



American  
**Horticulturist**

*Volume 56 Number 1 Late Winter, 1977*

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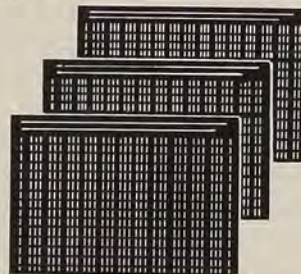
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# An Editorial

## The Critical Mass

By early 1977 the American Horticultural Society will have enrolled more than 30,000 active members. This achievement can be attributed to many factors including leadership from our Board, Staff and Consultants. It also means that you are responding to the recent changes in our publications and services which have been made to meet the needs of our members.

The renewals of our first year members have increased from 48% to more than 70%. It means that many people are seeking information to become better gardeners and wish to be identified as members of a national organization of horticulture, open to all who are interested.

Last summer we mailed a survey to our members. It was designed to help us guide AHS to meet your needs and interests. It contained 22 sections and required 15 minutes to complete. All individual information was confidential. By early fall we received over 9,000 replies. We have recently tabulated and analyzed the response. In brief, our members rate their gardening abilities as 36% amateur, 53% advanced amateur, and 11% professional. The major areas of gardening interest were flowers, trees and shrubs, indoor plants and vegetables. Overwhelmingly, 82% of our members feel that the writing style of the *American Horticulturist* is just right. 8% said it was too technical, while 10% said it was too elementary. 73% rated as excellent the photos, art and graphics. Remarkably, 80% of our members keep their copies of *American Horticulturist* indefinitely. The majority also gave an excellent rating to our *News & Views* and our seed distribution service.

These responses indicate that AHS and its purposes are greatly valued and appreciated by our members. If this is true—I urge you to help us develop and promote a grass roots membership in AHS. If every member can help us find a new member—AHS can finally reach its critical mass.

The critical mass is the number of members that can help us sustain our member services and expand the number of pages in our full color publication to bring more "how to" gardening information.

Please use the membership forms provided and help AHS reach as many potential gardeners as possible. You can be of service to your Society while at the same time being a friend to the environment.

Dr. Henry M. Cathey,  
President

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American

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## An Editorial

- 2 The Critical Mass—Henry M. Cathey

## Education

- 14 Home-Grown Orchids—Paul B. Moore
- 4 Proper Tree Planting—Mother It While It's Young—Tom Stevenson
- 22 The Sequoiadendron Story—Audrey Teasdale
- 10 A Refresher for Gardeners—Milestones for Seedlings—Henry M. Cathey

## Gardener's Notebook

- 26 Portable Plants for your Patio and Pad—S. Scott Roberts
- 19 Bush Fruits—D. K. Ourecky
- 34 For a Pleasant Surprise, "Neglect" Your Amaryllis—O. Hobart Mowrer
- 31 The Harbingers—Lorraine Marshall Burgess

## Commentary

- 36 The Worth of Gardening—R. Milton Carleton
- 32 Seed Packets Can Be Wrong—R. Milton Carleton

## My Favorite Plant

- 6 Begonia Exotics—Carrie E. Karegeannes

COVER PHOTO BY: Steve Tjosvold—The gnarled, fire-resistant bark of the giant Sequoiadendron.

# Proper Tree Planting

## Mother It While It's Young

By Tom Stevenson



A shade tree is one of the most important plants in a home landscape. Properly placed, in time to come it can reduce the roof temperature 20 to 40 degrees during the summer. When winter approaches, it drops its leaves permitting the sun to shine through.

One of the best times to plant a tree is early spring just before new growth starts.

Unfortunately, when trees six feet

often stand still for months or even a year or two, making little or no growth. This need not be. There are ways to make young trees grow much faster than they usually do.

First of all, make sure there is good drainage where you plant the tree. The importance of air, or more specifically oxygen, to the roots cannot be overestimated. Roots respire (use oxygen) just as the above ground portion of the plant does. When the oxygen supply to the roots

is cut off, as it is in water-logged soil, the roots die or are severely damaged. Dig a hole about three feet deep and fill it with water. If the water is still there 12 hours later, drainage is inadequate.

Shallow soils, less than 30 inches, underlain with hardpan (an impervious layer of clay) should have holes drilled through the hardpan to allow for drainage. The hole through the hardpan should be filled with coarse sand (0.5 millimeters) or gravel, according to Dr. Richard W. Harris, University of California horticulturist, who has done considerable research in this field.

For such drain holes to be effective, strata under the hardpan must be permeable. After the soil has been repeatedly wetted, water in the hole should have moved down at least a quarter inch or more per hour. Otherwise, there is little value in such drain holes.

In soils that have a good structure, the planting hole need only be deep enough to take the root ball of the plant, Dr. Harris says. The plant should be high (1 to 2 inches above the soil level) in all but sandy soils. Loose soil in the bottom of the hole will settle, causing the plant to be deeper than intended. If that happens, crown rot may occur in all but the best-drained soils. In most cases, the hole should be backfilled with the original soil, unless it is undesirable.

Fertilizer should not be placed in the planting hole or mixed with the backfill soil. Most plants will grow well the first part of all of the first growing season without additional fertilizer.

Research by Dr. Harold Pellett, University of Minnesota superintendent of horticultural research, showed that adding organic matter to the soil used to fill the hole did not produce more growth.

Dr. Carl E. Whitcomb, Oklahoma State University horticulturist, found during tests that adding peat to the soil did no good at all, in fact

in some cases was detrimental.

The roots of container-grown plants that are matted at the bottom or circling around the outside of the root ball should be loosened, cut and removed, Dr. Harris says. In freeing the roots at the periphery of the root ball, some of the soil should be broken away to provide better contact between the root ball and the fill soil. Dr. Francis R. Gouin, University of Maryland ornamental horticulturist, says he has been preaching the same thing for the past 10 years.

If the tree is planted on the lawn, eliminate grass from a circle, 10 to 12 feet in diameter, around the tree. In order for the tree roots to grow and increase in length, they would have to invade soil already occupied by grass roots. There would be competition for space, moisture and nutrients. At the outset, the tree roots would be at a disadvantage. The grass roots are well developed and able to hold their own for a year or two.

Studies have shown that the growth of a newly planted tree can be very much increased by eliminating the competition of the grass roots. The first three growing seasons are the most important. After that the tree roots should be well enough established to compete successfully with the grass.

Nor should weeds be allowed to compete with the tree. Pull them when they are small. A mulch of shredded bark, wood chips or ornamental gravel will help keep weeds down and also conserve moisture.

Don't prune the young tree any more than necessary the first few years after it has been planted. A young tree left completely unpruned, except for the removal of dead wood, will grow faster than if it is pruned at any time by any method. Even the leaves that grow along the trunk help produce food for the tree.

Of course, if the tree was planted bare-root or if the roots were damaged in any way, some pruning of

the top should be done to compensate for it.

Don't spade or do any other form of cultivation near the young tree after it has been planted. It would likely cause injury to the root system.

The incorrect recommendation of digging in fertilizer around the young trees should never be followed, according to Dr. Whitcomb. His studies have shown that surface applications (with a lawn spreader) are superior to other methods, he says.

Young trees can be fertilized every year unless the soil is so rich it is unnecessary. When they are making less than 4 to 6 inches of twig growth and the foliage is thin, they should be fertilized.

The slow-growing kinds, such as oaks and some maples can be stimulated by fertilization to grow almost as fast as the so-called faster-growing ones such as silver maple, box elder and ailanthus.

The newly planted tree should be watered regularly during the first three or four summers when there is less than an inch of rainfall during the week. It will take that long for it to establish a root system adequate to carry it through a period of dry weather. Drought can cause considerable damage to the tree's small feeding roots. If damage is severe, the tree may die with no help from insects or diseases. However, it is common for bark beetles to attack weakened trees. Also, scale insects can become a serious problem.

Unfortunately, most light rains which fall during the growing season do not provide adequate water, says Dr. Theodore Kozlowski, University of Wisconsin professor of silviculture. Some of the rainfall is intercepted by the tree crown and the remainder wets only the surface layer of soil.

With normal rainfall established trees can obtain an adequate supply of water from the soil, says Dr. Dan Neely, Illinois Natural History Survey plant pathologist. But newly planted trees and some shrubs may

need two or three years to develop an adequate root system.

The young tree should not be staked unless it is top-heavy and likely to be toppled over unless given support, says Dr. Harris. A young tree standing alone with its top free to move usually becomes a strong tree better able to withstand the elements.

Usually it is not a good idea to go into a forest and dig a tree to plant at home, according to Dr. D. G. Nielsen, Ohio Agricultural Research and Development Center entomologist. A forest tree transplanted to the hostile environment of polluted air, high velocity wind currents, insufficient light and water, and extreme temperature fluctuations of the city will be much more susceptible to attack by insects that would not normally bother it in the woods, he says.

For example, in the forest the bronze birch borer prefers mature trees or those in poor health. Actually, the insect provides a service to the forest by weeding out sick and old trees to allow more room for young healthy ones. In the city the birch borer will attack apparently young healthy trees. These trees are probably suffering from water stress in their foreign surroundings which make them more vulnerable to their insect enemies. Insects will attack a stressed tree in the urban environment just as they will a sick or old tree in the forest.

Just because a particular insect feeds on a tree or shrub does not necessarily make it a damaging pest. Most insects are harmless and some are even beneficial in their relationship with trees. The problem is knowing when the insect population will change from harmless to destructive.

Defoliating insects attacking in late summer are unlikely to threaten the survival of deciduous hardwoods. Forty per cent or less defoliation evenly distributed throughout a tree canopy is not normally considered too harmful to a well-established plant.

# Begonia Exotics

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Some of the rare and beautiful members of the genus *Begonia* were once beyond the hopes of the home grower unless he had a carefully controlled, heated greenhouse. Many wild species with vividly patterned and textured foliage are highly sensitive to humidity and temperature changes and require special cultivation practices. Numerous discoveries—from the subtropics of Central and South America, Africa, and Asia—have never been cultivated, remaining but dried specimens in museum herbaria.

Terrariums are changing all this.

With the present popularity of growing in enclosed containers, now widely available in many shapes and sizes, exotic and once difficult plants of many kinds are within the scope of the average hobbyist. The addition of fluorescent lights makes culture even easier. In terrariums, nearly perfect humidity and light conditions may be achieved with little effort or attention.

Still difficult is the unusual "Grass Begonia," *Begonia bogneri*—recognized as a begonia only because the discoverer, Joseph Bogner, was at eye level with the tiny pink flowers as he reached for a clump of "grass" to pull himself up a bank in Madagascar. Its thick ribbon leaves, 6 inches long by only 3/16 inch wide, would not have been identified.



Begonia 'Exotica'

A vibrant, metallic-red-leaved New Guinea species, provisionally called *B. 'Exotica'*, tends to grow too tall to be easily kept confined within containers. But hobbyists do grow these and many others today, in small bowls, large plastic globes, and recycled fish tanks. A recent magazine gave instructions for installing a second wall of glass a short distance inside a window wall to form an overgrown version of the Wardian case, early forerunner of our terrariums. Miniature rex cultivars appear in flower shows in landscaped candy jars. A small fish

bowl brims with the tiny yellow flowers of *B. prismatocarpa* under an office desk lamp.

The unidentified species going under the name *B. 'Exotica'* was found at the Baiyer River in warm, humid Papua, New Guinea, by J. S. Womersley and A. G. Floyd in 1954. It was grown in the Botanic Garden in Lae and distributed to botanic gardens throughout the world, but then largely dropped from cultivation in New Guinea. Attempts to find it again at the Baiyer River failed. (On occasion, it is the hobbyists who preserve species in cultivation!)

*B. 'Exotica'* grows on erect, canelike stems to 3 or 4 feet tall, carrying large (5 x 7 inches or more), obliquely ovate, corrugated leaves of shining olive green splashed with iridescent purplish red. The flowers are pink with short hairs on the backs, but the foliage outshines them. Stem-tip cuttings root readily in sphagnum or other porous mix in a terrarium or clear plastic box. Supplementary lighting is essential.

Sometimes cutting 'Exotica' stems too much may cause the plant to "melt" away to the roots. First new leaves may be silver and green, with the later leaves showing the brilliant red.

The dainty, tiny-leaved creeper *Begonia prismatocarpa* was discovered by Gustav Mann in Fernando





Po, Tropical Africa, before 1859. Sir William Hooker, Director of the Royal Botanical Gardens at Kew, England, published a hand-colored illustration in *Curtis's Botanical Magazine* in 1862, showing the crisply lobed leaves and the two-petaled golden yellow flowers tinged with orange streaks, but he found it "small and insignificant". It was not widely known over the years, but has now come into its own as terrariums lift it to decorative positions in our living rooms.

Grown with other plants, *B. prismatocarpa* needs frequent pinching back to keep it from taking over. Alone, it will spread to fill a large container but can be held to a small one, needing almost no care if the terrarium is closed. It blooms almost continually with filtered or artificial light. Leaves that drop will often root beside the parent plant similar to tip cuttings inserted in planting mix. Older, spreading plants may be divided.

Begonias have separate male and female flowers, usually in the same flower cluster, although the male flowers often drop before the female buds open. The seed capsule carried below the female petals (or tepals, as both petals and similar sepals are called botanically in the genus *Begonia*) is most often three-winged, but *B. prismatocarpa* and others of the African section *Loasibegonia* have odd linear, four-angled capsules.

In 1973 Michael Kartuz of Wilmingtongton, Massachusetts, pollinated *B. prismatocarpa* with pollen of *B. ficicola*, a larger African species. He registered *B. 'Buttercup'* in 1975. The hybrid is smaller (leaves 2 by 3 inches) and more free flowering than *B. ficicola* but has *ficicola's* curious bullate and peltate bright green leaves. The flowers are larger than those of *B. prismatocarpa*—chrome yellow striped in red—and appear throughout the year. 'Buttercup' is more tolerant of open air than either parent, but is still best as a terrarium plant.

