

Extension Bulletin 274

Revised June 1961

MN 2000

EB-274

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CARE OF house plants



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Agricultural Extension Service

U. S. DEPARTMENT OF AGRICULTURE

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Care of

HOUSE PLANTS

Richard E. Widmer

GROWING potted plants is one of the most popular indoor pastimes today. House plants provide color and beauty during the winter months, especially for holidays when entertaining is at a peak. Plants are now considered an important part of interior decoration.

In addition, the growing of plants in the home helps satisfy the gardening urge for those who cannot have outdoor gardens and for those who wish

to continue their horticultural activities during the long Minnesota winters. It also presents a challenge for even the most ardent outdoor gardeners.

Culture

The artificial conditions under which house plants are grown may present some problems. Selection of the proper type of plants for a particular home environment and a thorough understanding of their cultural requirements will simplify the procedure and insure a greater degree of success.

Soil mixtures. Since plants obtain water, nutrients, and air from the soil, the proper soil mixture is of utmost importance. Most flowering plants will thrive well in this mixture:

- 3 parts good garden loam
- 2 parts organic matter
- 1 part sand

Add bone meal or 20 percent superphosphate to the soil mixture at the rate of 1 cup to each bushel of soil. Rotted manure, leaf mold, compost, peat, or acid peat moss may be used as a source of organic matter.

If acid peat moss is used, substitute a cup of a 6-10-4 or a 5-10-5 fertilizer

for the bone meal or superphosphate. If the garden loam is heavy or clay-like, increase the proportion of sand. If the garden loam is light or sandy, omit the sand.

Foliage plants usually grow best in a soil mixture containing 50 percent organic matter. At least half of the organic matter used for foliage plants should be peat moss since most other sources may be too rich in nutrients. Acid peat moss should be used as a source of organic matter for acid-loving plants such as azaleas, camellias, and gardenias. A higher proportion of sand is advisable for cacti and succulents (plants with thick leaves or stems).

Fertilizers. Many more house plants suffer from an excess of fertilizer than from a lack of fertilizer. Symptoms of over-fertilization may include a slowdown of growth, stunted plants, burned or dried leaf margins, wilted plants, and dead plants, depending on the degree of excess. Symptoms of a lack of fer-

tilizer may include pale foliage, leaf loss, fewer flowers, or shortened and hardened plants.

When a good soil is used at potting time, most house plants will not need additional fertilizer for 3 to 4 months. Well established plants may need fertilizer every 5 or 6 weeks when actively growing. Do not fertilize resting or dormant plants.

The best way to apply fertilizer is in the liquid form. If a soluble fertilizer is used, follow the manufacturer's directions. If a dry garden type fertilizer such as a 6-10-4 or a 5-10-5 ratio is used, dissolve 1 teaspoonful in 1 quart of warm water. Stir well and preferably let stand over night before using.

When applying fertilizers in liquid form, use enough of the solution to wet the entire soil mass. Never apply fertilizer to a dry soil because root injury may result.

Acid-loving plants, such as azaleas, gardenias, and camellias, will develop chlorotic foliage if the soil is too alkaline. The chlorosis is corrected most quickly by adding a chelated iron product to the soil. In addition, the soil should be made more acid by adding iron sulfate or sulfur or by replanting in a fresh soil.

Containers. Glazed or unglazed earthenware, plastic, metal, or wood containers may be used if the soil is watered properly. Ordinary clay flower pots are porous and plants in such pots require frequent watering. Plants in nonporous containers should be watered less frequently to avoid a waterlogged soil.

Regardless of the type of container, a drainage hole in the bottom is advisable for the beginner. Take great care to avoid saturating the soil of containers with no drainage outlet. It is advisable to place coarse gravel or small pieces of broken flower pots in the bottom of such containers. Self-watering pots now on the market are satisfactory for some plants such as African-violets.

Watering. No time schedule can be followed in watering plants since the frequency of watering will vary with many factors such as weather, type and size of plant, and stage of growth of the plant. Most of the successful growers check their plants daily and water only when necessary. Usually the plant requires water when the surface of the soil appears dry. As a rule, the soil gets lighter in color when it dries, but some dark or black soils are deceptive. If in doubt, touch the soil to determine its moisture content. Also, a person who becomes familiar with different kinds of plants can detect when water will be needed by noticing, for example, the freshness, firmness, and general appearance of certain plants. Do not let the plants wilt.

