetables</i> Bulletin #10 USDA	55¢

Aquatic Gardening

Stephen Wolff
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Horticulturist

Nothing can add more charm and grace to a garden than an aquatic pool. A water garden with its many types of diverse plants and fish can create its own special serenity which is a delight to those who have the pleasure of enjoying it.

The ancient Egyptians realized the beauty of water plants and many beautiful paintings and carvings of water lilies are found on their vases and coins. Lotus and other aquatic subjects were not grown by the ancients for beauty alone, but were of economic importance as well. Seeds and rootstocks when ground, yielded flour which was used for baking. From these early beginnings aquatic plants have continued to enjoy great popularity and have even at times created great interest as in the discovery of *Victoria amazonica*. These large water lilies whose leaves may reach eight feet in diameter were discovered in Bolivia in 1801. Attempts to grow and flower this unusual plant in England resulted in the construction of the first modern greenhouse which was designed by Joseph Paxton and built at Chatsworth, England in 1849. This greenhouse was constructed specifically for the culture of this new and unusual discovery.

Today in the southern three-fourths of the United States, we may grow most aquatic plants, and even *Victoria amazonica* in easily constructed outdoor garden pools. The pools should be located where they can receive as much sun as possible, for sunlight is an important cultural requirement for most aquatic subjects. The size of the pool will depend on the type and number of water lilies which will be grown. Tropical water lilies should be placed 12 feet apart, measuring from their centers, and hardy varieties should have a like spacing of 8 feet. Never crowd water lilies. The main effect is received from a pool when it has an equal combination of plants and water surface which reflects the beauty of the sky, clouds, trees and other things in its environment.

The earth-bottom pool should be dug to a depth of 2-1/2 feet. A layer of heavy plastic is placed on the bottom for maximum water retention. Six inches of clay is placed above the plastic and tamped down securely. The pool sides should be at a 40-45° slope for the easy culture of emergent aquatics. A concrete-lined pool is of initially higher construction cost, but will eventually pay for itself in easy

maintenance and long lasting quality. A pool of this type should be two feet in depth and should have approximately nine inch thick walls and an eight inch bottom. These measurements will ensure against cracking due to sub-freezing temperatures. These concrete pools eliminate two problems encountered with the earth bottom pool. Firstly, concrete is easier to walk on than an earth bottom, and when tending individual plants, bottom sediment disruption is kept to a minimum. Secondly, the high maintenance problem of removing aquatic weeds is eliminated with a concrete floor. The natural pond which may already exist in the garden may also be used with minor changes. If the pond is too deep, which is a common problem, plants may be placed in portable containers and set on stones to raise them to the desired depth. Deep banks may be filled with soil to facilitate the easier planting and care of shallow growing emergent aquatics. Many things can be done with these three types of pools if imagination is used, and careful planning put into the effort.

Water lilies are a diverse plant group and varieties can be found to fit anyone's needs. *Nymphaeas*, the





View of Bog in Spring

generic name for water lily, can be either tropical or hardy. The tropicals such as *Nymphaea* 'St. Louis' or 'King of the Blues' are big plants and have large and impressive flowers. However, these varieties are tender and cannot be overwintered outside. Most hardy types such as: *Nymphaea* 'Comanche', 'James Brydon', or 'Sunrise' are smaller and more dainty than the tropicals. These can be overwintered outside in the pond without protection. Some tropical varieties such as *Nymphaea* 'Red Flare', or 'Missouri' are night bloomers, flowering between 7 p.m. in the evening until 9 a.m. the next morning. If a combination of day and night bloomers are used, the garden pool will be constantly in flower.

Because *Nymphaeas* are heavy feeders, they require a good pasture soil, rich and balanced in nutrients. This soil is best placed in containers which are placed in the pool. Normally one foot of water should cover the surface of these planters. The containers may be constructed of

wood, or large plastic tubs may be purchased reasonably at a local hardware store. Whatever is used, it should be large enough to accommodate 2-4 bushels of soil. As mentioned earlier, a heavy pasture soil should be used. This type of soil tends to hold nutrients longer than a soil which is light in texture and consists mainly of silt or sand. The addition of compost or peat moss is not necessary. Early aquatic gardeners relied mainly on manures for feeding because of its ready availability. Commercial fertilizers are used today due to the ease of handling and simply because they provide the plants with the same nutrients that manures contain. The use of a complete fertilizer such as 12-12-12 at the rate of 3/4 pound per bushel of soil will provide the main nutrients required for optimum growth. Supplemental feedings should be given once a month during peak growing periods through the summer. For this procedure, 3/4 pound of a complete fertilizer is placed in thin plastic bags

and pushed firmly into the soil around the plant. These feedings will provide sufficient nutrients for the season's growth.

Many types of emergent aquatics may be placed in tubs or planted on the shallow banks of the pool. Their care basically consists of a fertile soil and the proper pruning of dead leaves during the summer.

Papyrus (*Cyperus papyrus*), an ancient and beautiful plant with its tall and graceful growth habit is a welcome addition. Ferns such as *Osmunda cinnamomea* and *Taro* (*Colocasia antiquorum*), or *Lotus* (*Nelumbium*) are all attractive plants which grow well in bog conditions.

At the Missouri Botanical Garden in St. Louis, our aquatic plants are placed out around May 25 or by the time water temperature has reached 70°. In the previous month the pools had been cleaned and new soil placed in the planters. Two important factors to consider in planting water lilies are: first, to be certain water is contained in the pool so that at no time plants are allowed to dry out; second, the crown or growing tip of the plant should rest on top of the soil. If planted too deep, the lily may die.

Summer maintenance consists mainly of keeping plants pruned and fed regularly as mentioned earlier. Aphids are the main insect pest which attacks aquatic subjects. They may be washed into the pool or sprayed with a nicotine solution at 1/2 strength.

Overwintering pools presents no major problems. Hardy lilies may be left in their planters and will be safe as long as they do not freeze solidly. Most fish, also, may be kept in outdoor pools during the winter months.

Tender water lilies and other aquatics should be brought inside and stored until the following spring.

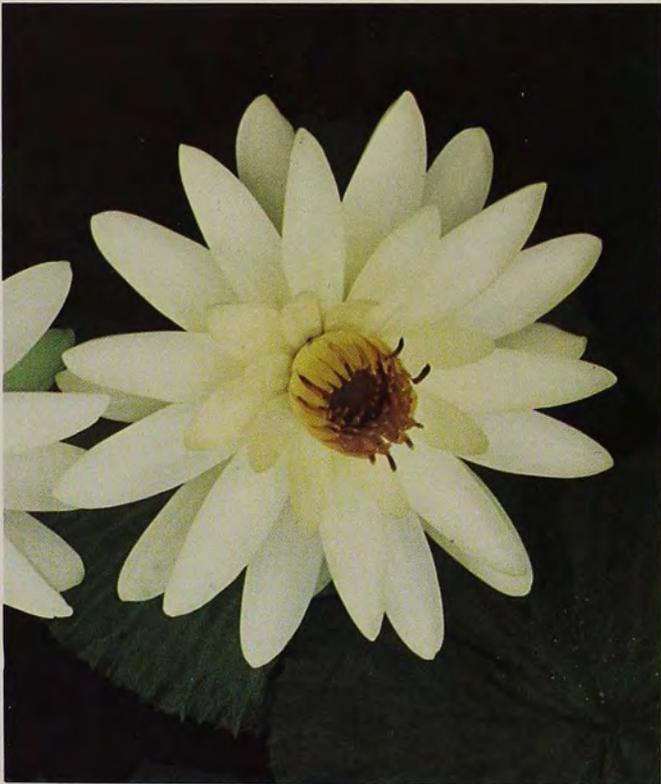
Aquatic gardening requires a vivid imagination and a strong interest. It is one aspect of horticulture which can be extremely rewarding.



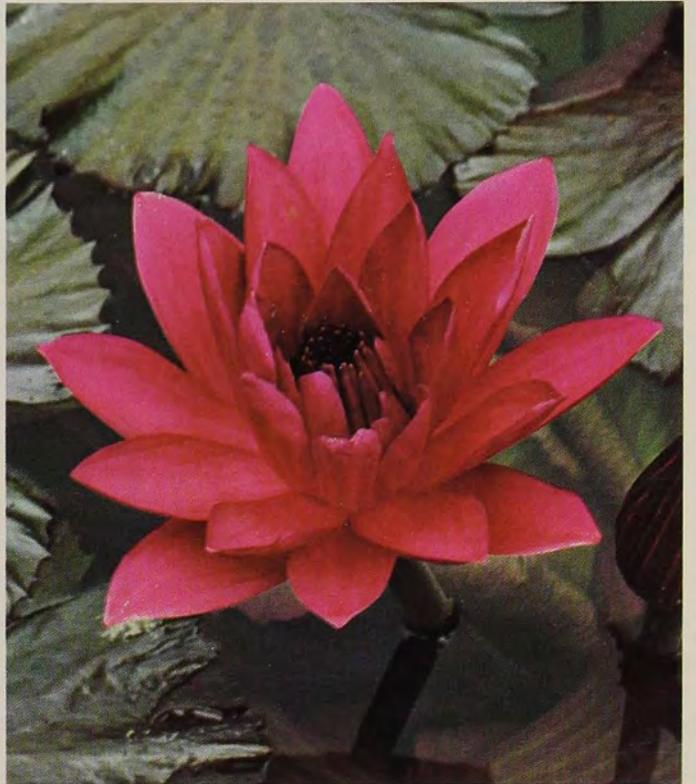
Nymphaea "Jack Wood"



Nymphaea "King of the Blues"



Nymphaea "Missouri", Night Bloomer



Nymphaea "Red Flare"

Her Majesty the Tulip

"White Triumphator" lily-flowered and "Red Shine"

Regal in form...exquisite in grace and bearing...perfection in color—add up to—Her Majesty, The Tulip, Queen of all flowers.