A gem that demands a terrarium is the richly glowing, plush-leaved *B. versicolor*, a species from Yunnan Province in China, first described in 1939. Leslie Woodriff of California, who imported it to the United States in 1951, called it 'Fairy Carpet' before the botanical name was identified. Green, rounded, 4-inch leaves, growing from a creeping rhizome, are maroon at the veins and shade to light green with silver on raised "bumps" between the veins. If the plant is grown in less light, the maroon changes to dark green. Red hairs thickly cover leaves and petiole, catching the light as velvet does when the plant is turned and softening the rough texture given by the small pustules at the base of the hairs. The small, light pink flowers with red hairs on the backs are held just above the mound of leaves and appear over a long period. Still, the foliage is its main attraction.



A hybrid of *B. versicolor* and *B. masoniana* (the "Iron Cross Begonia" of florists) was registered in 1971 by Leo W. Porter. Porter's *B. 'Wanda'* is a little more tolerant of changing conditions than is the species parent *versicolor*, but does best in a terrarium or humid greenhouse. It strongly resembles *B. versicolor*, but its wavy 6- by 8-inch leaves are more silvery, with green rather than maroon on the veins. Its flowers are a little brighter, larger and held a bit higher. Both the species and the cultivar easily make large handsome mounds in closed globes. They can wilt with alarming rapidity if permitted to dry, but will recover if found and watered soon. Leaf cuttings root quickly when kept en-

closed; insert the petiole at an angle in light mix or unmilled sphagnum. Rhizome tip cuttings will also produce new plants, as with other rhizomatous begonias.

Another Far Eastern novelty, *B. rajah* from the Malay Peninsula, was grown before 1900; it took a first class certificate at the English Royal Horticultural Society in 1894 after blooming in the Singapore Botanic Gardens in 1892. By the 1940's, however, *B. rajah* seemed to have dropped from cultivation. Sought after because of its puckered, glossy, bronze-to-maroon leaves marked by pale yellow-green veins, the rhizomatous species was difficult to grow in home conditions. Reintroduced into the United States in the 1960's, the rare plant has again become popular, easily grown in a terrarium. A handsome show plant can fill a globe 3 feet across with large leaves, but with shallow planting and less fertilizer *B. rajah* can be held to an 8-inch brandy snifter for two years or so. Leaf cuttings will provide new plantlets for temporary use in miniature landscapes. Small pink flowers appear from time to time during the year.

*B. 'Emerald Jewell'* and *B. 'Silver Jewell'*—small, compact, velvety-leaved hybrids of the Mexican species *B. imperialis* and *B. pustulata*—are less demanding of warmth and humidity than their parents, but all four are favorites for terrariums.

*B. imperialis* is a low, rhizomatous species with brownish, "pebbled", heart-shaped leaves covered in velvet and veined in emerald green. It was introduced to Belgium in 1859 and described as a greenhouse plant. Several natural varieties are known—varying in leaf color—and it has been used extensively in hybridizing through the years. Many of the distinctive hybrids withstand less than perfect conditions. Others have disappeared.

*B. pustulata*, discovered in 1853, is similar to *imperialis*, but its leaves have larger pustules and less hair.

Nile-green leaves of *B. pustulata* variety *argentea* are feather-patterned with silvery white along the veins. Both Mexican species carry small white flowers above the leaves part of the year—two-petaled on *imperialis* and three- and four-petaled on *pustulata*—but the plants are grown for the beauty of their foliage.

The 'Jewell' cultivars were developed in 1955 by Susie Zug in California and registered in 1958. Both inherited the soft glamor of *B. imperialis* and versions of the *B. pustulata* silver pattern. The 3- by 4-inch leaves of 'Emerald Jewell' are vivid green between veins overlaid with silver. 'Silver Jewell' leaves are silver blotched with green.

A more recent hybrid, *B. 'Brown Eyes'* (*B. 'Norah Bedson'* x *B. imperialis*, by Woodriff), won the American Begonia Society award for best new introduction in 1973. 'Brown Eyes' is a miniature with textured, silvery green leaves marked with brownish purple spiderweb tracery between the veins.

Mexico has also given the distinctive miniature *B. bowerae* var. *nigramarga*, one of a group of *B. bowerae* ("Eyelash Begonia") varieties and hybrids. Many *bowerae* hybrids—all carrying "eyelashes", or cilia, on their leaf margins—have grown on windowsills for years, but the species and wild varieties require high humidity (while preferring drier soil than many). Low, creeping plants with small leaves, they fit well into terrariums. They are usually small plants, but are sometimes encouraged to develop and spread to large mounds of little leaves.

The variety *nigramarga* was discovered by Thomas MacDougall in 1955. It was officially named by Rudolf Zieshenne in 1973, although it had been grown by begonia fanciers for some years before that. The variety is similar to *B. bowerae* itself except that the 1½-inch bright green leaves have longer white cilia and broad bands of black along the veins, instead of small blotches on the edges. The black areas expand when the plant is

grown in less light.

Hybrids of *B. bowerae* var. *nigramarga* tend to produce larger, huskier versions of *nigramarga*. *B. 'Robert L. Shatzer'* may show more bright green and possibly is a little more delicate than the robust *B. 'Elaine Wilkerson'*, but both have the black markings and green "window panes" on larger leaves. Both grow well in the living room, without a terrarium. All the group lift showers of small pink or white blossoms above the foliage in late winter or early spring. 'Elaine Wilkerson' is less insistent on the 12 hours of darkness that many winter bloomers require to set buds.

Begonias in the wild often grow in leaf mold and humus collected in crotches of trees or clefts of rocks, in moist and sheltered sites. Shallow roots ramble through the light, well-drained medium. And the begonias described here need a light, porous planting mix, or even straight unmilled sphagnum, with drainage provided by coarse material underneath (perlite, gravel, charcoal, or a mixture, works well). The medium should be just moist, not dry, yet not soggy wet. In soilless mixes, frequent feeding with very dilute fertilizer solution is best. Sterilized leaf mold offers some nutrition and feedings need not be as frequent. Many growers use sphagnum and feed very weak solutions with each watering. If you are holding the plant to a small size, feed less.

Most of the exotics do not like direct sun except early and late in the day. All are excellent under fluorescent tubes, whether in a basement plant room or spotlighting a formerly dark corner of the living room.

Small plants are obtainable from houseplant specialists, and seed is offered for many species in the Seed Fund of the American Begonia Society. The monthly ABS publication, the *Begonian* (memberships: Jacqueline Garinger, 8302 Kittyhawk Avenue, Los Angeles, CA 90045) offers additional information.



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# A Refresher for Gardeners

## Milestones for Seedlings

*Prepared by Dr. Henry M. Cathey*

The outdoor gardening season is some weeks away. Hopefully, your seed orders have arrived and you are waiting to begin your planting activities. To me, growing plants from seed is the most rewarding experience of the gardening year. One has the opportunity to introduce to the garden the newest and best types of all kinds of plants at a minimum of expense. To be successful, however, requires that you plan your spring planting activities carefully. When proper steps are taken, you will be assured that the plants will be ready to give their maximum productivity of flowers, fruits and foliage.

### **Milestones—Seed to Seedling**

**Seed**—Seeds offered to gardeners have been subjected to a series of steps to insure high germination percentages and seedling vigor. Most fresh seeds should be held at room temperature for 6 to 12 weeks after receipt to allow the necessary chemical changes to take place for proper germination. Your seeds should be stored dry in a cool (50°F) area. It is advisable to seal seed in a polyethylene bag or canning jar to prevent drying. Be sure to record the date that you received the seed. Most of the common garden seed may be stored up to 3 years and still produce viable plants. To avoid the storage problems, I prefer to use fresh seed each year. This also permits the introduction of new varieties each year.

**Seed treatments**—We should assume that the surface of the seed coat carries disease organisms. For many years we used trace amounts of organic mercury to control seed diseases. These products are no longer available. Look for a fine

coating of a dust; it is most likely thiram (Arasan 75%), the most widely used protectant.

If you have had trouble germinating seeds, you should consider treating them in 125°F water for 30 minutes. This may be the only way to get some seed to sprout.

**Media**—You can use the same growing media to germinate most seeds. It should be sterile, porous, low in nutrients, near neutral in pH. It has to be only 1 to 2 inches in depth. I do not recommend that you consider using your own garden soil—its structure, latent diseases and pests, and lack of standardization will greatly complicate growing. Consider purchasing a small bag of artificial growing media. This consists of equal parts peat and vermiculite (or perlite) with limestone and nutrients added. Also available are pellets, sticks and trays, which can be activated by placing them in warm (100°F) water. Prepare all growing media by adding water until fully saturated. Allow any excess water to drain away. Let the soil stand several hours prior to planting.

**Containers**—Sanitation is essential to maintain a sterile condition during the germination process. We most commonly forget to clean plant containers. Select any type of container which is rigid and does not rot rapidly—egg cartons, packing from fast food stores and cosmetics. Chipped dishes can also be used. Wash in warm, soapy water, followed by a rinse in a 20% bleach solution to disinfect all surfaces. Scrub all surfaces in the growing area and maintain routine sanitation procedures throughout the growing operation. To protect furnishings, con-

tainers should be placed in waterproof trays or polyethylene-lined surfaces. Water should not be allowed to remain in the trays; excess water they collect should be discarded. If collected water remains, green algae soon will cover all surfaces and interrupt drainage.

**Planting**—Seedlings require only 1 to 2 inches of growing media for germination. A layer of drainage material is not required in shallow containers. Fill with growing media to a depth of 2 inches. Water with a sprinkler and press surface level with a 3" x 5" block of wood to remove air pockets. For small lots (50 seeds or less) plant in rows, placing the seed uniformly along the row. The seed should be spaced so that there is room for about 3 to 4 seeds in between each seed you plant. Place them uniformly over the surface to insure equal space for development. For large lots of seed (over 50 seeds) I prefer to broadcast the seed over the surface of the container. Again, space the seed to give plenty of room for development. Use the block of wood to press the seed gently to the surface of the growing media. Fine seed, ones which are impossible to pick up individually, are generally light-requiring and must be left uncovered during the germination process. Seeds which you can handle individually should be covered to a depth of their own diameter. Use the moistened growing media to cover large seed. After planting, containers should again be watered to moisten the seed and to settle them into position. Allow excess water to drain, and put the planted container in a sterile, clear polyethylene bag. Place it at the temperature listed (Table I) for the



Use sterile containers and planting medium—soil or vermiculite.



Place the seeded container in a polyethylene bag and keep it in a warm place until the seeds germinate. Then remove the bag and begin watering and fertilizing the seedlings.



Seedlings, 8 weeks old, ready to be transplanted to the garden. Note roots growing through the walls of the peat pot.



Using a knife blade, carefully lift seedlings from the planting container.

number of days suggested for the germination process. No additional water should be necessary during germination.

**Light and temperature for seed germination**—A substantial listing of the major vegetable, flower, foliage and herbs was published in the Volume 54 No. 2 Late Spring 1975 issue of the *American Horticulturist*. Table I lists only a few of the plants grown from seed. The light should be provided by widely available 40-watt, cool white or warm white fluorescent lamps. Place the seeded containers about 9-12 inches away from the fluorescent lamps for about 12-16 hours daily. Light-requiring seeds are marked with L; D designates seed requiring absolute darkness—these seeds should be covered with black plastic. DL

means that the presence or absence of light has no detectable effects on the germination of the seed. Control the duration with an inexpensive 24-hr. timer. Use a soil thermometer to monitor the preferred temperature. An environment which is too warm will produce spindly seedlings. A cool environment produces slow-growing seedlings which are easily over-watered. The preferred light and temperature conditions will produce compact top growth, sturdy stems, and well-branched root systems.

**Water and fertilizer**—Water at frequent intervals to maintain adequate hydration. Never leave containers standing in a tray of water. I add a complete liquid fertilizer to the water (a fifth of the recommended amount for houseplants)

and fertilize every time I water.

**Sanitation**—Seedlings in the germination process are sensitive to many diseases and pests. It is essential for you to maintain air movement through the growing space to dry surfaces and dissipate excess heat. You should:

- Sterilize the exterior of your containers at frequent intervals—scrub down with dilute bleach every few weeks.
- Keep growing media sealed in a polyethylene bag.
- Hang watering hose off the ground and never allow the tip to touch the floor.
- Wash hands prior to handling plants. Never walk on growing areas.
- Keep animals out of growing areas.

**Frost-Free Planting Dates for the Continental U.S.**



- Separate seedlings from mature plants. Discard any plants with problems.

- Drench growing media with a broad spectrum fungicide if problems develop. Many seed houses offer benomyl (benlate) for use as a drench.

**Seed to Seedling**—The preferred temperature for growing the seedlings from germination to transplanting is generally 10 to 15 degrees cooler than required for prompt and uniform germination. The preferred night temperatures and the weeks to transplanting are listed in Table I.

**Transplanting**—The seedling must be sufficiently developed to withstand the transplanting process. I find that transplanting is best accomplished when the first true leaves (deeply lobed, shaped like a

feather or long and strap-shaped) begin to emerge. This means that the stem (hypocotyl) is completely developed and the lateral roots are beginning to form. Allow the growing media to dry somewhat to permit the lifting of individual seedlings. Dig only the seedlings you can transplant within 10 minutes. Seedlings wilt rapidly at this stage of growth. Use the same growing media as you used for planting the seed. Fill containers (plastic, clay, fiber, mesh, film) within ¼ inch of the top. Thoroughly saturate the growing media with water. Level and firm the soil into place. Use a pencil or planting tool to make a pointed hole in the center of each container. Place one seedling in each hole. Thoroughly cover the root system and support the stem base with soil. Water thoroughly and

allow excess water to drain away.

**Growing on to Planting**—Continue the cultural procedures outlined previously. The preferred temperature should be similar to the seedling growth stage. Reduce watering frequency (but not the amount of water) to maintain compact seedling growth. Follow suggestions in Table I. It tells how long it will take from transplanting to when the seedlings will be ready for planting in the ground or in containers. You should plan to have your plants ready to go into the garden as soon after the last killing frost as possible.