Soak the soil thoroughly when watering, but do not water more often than is necessary. Overwatering encourages rotting of the roots. It is often noted in the foliage by a change in color from green to yellow and in extreme cases by spotting or drying of the foliage and even death of the plants. Lack of water



Fig. 1. Fiddleleaf philodendron growing on an upright support of fernwood. Plants in ordinary red clay pots can be placed in more attractive containers for a neater effect in the home.

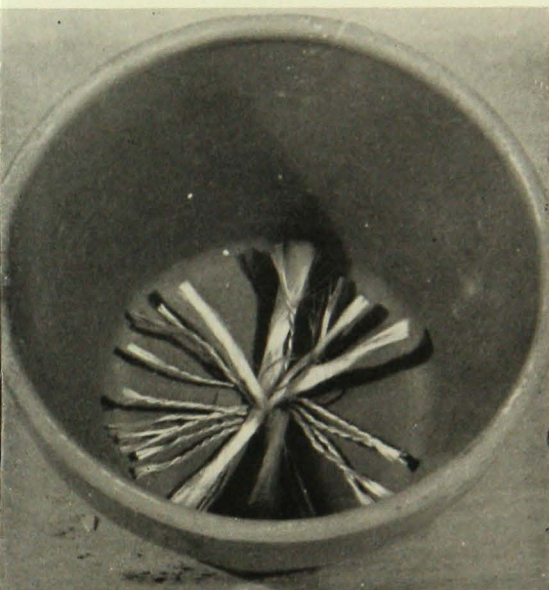


Fig. 2. A glass wick may be used for self watering.

can result in dwarfing, foliage spotting, leaf droppage, and eventual loss of the plant.

Temperature of the water used is especially significant. Do not use ice cold water, especially on tropical plants. Water should be of room temperature and applied in the morning whenever possible. It is advisable to avoid getting water in the crown of plants such as cyclamen and African-violets where it may encourage decay.

Watering from below is good since it wets the soil more thoroughly, but it is not essential. Do not keep the pot standing in water once the soil surface is wet, however. Plants can also be "self-watered" from below. Self-watering pots may be bought or they may be made in the home.

Some of them have a glass wick to carry water up into the soil. The wick is pulled through the drainage hole in the pot, unraveled, and spread in all directions on the bottom of the pot. The soil ball is then replaced in the pot, leaving out any drainage material such as broken pieces of pot. Then the soil

ball is firmed down to assure contact with the wick, and the pot is placed on a container that holds water. The lower end of the wick is inserted in the water.

The proper water level in the container must be determined from experience. If the soil is kept too wet, lower the water level; if the soil is too dry, raise the water level. The container should always have water. If the container dries up or if the soil in the pot becomes too dry, half submerge the pot in water for 30 minutes. This method of watering is not recommended for plants that prefer a relatively dry soil, such as tuftroot, cacti, and succulents.

Fertilizer salts will accumulate at the surface of the soil and on the pot rim when plants are watered from below. The excessive accumulation of such salts may be prevented by flushing the soil from above several times a year. Discard the water that drains out of the bottom of the pot during flushing.

The prolonged use of water from a water softener usually results in poor plant growth. In such cases, repot the plant in fresh soil and water with water that does not come from the softener. Quantities of chlorine and fluorine contained in some city water supplies are not injurious to plant life.

Aluminum foil is sometimes used as a pot cover for gift plants. Puncture the foil just below the drainage opening in the flower pot to help provide good drainage.

Humidity. The humidity in heated homes in this area is quite low during the winter. Some means of increasing the humidity of the air in the home will definitely aid plant growth. Many house

plants will benefit from a regular spraying with clean, soft water at least once a week. Growing plants on a waterproof tray that contains moist sand, crushed rock, or colored pebbles will also help solve the humidity problem, but be sure the pots themselves are not setting in water. Plants requiring a very moist air should be planted in a terrarium. See page 44.

Ventilation. Proper ventilation is more essential for human beings than it is for plants, but sudden temperature changes and drafts should be avoided. Many house plants are especially sensitive to small quantities of escaped gas in the atmosphere. Avoid careless lighting, poor combustion, and slight leaks in gas ranges. Poor combustion in coal furnaces and kerosene heaters can be equally harmful. Tomato plants, African-violet blossoms, or fresh cut carnations are good gas indicators. The tomato plants will droop and twist abnormally and the foliage will turn yellow; African-violet blooms will shrivel and drop prematurely; and the carnation flowers will "go to sleep" (petals will fold upward and inward).