Almost no other flower has affected world history so much as the tulip. They were planted in the secret gardens of Turkish Shieks who selected their special harems from those wives who showed the greatest affection for the tulips; the other wives were sent to unattractive and desolate dormitories. Tulips also became great love symbols of Persia. There, a young man, by presenting a tulip to his lady-fair, showed that he was on fire with her beauty, the color of the flower, and that his heart was burnt to a coal, the black base of each petal. And in Holland, tulips were traded for staggering amounts of money, which almost brought that country to ruin in the 1600's.

Tulips have been delightfully signifying the beginning of spring for centuries. They were growing abundantly in the eastern Mediterranean region long before they were introduced to Europe in 1554, by Ogier Ghiselin de Busbecq, the Austrian ambassador to Turkey's Suleiman the Magnificent. He wrote friends that he had seen these glorious flowers growing in and around Constantinople, and in his letter, he enclosed a few bulbs. Soon, the tulips popularly spread through Europe, and by the 1560's, they were being grown in Holland.

Holland obtained both the bulbs and the seed, for while modern gardeners grow tulips only from bulbs, seeds were as important as bulbs in the tulip's early journey. The flower

by Marc Reynolds &
S. Scott Roberts



Tulip, "Dreaming Maid", Triumph

was admired for its beauty and deep color, and the Dutch looked upon it as something exotic. There, the tulip's popularity increased so much that the demand began to far outweigh the supply, setting the scene for that forever famous era in Holland's history, from 1634 to 1637, accurately dubbed "Tulipmania."

During this period, nearly everyone in Holland went wild trading and selling tulip bulbs. Wealthy merchants, solid citizens, and even servants sold all their worldly possessions just to buy a handful of bulbs. Tulipmania grew to such an extent, that nearly every village in Holland had

an official exchange where bulbs were bought and sold, with prices soaring higher and higher.

For three years, this mania for tulips continued unabated. Records show that one bulb called the *Semper Augustus* sold for a carriage and horses, and enough money to bring the total to more than \$4,000.00, and in 1634, four thousand dollars was an even more overwhelming sum than it is today. Another tulipmaniac paid two loads of wheat, four loads of rye, four fat oxen, eight fat pigs, twelve fat sheep, two hogsheads of wine, four barrels of beer, two barrels of butter, a thousand pounds of cheese, a bed (with mattress, pillows and hangings), a suit of clothes, and a silver jug, all for one tulip bulb named *Viceroy*.

By 1636, speculation and prices had become so utterly fantastic, that chaos seemed eminent. The government, in response, put an end to all speculation of tulip bulbs by means of a proclamation in 1637.

In the 300 years since Tulipmania, Holland has developed the growing and hybridizing of tulips into an important industry on a sober, sound and scientific basis. Bulb growing has become a tradition which passes from father to son, and with the help of modern science and thorough professional education, each succeeding generation has advanced the industry's knowledge and ability in the cultivation of tulips.

Today, there are literally hundreds of varieties among fifteen classes of tulips available to ensure that your garden is the scene of a tulip festival from March to May. Tulips now come



in all colors of the rainbow, from white to almost black, from softest pink to deepest purple. They come in broken colors, bi-colors, striped, streaked, shaded, and even tinged colors.

In addition, modern tulips flower in a host of forms and shapes. Some have oval flowers, some are shaped like turbans, and others are square at the base. There are tulips with lacinated petals, fringed petals, curled petals and pointed petals. Some tulips have tiny flowers while others produce blooms as large as a man's hand. Some have stems only a few inches tall, while others soar majestically to almost three feet high.

Most gardeners are familiar with the major classes of garden tulips, divided into early, mid-season and late flowering periods, which provide garden beauty in April and May. But the species tulips and their hybrids, which make up another four classes, tend to flower earlier than the traditional garden varieties. And by including some of these in your plantings, tulip time can be stretched from March to late May.

Tulips are particularly easy to grow. All garden types should be planted six to eight inches deep and six inches apart. Darwin Hybrids and Parrot tulips must be sited eight inches apart because of the mammoth size of their blooms. The species tulips and their hybrids should be planted five to six inches deep and five to six inches apart.

Though flowering time stretches from March to May, planting time for all tulips, and all other bulbs for that matter, is the same. They must be planted in the fall, before deep frost hardens the ground. It should be remembered, however, that since these bulbs are subjected to natural conditions, there will usually be year to year variations. With an early spring, for example, the bulbs may flower a week of two earlier; with a late spring, the reverse will be true. And, of course, the location of your garden and section of the country where you live will play a role in the bloom period.

It is also important to remember

that tulips must be planted in soil that drains well. If your soil has a great deal of clay content, add sand, peat or vermiculite to a depth of 12 to 18 inches. If the soil is too sandy, add peat or compost.

And, even though all bulbs contain their first season's food supply, fertilizing is recommended to foster future growth. Choose a high phosphorus and potash mix, bonemeal or a good all-purpose fertilizer. For best results, work the fertilizer into the soil during the fall planting season, and again when shoots appear, to nourish the bulbs for subsequent years.

Species Tulips

Some of the most revolutionary and widely appealing tulips available today are the result of the phenomenal breakthrough in breeding between the four classes of species tulips, also known as "botanical" and "wild" tulips, Kaufmanniana, Fosteriana, Greigii and miscellaneous varieties, usually referred to as "other species." More and more hybrids of each class are introduced every year, and each new variety has something different and unusual to offer in terms of size, color, form, height and application.

The beautiful, wild species tulip, first discovered in the late 19th century in Turkestan, was introduced into Western Europe as the Kaufmanniana or "waterlily" tulip. Today, it has a host of hybrids and offspring, from crossings with other wild species as well as with garden tulips, resulting in hybrids that are early flowering, have new and subtle color combinations, and a unique bloom shape. The flowers of these hybrids are generally bi-colored, with the outside deeper in tone than the inside. The long narrow and pointed segments open out horizontally when the flower is in full bloom, and the stems are short, from 4-10 inches; their sturdy stature helps counter stormy spring weather. They are ideal in clusters for rockery, borders, edging, and for all those dull corners that need brightening in March and April.

Holland's hybridizers have taken the Fosteriana tulip, a wild species



Tulip, "Artist" Cottage



Parrot Tulip, "Blue Parrot"



"Meissner Porzellan", Triumph Tulip



"Elizabeth Arden", Darwin Hybrid



Kaufmanniana



Tulip, Double Late, "Eros"

found on the mountain slopes of the Mediterranean region, and crossed it with Kaufmanniana, Single Early and Darwin tulips to produce a fabulous new class of Fosteriana hybrids. The Fosteriana is one of the parents of the glorious Darwin Hybrids, known for their massive blooms and sturdy stems which range from 10-16 inches. The glowing colored flowers and fresh green foliage of the Fosteriana have been transmitted to their hybrids, which can be used for dramatic, and startling effects in the garden, for focal points in the rockery, border, terrace tubs and urns. Good Fosteriana hybrids include Red Emperor (15" vermillion-red), Princeps (10" orange-scarlet) and Purissima (14" pure white).

The Greigii species comes from the Chirchik Valley of Turkestan, where the wild species was discovered in the late 1800's. In recent decades, Dutch breeders have made a significant "break-through" in tulip breeding by crossing T. Greigii with Kaufmanniana, as well as with traditional garden varieties, to get outstanding hybrids.

Greigii hybrids are magnificently adorned with huge oriental-colored blooms, which are long-lasting and brilliant. They also have beautifully marked and mottled leaves. The mottling of the leaves in wild species has changed in some of the hybrids into broad, well-defined striping, so that the leaves have marvelous decorative value. In addition, the leaves spread out almost flat on the ground and cover the soil in a way no other tulips do. The hybrids grow 4-18 inches tall and have large cup-shaped flowers, approximately five inches in diameter. The shorter stemmed varieties should be planted 4-5" deep, and the taller ones, 6" deep. Spacing should be 5-6" apart, and they should be planted by the dozen. Greigii hybrids will add vibrant color, from orange-red to dazzling scarlets and yellows, to beds, borders, rockery, base of walls, near trees, and in terrace containers. Popular Greigii hybrids consist of Red Riding Hood (5" carmine-red with scarlet interior), Margaret

Herbst (16" vermillion) and Oriental Beauty (14" carmine-red).