**Next Issues:**

**April**—Milestones—Seedling to Terrestrial Gardening

**June**—Milestones—Seedling to Portable Gardening

**Table I: Milestones for Seedlings**

Species	Night temp. for seed germination (°F)	Days to germinate	Night temp. for seedling growth (°F)	Weeks to transplanting	Night temp. for plant growth (°F)	Weeks to bloom (or planting)	Weeks for crop time
Ageratum	70-L	5	60	4	60	6-7	10-11
Alyssum	70-DL	5	55	4	50	5	9
Aster	70-DL	8	60	3	60	4	7
Balsam	70-DL	8	60	3	65	4	7
Begonia (fibrous rooted)	70-L	15	70	8	70	6	14
Browallia	70-L	15	60	4-5	65	11	15-16
Cabbage	68-86	3-10	55	2½	55	3	5½
Celosia	70-DL	10	65	4	65	5	9
Coleus	65-L	10	60	3	60	5	8
Dahlia	70-DL	5	55	3	65	5	8
Eggplant	68-86	7-14	55	2½	65	4	8
Geranium	70-DL	5	60	2-3	60	13	15-17
Marigold	70-DL	5	60	3	65	7	10
Nierembergia	70-DL	15	55	5-6	60	9	14-15
Onion	68	6-10	45	—	50	11	11
Pepper	68-86	6-14	65	3	65	4	7
Petunia	70-L	10	60	4	60	7	11
Portulaca	70-D	10	60	6	60	7	13
Salvia	70-L	15	60	3	65	6	9
Snapdragon	65-L	10	50	4	50	5	9
Tomato	68-86	5-14	65	3	65	3	6
Verbena	65-D	20	60	4	65	6	10
Vinca rosea	70-D	15	70	5	75	8	13
Zinnia	70-DL	5	60	3	65	2	5

# HOME GROWN ORCHIDS

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Orchids are well on their way to becoming one of the most popular houseplants. Their ease of culture, their great variety of shapes and colors and long-lasting quality of flowers provide the characteristics demanded of good houseplants.

Yet they did not start out in this fashion! During the height of the orchid craze in Europe in the 1800's, wealthy aristocracy vied with each other to pay small fortunes for the newest or rarest plants. The horticultural annals of that period reveal the number of greenhouses built on vast estates, just to house this exotic flower. Hundreds, even thousands, of dollars were not uncommon for prize specimens, and only through a literal tidal wave of species wrenched from the jungles of Central and South America and from Asia and the Philippines, did the price slowly begin to subside at the turn of the century.

The vast increase of the orchid hobbyists today, a multi-million dollar industry in the United States alone, is largely the result of efforts of several 19th century "orchid hunters" who spent months deep in the jungles of New Guinea or scaling the cold heights of South American mountain ranges. Vast areas were combed of every available orchid plant. Today, most enlightened countries maintain a strict control over the exportation of their natural heritage. Yet, without this exportation of orchids during the late 19th century, it is doubtful whether orchids would have achieved the heights of popularity they now enjoy.

With the introduction of the first orchid hybrid in 1856, *Calanthe dominii*, the pressure began to lift from species. The infinite possibilities of color and form presented by the hybridizer's toothpick had by the early 1900's focused the world's attention on hybrids.



Unusual new phalaenopsis hybrid of *P.gersanii* X *P.'Ella Freed.'*





*Odontida* 'Red Knight' was grown under a greenhouse bench with Wide Spectrum Gro-Lux.



*Cypripedium*-'Golden Acres Margaret Ann.'



*Masdevallia caudata* is a miniature that will survive under fluorescent lights.



*Cattleya* 'Potinar'

While interest in orchid species is still strong, the majority of orchids grown are hybrids. The continual interbreeding of the various species and their resulting progeny has, to a large extent, subdued many of the cultural quirks of the parent species, and hybrids are grown virtually under all conditions.

### Greenhouse Culture

A greenhouse environment is probably the most suitable for orchids, because the creation and maintenance of different climatic zones is easier than on a windowsill or under fluorescent lights. The choice of greenhouse is largely up to individual taste. Great strides have been made in recent years, and, while fiberglass is still second in popularity to glass, it has proven an economical and satisfactory alternative in many cases.

### Light Intensity

Orchids have somewhat erroneously been considered light-demanding plants. This legendary quality no doubt arose from misconceptions of the nature of the tropics in which they grew. A north-south axis, in which the sun travels across the entire length from east to west, affords the maximum light potential and hence the maximum number of different types of orchids. Light can always be reduced through shading and other devices, but the wise greenhouse grower begins with as much light as he can manage.

Orchids are traditionally divided into three light categories—*high*, 3000 plus footcandles (fc); *medium*, 1500 to 3000 fc; and *low*, 1500 fc or below. The upper portions of the greenhouse, near the eaves, or certain benches unobstructed by hanging plants, will provide the high-light range. Among such orchids grown in this area are vandas and their various intergeneric hybrids, originating from Asia and the Philippines, many dendrobiums, and the occasional cattleya hybrid, bred from Central or South American species. Cymbidiums, the popular corsage orchids, also flourish in high-light intensities.

The medium-light range is usually found on benches somewhat shaded by the overhanging, more light-demanding plants. A vast range of orchids can and do adapt themselves to this 1500 to 3000 fc range which can often be approximated on a well-lighted windowsill or glassed-in porch. Cattleyas, oncidiums, odontoglossums, miltonias and many species are easily grown in this area.

The low-light range is usually found beneath benches, on the north walls of greenhouses, or in those greenhouses heavily shaded by trees or other obstructions. The low-light range is roughly equivalent to light provided by fluorescent lights. Among the orchids grown successfully under low light are *Phalaenopsis* and *Paphiopedilum*, particularly good subjects for the beginner. Frequently orchids will adjust to the range nearest their natural one. In other words, high-light orchids may flower in medium light conditions, but it is

highly unlikely they will grow well in low light—and vice versa.

### Temperature Zones

Orchids have also been categorized into three temperature zones: *cool*, 60-70°F day, 50-55°F night; *intermediate*, 65-75°F day, 55-60°F night; and *warm*, 75°F day, 60-65°F night.

None of these temperatures could be considered hot, although occasional torrid temperatures in summer may be tolerated for short periods through the cooling use of fans and ventilation. Orchids are primarily epiphytic plants and enjoy, in nature, open, airy places on trees or hilly slopes, where breezes constantly cool them. They cannot tolerate the dank, excessively hot environment which has mistakenly been attributed to them over the years.

There is a distinct difference between day and night temperatures. Without a minimum ten-degree drop in



temperature, flowering may be severely inhibited or, in some cases, entirely prevented.

Many orchids will adapt themselves to the temperature zone nearest their natural one. For example, warm-growing orchids, such as *Phalaenopsis*, will grow reasonably well in intermediate conditions, but will almost certainly suffer in cool conditions. Cool-growing orchids, such as cymbidiums and odontoglossums, are perhaps the most fastidious. While they may survive in intermediate conditions, they are not a great success. Most orchids are in an intermediate zone which is also most comfortable for human beings.

Temperature zones are created by sealing off sections of the greenhouse, each operating on a different thermostatic setting. In the small greenhouse a grower may have to depend on locating the position of various micro-climates located through trial and error. Heat rises, and thus warmer areas will be located near the top of the greenhouse or close to the heating equipment. Cool areas may be located in the north-facing areas of the greenhouse, near the floor, next to fans or evaporative coolers, or by the doors. Intermediate temperature areas are usually waist-high and occupy most of the bench space.

Selections of the appropriate orchids for any given environment are crucial to successful culture.

Kind	Temperature	Light
<i>Ascocenda</i> hybrids	Intermediate to warm	Medium to high
<i>Brassia</i> species	Intermediate	Medium
<i>Cattleya</i> species and hybrids	Intermediate	Medium to high
<i>Miltonia</i> species hybrids (Colombian)	Intermediate to cool	Medium
<i>Miltonia</i> species hybrids (Brazilian)	Intermediate to warm	Medium
<i>Oncidium</i> species and hybrids	Primarily intermediate	Medium to high
<i>Odontoglossum</i> species and hybrids	Cool	Low to medium
<i>Cymbidium</i> hybrids	Cool	Medium to high
<i>Paphiopedilum</i> hybrids (mottled leaf)	Intermediate to warm	Low to medium
<i>Paphiopedilum</i> hybrids (green leaf)	Cool to intermediate	Low to medium
<i>Phalaenopsis</i> species and hybrids	Intermediate to warm	Low to medium
<i>Vanda</i> species and hybrids	Intermediate to warm	Medium to high

### Humidity

Most orchids will not enjoy an excessively dank and humid atmosphere. While they may be found in sea-level swamps of the Amazonian basin, even here breezes do occur. Few orchids are located in arid areas of the world. The majority require a relative humidity from 50 to 60%. The greenhouse grower may create this optimum humidity with automatic misting systems.

### Air Movement

Hand in hand with appropriate humidity, continual change and movement of air is necessary. Except on the stillest of days, nature is always moving. Grasses bend, tree tops whip, leaves blow along the roads. This principle of constant air movement surrounding orchids in nature must be supplied in their artificial surroundings. Fans are essential in any greenhouse, combined with adequate top and bottom ventilation to emit new, refreshing air except on the very coldest of days. Without this air movement, heavy, humid air provides a breeding ground for disease and may weaken orchid plants.

### Pests

The larger and more varied the collection, the greater the chance of introducing pests. Perhaps the most common diseases are the various fungi characterized by black, dry or wet areas on the leaves. Though some fungi and bacteria require specific treatment, a good, all-purpose, systemic fungicide is benomyl or Benlate, applied at the recommended dosage. Many good growers, fearing the possibility of phytotoxicity, prefer to spray only when early symptoms appear. The most

common orchid insects are scales (grey-brown, small, shell-like creatures feeding on the underside of leaves) and mealy bugs (small, white, fluffy insects which have an astonishing ability to move about). Applications of malathion will serve to keep these pests at a minimum. Constant surveillance is necessary, however, and prompt action should always be taken before any pest gets out of control.

Virus diseases are serious and at present there is no good control measure other than complete eradication of infected plants.

### Potting, Watering and Fertilizing

Most orchids, except for the quasi-terrestrial paphiopedilums, are epiphytic, growing on tree branches, trunks, rocks, etc., and their root system, unlike that of terrestrial plants, is adapted to drying out. Too much water at the roots, particularly in the closed environment of a pot, will quickly cause roots to rot. Appropriate potting media therefore must be open and airy, capable of retaining moisture, yet not become soggy.

Most orchids are potted in bark mixtures of varying sizes, supplemented with sphagnum moss and perlite for moisture retention and buoyancy. Bark media provide no nutrients of their own, and while orchids require less fertilizer than many plants, a bi-monthly application of a general purpose inorganic fertilizer is adequate.

In addition to potting, orchids are frequently attached to slabs of tree fern or cork bark and hung in various locations throughout the greenhouse, thus truly simulating their natural environment. Orchids hung on slabs dry out very quickly and must be watered more frequently than orchids in containers.

Watering itself is a science and requires experience. A general rule of thumb is to water orchids only as the potting media approaches dryness. You may insert a finger deep into the potting media, or test the weight of a pot.

### Fluorescent Lights

Orchid culture "under lights" has been practiced for at least 35 years. Any place in the home will serve as an area for a fluorescent light orchid environment, and the growing numbers of fluorescent light orchid enthusiasts have set-ups ranging from plant carts in the living room to large areas in the basement.

Among many lights that have been tested and proven successful are cool-white, daylight, Gro-Lux Wide Spectrum, Naturescent and Verilux Tru-Bloom tubes, either singly or in various combinations. A basic fluorescent light orchid unit should consist of a minimum of four 40-watt tubes per group of plants. Fewer than four tubes per group of plants, or less wattage will provide light for vegetative growth but may hinder flowering. This basic unit will provide nearly 1200 fc of light directly below the source, diminishing



# Bushfruits

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The "back-to-nature" trend has spurred a renewed interest in fruit plants. With more leisure time and early retirement, people are discovering the joys of gardening. Bush fruits are becoming popular because many of the plants can be grown in a small area.

Bush fruit culture depends largely on the grower's ability to provide suitable growth conditions and his judgment in using appropriate cultural practices. No general recommendations can be made which will cover unique environments, but there are standard fundamentals in soil and site selection, cultural methods, selection of varieties and control of diseases and insects.

There are seven basic essentials to any successful fruit-growing endeavor:

1. Select an adapted, productive variety suitable for the purpose.
2. Select a site with good soil and water drainage.
3. Provide adequate water throughout the growing season.
4. Plant early.
5. Provide adequate spacing, avoid crowding.
6. Control insect and disease problems.
7. Control weeds.

## **Raspberries**

"Raspberries" is a collective term, including red, black, purple and yellow fruited types.

Most people think of raspberries as being red, mainly because they are more widely distributed in nature. The raspberry industry has steadily declined in acreage over the past 50 years. Much of this was due to poor quality nursery stock and the high cost of hand labor for picking and training. Today, virus-free stock is available from most nurseries which enables the grower to establish a vigorous productive planting. The high cost of fresh fruit makes hand labor feasible. Extensive research is also being conducted on mechanical harvesting for commercial operations.

Select your planting site carefully. Avoid frost pockets and provide good air drainage. Raspberries will grow on a wide range of soil types; however, blacks and purples tend to perform best in lighter soil.

The soil type and site exposure will affect the time of fruit ripening. Windbreaks may reduce cane desiccation caused by strong winter winds and loss of fruit due to rubbing and bruising. Sites should also be free of perennial weed problems and root diseases like crown gall and Verticillium wilt. The latter disease may seriously affect black and purple varieties.

Adequate water during the entire growing season is essential for fruit production and will determine the quality of cane produced which will

yield next year's crop.

Black and purple varieties are propagated by tip layers. Insert them vertically into the soil to a depth of 4-6 inches. Canes will root sufficiently to be transplanted in November or they may be transplanted in early spring. Red and yellow varieties are propagated by suckers.

Most raspberry plants are set 61 centimeters (2 feet) between plants with 2-3 meters (9 feet) between rows. Reds and yellows may be trained to form a hill by removing the suckers which form. They may also be allowed to form a hedgerow 61 centimeters in width with suckers growing at random. Blacks and purples do not sucker and, therefore, form vigorous hill system plants. Canes which have fruited are removed soon after harvest, allowing the new canes to mature. In a hill system, 6-10 vigorous canes are usually selected for fruiting the following year. All others are removed. In blacks and purples, 4-7 canes should be selected. Reds are topped at a height of 1½ meters (5 feet) in early spring and often are grown with a trellis or support. Blacks and purples are topped in June. This creates a low-branched profile which helps reduce cane breakage.