Such plants are affected by gas long before humans detect it. Pure ethane, butane, and propane are not injurious to plants. Natural gas in itself is not harmful to plants, but manufactured or blended mixtures of natural and manufactured gas are toxic to plants.

In light, plants discharge oxygen and take carbon dioxide from the air. At night the process is reversed but the quantity of carbon dioxide given off by plants is so minute that it is of no significance. Plants need not be removed from sickrooms or bedrooms at night.

Temperature. Adverse temperatures account for the failure of many house plants. Most plants will grow well in a day temperature ranging from 65° to 75° F., but night temperatures should be approximately 10° F. lower. Flowering plants, with the exception of a few such as African-violets, gloxinias, and poinsettias, will last much longer at

night temperatures as low as 50° F. regardless of the conditions. Foliage plants, most of which originated in tropical areas, generally prefer day temperatures up to 80° F. and night temperatures between 60° and 75° F.

In some instances it may be well to transfer plants from a warm room to a cool place at night. During the cold period of the year, plants located near windows are subject to much lower temperatures than plants in the remainder of the room. In the case of green foliage plants requiring high temperatures, it will be wise to protect them in some way such as pulling shades or drapes or placing newspaper between the plants and the window.

Keep plants out of cold or hot air blasts and away from hot air registers, radiators, open windows, and doors (in winter) and air conditioners (in summer).

Specific temperatures for inducing flowering on some plants such as the Christmas cactus are discussed under specific plants later in this bulletin.

Light. Light conditions in the average home are poor—light coming from one side only and often in small quantities. A plant growing in a sunny window or strong light can stand higher temperatures than can the same plant growing in poor light. Excessively high temperatures and low light intensity form a fatal combination.

Some plants require more light than do others, so keep this factor in mind when choosing a plant for a particular location. Flowering plants usually require sunlight or bright light most of the day. Although foliage plants will thrive in less light, their location should be bright enough to permit reading of a newspaper most of the day.

Symptoms of insufficient light include small leaves, long thin stems, poor color, weak growth in general, and failure to flower.

If plants are desired in relatively dark locations and artificial light is not used, their attractiveness and life span

may be increased by rotating them with plants grown in lighter parts of the home.

It has been shown that some plants such as African-violets can be grown under artificial light (see page 40). The use of artificial light to supplement natural daylight may keep plants thriving for longer periods when they are grown in dark locations.

Training. Pinching of the growing tip of many plants at the proper time will produce stockier, more shapely plants. Geraniums, begonias, coleus, and ivies will illustrate this point. Plants such as ferns, tulips, lilies, and African-violets do not require pinching, however.

Older plants may often require pruning or shearing to keep them within bounds and to maintain a favorable shape. Train trailing plants to follow a support when growing; don't wait until they are too large to tie up. Not all trailing vines require support since the cascade effect is often desirable.

Materials used to support vines and other trailing foliage plants include fernwood, cork, driftwood, pecky cypress slabs, and plastic poles. Some persons may prefer to fill a chicken wire cylinder with sphagnum moss. If a small flower pot is placed in the top of the cylinder, it can be filled with water occasionally to keep the moss moist. Aerial rootlets of philodendrons and similar plants will then penetrate the moss.

Occasionally plants trained to the shape of a tree are desired. Such plants are started by limiting the plant to one trunk and staking for support, if necessary, and removing the side shoots soon after they appear. The terminal is pinched once the plant reaches the desired height. Plants so handled include geraniums, fuchsias, and standard (large-flowered) chrysanthemums. Very good light conditions are needed to produce such plants in the home.

Summer care. Many house plants thrive better and are easier to care for outdoors during the summer if they



Fig. 3. A tree geranium supported by a green stake. The variety is *Enchantress Fiat*.

are adaptable to outdoor conditions. They can be grown on porches or terraces or in the garden border. However, African-violets, gloxinias, and a few other tender plants should be left indoors all summer.

In areas of the state where summer nights are quite cool, keep plants indoors if they require temperatures of 60° F. or more. A great many plants can be carried through the summer with a minimum of care by sinking the pots to the rims in the garden border, remembering to respect the light requirements of the various types of plants. Flowering plants usually prefer a semi-shady location at this time of the year.