Early-Flowering

There are two classes of early-flowering garden tulips—Single Early and Double Early. The Single Early are single cupped in form, with sturdy stems 10 to 15 inches tall. They come in striking shades of almost every known color and are more popular today than at any time in their 300 year history.

Single Early varieties normally flower in mid-April, and are invaluable for massing in beds and borders to produce early dramatic splashes of color in the garden. They are excellent for edging and ideal for windowboxes and terrace tubs. Most varieties also do well in pots and bowls indoors. Good Single Early tulips include Brilliant Star (12" bright scarlet), Bellona (15" golden-yellow and scented), Christmas Marvel (14" cherry-pink), Charles (13" scarlet), Keizerskroom (14" orange-red), and Princess Irene (12" orange and purple).

While Double Early tulips are approximately the same height as the Single Early varieties, they have large, widely open, double flowers which, on the whole, last longer. They are excellent for mass plantings in beds and borders, and they do particularly well in a sunny, partially sheltered site. Their neat, even growth makes them ideal for edging, windowboxes and terrace displays, and many varieties do well in pots and bowls indoors. Favorite Double Early tulips consist of Electra (12" deep cherry-red), Hoangho (12" pure yellow), Orange Nassau (11" orange-scarlet), Hytuna (12" buttercup yellow), Mr. v.d. Hoeff (11" golden yellow), Peach Blossom (11" rosy pink), Schoonoord (11" pure white) and Stockholm (11" scarlet).

Mid-Season Flowering

There are three classes of mid-season flowering tulips to choose from—Mendel, Triumph and the relatively new and extremely popular Darwin Hybrid class. While all bloom from the last week of April into May, each has its own particular applications in the garden and all make lovely cut flowers as well.

Mendel tulips are not as stout of stem or habit as the Triumph variety. For best results, plant them in a sheltered position where the wind will not whip their 16 to 24 inch stems. Picturesque effects can be achieved if you site them in clumps of protected beds, borders or beneath light trees, where their large, handsome single flowers, encompassing a broad range of colors, can be appreciated. Attractive Mendels include Apricot Beauty (16" salmon-rose tinged red), Athleet (18" red-edged yellow), Pink Trophy (20" pink-flushed rose), and v.d. Eerden (19" glowing red).

Triumph tulips, which are excellent for forcing, have stiff and sturdy stems, 16 to 24 inches in height. They, too, have large single cup flowers in a wide range of colors, often striped and margined and the blooms are weather resistant. Triumphs are ideal exposed, in beds, borders and other garden sites. Among the many varieties, popular Triumphs are Aureola (19" bright red-edged golden yellow), Elmus (21" carmine-red-edged white), Kees Nelis (20" red-edged yellow), Merry Widow (24" red-edged white), Olaf (20" scarlet), Paul Richter (25" geranium-red), Topscore (24" geranium-red, with yellow base), Attila (22" light purple-violet), Bing Crosby (21" glowing scarlet), Peerless Pink (20" pure satiny-pink) and Thule (24" red-edged yellow).

Darwin Hybrids represent one of the finest achievements in the tulip's horticultural history. Obtained only recently from crosses between Darwin varieties and *T. Fosteriana*, the Darwin Hybrids are the newest of the garden tulip classes. They have the largest flowers yet produced, and are particularly striking because of their brilliant colors. These giant tulips, which make superb cut flowers, have huge single cups, noted for their satiny shades of red, and are extremely tall, ranging from 22-28 inches in height. These hybrids are in a class by themselves and should be planted at focal points in the garden, for they are real eye-catchers. Flowering time is the last week of April. Darwin hybrids are also surprisingly inexpensive,

with many varieties available: Apeldoorn (24" orange-scarlet), Beauty of Apeldorn (24" flushed-magenta-edged yellow), Golden Apeldoorn (24" golden yellow), Hollands Glory (24" orange-scarlet), Oxford (24" red), Parade (26" scarlet), Gudoshnik (26" sulphur-yellow) and Red Matador (22" carmine-flushed scarlet).

Late Flowering

There are six classes of late-flowering garden tulips, all bringing splendour to the garden in May. And each class is distinctly different from the others, and all are particularly well suited to floral arrangements in the home.

Darwin tulips, named after the great naturalist, Charles Darwin, are almost as important historically as were the first few bulbs from Turkey to Western Europe. Darwins are superb in beds, borders, kitchen gardens and orchards. They have long, sturdy stems 26 to 32 inches in height, which also makes them superior cut flowers. Many varieties can be grown in pots and bowls indoors. These large-cupped flowers are squared off at the base and top of the petals. They come in virtually all colors and have a distinctive satiny texture. All varieties are resistant to wind and rain, and can be grouped effectively among shrubs or evergreens. All the varieties flower in May, and some of the more popular Darwins include Aristocrat (30" soft purplish-violet and white), Clara Butt (23" salmon-pink), Dix's Favorite (27" glowing red), Gander (30" bright magenta), Magier (26" white-edged violet-blue), Pink Supreme (28" rich deep-pink merging to rose-pink) and Queen of Night (30" deep velvety-maroon).

Lily-flowered tulips, which resemble lilies, are the most graceful and elegant of all garden tulips. They create beautiful pictures when planted in groups in beds, borders, or when they are featured in terrace tubs and window-boxes. Lily-flowered tulips have pointed petals, beautifully reflexed on tall wiry stems some 20-24 inches tall, making them excellent cut flowers. Their colors are rich and glowing, and groups of different varieties make a



"Saxatilis", Species Tulipa



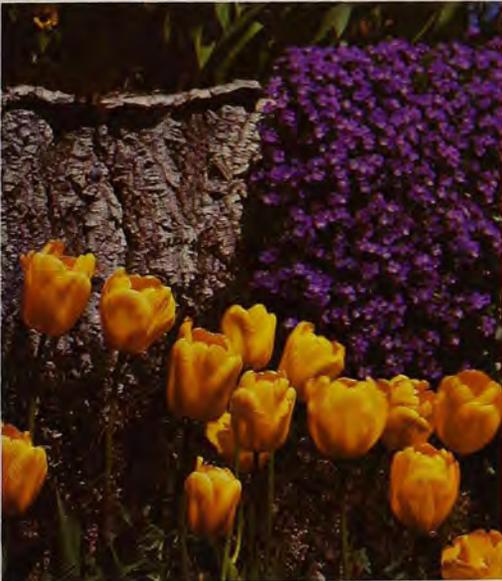
Brilliant Star, Single Early Tulip



"West Point", Lily Flowered



"Keizerskroon", Single Early Tulips



Tulips, "Bellona", Single Early



Tulips, "China Pink", Lily-flowered

splendid display. All varieties bloom in May, and favorites include Aladdin (20" scarlet-edged yellow), China Pink (22" satin-pink), Mariette (24" deep satin-rose), Maytime (20" reddish-violet), Queen of Sheba (20" red-edged orange), Red Shine (20" deep red), Westpoint (22" primrose-yellow) and White Triumphator (24" pure white).

Cottage Tulips, so named because they were originally found in old cottage gardens, have more variation in form than any other class of tulip. They often have slender buds with long pointed petals. These single-flowered tulips are strikingly effective when planted in bold masses because of their vibrant pastel colors. They have extremely long stems, ranging from 20-32 inches, and should always be massed in clumps. These large egg-shaped flowers bloom early in May, and good ones are Balalaika (28" turkey-red), Burgundy Lace (20" wine-red, with fringed edge), Dillenburg (26" salmon-orange), Golden Harvest (26" lemon-yellow), Maureen (30" marble white) and Renown (30" light carmine-red).

Tulip history began with "broken-colored" tulips and there are still a few varieties around for the keen gardener primarily interested in unusual flower arrangements. For many years, these tulips were classified as Bizarres, Bijbloemen, and Rembrandt, according to parentage and color, but with so few varieties now in commercial cultivation, they have all been incorporated in a single class called Rembrandt. All varieties have large single cups, with stems ranging from 18 to 30 inches. They come in most artistic colors with feathered or flamed blooms. Grown primarily for cutting, they also make fascinating clumps in the garden. All flower in early May, and better varieties include Absalon (26" coffee-brown on yellow ground), Black Boy (20" dark chocolate-black on garnet-brown), Dainty Maid (18" magenta-purple on white ground), Insulinde (23" violet on yellow ground), Pierette (22" pale violet-streaked blackish-violet) and Victor

Hugo (18" cherry-rose on white ground).

Parrot tulips are mutations from the other classes, with larger flowers and lacinated segments creating a fringed, waved or scalloped effect. They are quite showy and are ideal as focal points in the garden, which are provided with some shelter from winds, to protect their 20-26 inch stems. The blooms come in a wide range of colors, and the foliage, which is light green, offers a fine contrast to the rich brilliant blooms. Parrots flower in May, and good ones consist of Orange Favorite (22" orange with green blotching), Fantasy (24" soft rose-streaked green), Blue Parrot (26" bright violet), Karel Doorman (20" cherry-red-edged golden-yellow), Texas Gold (20" deep yellow) and Black Parrot (24" purplish-black).