Cultivation should be only deep enough to destroy weeds and sucker growth, and loosen the soil for water penetration. Fertilization varies de-

pending upon soil type, previous cropping, organic matter content, and nutritional level. A complete fertilizer is best and is generally applied with a nitrogen equivalent to 15-30 kg (40 to 80 pounds) of actual nitrogen per acre.

Mulching is recommended for the smaller grower, but is usually too costly and impractical for large-scale producers. Mulches conserve moisture, reduce soil temperature, prevent erosion, and eliminate root injury from excessive cultivation. On the negative side, they introduce weed seed, may require supplemental nitrogen, and are a potential fire hazard and haven for mice.

The crown borer is a major problem threatening the longevity of any planting. The fruit worm and tarnished plant bug affect fruit development and quality. The control of raspberry aphids is necessary to prevent the spread of viruses. Leaf diseases are more prevalent in central and mid-Atlantic states. Spur blight and anthracnose may be serious cane problems. Control measures may be obtained from the local county extension service. Several good herbicides are available for weed control; however, the elimination of serious problems prior to planting is recommended.

The selection of a variety adapted to your area is very important. In eastern U.S., 'Newburgh', 'Taylor', 'Milton', and 'Latham' are very successfully grown. 'Cherokee', 'Hilton', and 'Citadel' are newer red varieties which deserve a try. 'Heritage' and 'Fallred' are planted for their fall crop. 'Heritage' is being grown commercially for this purpose and highly recommended. 'Amber' is the only yellow fruited raspberry planted in quantity. When it comes to black raspberries, the old varieties 'Bristol' and 'Dundee' are hard to beat. Promising recent introductions include 'Allen', 'Huron', 'Alleghany', and 'Jewel'. Purple raspberries are mainly grown in eastern U.S. 'Sodus' and 'Marion' have been replaced by 'Clyde'. 'Amethyst' is a new variety

from Iowa; however, 'Brandywine' a new variety from Geneva, New York (formerly 'New York 905'), appears to be the most promising purple released to date. The variety picture is somewhat different on the West Coast and Canada.

In northern states the red varieties 'Newburgh', 'Boyne', 'Latham', 'Chief' and 'Fallred' are recommended. Most of the black raspberries are not fully hardy where temperatures are extremely low.

Iowa has released a new red variety, 'Liberty' for trial. 'Amethyst' was released as a new purple variety while 'Black Hawk' is still recommended as a black variety.

In the Southern Illinois region, the variety 'Southland' has performed well, while further south 'Dormanred' is the only red raspberry adapted to the southern states.

The variety picture changes in Washington and Oregon where the recommended red varieties are 'Fairview', 'Willamette', 'Canby', and 'Heritage'. Small plantings of 'Meeker' and 'Haida' may also be found. As for black raspberries, 'Munger' and 'Plum Farmer' perform well.

#### **Blackberries and Dewberries**

The blackberry most commonly grown in eastern U.S. is the erect, thorny type with fruit ripening in August. This is in contrast to most dewberries, which are trailing types generally requiring support. Most dewberries are not truly hardy in the northeast and, therefore, are grown on the west coast and in southern regions. The development of thornless blackberries has created renewed interest in this fruit plant. Most varieties tend to require support. They are large fruited, generally lower in quality and lack winter hardiness. However, they are extremely vigorous and productive. Because they are not winter hardy, no crops are produced in the northern states except on canes protected by snow or soil. The erect, northern varieties have been used in breeding with varieties adapted to the

southern states and as a result, 'Cherokee' and 'Comanche' have been released.

Blackberry plantings are usually long-lived, if kept free from insect, disease and weed problems. Blackberries perform best on a medium to light soil, high in organic matter, slightly acid, with good water drainage. Light droughty or heavy clay soils should be avoided.

Blackberries are easily propagated from root cuttings or suckers. Dewberries and intermediate types tip-layer readily.

Row and plant spacing requirements are similar to those of raspberries. Dewberries and intermediate types may form a hill system, and require more space between plants, while the erect eastern varieties do best in a hedgerow. Canes should be removed after fruiting. Erect types are topped in early spring while trailing types are trained on a trellis. Mulching, fertilizing, and herbicide requirements are similar to those of raspberries.

Orange rust is a serious disease generally controlled by roguing. Fruit worms and the tarnished plant bug are the most serious pests affecting fruit development. In southern regions, leaf and cane diseases may cause problems.

'Darrow' is one of the best erect varieties. It is vigorous, fairly hardy and productive with large, good quality fruit. 'Cherokee' and 'Comanche' are new releases from Arkansas and grow well in the mid-west. 'Black Satin' and 'Dirksen Thornless' are new thornless varieties which are productive, but not very hardy in the northeast. 'Ranger' and 'Raven' are fairly erect varieties, and are best grown in Maryland and states to the south.

#### **Currants**

Currants are very hardy, easy to grow and make one of the finest jellies or juice drinks. Their production is restricted by law as they serve as alternate host for the white pine blister rust. Most currant production in the U.S. is limited to gardens

as most fruit and fruit products are imported. Before growing them, check with the local county agent to see if they are permitted in your locality.

Currants are easily propagated by hardwood cuttings made in the fall or early spring. They may be planted in a nursery or cold frame, where only a few plants are desired; low-growing branches may be layered.

Since currants are among the first fruits to bloom in the spring, site is important. They will grow on a wide range of soil types but prefer deep, well-drained loam. Perennial weeds should be eliminated before planting. Currants will tolerate a wetter soil than gooseberries. Light soils should be avoided because of droughty conditions and high soil temperatures.

Plants are generally spaced 1 meter apart within the row, with rows 2-3 meters apart. A variety of mulches may be used with fertilization ranging from 15-30 kg of actual nitrogen per acre. Complete fertilizers are not generally recommended because they contain the muriate form of potash which is injurious to currants and gooseberries.

Fruit is borne at the base of 1-year old wood with the greatest production on spurs of 2-3-year old wood. After three or four years, the older canes are gradually removed and replaced by young, vigorous canes.

Anthraxnose and leaf spot are the major foliage diseases which can be controlled by an early spray. If not controlled, complete defoliation may occur in mid-summer, resulting in reduced weak growth susceptible to winter damage. Aphids and fruit worms may also cause problems.

The most promising red varieties are 'Red Lake', 'Wilder', and 'Stephens #9'. 'Wilder' is less susceptible to foliage diseases than the other varieties.

#### Gooseberries

Gooseberries are also easy to grow and extremely hardy. They may be grown in bush form or trained as an espalier. The most productive high

quality varieties are thorny. The thornless types are generally unproductive, small-fruited, and poor in quality. Fruits are used for pies, sauce, or jelly. Production is very limited in the U.S. One of the largest plantings is located in Michigan and consists of 40 acres. Today, most of the fruit and fruit products are imported.

Gooseberries are also easily propagated from hardwood cuttings. Lower branches may be layered. Two years of growth are required before a good root system is formed. Pruning should be limited to a thinning and renewal process.

Mulches are beneficial and a complete fertilizer should be applied; however, the muriate form of potash should not be used.

The large-fruited English or European varieties are seldom grown because of susceptibility to mildew. 'Fredonia', a large-fruited red variety and 'Chautauqua', a large green-fruited variety, are satisfactory but are seldom sold by nurseries. The American types are smaller fruited but resistant to mildew. 'Poorman' is the best-recommended variety, being productive with red high quality fruit.

#### Blueberries

The blueberry is one of the most recent fruit plants taken from the wild and through extensive breeding developed into a commercial fruit crop. There are three major types: the low-bush grown in the New England states, the high-bush—the most widely known, and the rabbit eye—best adapted to the southern states. Some species are found in extremely cold regions while others require only a short rest period and may be grown in warm climates. My discussion will be limited to the high-bush type.

The blueberry requires a year-round moisture supply and does best in an acid soil. Temperatures below  $-30^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$ ) may cause some winter injury to canes. Vigorous plants making late growth are

*Continued on page 29*



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# The Sequoiadendron Story

Audrey Teasdale  
400 E. Las Palmas  
Fullerton, CA 92635

Born more than one hundred million years ago and flourishing throughout Northern Eurasia and America when trees and reptiles were gigantic, was the ancestral form of *Sequoiadendron giganteum*. During the Ice Age, most of these majestic giants were unable to survive the great sheets of glacial ice that covered the continent. However, destruction of *Sequoiadendron* was not complete. The ancient race now exists at 5,000 to 7,000 feet on the western slopes of the Sierra Nevada, the oldest, warmest area of California. These remnants stand on a 250 mile strip in groves surrounded with Incense Cedar, yellow and sugar pines, and firs.

The *Sequoiadendron giganteum* was discovered by white man in 1833 and due to the resemblance to Bald Cypress was named *Taxodium giganteum*. An English botanist, discovering the genus incorrect, named the Sierra tree *Wellingtonia gigantea* in honor of a British general. Outraged by the placing of a British name on the American tree, patriots chose *Washingtonia gigantea* in honor of their American general. They were delighted when it was found to be related to *Sequoia sempervirens* (Coast Redwood) and received the very American genus, *Sequoia*, after an outstanding American Indian. The genus was agreed upon but the name of the species was still debated

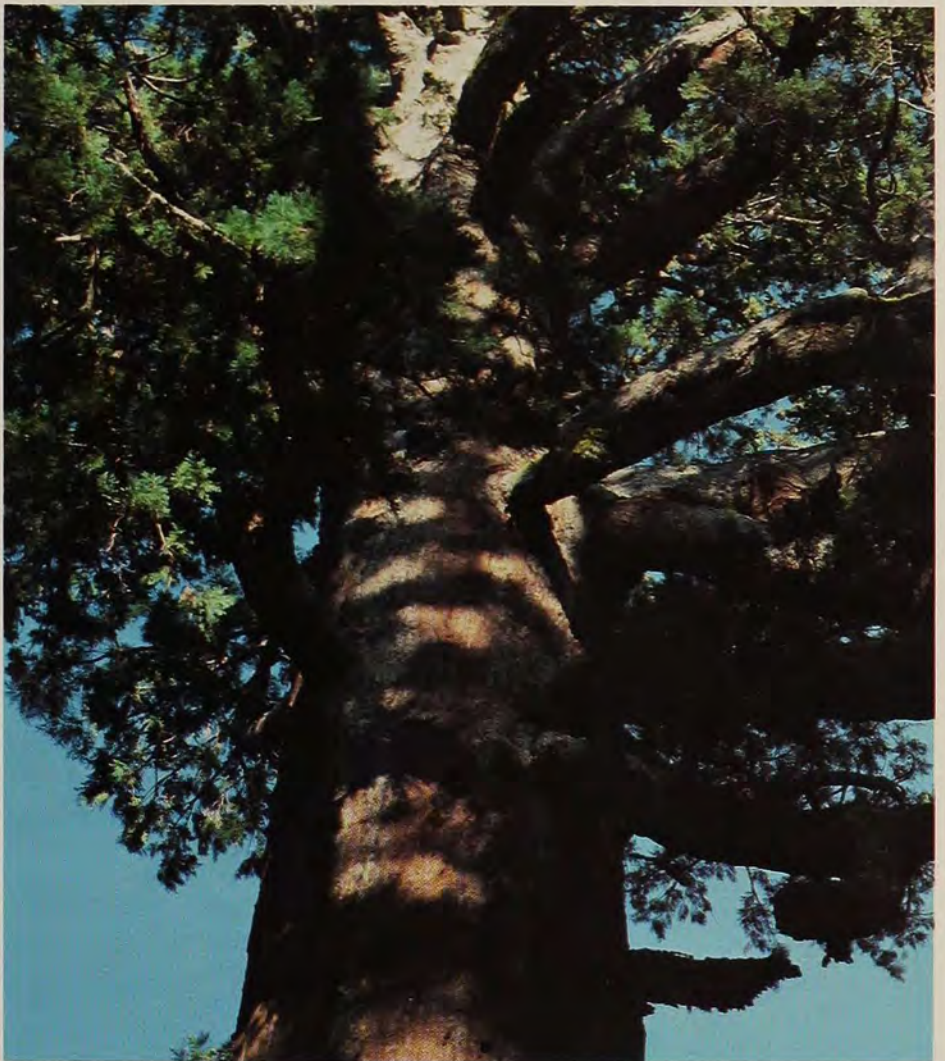
(as *wellingtonia*, *washingtonia* or neutrally *gigantea*). These names caused much confusion until 1939 when Buchholz placed the Sierra tree in an entirely new genus, *Sequoiadendron*. Though both *Sequoia sempervirens* and *Sequoiadendron giganteum* are referred to as redwoods, foresters restrict this common name to the Coast Redwood. The *Sequoiadendron giganteum* is referred to as the Big Tree or as the noted naturalist, John Muir, called it, Giant Sequoia.

These magnificent Giant Sequoias surpass all world trees in bulk (the largest, General Sherman, weighs 2,200 tons) and it was thought until recently that they were the oldest living tree. A ring study in 1953 revealed the Bristlecone Pine of California to be 1,000 years older than the oldest accurately recorded Big Tree, 3,212 years old. The ages of the living trees are unknown. Unfortunately, coring instruments will not penetrate the thick trunk, so the only reliable method to determine age is to count growth rings from a fallen tree.

When first discovered in the 19th century, the Big Trees were very popular and their seeds were shipped to Britain and Europe and planted in large estates. The specimens in Britain are in very good condition and some 60 to 70 feet in height.







Photos by Steve Tjosvold

Attempts to grow these trees outside California are usually not successful; however, Tyler Arboretum in Pennsylvania has a specimen over 70 feet tall. Longwood Gardens, also in Pennsylvania, has four Big Trees planted in a grouping. These are the survivors of some four-foot trees brought by P. S. du Pont from California and planted in 1929 and 1930. These four trees are still growing well; however, they all have had terminal dieback. Mrs. Wister, Director of Tyler Arboretum, felt this dieback was probably due to the trees not being acclimated completely before winter. The *Sequoiadendron* at Tyler is in a more exposed area so the tree will acclimate properly, whereas the Big Trees at Longwood are protected by nearby plantings and not exposed to the gradual decrease in temperature which prepares them for the winter chill, hence terminal dieback results.