Set the plunged pots on a base of gravel, clinkers, or sand to insure good drainage. Lift or twist the pots once a month to discourage rooting through the drainage hole. A location protected from strong winds is also to be desired.



Fig. 4. A ti plant with the pot and soil wrapped in plastic to conserve moisture while the family is away.

Before the nights become cool in late summer or autumn lift the pots and repot the plants if necessary before returning them indoors. Do not return diseased or insect-infested plants to the home.

Fast growing plants which are fairly easy to propagate, such as fuchsias, geraniums, and coleus, may be planted directly in the border. New plants raised from summer cuttings will produce house plants for the following season.

Leaf-polish. Dusting or washing the foliage of house plants improves their appearance and frequently results in better growth. Numerous leaf-polish products on the market are recommended for use only on firm leaves, such as those of most foliage plants. It is preferable to dust the leaves before applying such products.

Leaf polishes are often used to mask hard water residue on the foliage. They are usually some type of plant wax, and give the plants an extra shiny appearance. Always follow the manufacturer's recommendations and apply when the soil is moist to lessen the possibility of plant injury. If plant toler-

ance is doubtful, apply to a few leaves first. If no injury is evident within a week, the entire plant can be treated.

Vacation care. Many persons enjoy a vacation away from home for one or more weeks each year, and the care of house plants may present a problem on such occasions. The simplest procedure, where many house plants are involved, would be to have a friend check the plants for watering needs at regular intervals. If only a few plants are involved it may prove easier to move the plants to a friend's home or to place the plants outdoors in a protected location during the summer vacation.

If none of the above suggestions is practical, the pots may be wrapped in polyethylene plastic, fastening the plastic around the base of the plant to reduce water loss from the soil. In such instances the soil is thoroughly watered before wrapping. An alternate method would be to place the house plants in a group, water thoroughly, and surround the pots with moist sphagnum or acid peat moss. This procedure increases the humidity of the surrounding atmosphere and keeps the soil moist for a longer period.

Repotting. Plants obtained from the florist in full bloom usually do not require repotting until they have completed their growth and are ready to enter another growing period. Repotting will be necessary when the plant top outgrows the pot and there is not enough room for the roots.

If a plant requires water more often than once every 24 hours, it is safe to assume that a larger pot is required. Some plants require repotting annually, while slow growing species may require only the replacement of a little of the topsoil with fresh soil.

In repotting, remove the shoulder of soil around the top and also any loose soil. To remove the soil, use a gradual squeezing motion to avoid breaking the tender young white roots. The appearance of the plant and pot in combination should help determine the proper



Fig. 5. The artillery plant in pots that are (left to right) too small, proper size, and too large.

size pot to use. Clean pots only should be used.

Broken pieces of flower pots, gravel, or similar material may be placed in the bottom of the pot for drainage. When using a piece of broken flower pot over the drainage opening, face the convex side up to avoid plugging the opening. The only benefit obtained from the use of charcoal in the bottom of the pot or in the soil is to maintain good drainage.

When shifting to a larger pot place some soil in the bottom of the pot and firm the soil around the old root ball. Leave enough room in the top of the pot for proper watering ($\frac{1}{2}$ inch for a 4-inch pot and 1 inch for an 8-inch pot).

Water the soil thoroughly at first. Do not water again until the soil dries out on the top.

Rest periods. Most house plants pass through seasonal growth cycles as do outdoor plants, although the cycle is not equally apparent with all plants. In general, water and fertilizers should be reduced or withheld entirely during periods of low activity. More detailed information is provided on specific plants later in this bulletin.

Propagation. Most house plants are propagated by cuttings. Terminal or stem cuttings are the most commonly used types. Leaf cuttings employing only a portion of a leaf may be used