Double Late tulips resemble paeonies so much that they are called "paeony-flowered" tulips. They have large, fat, double flowers on sturdy and erect 16 to 24 inch stems, and are wonderful planted in groups in beds, borders, terrace tubs and window-boxes. Many varieties are two-toned, and all are magnificent for floral arrangements. They are at their best in the latter part of May.

In conclusion, an old Turkish legend states that when the world was finished, so many angels gathered on a rainbow, that it broke in many pieces and fell to earth. And from these bits of rainbow, continues the legend, beautiful flowers, like tulips, were formed.

Now is the time to start thinking about fall planting, if you want to have "pieces of the rainbow" bloom in your garden this spring.

HAWAII

To Extend the Life of Hawaiian Flowers

*Dr. Donald P. Watson, Urban Horticulturist
University of Hawaii*

Tropical flowers are being jetted from Hawaii to the mainland regularly. They are no longer seasonal and arrive every day. Many boxes of anthuriums, orchids, gingers, heliconias as well as mixed tropicals go directly to consumers air-mail special delivery; others go to florists. Visitors nearly always take some home with them.

These flowers were grown under big tree ferns or in saran houses where the air is laden with moisture, where the temperature rarely drops below 70 degrees. Most tropical flowers are rugged and have good keeping quality. But no matter how tough, how well they were packed, or how fast they are rushed to their destination, they require different care than flowers that were grown commercially under mainland conditions.

Anthurium *Anthurium andraeanum*

Upon arrival:

Unpack, unwrap, cut one inch off the base of the stem with a sharp knife. Immerse the flowers upside down in water at room temperature for 2 or more hours. Every 3 days repeat this operation soaking for 1 hour.

The pencil-like spadix in the center of each anthurium is made up of hundreds of small individual flowers that evaporate water freely, especially when the stigmas protrude and are receptive. Therefore, it is equally as important to keep the humidity high around the top of the flowers, as it is to have the base of the stem in water. If they are to be stored for any length of time before being displayed in the home, stand the stems in water with flower preservatives; enclose the flowers in a plastic bag and keep them at room temperature.

Do not refrigerate. They should keep from 3 to 4 weeks.

Red Ginger

Upon arrival:

Soak the whole stem including the red bracts in water at room temperature for half an hour. Repeat every 3 days or more often. Frequent soaking does not harm red ginger because it grows in intermittent gentle tropical rain.

Do not confuse red ginger (*Alpinia purpurata*) (See American Horticulturist, Vol. 53, No. 4, Pages 21 and 27) with torch ginger (*Nicolaia elatior*) which is larger, heavier and has such a short shelf life that it is not commonly shipped as a cut flower. The decorative part



Heliconia humilis—lobster claw



of red ginger is the spike of conspicuous red bracts which keep fresh much longer than the inconspicuous small white flowers.

Do not refrigerate. They should keep 2 to 3 weeks.

Heliconia and Scarlet Banana

Upon arrival:

Sponge the flower heads with water at room temperature containing a little detergent and a few drops of cooking oil. Rinse with fresh water.

Do not soak in water. No water should collect in the open sheath. Do not refrigerate.

Lobster claw (*Heliconia humilis*), hanging heliconia (*Heliconia rostrata*) and scarlet banana (*Musa coccinea*) are the most common of the banana-like flowers that are available from Hawaii.

Hanging heliconia will only retain its color for 5 days, upright heliconia about 2 weeks and the red banana for almost a month.

Bird of Paradise

Upon arrival:

Cut one-half inch off the base of each stem with a sharp knife. Two or three more flowers are still enclosed in the heavy sheath. They are nicely protected until arrival but will never emerge automatically after the stems have been cut from the plant.

As soon as the first flower fades, soak the head in water at room temperature for about 20 minutes. Insert your thumb through the slit inside the unopen sheath, and gently lift out one new flower at a time. Tear off the thin white membrane that separates one flower from another.

Do not refrigerate. They should keep from 1-1/2 to 2 weeks.

Ti

Leaves of Hawaiian Ti (*Cordyline terminalis*) are usually packed with shipments of cut flowers. They are used to raise the humidity in the box, to cushion the flowers and as foliage to complete an arrangement. Hawaiian Ti may be green, red or variegated. There are over 50 cultivars in local gardens.

Upon arrival:

Cut one-half inch off the base of the petiole, stand the leaves in water and refrigerate until ready to use. They should be fresh for 3 weeks.



Heliconia rostrata—hanging heliconia

Mixed Tropicals

If you receive a box of mixed tropical flowers, treat the individual flowers as described above. When they are arranged in their permanent vase, add flower preservatives to the water.

Flower Leis

Fresh flower leis are a different matter.

Plumeria leis (*Plumeria acuminata*) will last 3 or 4 days if they are sprayed with a fine mist of water, enclosed in a plastic bag and stored in the refrigerator.

Carnation leis will last 4 to 5 days if they are rolled in a damp paper or terry cloth towel and stored in the vegetable crisper in your refrigerator. They will also keep fresh in plastic bags stored in the refrigerator.

Keep vanda orchid (*Vanda* 'Miss Joaquim') leis dry. They deteriorate rapidly if they are sprayed with water before being stored in a plastic bag. The flowers turn white if the stamens are broken at the time they are picked or the leis are made. For best results, place them in a plastic bag without any water and store them in the refrigerator.

So send for some tropicals for a special occasion. Or better still, plan to come to the Congress in September and take some home with you.

Olu Pua Sanctuary from Progress

Dee Dickson
5900 Wilshire Boulevard
Los Angeles, Calif. 90036

Ray and Bettie Lauchis have a slightly better deal than Adam and Eve.

Although they had to develop their own Eden, they do not have to contend with forbidden apples or wily serpents.

The Lauchis' 12 acre Eden is called OLU PUA, a botanical paradise open to visitors near Kalaheo on the "Garden Island" of Kauai.

Just as most plants in these Islands came from somewhere else, Mr. and Mrs. Lauchis, too, are transplants. Their roots were in Cleveland, Ohio.

Bettie, when still a sprout, developed a fondness for plants—a devotion that led her to formal horticultural training at Kent State University and Western Reserve University of Ohio; later, radio work under the name, "Mrs. Greenthumb."

Ray and Bettie had married in Honolulu; lived here in the late '40s and early '50s, loved Hawaii and had a great desire to someday return permanently to the Islands.

Bettie also had a dream of some day establishing a botanical garden, and for many a year finding such a place had been their private treasure hunt.

Finally returning to Honolulu in 1964, the couple sought a site on one of the Neighbor Islands where they could build a garden of Hawaii's dwindling endemic plants, a sanctuary from encroaching progress.

Estate Site was a "White Elephant"

About the same time on the Garden Island, Kauai Pineapple company found the Kalaheo hillsides difficult to mechanize and its parent company; Alexander and Baldwin, decided to turn the pine lands over to its subsidiary McBryde Sugar Company.



Musa velutina—pink fruited banana



Tapeinochilos ananassae—pineapple ginger

Centering the lands that would be cane fields was a now unwanted 12-acre site developed in 1929 as a residential estate for the plantation manager. It included a home designed and built in 1931 by then-architect, now hotelman, Roy Kelley.

Through the years the plantation people had experimented with new plants brought to the Islands, so for some 40 years the estate had been enhanced with about 1000 varieties of trees, shrubs and vines.

Although developers bid for the property, A&B resisted, hoping to find a buyer who would preserve the character of the land and its majestic trees and plantings which might disappear under the developers' penchant for asphalt and concrete.

Into this deliciously-baited trap, apparently shoved by the hand of fate, stumbled the uprooted Clevelanders with budding dreams of gardens.

New Owners Learn to "Sow Before You Reap"

Even with ownership of the land a reality, Mr. and Mrs. Lauchis found completion of their garden a long way away. It was proved that you must "sow before you reap."

"Sowing" and development started in 1964—planning revisions of existing plantings on the rolling lawns, slopes and a jungle area that Ray recalls had become overgrown with *lilikoi*, passion fruit vines, until it was

"a no man's land."

Ray, who says his knowledge of horticulture came to him "by osmosis" through marriage, still jokes he had but one aim in buying the estates with his wife.

"Instead of working in her yard, I thought I was going to just make her yard work for me."

Even though he likes to fake that idleness was his intention, it didn't work out that way. While Bettie keeps her thumb green, Ray's fingers are into all the business and promotional ends of their enterprise.

While other botanical gardens are supported by trust and grants, the Lauchis operate what is probably the first commercial botanical garden, meaning that they rely on the admission price to support their horticultural research and educational work.

The admission to OLU PUA, open daily from 8:30 am to 5:30 pm, is \$1.50 for adults and 50 cents for children under 12.

Before swinging open the garden gate in June, 1968, and in addition to clearing overgrowth and putting in roads, much labor was necessary to expand the species already on the property.

Nursery is Developed For Seeds, Cuttings

Since Hawaii has strict agricultural laws, species from outside the state had to be brought in by seeds or cuttings. So in addition to the gardens, Bettie developed and still maintains her own nursery. The species count today has reached slightly less than 4000, each catalogued as to origin and date of seeding.