*Sequoiadendron giganteum* was used by the Indians as a strong astringent. This bright purple medicine was made by dissolving a dark gritty substance from the cones and trunk in water. An excellent furniture stain was made by soaking the pigment (mainly tannin) that surrounded the seed in water till a deep brown-red color developed. This same fluid was used by John Muir as a long-lasting legible ink.

It was thought at one time that the Big Trees were vanishing and no young trees existed because of the different growth habits. The 100-year-old babies are in a bushy symmetrical shape. They retain their dense well-distributed foliage along low-growing branches, which are pushed downward in heavy snows and brace the young tree. When 600 years old, the lower branches are lost, foliage is in dense tufts at branch ends and the top becomes dome-shaped. At full maturity (1,000 years), the tree is craggy and weather-beaten with a height of 300 feet or more, a width of 10 to 30 feet and limbs 100 feet above the ground.

The bark thickens to two feet and forms a gnarled buttress at the base. The foliage is gray-green and approximately one-half inch long, rough, overlapping, awl shaped, and adheres to the branchlet four or five years.

The root system of the Big Tree is composed of a taproot when young. As growth progresses lateral roots form abundantly in the top six feet of the soil and may extend outward two acres. This root system enables the Giant Sequoia to attain its enormous proportions, nourishment, and moisture supply in the dry Sierra seasons. Great sections of these shallow roots can be killed by fire resulting in eventual falling or formation of a strong supporting buttress.

A rapid growth rate of the Big Tree results if there is available water and food, a long growing season and a juvenile tree. The average growth in height is 1½ to 2 feet per year, but falls off rapidly when their tops grow above surrounding trees (approximately 120 feet). A young tree grows quite fast and may increase one inch in width seven times faster than a 500-year-old tree. Growth ring studies reveal that dry seasons and suitable lower elevations in the Sierras result in the greatest growth (thicker rings) because of less snow, hence a longer growing season.

Vegetative propagation of *Sequoiadendron giganteum* was done in England in the 1950s and produced high quality, desirable cultivars. Four main cultivars that were developed are still available through Hilliers Nursery in England: 'Pygmaeum'—a small medium conical bush; 'Variegatum'—leaves flecked with white variegation; 'Glaucum'—a bluer narrower tree; 'Pendulum'—narrow with pendulous branches. Recent studies have proven that rooting ability of a cutting declines as the donor tree's age increases. The cuttings from the one-to six-year-olds appear to be a practical means of mass vegetative production.

The Big Trees are also reproduced by seed. The pollination process oc-

curs during May by separate male and female catkins on trees older than 20 years. The female catkins grow on the larger stems closer to the ground and the male catkins grow near the top. Pollen is wind-blown or falls to the receptive pistil below and two years later a cone the size of a lime ripens and sheds about 234 seeds. If seeds are mature but conditions unfavorable, the mature cones retain the seed and continue in growth (a unique feature among conifers); the rings of the peduncles have determined some of these cones older than twenty years.

*Sequoiadendron* seeds are ¼ inch long, pale and shiny, resembling dried rolled oats. Though a large quantity of seed is shed, only one in a billion will survive in its native habitat. Propagating in a nursery, the seeds are soaked in the tannin pigment from the cone which apparently protects them from fungus and lichen attack and results in germination rates of 40 percent.

The death and falling of the Giant Sequoia results from calamity, not age, with few enemies causing harm. Fire can damage the shallow roots but the trunk is protected by its two foot thick, spongy asbestos-like bark which only the hottest fires can penetrate. If a Big Tree is burned, it reheals with the help of tannin, a compound produced in the bark and heartwood that actually seals off newly scarred areas and prevents attack from fungus, rots, and insects. Rarely do these Big Trees die in a single fire because of these defenses, but if an excessive amount of sapwood is damaged, a proportionate amount of the crown will die because translocation is prevented. Lightning will strike these tall Giant Sequoias but rarely are they killed, rather shattered and split producing large scars or sometimes completely burned out in the center and still continuing to grow. Erosion and gravity are dangerous enemies because the massive Big Tree balances on a broad platform of shallow roots. Erosion can cause toppling due to unbalanced leaning,

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particularly in trees growing near creek areas. Root compaction of the shallow roots was at one time a problem when visitors and traffic were allowed to travel up to the Big Trees' trunks. The solution was restricted walking areas and trams to carry visitors through the area. No Big Tree has ever been known to be killed by insects, fungus, or disease. Some insects such as the Sequoia bark beetle and Sequoia scale will burrow in the twigs or attack the foliage but without serious effects.

White man was the Big Trees' main enemy. Indians felt these giants were sacred and warned white man when he began to fell them of the bad luck it would bring. Man tried using these trees for lumber but their massive size made them too difficult to chop down. The largest trees were located in rough mountain terrains inaccessible to man. When trees were felled, their enormous weight resulted in shattering of the wood, a waste as high as 50 percent. The lumber companies realized they could make a better profit by exploiting them through tourism and some of the larger trees ended their approximate 3,000-year existence to the fate of the axe or removal of giant portions of bark for the tourists. Other trees were tunneled through and on some stumps a pavilion and bowling alley were built.

Thus tourism killed many ancient trees, fortunately their size, inaccessibility, brittleness and conservation movements protected the Big Trees from extinction and has allowed our generation to view these inspiring giants. As John Muir, the noted naturalist wrote, "There's something wonderfully attractive in this king tree, even when beheld from afar, that draws us to it with indescribable enthusiasm; its superior height and massive smoothly rounded outlines proclaiming its character in any company; and when one of the oldest attains full stature on a commanding ridge it seems the very god of the woods."

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# Portable Plants for Your Patio and Pad

by *S. Scott Roberts*  
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Forest Hills, NY 11374

How would you like something different for your patio and outside area?—something inexpensive and elegant that can be changed as your mood changes?—that can even be brought indoors to decorate your home beautifully? If your answer to one or all of these questions is yes, then container gardening is for you.

Planting in containers has a great many advantages, indoors and out, and it adds a special dimension to gardening. Putting a plant in a pot, box or tub immediately gives it new character. The plant changes from a mere bush to a shrub of distinction. It's like picking a person out of a crowd and placing the individual on a pedestal. A low-growing juniper, for example, is just a ground cover when hugging the ground, but when elevated in a box, pinched and pruned, it becomes a piece of art with a windswept look. Or, if the wide-spreading juniper is lifted in a hanging pot, it's suddenly transformed into a lavish green drape.

Container plants have another distinct characteristic not usually considered—companionship. You live a lot closer to plants in containers than the same plants in beds or borders, especially when the containers are displayed on a patio, terrace, balcony or in your home. They're around you constantly, living with you, rather than in their own separate quarters in the ground.

Probably the most obvious advantage to container plants is their easy mobility. They can be moved around to suit the changing light at different times of the year, or to fit your changing mood. Most plants can even be brought into the house for an exquisite decoration and left by a light source, or taken back outside again.

Another advantage to the mobility of container gardens is that if you change addresses, you can take the plants along. This is particularly appealing to many gardeners, for after spending a great deal of time and trouble caring for and growing your "foliage friends," it becomes somewhat painful when you have to leave them behind.

Container gardening also enables you to exercise more control over the environment around your plants. If, for example, your area is not blessed with good soil, rather than working with what you have, or spending a

great deal to improve the conditions, you can obtain the perfect mixture for each specific plant in each container, and you'll need much smaller quantities than working with beds and borders. In addition, if the weather becomes especially inclement, you no longer have to worry about leaving your plants outside at the mercy of the storm—just bring them in until the big wind blows over.

## Container Gardening the "Maxi" Way

Planting in containers is not limited to small plants alone, and those who prefer the larger varieties can also enjoy the advantages of container gardening. You can grow all the large plants you want—even trees. Although even the greatest forest trees will thrive in containers in their youthful years, trees for the patio should be of smaller stature; they'll look a lot better and will be a great deal easier to care for—and who wants a gigantic redwood in the middle of the patio—there'll be no room for you! Patio trees should also be slow growing, and interesting enough to merit a close-up look, since they can be moved as close as you want.

Yes, even with large plants, shrubs and trees in containers, you can still maintain the advantage of mobility, though, obviously, it will be a bit more difficult than with smaller plants. Using a lightweight soil,  $\frac{1}{2}$  peat moss and  $\frac{1}{2}$  perlite or vermiculite, will lighten the weight problem considerably. Also keep in mind when moving larger plants, that the weight of the mix when dry is far below the weight of moist mix. Another idea for moving larger plants easily is to put their containers on casters; many attractive varieties can be purchased in almost any hardware or department store. The casters will not only make the container easy to move, but will also provide space underneath for air to circulate.

If you have quite a few heavy containers and like to move them around, you can purchase an inexpensive hand truck, or try using a set of wood dowels like the ones for hanging clothes in closets. Three or four will do the trick, and as you push the container forward, take the one from the back and put it up front until your container has reached its new destination.

## Choosing Containers

Choosing containers for your plants is a hobby in itself because almost any kind can be used—wood, plastic, glass, metal—anything. Just make sure that it has proper drainage, and that it's not too big for a little plant and not too little for a big plant. You might also want to experiment with decorative containers, which have become extremely popular because they can create extraordinary displays by themselves. If the container you choose has no drainage hole, simply add stones or pieces of a broken clay pot to the bottom before adding the soil. This is usually a particularly good idea for hanging plants, since you don't want them dripping on you and your friends.

And, speaking of hanging plants, many overwhelming displays can be created by making trapeze artists out of your plants. You can, for example, arrange several plants at different heights on pulleys. This technique will allow you to lower them for easy watering and grooming, and to raise them for best light conditions. If this becomes too tedious, you can arrange several plants on one pulley system. Another idea worth considering is to create an eye-catching effect by hanging larger and larger containers directly underneath each other, to resemble a "fountain" of colors. The possibilities are endless, and you can try anything you desire, with almost any container you want. You can even convert unique things laying around the house into containers, like gold-fish bowls, wooden shoes, waste-paper baskets, kerosene lamps, old wheelbarrows, etc.

## Container Gardening Straight Up

Limited space gardeners will also find container gardening especially rewarding because it offers another dimension to a small area—instead of planting out, where there is no room, you plant up. Vertical gardens of all shapes, sizes and materials can be constructed to create "sky-scraping" displays which add a great deal of growing space.

With a little imagination, a vertical garden can fit almost any need. Some ideas you might wish to consider include a checkerboard effect, with every other square filled in, or for those hungry for plant space, you can fill in all the openings, alternating the plants. A grandstand, or steps, effect can be created with just a little construction, or you can simply mount your plants on a regular ladder. Planting along a fence, or building vertical displays around the fence is another possibility. Let your imagination run free and guide you to a design which will fit your area perfectly.

A particularly easy project for a vertical garden is a "wire tree," with soil on the inside and plants on the outside. They can be made in various sizes and shapes, hung or at ground level, to create a breathtaking effect. In addition, they can be constructed as cylinders, which are best for hanging, or half-rounds, if you plan



Container Primroses



Container Tomatoes

to rest them against a wall or fence. To do-it-yourself, use hog wire or welded wire with 2-inch mesh, and wooden slats and a can bottom for stiffening. Either sphagnum moss or black plastic will hold in the soil. The sphagnum moss is a lot more gardenesque looking than the plastic, but the plants will soon cover the entire area anyway. And, lightweight soil mixes are usually best for this technique. Once the tree is set up exactly as you want it—good and sturdy and filled with soil—simply place the plants in through the wire, and they'll grow as good as those in the ground.

### Soil

Specially prepared soil mixtures can be purchased in garden stores everywhere under a wide variety of trade names like Redi-Earth, Jiffy Mix, Metro Mix, Super Soil, Pro-Mix, etc. These mixtures are usually referred to as "soiless mixes" or "synthetic soils"—but don't worry, they're not artificial at all and the ingredients are as natural as Mother Nature can make them.

Usually, a simple combination of peat moss and vermiculite, or perlite, or fine sand, can be used with almost all types of plants, if you want to mix your own. The ingredients of prepared mixes vary somewhat, but the principle behind each is the same—soiless "soil" must provide three essential functions:

First, the soil must allow water to drain through quickly. This is a particularly important point to keep in mind, because container soil must have better drainage than regular garden soil. Many plants will grow in a garden soil where the rate of infiltration is as low as 1/2-inch an hour. Under container-growing conditions, rates of 5 to 10 inches per hour are considered minimum.

Second, the soil must have a reservoir of water after drainage. This function is obviously essential to give the plant a continuing supply of nutrition to help it thrive and ward off disease and insects.

The third point is probably the most important in any container mix—the soil must retain air after drainage. Plants vary greatly in aeration requirements or percentage of air space after water has drained away, but they all have one thing in common—the roots must have air for growth and respiration.

### Feeding Time

Plants growing in containers demand closer attention than the same plants growing in a flower border or in a vegetable patch. When you constrict the root zone in a container, you must compensate for the smaller root area by more frequent waterings and more frequent feedings.

Because fertilizers are leached through the mixes when watered, the amount of watering determines the amount of fertilizing. For example, fertilizers will leach faster from mixtures containing perlite than from a mix containing vermiculite. Therefore, plants grown in a



Ferns help "green up" outdoor areas with lower light levels.

peat moss-perlite mix will require more frequent applications of fertilizer.

Some container gardeners prefer to fertilize with a weak nutrient solution, applying it with every other irrigation. When feeding plants in this manner, a safe concentration would be about 1/5 the amount called for on the label for a monthly application. If, for instance, the label calls for 1 tablespoon to a gallon of water, make the dilution 1 tablespoon to 5 gallons of water.

### Vegetable Gardening in Containers

All the benefits of growing plants in containers are also available to vegetable gardeners, and many vegetables make extremely beautiful displays as well. Tomatoes, for example, are perfect container vegetables. They are lovely hanging, in a simple pot, or in a lavish vertical design. Several varieties can even be grown indoors. Peppers are another very colorful and productive crop, as are lettuce, carrots, cabbage, strawberries, beets, herbs of all kinds, etc.

Container gardening can provide an immediate rainbow of color practically anywhere you want it. You can grow your own, get a really instant prism of plants by purchasing them full grown at a garden shop, or you can try something somewhere in the middle. You can grow large trees or small plants, flowers, foliage plants, even vegetables will work. For specifics on what to do, and which plants will work best in your area, visit your local garden shop, or contact your County Extension Agent, or get a good book on the subject, like Ortho's "Container and Hanging Gardens."