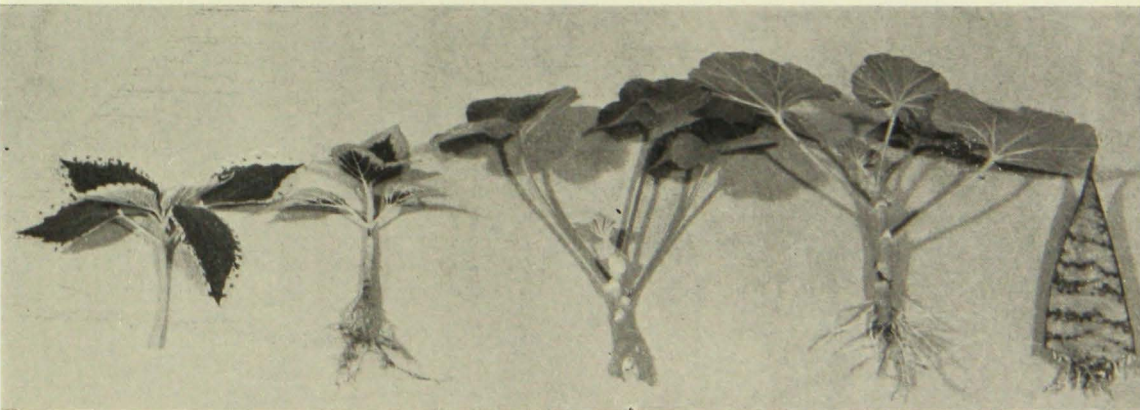


Fig. 6. Coleus, geranium, and snake plant cuttings. The coleus and geranium are seen unrooted and rooted ready for potting.

for plants such as the rex begonia, bryophyllum, sedum, and sansevieria. Leaf petiole cuttings are used with the African-violet, peperomia, Christmas begonia, and gloxinia. Leaf bud cuttings which include a portion of the stem to which the petiole is attached are used with philodendron, English ivy, Japanese grape ivy, and others.

Cuttings may be rooted in clear sand, vermiculite, a mixture of peat moss and sand, or vermiculite and sand, or in some instances, water. Rooting of some cuttings may be rather difficult in the home because of the low humidity unless some type of propagating case, terrarium, or cover is used. Large glass jars or plastic bags may be used to cover the cuttings if excessive condensation is not allowed to accumulate.

Ordinary window glass about 9 inches in height may be used to enclose the area above a flat. Seal the cracks with transparent adhesive tape to avoid drafts and to keep the glass in place. Cover the top of the case with two pieces of glass which may be moved to

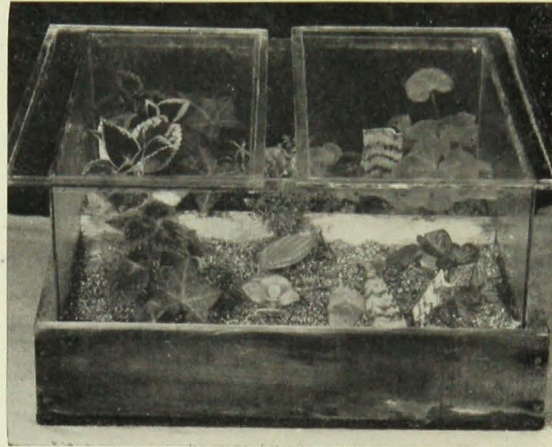


Fig. 8. A simple propagating case which makes it easy to root cuttings in the home.

increase or decrease ventilation. Bottom heat, which usually speeds up the rooting of cuttings, may be supplied by a 5-watt bulb placed in a flat lined with aluminum foil. Place this flat under the flat used for propagation.

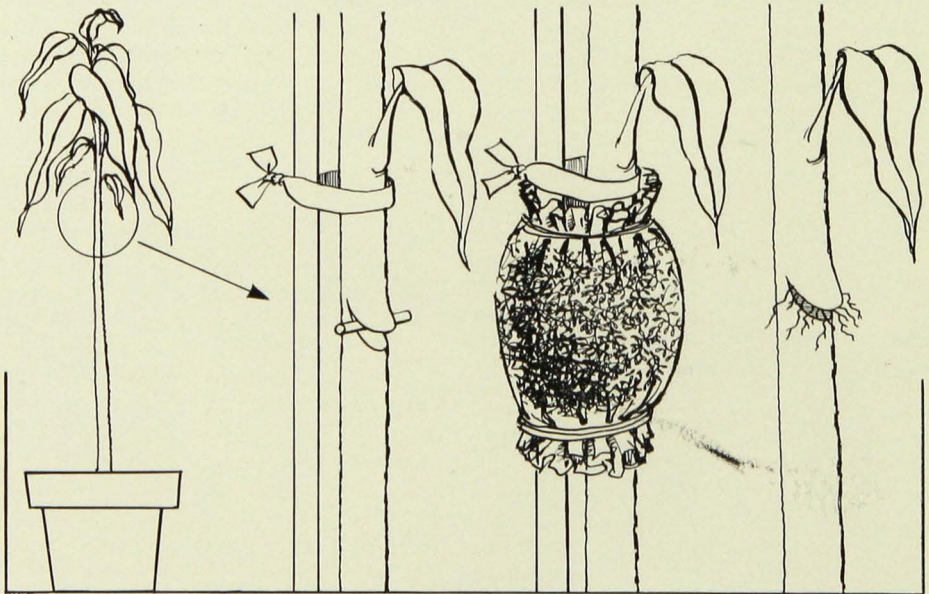


Fig. 7. The steps in air layering.