Scattered within strolling distance around the estate are a terrace of annuals, a plot blossoming exclusively in shades of blue inspired by Cambridge Gardens at Kew, England, a sunken garden and gardens each devoted only to succulents, palms, hibiscus, bromeliads and "kau kau," a slang Hawaiian word for food.

In addition, there are Oriental jungle and rock gardens. Here there are benches where visitors may linger and contemplate OLU PUA, which means floral serenity.

Because the Lauchises are warm, gregarious people with a good sense of humor, OLU PUA has what few (if any) other botanical gardens have...whimsy.

This becomes apparent shortly after visitors turn off Highway 50 between flying American and Hawaiian flags to wind along the road toward the plantation house.

Halted by a bamboo barrier, visitors will note the sign: SOUND HORN TO WAKE ATTENDANT. Against the house leans another small sign cautioning BEWARE OF CAT, signifying the presence of a beautiful white Persian, deaf but docile.

"Everything can be so stodgy and serious in a botani-



Jacobinia aurea

cal garden” admits Bettie, “but I think if people can laugh a little, start out in a happy mood, then they will enjoy the garden more.”

Other examples of the humor scattered here and there around the estate amid the flowers is an “Early Hawaiian Weather Stone.” Near the house, a rock dangles from the pole support, its legend reading:

This stone was the perfect weather indicator—100 percent accurate. A dry stone means fair weather. A wet stone means it is raining. A shadow under the stone means the sun is shining. If the stone is swinging the wind is blowing. If the stone is jumping up and down, an earthquake is upon us. If the stone is white...it is snowing.

So far, neither smiling Hawaiians nor an occasional passing weatherman has ever disputed its logic.

Besides hosting car and bus tour loads of visitors to the gardens, the more serious side of OLU PUA is in learning to grow and propagate tropical plants, to germinate seed, and to develop new species that will benefit Hawaii.

Although OLU PUA is almost a natural outdoor greenhouse (750 feet elevation, temperature between 65 to 70 degrees, annual rainfall of 60 inches and constant tradewinds), there are hotter, drier areas in the Islands. Among her projects, Bettie is studying ornamentals that will do well in the dry spots.

On the educational side, with hopes to instill botani-



Protea cynaroides—king protea

cal, horticultural and agricultural interest in local youths, the Lauchises invite schools to bring their science classes to OLU PUA without charge to learn about living things that can be economically important to the state.

Bettie’s skill in her profession has brought acclaim in horticultural circles. She has been an American Horticultural Society director (first person from Hawaii to be so recognized), an active member of the American Association of Botanic Gardens & Arboreta and was selected for the International Plant Propagators’ Society membership.

She has recently been nominated by Hawaii Senator Hiram Fong to the Hon. Earl Butz, Secretary of Agriculture, for membership on the National Arboretum Advisory Council.

But whatever her honors and titles, “Mrs. Greenthumb’s” favorite role seems to be tending her plants and welcoming visitors to their Hawaiian Eden.

While the garden is a delight to serious and amateur gardeners as well as photographers, it is more. It is a sanctuary so quiet that the only sounds are of birdsong and tradewinds stirring the leaves: a total visual escape from paving and concrete.

Inspired by a visit, 4th-grader Elizabeth Panui thanked the Lauchises with this description:

“OLU PUA Garden rests beneath the folding hills where men and angels taste peace and happiness still.”

Cincinnati Nature Center

Virginia Von Barga
Cincinnati Nature Center
4949 Tealtown Road
Milford, Ohio 45150

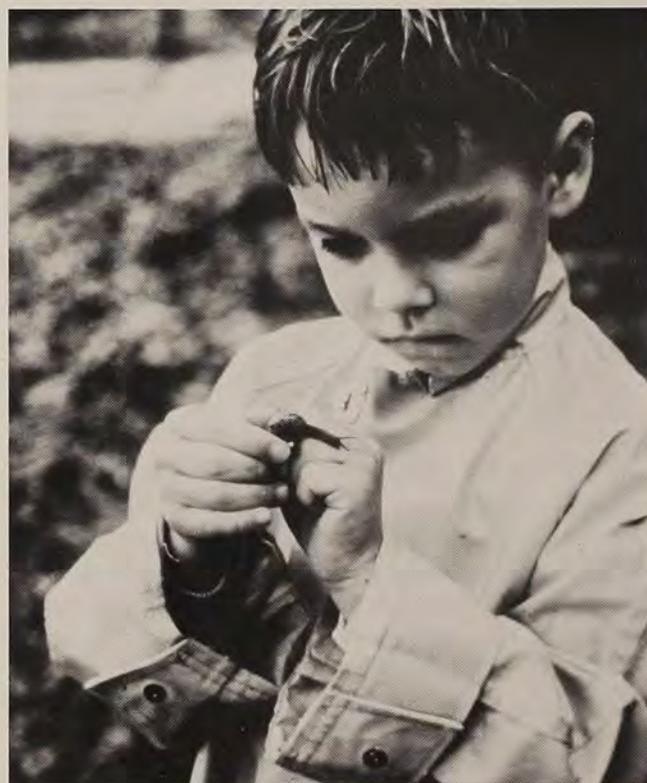
Twenty miles from the heart of the city, in the rolling hills of south-western Ohio, the Cincinnati Nature Center preserves 175 acres of magnificent forest that is known as "Lob's Wood." Here in this peaceful oasis, a clear stream tumbles over a limestone and shale bed rich in fossils, and the tranquil surface of a pond belies the teeming aquatic life beneath its waters. Giant sycamores stand sentinel in the low places, while oaks, sweet gums, beeches, sugar maples, sour gums, and shagbark hickories climb the hillsides and crown the summits. Birds nest in old hedgerows and small animals take shelter in the tangled underbrush. In spring, flowers, both cultivars and natives, spread glowing carpets of blossoms in forest and clearings, but no season in this woods is barren of bloom.

Lob's Wood exists today because of the boyhood dream of Mr. Carl Krippendorf, a man who loved nature and understood the principles of conservation. A childhood illness first brought boy and wood together; to recuperate from a fever, young Carl was sent to spend the summer in the country with Dr. Spence, the man who at that time owned the farm that included the woods. For the boy, it was the first of many summers spent roaming the countryside, savoring the sights, sounds, and smells of the great forest. He promised himself that someday he would buy this wonderful property, and near the turn of the century, with some of the first money he earned, he did buy it, and he called it "Lob's Wood."

Mr. Krippendorf liked to grow things, and he determined to turn his forest into a vast woodland garden that would bloom in every season, and provide food and shelter for birds and animals. He wanted to see great drifts of bloom spreading color beneath the great trees, and to develop his ideas, he planted bulbs and seedlings by the thousands, and scattered seed by the pound.



Cultivars: shooting star.



In all weather, to all people, there are wonders to discover!

He succeeded in naturalizing such flowers as squills, winter aconite, snowdrops, snowflakes, crocuses, daffodils, and colchicums, and he coaxed more bloom from many of the native flowers by patiently collecting seed and sowing it thickly in various parts of the woods. He planted hedges of multiflora roses as shelter for birds and small animals, and groves of walnut trees as food for the squirrels. He did much of the planting himself, and he and his ax fought a running battle with the underbrush that constantly threatened to "close" his woods. For over sixty years, until his death in 1964, he cared lovingly for his big garden, and the woods rewarded him richly with breathtaking bursts of bloom.

Thanks to a group of farsighted Cincinnatians led by Stanley M. Rowe, Sr., Lob's Wood is still here for us to enjoy, with all of its beauty intact. These conservation-minded people were disturbed by our society's misuse of land and natural resources, and they recognized a pressing need for an informed citizenry who would be able to make knowledgeable decisions about the environment. Like Mr. Krippendorf, these people had a dream too; they dreamed of saving Lob's Wood for all time, and of making it the nucleus of a larger area that would be used to teach children, who are our future decision-makers, and adults alike the principles of ecology, and hopefully, to open their eyes to the beauty and harmony of the natural world. In 1965 the group purchased the land from Mr. Krippendorf's daughter, Rosan, and a year later the Cincinnati Nature Center was established. During the past nine years, the Center has added 585 acres to the original 175, three ponds, a five-acre lake, and the Rowe Interpretive Building, which houses the administrative offices, classrooms, a bookstore, a library, and a gift shop.

The first school children came to Lob's Wood in 1967, and they have been coming ever since in larger and larger numbers. The Center teaches by a unique "discovery" method whereby guided explorations lead students to discover answers for themselves. For teaching the complex interrelationships of plants, animals, soil, water, and man, Lob's Wood and the surrounding acreage provide the ideal classroom. Each year, under the guidance of three full-time naturalists, one part-time naturalist, and a devoted corps of some fifty volunteers, over 10,000 school children and hundreds of school teachers from eight southwestern Ohio and northern Kentucky counties enjoy this unusual learning experience in a vast outdoor laboratory where nature literally "comes alive" for them.



Besides its school-centered activities, the Nature Center provides out-of-doors learning experiences for other young people, such as church groups, scout groups, and the YMCA, and for adults. These groups are taught by volunteer teachers who have undergone an intensive training program at the Center. Particularly popular with garden clubs are the wildflower and daffodil walks. In summer, a week of instruction in biology combines both fun and work for groups of children six to fifteen years old. In a healthy outdoor classroom these children learn to recognize and care for small animals, and to use simple scientific tools such as microscopes and binoculars.