Continued from page 21

## Bush Fruits

more susceptible. Blueberries blossom early and, therefore, may be injured by frost, but their blossoms are more tolerant to low temperatures than many other fruit plants. Fruit generally ripens from 60-90 days after bloom.

These plants have a very fine root system and demand a loose, porous soil. Light soils high in organic matter are best. The plants are shallow-rooted and cannot withstand drought, thus requiring frequent irrigation on a water table within 1/2 meter of the soil surface. Plants are also easily killed if flooded during the growing season. Mulches are very effective in conserving moisture. Soil may be acidified to some extent by the addition of sulfur and use of ammonium sulfate fertilizer. A soil pH of 4.0 to 5.2 is best.

For best growth and production, planting should be done in open sun, free from shade and competition. Blueberries are self-fruitful, but if several varieties are grown a greater fruit set and earlier ripening are best insured.

Blueberries are usually grown from hardwood cuttings placed in special beds or semi-hardwood cuttings under mist. One-year-old plants are generally rooted cuttings, small but vigorous. Best performance is obtained from setting 2-year old plants spaced 1 1/2 meters apart with rows 3 meters apart. Plants are generally not fertilized when set but a light application may be made in June and each spring when the buds swell. Plants should be pruned like most shrubs. This adjusts the fruit crop to the capacity of the bush and root system and stimulates vigorous shoot growth for next year's crop.

Bird control may be a major problem. It is best solved by some type of netting. Fruit worms and some leaf diseases are the major pests. Most of the major highbush varieties are widely adapted. They are listed in order of ripening. These are the

most promising: 'Earlblue', 'Collins', 'Blueray', 'Bluecrop', 'Berkley', 'Herbert', 'Jersey', and 'Coville'. Other varieties being tried include 'Bluetta', 'Northland', 'Bluehaven', and 'Lateblue', and the rabbiteye varieties 'Tifblue', 'Woodard', 'Gardenblue' and 'Homebell'.

### Elderberries

Most elderberry fruits from the past were collected from the wild, but through extensive breeding and selection improved varieties are now available. Most of the fruit is used for pie-making. Elderberry-growing can be profitable if an outlet is available. Various species of elderberries may be found growing from Maine to Florida. To date, most of the commercial varieties have been developed from *Sambucus canadensis*.

Elderberries may be grown on a wide range of soil types, but again are adapted best to a rich, slightly sandy soil with good moisture content. Plants should have good air drainage to reduce mildew infection. Like most bush fruits, a good moisture level throughout the growing season is desirable, especially during fruit formation. Like most fruit plants, early planting is advantageous. Plant spacing may vary from 4-5 meters between rows with 2 meters between plants within the row. A complete fertilizer should be applied early each spring. Shallow cultivation is recommended. Mulches may be of great benefit. In cold areas stimulation of late growth is undesirable.

Plants perform best if pruned in the spring when winter injury can be assessed. Prune to adjust the size of the plant and produce a vigorous shrub. Occasionally, old canes are removed and younger ones allowed to grow. Plants are easily propagated from three-bud hardwood cuttings planted directly into the nursery. Elderberries are not very self-fruitful; therefore, it is advisable to plant several varieties to insure proper pollination.

Continued on page 44

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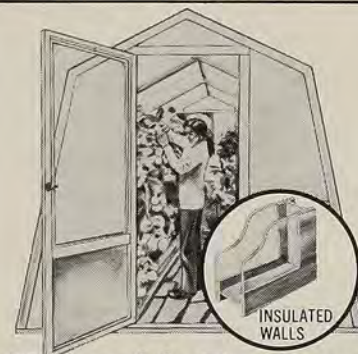
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# The Harbingers

Text by Lorraine Marshall Burgess

Photos by Guy Burgess

202 Old Broadmoor Road

Colorado Springs, CO 80906

Now is the time to welcome all the brave and resilient flowers of spring. These are the true harbingers of our gardening year. Spring in all its wonder is upon us, so let's enjoy this year's display and plan now to make next year's show in our gardens even better.

Harbingers in the past, according to the dictionary, were advance men sent out to secure lodging for an army. But the word harbinger has since caught the fancy of poets, and now more often refers to robins, hummingbirds, and early spring bulbs that give notice of the 'army' of birds and flowers to follow. Our garden harbingers are snowdrops, crocus, squills, grape hyacinths, daffodils, and species tulips. They all dare to bloom amidst the lingering snows and dreary remnants of winter.

Spring, that glorious season between the vernal equinox and the summer solstice, is considered the freshest and most invigorating stage of anything. It is a time of tiny marvels and great miracles, a time of rebirth and new beginnings. Gardeners are duly impressed, but they also believe they can help orchestrate this new world symphony.

They know that spring flowers will not appear unless someone has had the forethought to plant them

there in the fall. But once established these tiny jewels will bloom year after year with the very minimum of care. Therefore wise gardeners purchase lavish supplies of the small spring-flowering bulbs to plant in their garden entries, under shrub plantings, or naturalized on woodland lots. They get them in the ground in the fall as soon as they can. There is no advantage in waiting. The best bulb storage is in the soil itself. Where winters are severe, the bulbs are planted a little deeper than prescribed to slow their spring emergence. (Harbingers deserve a fair chance of surviving.)

The earliest bulbs are so small that experts plant them in quantities of one hundred or more to assure a good show. The bulbs grow best in moist, slightly-shaded soil. Random planting is considered most suitable.

The selection is wide. Choose from grape hyacinth (*Muscari botryoides*), miniature daffodils (*Narcissus bulbocodium*), miniature bulbous iris (*Iris reticulata*—look for hybrids 'Cantab' and 'Danfordiae'), snowdrops in standard and giant sizes (*Galanthus nivalis* and *G. elwesii*) and squills (*Scilla sibirica*).

Include a great array of crocus, including *Crocus chrysanthus*, *C. siberi* with var. *versicolor*, and *C. to-*

*masinianus*, and add a gathering of giant hybrids in deep purple, pencilled blue, lavender, yellow, and white. These hybrids bloom later than the species plants, thereby extending the blooming period.

Consider also the species tulips, mostly early, ground-hugging varieties. Select from a wide variety of *Tulipa kaufmanniana*, and from *T. greigii*, and *T. tarda*. All are exciting additions to a harbinger's garden. The larger Dutch hybrid tulips bloom so much later in the season (in May and June) that they should not be considered among the harbingers.

Because these tiny spring flowers have equally small bulbs, it is smart to mark informal plantings with decorative pieces of twisted wood, or such semi-precious stones as rose quartz or alabaster. The wood will protect the bulbs through winter and frame the tiny blooms in spring. The stones will discourage trespass of the planting area and provide sun-warmth and color-warmth when the bulbs come into flower. To clothe an otherwise barren winter landscape, add flowering shrubs backed with evergreen trees and shrubs to keep the early bulb flowers pleasant company. Such consideration can add to the beauty of an otherwise modest pre-spring show.

# Seed Packets Can Be Wrong

*R. Milton Carleton  
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Pick up a packet of any perennial seeds and the directions for planting will almost certainly recommend sowing them in June. Here is evidence that Americans have not declared independence from England, at least insofar as growing perennials is concerned.

For generations, the British have made a practice of waiting until the rush of spring planting is over to sow seeds intended to produce plants for next year's perennial borders. The results prove that they are sound in doing so (witness those magnificent explosions of color which one English writer called "a gorgeous gaudy blotch").

Almost to a man (and woman), American writers picked up this recommendation for early summer planting as gospel, without giving a thought to the tremendous differences between our two countries. England, with its maritime climate, usually experiences night-time temperatures in the 50s. Anyone who has visited the tight little isle without being prepared with a topcoat or sweater will testify that normally the weather is nothing like that of most of continental United States.

Even during the summer of 1976 when Britain experienced the hottest weather on record, nights averaged 10 to 15 degrees lower than the same dates for most of the United States. True, upper New England and Pacific Northwest are areas where similar climates permit June sowing of perennials.

Although there is danger in oversimplifying the life cycle of plants grown for more than one year, a majority of them must be able to survive as dormant seeds. Many of them require vernalization—exposure to low temperature for a considerable period before germination can begin.

Perennial Phlox, for example, is a constant source of complaints for seedsmen who use packets with the usual directions for perennial seeds. Sown in June in the Middle West this species results in total failure.

Even when no mechanism of after-ripening or vernalization is involved, June sowing all too often is done when soil temperatures have risen above 60 degrees, maximum for many species, including Geum, Lunaria, Viola and Hollyhock. Even more sensitive are Lupine and Delphinium, which will not sprout at above 55 degrees.

Delphinium seed has another weakness which makes its culture in our continental climate areas both

difficult and irritating. As formerly handled in the American seed trade it lost germination so rapidly after ripening that it had to be sown within a few weeks after harvesting. Fortunately, Dr. Barton at Boice-Thompson Institute came up with a solution—low-temperature storage. She found that when stored at below freezing, humidity and moisture content were no longer factors. In 1948, she showed me seed that had been frozen for 13 years, yet when tested by standard methods, it was 72% viable.

Today, practically all good seedsmen store perennial seeds under refrigeration to maintain high germination. This does, however, create a problem, particularly for the gardener who orders his seeds as soon as the catalogs arrive in January. Naturally, his orders are filled first and arrive early. If stuffed in a convenient corner in a heated house, many seeds will be injured or even killed.

Is it any wonder that gardeners complain that they can't grow perennials from seed or that their source of supply is unreliable?

Fortunately, there is an answer to the question, "With all these barriers in the way of germination, how can I hope to succeed?" All perennials grown in cooler parts of the United States are hardy enough to resist considerable freezing. Preparing the perennial nursery beds in fall just prior to a freeze-up is not difficult. Most successful growers use frames, not so much to protect the seeds as to give better control over moisture, weeds and other factors.

A few "iffy" genera, such as Rosa, Dictamnus and Phlox, can be sown immediately to provide the necessary exposure to cold. Practically all popular garden subjects will do well if sown as soon as the soil is in workable condition (March in most parts of the United States).

If you buy seed from a reliable dealer, it should germinate normally when conditions are right. I have always been surprised how genera with widely-different critical temperature requirements will come through. Some demand alternating readings (such as 54 degrees nights, 86 degrees days, for one) while others want a constant temperature of 68 degrees or 86 degrees. Yet somehow during an exposure to conditions such as I have recommended, each species is stimulated by a range of warmth which meets its germination requirements.

# For a Pleasant Surprise Neglect Your Amaryllis

O. Hobart Mowrer  
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Photo by O. Hobart Mowrer



During the past 20 years, I have, from time to time, purchased or been given a number of amaryllis bulbs. The results were never very exciting. Sometimes the blooms appeared first and then the foliage, or the reverse; and, in any case, the blooms, although spectacular, were shortlived. Moreover, I was never quite sure what to do with the potted bulb from one winter (the blooming season) to the next. The result was that I rarely had an "old bulb" in blooming condition the following year—if, indeed, I still had it at all.

However, in the Fall of 1973, I was again given a fine big amaryllis bulb, in a six-inch clay pot, which thus allowed for the commonly prescribed inch of potting mixture around the bulb, about half or two-thirds submerged in the mixture. But with *this* bulb came some brief instructions: After the bulb blooms, keep it watered and fertilized, so that the leaves remain vigorous; and when warm weather comes, put the plant outdoors where it is protected from the mid-day sun (as on the north side of a tree) and continue to water and feed. (I already knew that during the flowering season indoors, amaryllis should be given as much sunshine as possible.)

Early in the summer of 1974, I noticed that a new plantlet had appeared alongside its "mother," and, instead of separating them, I carefully put them together, in a slightly larger *plastic* pot. I continued to water and feed but did not otherwise disturb the situation; and by the end of summer, the new bulb had become so large that it and the original one crowded the pot to such an extent that it was pushed into a decidedly oblong shape; so, again without disturbing the rootball, I transplanted the two bulbs to a 10-inch plastic pot—and *both* bulbs bloomed late that winter (1975). The

following summer more new plantlets appeared; and one of them was strong enough to bloom, along with the two older bulbs, early in 1976. The accompanying photograph shows the three bulbs blooming simultaneously, with a nice accompanying growth of foliage.

It seems to be taken for granted that an amaryllis bulb ought to grow and bloom *alone*, in a relatively small pot. If a plantlet appears, it is supposed to be gently separated from the parent bulb and put in another pot. It may there bloom "in two or three years"; but, by leaving the plantlet undisturbed, as described above, transplantation shock is avoided and blooming is greatly accelerated. Amaryllis can also be propagated by "bulb cuttings" (wedgeshaped slices) kept in wet sand, and from seed. Reports vary as to how long it takes to produce a blooming amaryllis by these methods.

My amaryllis are now (November, 1976) "resting" in the shade on a cool sunporch (50°F. minimum temperature) and are getting no water, yet many of the leaves are still green and thrifty looking. I've just examined these plants; and, in addition to the three that bloomed last season, there is one that looks as if it will almost certainly flower this coming winter, and there are two more which, with luck, will come into bloom the following season. This coming summer, if I see signs of serious crowding in the plastic pot these plants are now in, I'll move them intact to a still larger pot. For some months now I have been thinking that if one had a big enough container—and enough help in moving it around—one could eventually have a small "plot" of indoor blooming amaryllis.

As a result of my rather accidental discovery that several amaryllis plants can happily co-exist and bloom in the same container, I have done a good deal of reading about this plant and have discovered that in Florida amaryllis grow and multiply as outdoor perennials. And

another source adds: "In the South the foliage, except when cut down by frost, is evergreen." I am now tempted to get another amaryllis bulb and keep it "going" continuously, without any rest period at all. If watered, fertilized, and kept in sunshine on my sunporch during the entire winter, it ought to behave just as it would "in the South"—or even better because I can be sure that the leaves will not be nipped by frost, since the temperature there is automatically controlled so that it never goes below 50°. But a bulb so treated would probably not bloom until late Spring. After all, one must remember that we get amaryllis to bloom during the winter by *forcing* them, i.e., bringing them from a cool atmosphere into a much warmer one. But I think it still might be interesting not to force an amaryllis and see what happens.