The temperature of the rooting medium should not exceed 75° F. Check the temperature with a thermometer. Don't place such structures in strong sunlight.

A limited number of plants such as ferns, maranta, and African-violets may be divided to increase the number of plants. A number of others including annuals, asparagus fern, and cacti are propagated by seed.

Large-leaved plants with stiff or woody stems, such as tuffroot, dracaena, some philodendrons, and ficus, may eventually grow too tall and become unattractive. Such plants are often difficult to propagate from cuttings in the home, but they may be renewed by air layering. This process allows a portion of the plant to root while it is still attached to the parent plant.

A cut is made a little more than one-half-way through the stem at the point where roots are desired. It may be necessary to tie the stem to a stake for support. The cut is propped open with a pebble, match stick, or similar item. Surround the area of the cut with moist, not wet, sphagnum moss and cover with a piece of polyethylene plastic. Remove the plastic and some of the moss when the roots are visible under the plastic. Then sever the "rooted cutting" from the parent and plant it in soil.

Control of Insects on House Plants

L. K. Cutkomp

House plants may become infested with any of several kinds of insects and mites that thrive in the favorable temperature and growing conditions found in the average home. High temperatures are particularly favorable to most insects. Rapid reproduction is very apparent among spider mites. These pests may be brought into the house on newly acquired potted plants or on cut flowers.

During the warm weather they can easily enter through opened doors and windows or may occasionally be brought in from the outdoors on clothing. In time, they multiply and spread to other plants in the house, select the ones on which they prefer to feed, and reproduce rapidly. Often they escape early detection, but once established they can do much damage and are sometimes quite difficult to control.

The presence of insects can be detected by periodic examination of the plants. Each insect produces a characteristic type of injury. The most common damage to house plants is caused by sucking insects that draw out the vital sap of plants. This may greatly interfere with normal growth, development, and blossoming.

Some pests attack the surface of leaves, producing a white, stippled effect. This is injurious to plants. An insect infestation may be (though not always) responsible for one or more of the following: lack of vigor, loss of normal color, stunting, failure to develop new shoots, and various types of discoloration such as yellowing or browning of foliage. Some plants may actually be killed by insects.

PRINCIPAL PESTS OF HOUSE PLANTS

Aphids or plant lice, the most common pest of house plants, may be green, pink, red, brown, or black. They usually feed in colonies, infesting growing tips and attacking the underside of leaves. Plants become unthrifty and stunted and leaves turn yellow and often curl. A sticky honeylike substance (honeydew) on the leaves and white cast-off skins are signs of aphid infestation.

Aphids can be controlled with malathion (premium grade for indoor use) using 1 to 2 teaspoonfuls of a 50- or 57-percent emulsifiable concentrate to 1 gallon of water; 2 level tablespoonfuls of a 25-percent wettable powder in a gallon; or a 4-percent dust. If temporary

leaf or blossom spotting is undesirable, avoid using the wettable powder. Other materials that are effective are 1 to 2 teaspoonfuls of nicotine sulfate plus 2 tablespoonfuls of soap flakes in 1 gallon of water or preparations of pyrethrum for indoor use on plants. Since aphids are fairly easy to control, the aerosol bombs specifically prepared for use on growing plants can be effective.

Mealy bugs infest the joints of stems and the main veins on the undersides of leaves. They live under white, cottonlike protecting masses; heavy honeydew on the leaves may reveal their presence. Plants are badly stunted and may be killed. Malathion, used at the higher dosages suggested for aphids, gives fairly good control, but thorough coverage is important and a repeat application at 7 to 10 days is often desirable. Combinations of malathion with DDT give longer protection against young stages of mealy bugs. The wettable powder form of DDT is usually safest on plants. The white masses may be effectively removed with a cotton-tipped swab that has been dipped in rubbing alcohol. Frequent washing of plants and good care prevents the establishment of mealy bugs.