Members of the Center are fortunate people, indeed, because they have a very wide choice of activities. Workshops covering a broad range of subjects from botany to zoology are offered regularly; longer courses in such special interest subjects as taxidermy, land planning for the small landowner, and sketching appeal to so many people that classes are always filled, while

educational walks to study such seasonal events as wildflowers blooming, tree frogs singing, or warblers migrating are also very popular. Safaris take the more adventuresome members to such places as the Canadian Arctic; for those members who cannot be away so long, there are weekend trips to closer areas, such as Mammoth Cave in Kentucky.

The Center is open to the public during the week, but weekends are restricted to members only, providing a strong incentive for membership—a place of quiet where people may go to walk in their leisure hours—a place frequented by others of like concern...and love for a forest preserved for the future.

But the Nature Center does not exist solely for serious students and members. Beginners, hobbyists, and casual visitors are all welcome, and its services are available to anyone. No matter what your interest in nature may be, you will find something to intrigue you at the Center, but if you love plants and flowers, whether as a serious horticulturist or as a hobby gardener, you will



Rowe Interpretive Building at the Cincinnati Nature Center.

find a visit to Lob's Wood a particularly rewarding experience.

Six and one-half miles of excellent stone-based and woodchip covered trails traverse the natural areas of the Center, and clearly-marked paths lead to all points of interest. The Center has retained many of Mr. Krippendorf's plantings, and has added others, so that flowers bloom in the woods in all of the mild months, and even in some of the cold ones.

The spring wildflowers begin to bloom in March, and continue until mid-May, with bloom peaking in April. Among the many native species are spring beauties (*Claytonia virginica*), Dutchman's-breeches (*Dicentra cucullaria*), squirrel corn (*Dicentra canadensis*), blood-root (*Sanguinaria canadensis*), blue phlox (*Phlox divaricata*), and hepaticas.

For daffodil lovers, mid-April is the time to visit Lob's Wood. Acres of daffodils, in every shade from cream to deep yellow bathe the woods in a golden glow. Mr. Krippendorf loved daffodils, and over a period that spanned more than sixty years, he planted tens of thousands of bulbs, including such rarities as "Queen of Spain" and *Narcissus eystettensis*. Because many of these plantings were made years ago, a number of the old varieties, such as "Little Dirk," "Mrs. Langtry," "Grandes," and "Victoria" still flower in Lob's Wood. In the Center's *Daffodil Exhibit Garden* new varieties of prize-winning bulbs from the United States and England are displayed and tested.

Another display of horticultural interest is Fern Valley, a small ravine planted with forty species of ferns indigenous to Ohio. Specimens include the unusual walking fern (*Camptosorus rhizophyllus*), the delicate maidenhair fern (*Adiantum pedatum*), and the coarse and robust sensitive fern (*Onoclea sensibilis*), so named because it is sensitive to changes in temperature, not to touch.

Herb fanciers will find Mr. Krippendorf's dry wall of interest. This wall has been restored by the Center and is planted with a number of saxatile plants, including an interesting collection of over twenty-two thymes.

Whether you come in spring when the woods is golden with daffodils, in summer when *Lycorus* lilies make lavender-pink pools under the trees, in the autumn when the great trees blaze with golds and russets, or in winter, when a silvery skein of ice covers the sleeping ponds, and the beech branches show white as the winter sky, you will find Lob's Wood has something to teach you, too.



School visits last all day; children work in small groups.

Roof Top Roses

by Linda Yang
New York, New York



Rose Trellis

As a city slicker born and bred, I believed that roses grew only on huge estates in the country. I would tour these perfect gardens and marvel at flowers I thought I could never have.

As the owner of a mid-Manhattan (New York City) balcony, I was used to being bombarded with nursery-men's exclamations that no self-respecting plant could live here. How could I possibly consider something as exalted as a rose?

I'm not sure exactly when I began to doubt this, but it was after I had acquired my second terrace and was still successfully growing a variety of

large trees and shrubs despite the cynicism of suburban nurserymen.

By then, the rose catalogs were coming fast and furiously each spring, and the temptation of these beauties was more than I could stand. I sure wanted to grow them. Well, WHY NOT? I HAD to have a rose!

According to my records, the first one I planted was a bare root climber from a mail order catalog. It grew rapidly the first year, with dozens of healthy leaves and nary a flower. Not realizing that this wasn't the way things had to be, I accepted this non-bloomer fatalistically. At least, I

thought, the plant is alive.

However, not for long.

A dry winter plus a sudden late spring deep frost (after too-early removal of the "protection") mercifully ended my problems with that rose. But I was hooked and on my way. That was several years ago.

My present collection consists of: Don Juan, New Dawn, Blaze, Golden Showers, Margo Koster, Gene Boerner, Woburn Abbey, Jiminy Cricket, Chicago Peace.

And I still garden on a terrace on the 19th floor of an apartment building in the middle of New York City.

My secrets?

First of all, I now use only stock which is already growing in plantable cardboard boxes. These I purchase from local dealers in mid-spring. By then, it is obvious which specimens are in good health, producing abundant leaves with signs of future budding. (I know that dormant bare-root roses are used widely for in-the-ground plantings; however, I found that the "cultural shock" they experienced in being shipped to and then replanted on a mid-city terrace was quite great, and I was forced to spend the entire first summer fussing over most of them if I wanted them to *survive*, much less bloom!) My cardboard purchase is then planted according to the grower's directions in as generous a size tub as I have room for, certainly never less than 15 inches. I mix the tub soil in advance, making sure it is rich in organic matter, friable and light enough to drain well.

Summer pests are kept under control with periodic forceful water hosing or hand cleaning. If greedy hoards get out of hand, I use a soil systemic first and a water-spray insecticide if

that fails (sprays are sometimes hard to handle, given the vicissitudes of terrace winds). A dormant oil in late fall takes care of problems which might overwinter. But in any case, only disease-resistant plants are used, and anything which is continually sickly gets ruthlessly discarded in the fall (Darwin had nothing on me).

I no longer bother with "winter protection," having decided that the varieties I've selected either will be hardy here or they won't. However, I do secure all canes before the strong winds come, and in December I place holiday evergreens on all the tubs (I admit this is "winter consolation" for me more than anything else).

In the spring I cultivate the soil deeply around each plant, working in the dropped evergreen needles, adding superphosphate, compost and lime when soil tests show the pH has slipped too low. This is followed later in the summer by diluted water-soluble commercial fertilizers.

In late fall I turn the soil again, this time adding bone meal and cow manure.

Winter moisture is carefully controlled—which means supplementing what has NOT come from above. My neighbors think I'm nuts when they see me with a watering pail in January, but a light winter rain or snow is totally useless for roses in the limited confines of containers.

My city-bred plants apparently don't mind sharing their tubs with an assortment of small (but compatible) shrubs and flowers. They appear adjusted to their crowded city life and don't know any better—so I don't tell them. From early June through frost, our apartment has dozens of home-grown roses, and last year "Don



Broken flower pots are used to cover drainage holes.



The drainage layer is composed of small rocks and broken pots.



A fibreglass screen helps prevent movement of soil until roots develop.



This rose is planted cardboard box and all as directed on the label.

Juan" was flowering into the first snow.

Well-meaning nurserymen still insist that I musn't grow this and I can't grow that, and maybe they're right.

So I smile politely and do it anyway.

(Ms. Yang is the author of *The Terrace Gardener's Handbook*, Doubleday, 1975.)

Interested in growing Roses? Join the American Rose Society., P.O. Box 30,000, Shreveport, LA. 71130.

*(Part III In A Three Part Series Continued
From the Late Spring and Summer Issues).*

FOOL-PROOF VEGETABLES

Replanting Your Garden.

By late Summer, there should be bare spaces appearing in your garden plot. All of the cool weather vegetables (lettuce, radish) from Spring have long been harvested or shaded out by your warm weather plants (squash, tomatoes, peppers, eggplant). Tucked away in your plot will be spots where you can begin to plant seeds for cool weather crops during the Fall. None of the spaces may be large enough to grow more than a few plants, but by staggering the planting times, you can have production of lettuce and radish right up to killing frost.

Buy seed tapes (a water-soluble plastic which permits handling seed by the yard) to do this planting. This allows you to cut off just enough tape to do the area available. Use a hoe to dig a trench and break open the soil. Place the tape in the trench at the suggested depth, cover and firm with the surrounding soil. Use a hose to moisten the area. Then cover with several layers of newspapers to retard moisture loss. Remove the newspapers as soon as the seedlings begin to emerge. Remove the extra plants to give the remaining ones room to develop. As with the Spring, you should replant other areas to time your plants to be ready for harvest right up to killing frosts.

When to Harvest.