In the amaryllis literature one occasionally sees reports by amateur growers that their plants bloom twice, or even three or four times, a year. One authority disposes of this claim as follows: "The amaryllis (*Hippeastrum*) does not bloom more than once a season. Strong bulbs will sometimes produce more than one flower scape, however. If your plant blooms every 3 or 4 months, it is something other than *Hippeastrum*. There are many bulbs of the amaryllis family (*Amaryllidaceae*) with varying characteristics."

This is not the place to discuss the various species of amaryllis—wild and hybridized; but it is worth noting that "all species of amaryllis are natives of tropical and subtropical America, with the exception of one, *A. reginae*, which is also found in Africa." *Amaryllis reginae* is distinguished by the fact that it has a solid stem, whereas the stem of *A. hippeastrum* is tubular. After the latter plant has bloomed, the stem, as it withers, turns yellowish and then brown. To preserve the attractiveness of the plant, cut the stem off and discard it.

Yet in all that I have read the only reference I have found to growing amaryllis as house plants in this way

is the following: "I have . . . heard of instances where the small bulbs were not repotted, but were allowed to remain beside the mother plant in a larger container. Thus there might be several amaryllis blooming in the one pot." This is precisely the situation I have and think the effect is sufficiently remarkable to be worth describing and documenting with a photograph. Two, three, or more amaryllis simultaneously blooming in the same pot constitutes a very unusual and striking sight and is sure to be a "conversation piece." Yet anyone who can successfully grow and bloom one amaryllis bulb indoors can, if he or she wishes, easily produce the same effect by following the procedure here described.

Although there are few, if any, plants that produce more spectacular blooms than does *Amaryllis hippeastrum*, it has one disadvantage: its flowers achieve and hold their full splendor for only two or three days and then begin to fade. Since amaryllis blooms only once a year, one sometimes wonders if this one brief, although spectacular, show is worth the price of admission. In one of the sources I have been reading, an excellent suggestion is made: Once an amaryllis comes into bloom, put it in a place where it will still have several hours of sun each day but where the ambient temperature is several degrees lower (and the humidity higher) than the situation in which it was induced to bloom, several weeks earlier than it otherwise would have. I have never resorted to this expedient, but intend to do so the next time my plants bloom. I shall put them back on the cool sunporch, and I have no doubt that the blooms will maintain their regal beauty for a week or longer. This year, for the first time, I have florabunda roses growing and blooming on this porch, and I notice that the blooms last, not just a few days, but two or three weeks. The same strategy ought to work, regardless of whether you have only one or more blooming amaryllis bulbs, in single containers or a small "garden" of them.

# The Worth of Gardening

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Years ago, one of America's leading poets of the outdoors, the late Lew Sarrett, spoke to the Men's Garden Clubs of Chicago. In his early life, Sarrett had been a forest ranger, loving the open and its beauty. As his sensitive poetry became better known, he was asked to join the faculty of Northwestern University.

Almost in self-defense he began to garden, finding in that hobby a contact with nature which had been so important to him early in life. In speaking of his need for contact with growing things, he defined gardening in a way which might well serve as a credo for all gardeners:

*"Gardening is a way of life, a happy and a pleasant way, opening up a world so rich and so rewarding that only those whose hands have been thrust deep in garden loam can hope to fully know its pleasures and delights."*

It is this world, so unknown to many Americans for which we must speak, and which we must persuade others to share. Gardening is important because it satisfies a human need all but impossible to meet by any other agency. It gives to those who take part in it a purpose, a reason for living. Lest that sound like hyperbole, let Mark Twain tell us of the other side of the fence:

*"Myriads of men are born; they labor and sweat and struggle for bread; they squabble and scold and fight; they*

*scramble for mean little advantages over each other. Age creeps upon them; infirmities follow; shames and humiliations bring down their prides and their vanities. Those they love are taken from them and the joy of life is turned to aching grief. The burden of pain, care, misery grows heavier year by year. At length, ambition is dead, pride is dead, vanity is dead: longing for release is in their place. It comes at last, the only unpoisoned gift that earth has for them—and they vanish from a world where they were of no consequence; where they had achieved nothing; where they were a mistake and a failure and a foolishness; where they had left no sign they existed—a world which will lament them for a day and forget them forever. Then another myriad takes their place and copies all they did and goes down the same profitless road and vanishes as they vanished—to make room for another and another and a million more myriads to follow the same arid path through the same desert and accomplish what the first myriads and all the myriads that came after it accomplished—nothing."*

If Mark Twain had been writing today, he could not have come closer to drawing a portrait of too many present-day Americans—men and women struggling to survive and exist, only to find that the burden of making a living leaves them without purpose, without accomplishment, without a sense of belonging to the world around them. Nothing they have done will sur-

vive the brief memory they leave with their next-of-kin—a memory that will pass as they too join them in death.

We who garden might well pity them, for we need not share their sense of frustration and futility. As we work the soil, we enjoy a great opportunity to leave a better world than we found. How many ways are there that we can make an imprint on the world—to survive in memory beyond the generation we have touched.

You may write a book. It will be one of thousands published this year, one of millions that were written in the past. Of these, less than one in a hundred thousand survives past the year of its appearance. Have no illusions about the imprint of time on books: few are remembered for as long as a decade.

Even so solid a monument as a great building is today but a passing lump on the earth: the masterpiece of today is tomorrow's rubble.

It would be possible to go on naming deed after deed which seems to make a permanent mark on the world, yet none of these, except for the few destined for astral glory, will survive for more than a moment. Yet thru gardening, man can create something that will go on long after his life is over. This does not imply his name will be remembered, but in contributing to a better, more beautiful world, he will at least avoid the sense of frustration that comes from knowing he has left

nothing behind.

The gardener can leave behind at least one memorial that will probably outlive any building of wood or stone, or monument of marble or bronze, a memorial that costs practically nothing to set up and that will increase in size and importance with each passing year.

That monument is a tree—a living, growing reminder to the citizens of the future that those who lived before them gave thought for the morrow. Planting a tree is perhaps the most considerate, the most unselfish act the gardener can perform. Few of us will live to see a sapling we have planted become a vast canopied oak, a glorious maple golden and scarlet in the autumn sun, or an awesome beech sheltering our grandchildren with its shade. We are planting for tomorrow and again tomorrow, with the hope that if the world can be spared from holocausts, our simple acts will serve generations yet unborn.

We face a new era—the beginnings of a third century of freedom. I have a conviction that gardening can serve us well in filling the new hours of freedom already promised in the three-day week, earlier retirement and the many hours in this age of new leisure. Think of these hours as filled with color and with new life upwelling from the earth. As gardeners, we face a brave new world: what we do with it lies in our own hands.

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## Orchids

to 600 fc or less, eight inches or more below the source. This encompasses the low-light range suitable for phalaenopsis and paphiopedilums and accommodating to many orchids from the medium-light range. Various types of high-intensity tubes whose wattage is much greater than normal tubes may be used successfully for an intermediate light range collection. High-light range orchids, such as vandas, dendrobiums and cymbidiums, are the least successful choices for any type of fluorescent light culture, although, as is the astonishing case with orchids, some individual plants may adjust with surprising ease to fluorescent lights and flower well, though not so abundantly as under greenhouse culture.

Most homes cannot provide the basic 50% humidity required for orchids. Since most fluorescent light orchid collections remain small, humidity will not usually be created by the plants grouped together. Hence, it is imperative that a satisfactory home humidifier be introduced into the growing area during the "daylight" hours, or those hours during which the lights are turned on. Lights have a drying effect on plants, especially since the plants must be placed fairly close to the lights in order to stimulate the initiation of flower buds.

The position of the plants under lights is also a crucial factor for successful flowering. As we created mini-environments within the greenhouse, we may do the same with fluorescent lights. Light intensity diminishes toward the end of the tubes, and as the distance between the tubes and the plants increases. Thus, less light-demanding plants such as seedlings, paphiopedilums and phalaenopsis may be situated at the ends of the tubes or six inches or more below the tubes. More light-demanding orchids should be situated directly under the center of the tubes with the leaves as close to the tubes as possible. Should the leaves actually touch the tubes, they may burn.

There is one major restriction in fluorescent light orchid culture. In greenhouse culture there is relatively little difference in light intensity between the top and bottom of the greenhouse. Fluorescent light set-ups, however, lack the height dimension, and flower spikes, eventually reaching ten or more inches on many plants, may tend to grow into the lights. Many growers, therefore, find it advantageous to grow their plants on raised platforms or inverted pots and then lower them as the flower spike elongates.

Temperature is equally crucial in fluorescent light orchid culture. A ten-degree drop in temperature from day to night is essential, and the maximum night temperature should be no more than 60°F, preferably less. This is difficult to provide in most homes, whose thermostat setting at night may be no lower than 65°F. High

night temperatures will retard, weaken or diminish flowering entirely. An open window at some distance from the plants in the cellar area may remedy this problem. A lower setting on the thermostat for plants growing in the living area may be a necessary sacrifice in consideration of energy conservation.

The duration of the period of light is important for good flowering. Since the maximum light intensity for most fluorescent light set-ups will be 1200 fc at any given moment, compared to 6000 fc in a greenhouse, lights must be turned on for a minimum of 14 hours per day in order to accumulate sufficient light. Some attempt is made to regulate this duration to normal day length, never dropping below 12 hours per day. More than 16 hours of light per day may impede adequate flowering.

With fluorescent lights the days are always "sunny". The light intensity of the tubes does diminish, so it is beneficial to change tubes every 8 months.

Summer is a difficult time for fluorescent light collections due primarily to the heat. Many growers summer their orchids out of doors under trees or beneath a lath structure, taking advantage of the natural conditions.

### Windowsill Culture

The greatest difficulty in windowsill culture is providing an adequate light source. A southern, western or eastern exposure window will usually be adequate for all low-light plants and many intermediate-light plants, provided that trees or other obstructions do not diminish the light appreciably. Growers may take advantage of the entire area of a window by hanging a sheet of hardware cloth from top to bottom and placing orchids, particularly miniature types, over the entire area. In effect, you create a small greenhouse through the advantage of height not available in most fluorescent light set-ups.

A northern exposure is least useful. If this is the only choice available, supplementary lighting will be called for.

The types of orchids you can grow successfully, the varied colors, perfumes, blooming and vegetative habits, make this one of the most interesting of all plant families. There are over 300 orchid societies throughout the world, ranging from 10 to over 1000 members. In the United States, the focus of orchid interest revolves around the American Orchid Society and its monthly *Bulletin*, published at the Botanical Museum of Harvard University, Cambridge, Massachusetts 02138.

Though appearing far back in the 19th century, orchid culture is just beginning to reach its potential today. In the surging interest in general horticulture, orchids will play an increasingly significant role. More and more people, astonished at their variability, the incredible display of forms and colors, the relative ease of culture, suitability for the home and greenhouse, will start to grow orchids and embark on a satisfying and fulfilling lifetime hobby.



# Gardeners' Questions & Answers

By Tom Stevenson

**Q:** Is there any good research to support the belief that chemical fertilizers are not as good for producing food crops as organic ones?

**A:** According to Dr. W. H. Allaway, head of the Plant, Soil and Nutrition Laboratory, USDA Agricultural Research Service, Ithaca, N. Y. repeated research has shown that there is little or no difference between the two, provided both contain the necessary elements.

"There is no laboratory test or animal feeding trial that will distinguish between crops grown with inorganic (chemical) or with organic fertilizers," he says. "The principal benefit from adding such organic materials as farmyard manure, composts, crop residues, sewage sludge, and peat is that these materials nearly always improve the physical properties of the soil."

The food-production systems of the future will most certainly include a combination of organic and inorganic fertilizers, says he, and there appear to be very promising opportunities to improve the nutritional quality of plants and to develop systems of soil management and crop production that will yield crops of even better nutritional quality than the best crops available today.

In order for people to remain healthy, he said, their diet must contain at least 14 vitamins. Plants that grow normally and produce satisfactory yields can be expected to contain normal levels of whatever vitamins are characteristic of that species and variety.

**Q:** I have a snake plant (*Sansevieria trifasciata*) with a pretty flower on it and everybody I tell about it thinks I'm nuts. They say it does not bloom. Is my plant something pretty unusual?

**A:** It is pretty but not unusual. There are about 34 different species of *Sansevieria* and all of them have been known to bloom.

There are different theories about the conditions that encourage them to bloom. One is they should be given a rest period of 6 to 8 weeks in late summer or early fall during which they are given no water at all. This practice has been tested repeatedly and sometimes it results in flowers and sometimes it does not.

The ones that seem to bloom more often are the ones that receive good care. During the growing season give them good light and water when the soil gets dusty dry on top (usually every week or 10 days). During the winter months water only about every 3 or 4 weeks. Fertilize every three months during the growing season (three times a year).

**Q:** My peonies had only a few flowers on them this year. What can I do to make sure I get plenty of blooms every year?

**A:** One of the main reasons peonies fail to bloom is because of poor care during the summer. The food for initiation of growth and flowers is produced during the summer and early fall, and stored in the roots. The food is produced by the leaves (photosynthesis).

Plenty of healthy foliage is essential for good food production. If the peonies have to compete with weeds or other plants, if the plant suffers from want of water during dry weather, if the foliage is partially shaded by the branches of trees or shrubs, food production will be low and flowering correspondingly poor the following spring.

**Q:** I have a miniature orange tree, it is about 16 inches tall, has a 12-inch branch spread and is in a 5-inch pot. Does it need a larger pot?

**A:** It probably does. Turn the plant upside down, tap the rim of the pot on the table to loosen the ball of soil and let it slide out (instead of pulling it out with your hand). If roots can be seen and are matted together and crowded, the plant needs repotting. Put it in the next size larger pot (in this case a 6-inch pot). Water the plant a few hours before repotting. This reduces the risk of root injury during the repotting operation.

**Q:** I want to get some house plants but am afraid they won't do much for me because I can't give them very good light. Are there some that need less light than other?

**A:** Here are some that have rather low light requirements (the light should be good enough to read fine print): Chinese evergreen (*Aglaonema simplex*), Cast-iron plant (*Aspidistra elatior*), Bamboo palm (*Chamaedorea erumpens*), Parlor palm (*Collinia elegans*), Jade plant (*Crassula argentea*), English ivy (*Hedera helix*), Tricolor bromeliad (*Neoregelia carolinae*) and Snake plant (*Sansevieria trifasciata*).