Whiteflies may be troublesome, particularly because they fly to many plants. They are especially serious on soft and hairy-leaved plants. They feed on the lower sides of the leaves, giving off a lot of honeydew. The young are scalelike and don't move.

Plants attacked by these flies appear unthrifty and may die. One or two tablespoonfuls of 50 percent DDT wettable powder mixed with malathion as for mealy bugs can provide control. Repeat applications two or three times at weekly intervals if the infestation is severe or persistent.

Scale insects of various colors (usually brown) and forms are common on woody plants and ferns. They feed on the lower side of leaves and discolor

the foliage around their feeding places. Some species leave a honeylike residue on the leaves.

Individual scales may be treated with cotton swabs dipped in nicotine sulfate or alcohol. DDT and malathion will control very young scales in the crawling stages. Good care of plants and frequent washing of foliage will prevent heavy scale insect infestation.

Thrips are tiny, narrow insects that are yellow, gray, brown, or black. They are very active when disturbed and hide in the foliage. They scrape the leaf surface with their sharp mouthparts, producing small, white, irregular patches, and they deposit small black specks over the infested foliage. DDT or malathion in spray or dust forms will give good control of thrips.

Spider mites or red spiders are one of the worst pests of house plants. They breed best in dry, warm places and may infest all plants. The injury is much like that of thrips—small white dots over the surface of the leaves. There are no prominent black specks; however, the white specking produces a bleached and unhealthy appearance of the foliage and the plants may be killed. When the mites are numerous, there will be a fine webbing over the leaves.

Fine dusting sulfur may be dusted over dry plants. Malathion, at the higher doses, gives good protection if used before the mites are quite numerous. Some aerosols containing lindane, pyrethrum, and rotenone are also very helpful. A Kelthane wettable powder (18½ percent) used at 2 level tablespoons per gallon or 2 teaspoonfuls of 25 percent Chlorobenzilate per gallon are very effective on spider mites but do not control any insect pests.

Cyclamen mites are difficult to control because they feed in the heart of the plants and they may curl the young leaves, cause plants to become excessively hairy, and deform young shoots.

Cyclamen mites may be found on African-violets, begonias, cyclamen, English ivy, geraniums, and a few other plants. Kelthane, used as for spider mites, provides effective control.

Fungus gnats invade potted soil and may injure the roots of plants. They are small white worms in the larval stages that come to the surface when pots are watered. Adults are very small, black, mosquito-like flies. They are easily controlled by a light dusting of the soil surface with a 5- or 6-percent chlordane dust. Regular watering will carry the insecticide into the soil.

Spring tails or collembola are often seen running on the soil. They jump when disturbed. If especially numerous they may injure the roots of plants.

Symphilids or greenhouse centipedes are close relatives of insects and are known to do much damage to plants by feeding on root hairs, thus seriously weakening and stunting the plants. Both of these pests can be controlled with a 5- or 6-percent chlordane dust applied to the surface of the soil.

Earthworms are found occasionally in potted plants. Repot these plants and eliminate the earthworms because they clog the drainage hole and lump the soil by tunneling among the roots of plants.

INSECTICIDES

Since concentrations of different insecticides vary, follow directions on the packaged insecticide very carefully. This is important because the sensitivity of many house plants is greater than those grown outdoors.

Wetable powder formulations must be agitated well when mixed with water and while spraying. Some of the powdery material will be left as visible residues on the sprayed plants.

Emulsion concentrates are liquids that mix readily with water; but, be-

cause they contain some oily solvent, there is more danger of burning on the plants. Malathion emulsions, properly diluted, can be safely sprayed on most house plants. A premium grade of malathion is desirable for indoor use to avoid the persistent odor in an agricultural grade. Do not overspray, particularly with emulsions.

HOW TO TREAT

Plants may be treated by spraying, dipping, dusting, or by an aerosol bomb. Spraying can usually be done more efficiently and with less danger of wetting furniture by putting plants in the bathtub, in a washtub, or in the basement for treatment. Soapy solutions of the insecticides can also be applied by brushing or sponging the leaves and infested stems. Use rubber gloves whenever there is a possibility of contacting the spray or dip. Plants may also be dipped, but make certain the insecticide is uniformly mixed with the water before dipping the plant. Check the condition of the plant and soil in the flower pot before upending it and dipping the plant.