Maximum freshness and taste depend upon when you decide to harvest the plant. Each has different characteristics to look for (listed in table). Most plants cannot be held in the garden very long. They will become fibrous, tough, or rotten. Harvesting at the proper stage will ensure later croppings of fruits, roots, and leaves. This will mean that you must visit the garden every second or third day to gather what has matured. Always pinch the larger fruits, roots, or leaves without injuring the other parts of the plant. This leaves room for the other plants to develop. Break off injured leaves or fruit and put them under the mulch to decompose. This way there is no major clean-up job to do at any

time during the growing season, the plot is always on show.

Prolonging Productivity of Plants.

If you harvest the plants at the proper time, you will prolong their productive season. Continue to water, fertilize and stake the warm weather plants such as tomatoes, peppers, eggplant. Remove some of the side shoots to slow down the vegetative growth and shake the flowers to ensure pollination. On chilly Fall nights, put up a canopy of plastic to protect your vegetables. The sensitivity to chilling of the various plants is listed in table.

Storage of Fresh Produce.

Plants fall into two basic types for storage:

Ones which must be held at 32°F at high humidity (examples: carrot, radish, spinach.)

Ones which must be held at 45-55°F at moderately high humidity (examples: zucchini, eggplant, pepper.)

A perforated polybag will help prolong the storage life by retarding water loss without impeding exchange of oxygen and carbon dioxide. The optimum temperatures, relative humidity, and effective storage times are given in table. These storage times may be very arbitrary. It will depend upon the presence of rot organisms on the surface of the fruits, root, and leaves. Under no circumstances, just pack them up and leave them for extended time. They are always best if used as soon as convenient.

Sharing Vegetables with Friends.

Most gardens produce surplus produce. This is particularly true with tomatoes, peppers, and zucchini. You have the choice of freezing or canning the excess. These operations without training and equipment may not be very satisfactory. The amount of produce available at any time may not warrant all of the effort for just a small batch. Many prefer to share excess with friends, particularly people who have limited growing opportunities because of location, or because they physically cannot maintain a garden. Several tomatoes

or even one pepper or zucchini may be the basis for a whole meal.

Closing the gardening season—Preparing for Winter

When daylength shortens and night temperatures will begin to go down to freezing, the gardening season suddenly ends. You may have a few plants left: cabbage, radishes, even lettuce may survive several light frosts. The high temperature plants such as pepper, tomato, eggplant, and zucchini, will be injured by the first frost. Remove the injured plants, chop them into small pieces with a shovel, and place them underneath the plastic or aluminum foil mulch. The debris will decompose rapidly. By the time of the hard killing frosts, much of the clean up has already been accomplished.

Remove and dispose of all diseased plants. If you

leave them in your garden area this will be the inoculum for next seasons diseases and insects.

Remove all stakes and supports. Clean them and put in dry storage for next year.

Roll up your aluminum foil. Take to a recycling center.

Remove all of the debris from your garden plot. Dig dead plants back into your garden plot along with a 2 inch layer of leaves from your trees—begin now your soil for next seasons crops.

Plans for next year:

What did well?

What was a failure or not worth the space?

What new would you like to try?

What information do I need to do a better job next year?

Vegetable Name	When to harvest	Storage of fresh produce—traditional procedure	Temperature, Relative Humidity (RH), storage time of fresh material
Cabbage	Ready when heads are solid. If left, heads may crack open. Slice head from the stem, discard the rest of the plant.	Harvest entire plant. Hang upside down in a cool place. Cut head out of plant—wrap in paper and store.	32° F, 90-95% RH; 3 to 4 months.
Carrot	Pull the largest carrots—to leave space for smaller ones to grow. Leave plants in ground with a mulch for protection.	Dig, break off tops and store layered in damp sand in a cool place. Moisten sand to prevent drying.	32° F, 90-95% RH; 4 to 5 months.
Eggplant	Harvest when about 4"—glossy purple black. Prolong season by putting canopy over plant.	Store in a cool place—slowly dries out	45°-50° F, 90% RH, not more than 1 week.
Lettuce	Any stage of growth—Head lettuce—cut at soil line—thin larger plants to permit smaller ones to develop.	Perforated polybag in bottom of refrigerator.	32° F, 95% RH; 2 to 3 weeks.
Onion	Remove large plants for salad bowl to permit the other plants to mature 5 inches apart.	In Fall, dig on a summer day and dry tops. Shake off soil, braid by the stems into 12-18 inches long—hang in a dry cool place.	32° F, 65-70% RH; 6 to 8 months wide variation in storage potential of most varieties.
Pepper	Harvest at any stage of development. Remove all fruit to keep plants producing. Shelter with canopy to prolong Fall production.	3 weeks in bottom of refrigerator.	45°-50° F, 90-95% RH; 2 to 3 weeks. Subject to chilling below 45° F.
Radish	Pull when red shoulders appear through the soil. Over-mature radishes are tough and bitter.	Leave in row until ground is frozen. Pull, store in layered damp sand in a cool place.	32° F, 90-95% RH; 3 to 4 weeks.
Spinach—New Zealand	Pick leaves when still expanding—3 inches from tip. Trim back plants to promote growth of side shoots.	Store in bottom of refrigerator in a closed polybag.	32° F, 90-95% RH; 10 to 14 days.
Tomatoes	Pick when fully mature so called vine ripened. Hold in a cool dry place—green tomatoes will ripen over a period of time.	Bottom of refrigerator.	Mature—green/55°-77° F, 85-90% RH; ripen 7-14 days Ripe/45°-50° F, 85-90% RH; 1 week
Zucchini	Pick when the skin is still tender enough to break with a fingernail.	Storage of large (2 ft.) fruit in a cool, dry spot—use up to 4 weeks.	32°-50° F, 90% RH; chilling more than 4 to 5 days causes deterioration.

Lillies Create Interest for Everyone

Donald Wyman, Director Emeritus, Arnold Arboretum

Red King. Cut lilies maintain their freshness for over a week if kept at room temperature.



The colorful lilies are really not hard to grow if a few simple precautions are taken. They are conspicuous in the garden when in bloom and range in color from white to pink, red, yellow, purple and various combinations of those colors. Some are only a foot or so tall; others will grow 5 feet or more in height. We found in our large display garden of 250 varieties, that some were in bloom from June 7 until September, depending on the variety. Some may have only 1-2 flowers per stalk, others like *Lilium davidii macranthum* may have 90. After a careful check one year, in which we kept track of the length of time each variety was interesting in flower, plants of the Butterball Strain came off with highest honors in this category with some flowers on display for a 44 day period. Of course not all varieties will perform that way, the average time in bloom being about 15-20 days, but even at that, if one selects the right species and varieties, one can display them for quite a period.

To me, it is not only the bright colors of these plants that prove interesting, but the ease with which some of them are propagated by the home gardener. They reproduce by seed of course, but the bulbs can be divided, some form small bulbs on the stem above ground (*L. tigrinum*, *bulbiferum*, *sargentiae* and *superbum*), many (though by no means all of them) form small bulbs along the underground stem, and most of them can be propagated by "scaling." This last method is simple, easy and often creates considerable garden interest for any young people in the house.

As one grows older, most forms of gardening are interesting, but to get teen-agers interested is often nearly impossible. I know, because I tried four times! But when they can carefully take a few scales from a bulb, mix them with moist vermiculite and put the mixture in a tightly tied polyethylene bag on the kitchen shelf for a few weeks and see the new young bulblets form at the base of the scales—it is then that they realize (some of them) how interesting growing plants can be. It doesn't take much after that to get the youngsters to plant the new bulbs, watch over them (for a while) and even to weed them. It may just be that a new garden assistant will be in the offing. Anything we can do to help create interest in our young people for growing things is all to the good, and propagating lilies is one of them.

Lilies must have a well drained soil, otherwise they simply will not survive. They are usually planted in the fall, any time up until the ground freezes. It is best to buy only American grown bulbs, and fortunately there are now plenty of these. The reason for this is that if the bulbs are kept in storage too long, or are banged around a lot in shipping, the fleshy roots at the base of the bulb will either be dried up or knocked off. Bulbs get off to the best start with these basal roots intact, the reason why good American growers ship them carefully in

moist sphagnum, peat or excelsior. They should not be allowed to dry out after they have been received, so the sooner they are planted the better they will grow.

Depth of planting depends on the size of the bulb—about 4 inches deep for small bulbs and possibly 6 inches for large bulbs. The larger the bulb, usually the larger the flowers the first year. It is advisable to dust the bulbs with some recommended disinfectant like Arasan, to forestall rot. In fact, bulbs with any rot at all should be discarded. Also, it might help to place a small handful of bone meal in the bottom of the hole at planting time. Mulching with 2 inches of peat moss, wood chips or any other easily obtainable mulch is helpful in aiding the soil to retain moisture and gives the bulb a longer time to get started before the ground freezes.

The majority of the oriental hybrids do best in full sun, and because of their height they are usually placed at the rear of the flower border. Cutting off the flowers as soon as they have faded prevents seed formation and a subsequent drain on the foods stored in the plant, thus aiding better flowering the following year. Cut off the stalks as soon as they have died back in the fall.