Without adequate light, the plant is unable to produce sufficient food (photosynthesis). Thus the plant must utilize stored food, and deterioration of plant quality occurs until reserves are exhausted and death occurs. Flowering plants need more food (energy) than foliage plants and thus more light, because generally with more light more food is produced.

Many foliage plants, however, are native to tropical rain forests and suffer when placed in full sun. Light duration is as important as light intensity, since the total amount of light received is the product of intensity and duration. The longer the plant is lighted, the more food produced, and inadequate light intensity can be compensated for by giving light for longer periods (12 to 14 hours) each day. This can be done with artificial light (preferably fluorescent lamps).

Continued on page 43

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# BOOKS

Reviews by Tom Stevenson

## HORTUS THIRD

A concise dictionary of Plants  
cultivated in the United States and  
Canada

by

Staff of L. H. Bailey Hortorium, Cornell  
University

Macmillan Publishing Co.

New York-1976

1344 pages, 260 illustrations, \$99.50

This is the book for which all horticulturists have been anxiously waiting. It has taken the staff of the Bailey Hortorium twenty years to write and produce. In the 35 years since Hortus II was published, botanists have been busily engaged in research, changing names and describing new plants. Others have been hybridizing and introducing new plants to America from all over the world so that the old Hortus II has become very much out of date.

The staff of the L. H. Bailey Hortorium of Cornell University obtained the services of over 90 botanists in writing Hortus III, deleting the names of species and varieties no longer correct, and adding the names and descriptions of thousands of new plants in order to make this the standard reference of plants now being grown in the United States, Canada, Hawaii and Puerto Rico. No other volume as complete or up-to-date is available.

The new system of horticultural nomenclature has been used. Nearly 24,000 families, genera and species have been described together with thousands of varieties too numerous to mention. Like other botanical texts it contains a glossary of botanical terms and helpful explanatory drawings, but most important for the horticultural public, a list of over 10,000 common plant names with their botanical equivalents. A glance through this list shows which common names have been used for more than one plant, thus giving invaluable information that is not easy to find elsewhere.

Horticulturists will find that the first letter of some specific names are still capitalized (this for some botanists who want this information) but in the introduction is the extremely important statement that it has been agreed that such names can be properly written without such capitalization. Some of us have wanted this for a long time!

Hortus III brings the plant nomenclature of cultivated plants grown in America up to date. Thirty five years of

changing names has been summarized, thanks to the efforts of the numerous botanists working on the project. It will remain the standard reference of the cultivated plants in America for many years to come. All horticultural writers, nurserymen, landscape architects and gardeners will follow it as the best up-to-date source of plant nomenclature and description, in one volume, available today.

Donald Wyman

## THE MASTER BOOK OF IKEBANA

by

John March-Penney

Two Continents Pub. Group

New York, N.Y.-1976

176 pages, superbly illustrated, \$16.95

The author first became interested in the arts of Japan about 40 years ago. After his retirement he studied art at St. Martin's School of Art. Later he began a serious study of Ikebana under the tuition of Stella Coe, the first Englishwoman to qualify as a Flower Master. Then he went to Japan where he studied the traditional methods at Japan's most famous schools. In 1965 he obtained a Teacher's Diploma from the Sogetsu School in Tokyo. He also became an exponent of the Ichiyo School following his studies with Mrs. Joan Lutwyche of the Tokyo Ichiyo Academy of Floral Art.

March-Penney has traveled extensively in Japan and has lectured and demonstrated all over the United Kingdom.

Beautifully illustrated, with expert photographs taken by his wife, Janet March-Penney, the book conveys the author's enthusiasm and delight for this ancient Japanese floral art form. With approximately 100 color photographs and 150 black-and-white prints, it vividly demonstrates the various types and sizes of arrangements, gives guidelines for choosing containers, tells of the cultural heritage of Ikebana and of the importance of symbolism in what can be called the art of plant sculpture. Simplicity, says the author, is the secret of good Ikebana.

He starts by describing single flower arrangements, covers Moribana, arrangement in a shallow bowl, Nageire, arrangement for pots and vases, Chabana, the flower arrangement for the tea ceremony and what it signifies.

He advises on selecting material to use, and has a chapter on the modern variation called Morinomo in which fans, decorative stones, branches and flowers, miniature fish traps, and certain Japanese dolls are used. In Morinomo, water is suggested by brushing fine white sand with swan, heron or crane feathers (each for a specific use).

There are currently more than 200 chapters of Ikebana International, most of them in the United States. They meet regularly to trade experiences, and hear Japanese artists and Ikebana masters from the various schools speak and display their own works.

## WEEDS IN WINTER

by

Lauren Brown

W. W. Norton & Co.

New York-1976

253 pages, Well illustrated

The author is a graduate of Swarthmore College and the Yale School of Forestry and Environment. She has taught plant identification at Yale University and lives near New Haven.

This book is a guide to identifying dried weeds and wildflowers in winter, she says. Books have been written which enable people to identify trees in winter, or wildflowers in summer, but, until now, there has been no way to identify the dried herbaceous plants that proliferate throughout the countryside, so often admired and collected by people on their winter walks.

This guide identifies over 135 of the common species found in the Northeast quarter of the United States, from the Atlantic west to Minnesota, and from Canada south to Virginia. You don't need to be a specialist to use and enjoy this book, just a lover of nature in all its seasons, says she.

You have probably picked these dried things and brought them into your home for decoration. You may even have gone to a gift store and paid outrageous prices for something you could have picked along the edge of a turnpike. If you ever tried to identify any of these plants, you probably found your books useless.

This book is intended to take care of that, she says. It is written for the lay person.

Continued from page 39

**Q:** My neighbor had two trees cut down and I have a lot of sawdust as a result. Can it be used generally for mulching without making the soil too acid?

**A:** Sawdust is an excellent material for mulching vegetable and flower gardens, for strawberries, berry bushes, trees and shrubs.

Studies conducted at the Connecticut Agricultural Experiment Station over a 5-year period showed that the sawdust had no appreciable effect on soil acidity. The final effect of sawdust is to help maintain or slightly increase the alkaline reaction of the soil.

Used as a mulch (about one inch deep) sawdust reduces the crusting of soil, improves the germination of seed and the emergence of the young plant; according to Dr. Wesley P. Judkins, recently retired professor of ornamental horticulture, Virginia Polytechnic Institute. It also helps rainwater move into the soil, helps control weeds, conserve moisture, keep the soil cool during hot summer months, prevents the soil from freezing deeply during winter and the yield of the crop is increased and quality improved, he says. If plowed or spaded into the soil after it has served as a mulch, heavy soils become lighter and easier to work and light soils have a higher water-holding capacity.

Sawdust, autumn leaves and straw have too high a carbon/nitrogen (C/N) ratio, 30 parts carbon for each part of nitrogen, or a C/N ratio of 30. Most fertile soils have a C/N ratio of about 10.

The excess carbon as carbohydrate furnishes the soil bacteria (which bring about decomposition) a great deal of energy food. With this food, which acts like sugar, they increase enormously in numbers. They take nitrogen and phosphorus out of the soil which otherwise would be available for plants. To compensate for this, a fertilizer such as 10-10-10 should be added to the soil along with the sawdust. The amount will vary according to the

situation, but usually two or three cups per bushel of sawdust is about right.

If the sawdust is composted before being mixed with the soil, the fertilizer should be added to the compost pile.

**Q:** All my gardening is done indoors, on the sill of a very large window with a northeastern exposure. Here my gloxinias are simply gorgeous. Can I reasonably expect them to bloom again next year if I keep the plants alive through the winter for the sake of the velvety green leaves? Or will it be necessary to store the bulbs, repotting them in the spring? I have no cool place to store them, only at room temperature.

**A:** Most types of gloxinia should be allowed to go dormant after they have finished blooming. Like most plants, they need a rest period, and it is unlikely they will bloom again if they do not get it.

The usual practice is to cut back on watering after the flowers are gone. When the foliage has died down, store the pot in a cool place (45 to 50°F). Don't water. In late February or early March repot the bulb and let it grow. It should be watered and fertilized, of course, and given very good light, but kept out of the hot sun.

If it is impossible to provide a cool place for the rest period, just wait and see what happens. You can always buy a new bulb and start all over again.

I have heard of plants rested at room temperature that started growth again but neither the foliage or flowers were very good. Nor is there any certainty they will start growth again.

**Q:** I have a 3-year old African violet that has bloomed all of that time but one month. At the moment it has 50 blooms. It has been transplanted twice and is in a 16-inch pot. I think it needs a larger pot. Can I do it now while it is in bloom?

**A:** An African violet plant in a 16-inch pot is very unusual. There are plants that have bloomed con-

Continued on page 44

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Continued from page 43

tinuously for years but for each one that does there must be hundreds or even thousands that do not. Shifting it to a larger pot is undesirable because as the pot gets larger and larger, the more difficult it will be to handle.

If it should become quite pot-bound and stop blooming, perhaps fertilizing and watering a little more often may take care of it. Why not wait and see what happens? If you prefer to put it in a larger pot, it can be done successfully while it is in bloom if done carefully.

**Q:** Will the presence of an old scrub apple tree in the neighborhood of some good bearing trees alter the quality of the fruit due to cross pollination? Should the tree be removed?

**A:** To get fruit from sweet cherries and certain varieties of apples, plums and pears, it is necessary to have more than one variety for cross-pollination. The pollen produced by one variety does not function on the stigmas (the sticky surface of the female organ which receives the pollen) of the same variety.

The fruit produced as the result of pollination is characteristic of the female parent regardless of the variety that furnishes the pollen. The seed within the fruit combines the characteristics of both male and female parents. For example, all the varieties of *Cucurbita pepo* (which includes some pumpkins and summer squash) will cross-pollinate.

It does not affect the flesh. But if you save the seed, you'll never know what you are going to get from them until you see and grow the plants that result.

It may very well be that the scrub tree is serving a useful purpose by providing pollen for the trees that are producing good fruit. On the other hand, it may be the scrub tree is not providing effective pollen and its removal would not change anything.

Continued from page 29

## Bush Fruits

The recommended varieties include 'Adams #1', 'Adams #2', 'York', 'Johns' and 'Scotia'. Some other varieties which are generally less desirable include 'Ezyoff', 'Kent', 'Victoria', and 'Nova', however 'Nova' is a heavy yielder.

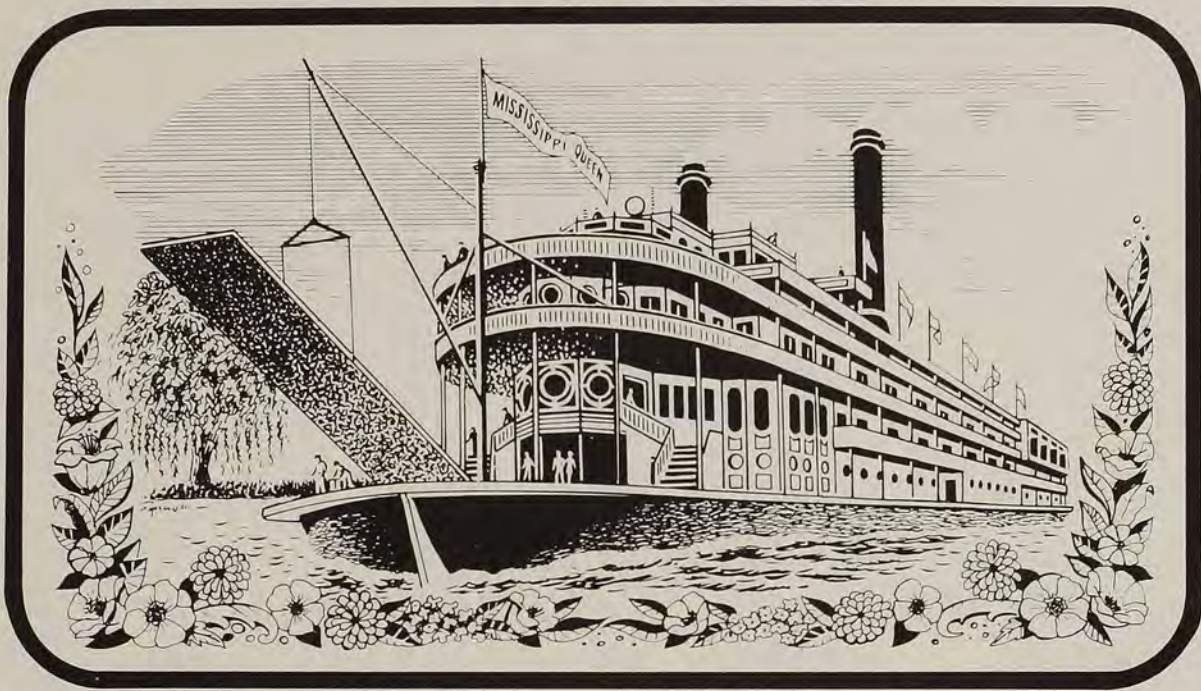
Birds are a serious problem for small plantings, therefore a protective netting is the only effective control measure. Cane borers and mildew may also cause problems.

### Juneberries

The Juneberry is commonly referred to as the shad-bush, serviceberry or Saskatoon. Many species related to the Juneberry bear fruit, however most of the present selections and varieties have been derived from *Amelanchier alnifolia*. These plants are extremely winter hardy and are found growing wild in the Great Plains northward into Canada. They thrive on a wide range of soil types, are propagated from seed or suckers. Plant growth habit may range from a dwarf shrub to a small tree, if the suckers are allowed to grow. The plants are among the first to flower in the spring. Fruits may vary in size from a small pea to 2 cm. in diameter. The fruit is generally purplish-blue to black with a heavy bloom resembling a blueberry. They are juicy, rather insipid or mild-flavored, and ripen in late June.

Cultural recommendations for the elderberry would apply. Some of the old varieties found in the trade include 'Shannon', 'Indian', 'Success' and 'Dwarf Mountain'. Through a selection program in Canada, superior clones have been released, but at present American nurseries have not propagated these plants in quantity. These new varieties include 'Smoky', 'Pembina', 'Forestburg' and 'Alt glow'. Fruit today is being used for making juice, jelly and wine and is grown where the highbush blueberries cannot be grown.

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