Much is written about the virus diseases of lilies, and admittedly this is a hazard to contend with. Buy bulbs from reliable growers with pure stock, keep down the aphid population by spraying, (thus aiding in prevention of the virus spreading from plant to plant) and dig up and discard any plants that show the foliage yellowing which is so characteristic of lilies with virus. My suggestion is to do these things carefully, and first try species or varieties like *L. hansonii*, *dauidii*, Mid Century hybrids and selected clones of *L. tigrinum* and *L. candidum*; that are known to be virus resistant, then enjoy the lilies. There are many others slightly more difficult to grow, that you will want to try later. Remember, however, in the propagation of them, that propagation by seed is safe—virus is not transmitted. Propagation by asexual means—division, bulbils, bulblets and “scaling:” will result in transmitting the virus to the off-spring. Hence only propagate from clean stock, and if virus does get into your stock, start over again with seedlings.

It is home propagation that really creates interest and is well worth trying by everyone, even if to grow a few young plantlets to give away to friends. Dry the seed from a mature seed capsule for several days until it is thoroughly dried. Then mix it with a small amount of moist, but not wet, vermiculite, and put in a tightly bound polyethylene bag on a dark kitchen shelf. After several weeks look at it. If nothing has happened, and the material is still moist, replace it on the shelf again. Sooner or later the seeds of certain quickly germinating species or their varieties or hybrids like *L. amabile*, *concolor*, *dauidii*, *pumilum*, *regale*, *tigrinum*, and the



L. hansonii, a smaller flowering species variety.

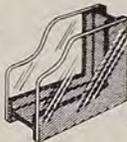
Mid Century will show small rootlets.

Note, however, that seed of certain species like *L. aurantum*, *canadense*, *martagon*, *speciosum*, *superbum* and others, is slow to germinate and may take 3-18 months. If the seed germinates before it can be sown out of doors, put back into the vermiculite in the polyethylene bag and keep in the home refrigerator (not the freezer) for 3-4 months, then sow.

“Scaling”, is interesting and profitable. In the early fall, dig carefully around a lily bulb, remove a few of the large outer scales without disturbing the bulb, place them in moist (but not wet) vermiculite in a polyethylene bag placed on a dark kitchen shelf at room temperature. After 3-4 weeks small bulblets will develop at the base of the scales, shortly sending out roots and even a leaf or two. When the roots are a half an inch long, the scales can be planted with just the tip above the soil, or if too early to be planted outside, the bag can be placed in the home refrigerator (not the freezer) and kept for weeks or even 3 months until the scales can be planted outside.

So, by this method you can increase your supply of bulbs and have some for gifts to friends. If there are teenagers in your household, see if you can sell them this as their very own project. It may bear results.

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Fall Friends Events Planned

The Friends of River Farm Committee has planned a "Fall Friends Day" for October 12, 1975. There will be many unique and exciting horticultural demonstrations (among them "Indoor Vegetable Gardening for Winter"), a rare plant exhibit and sale. More details in September "News and Views."

Proceeds from the successful May 4th Friends Day are being used to repair, restore and paint several deteriorating outside balconies and balustrades as a first step in the complete exterior renovation of the River Farm house.

The Committee also voted to mount, pad and back the needlepoint window seat covers for use in the ballroom. For the past six months, nine committee members have been hand-stitching the 1' x 4' Floral design containing the official emblems of all U. S. Plant Societies. Mrs. Erastus Corning II estimates that each seat cover represents four hours labor a day for six months, or a total of 720 hours.

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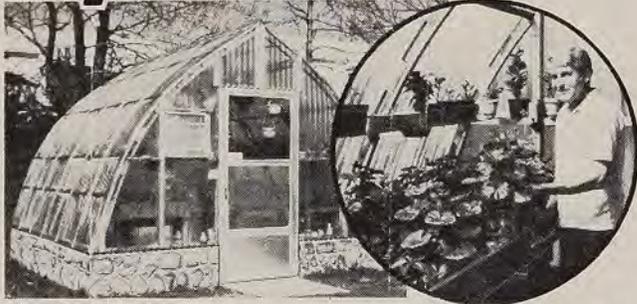
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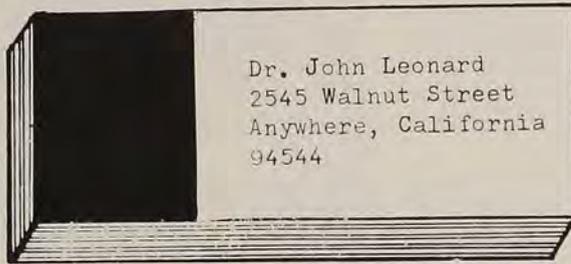
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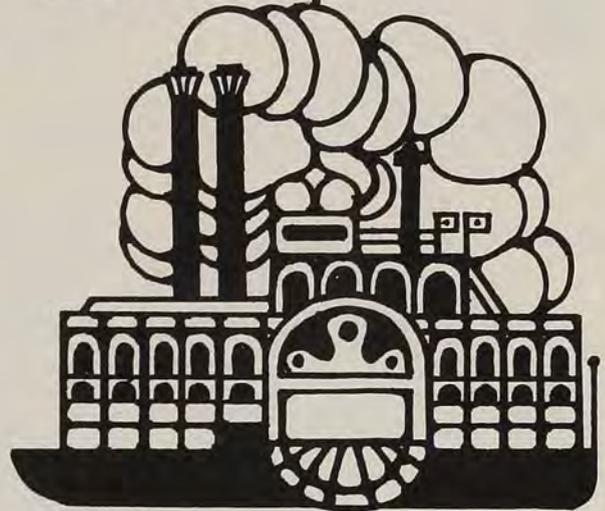


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Azaleas, camellias, Confederate jasmine, and spring wild flowers are expected to be at the height of their bloom the week of the tour.

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The trip (including *Delta Queen* passage, meals, tipping and admission fees to gardens and houses) will cost a maximum of \$740 for a single cabin with private facilities and a minimum of \$560 per person for a two-berth cabin with private bath *plus* for all passengers a tax deductible contribution of \$100 per person to The New York Botanical Garden.

If you would like to be on the mailing list to receive the *Delta Queen* Botanical Boat Trip announcement and reservation forms when these are mailed in September of 1975, please complete the coupon below.

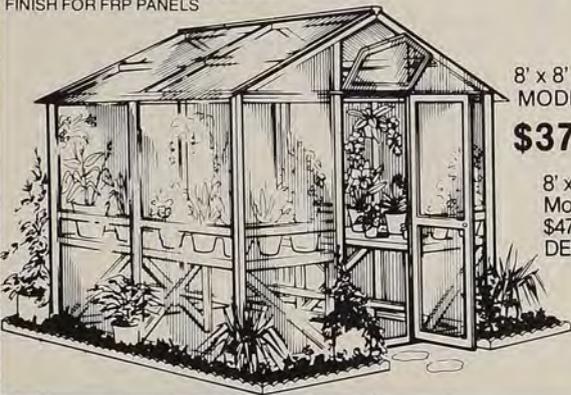
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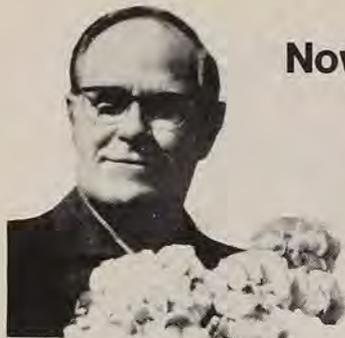
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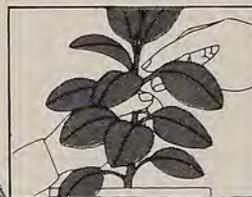
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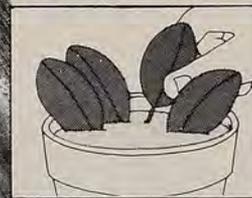
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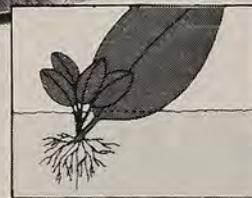
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Fleshy-leaved house plants such as peperomias and crasculas can be multiplied by snapping off single leaves. Choose healthy, medium-sized leaves, removing them at the points where they meet the stem.



Insert the stem of each leaf at an angle into equal parts of moistened peat moss and sharp sand; bury one edge of the leaf to support it. Angled planting keeps the leaf from shading new growth when it appears.



Set the pot in bright indirect light until the new leaves are about one third the size of the parent. Then gently lift and separate the old growth from the new and transplant the shoots to potting mixture.

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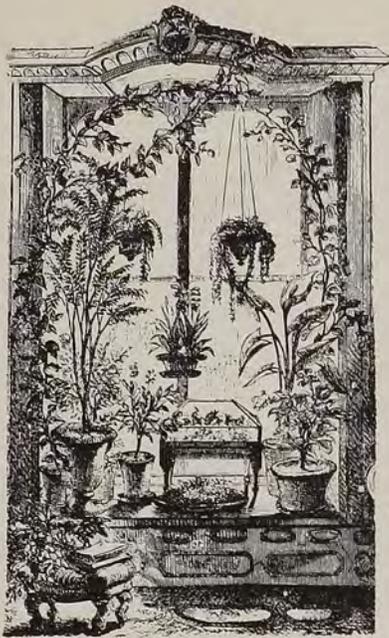
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