Aerosols, or small bombs in cans, are carefully prepared mixtures that can be atomized directly on the plants without any dilution or mixing. Use only bombs that are sold for use on ornamental plants and read the label to see that it is recommended for spraying house plants. Bombs prepared for fly, mosquito, or roach control may burn and even kill sensitive plants. In general, aerosols do not deposit as much insecticide as a sprayer. Because of this it may be necessary to use several applications at intervals of a few days for complete control.

Use great caution when handling all of the insecticides. Avoid food, cooking utensils, and aquaria. Do not spray heavily in a small space without good ventilation.

Control of Diseases of House Plants

Herbert G. Johnson and
Neil A. Anderson

Diseases and disorders of house plants are in many ways quite different from those of plants growing out-of-doors. Low relative humidity and continuously dry leaf surfaces prevent infection by fungi and bacteria that cause leaf spots on plants growing in more moist places. The typical leaf spots and powdery mildew may be present on plants that have been brought to the house from out-doors or from greenhouses. Chemicals may be used initially for control but these diseases generally will not persist under house conditions.

Space plants adequately to prevent high humidity and condensation of water on leaf surfaces.

Potting soil should be free from disease-causing organisms. Field soils may be satisfactory, but there is always the risk of infection when using such soils. Clean soil can be purchased from greenhouses and garden stores, or soil may be made safe for planting by chemical or heat treatment. Small amounts of soil can be pasteurized by heating in an oven in a shallow pan. The soil should be moist but not wet when heated. The temperature of the soil should be raised to 180° F. and held there for 20 minutes. Old clay pots and similar containers can be sterilized by heating in boiling water for 30 minutes. These directions also apply to the broken pieces of pottery used for drainage. Porcelain and metal containers should be washed clean and scalded with boiling water.

The items listed below for the care of foliage plants apply equally well to most other plants grown in the home.

LEAF DISORDERS OF ORNAMENTAL FOLIAGE PLANTS

Leaves of ornamental foliage plants often show various kinds of symptoms

in the form of spots, dying of margins, and color variations. These are generally caused by adverse growing conditions rather than infection by specific disease-causing agents. Leaf-spotting fungi, bacteria, and nematodes generally are unable to infect the foliage plants in the house because the leaves are continually dry on the surface. Generally the cause of trouble in most leaf disorders is associated with the roots. The following items should be checked over and corrections made in the handling of plants where necessary:

1. Improper watering—this is the most common cause of trouble. Follow the recommendations on watering given under "Culture" in the first part of this bulletin.

2. Adequate fertilization — fertility levels of soils may be too high, too low, or out of balance. Nitrogen, phosphorus, and potash are the nutrients that are generally needed at regular intervals and in proper amounts. Light green color or yellowing of foliage often indicates a nitrogen deficiency. Potash deficiency usually results in dying and browning of leaf margins. Phosphorus deficiency symptoms are less distinct. Leaves may become a dark, dull green or a bluish-green or no specific symptom may be present. Follow fertilizing recommendations given in the first part of the bulletin.

3. Accumulated salts—unused salts from fertilizer and some from water may accumulate in soil over a period of time and often damage plants. These salts sometimes occur as crusts of salt crystals on the soil surface and the rim of the container. At times the crusts may be on plant stems. A general high level of salts in soil impairs normal root functions. Prevent these salts from forming or remove them when they occur. Regular leaching of the soil about twice a year is a good practice. A porous soil is necessary to do this. The method consists of pouring large amounts of water through the soil in a period of

hours. The soil and container must drain freely and must be placed where the water can drain away. Pour through amounts of water equal to five times the volume of the container. If that amount of water will not go through in the required time, drainage is not adequate and must be corrected. Repot the plant using a porous soil.

4. Repotting—See section on repotting under “Culture.”

5. Insufficient light—See section on light under “Culture.”

6. Root and crown rot—These are diseases caused by living organisms. Some of these may be severe enough to cause death of the plant. In some cases, new plants can be started from above-ground-parts before the plant is too far gone. In this case, the trouble can be eliminated by rooting the shoot and

planting it in disease-free soil. In most instances, root and crown rot are encouraged by poor growing conditions, as described above.

7. Nematodes—These are small eelworms that live in the soil or in plant parts. Some types of nematodes produce enlarged growths on the roots. Their feeding is often followed by root and crown rots. In most cases the starting of new plants from stem or leaf cuttings and planting in clean soil is the best way to eliminate the problem.

8. Virus diseases—Viruses are liquid-type infectious agents that cause diseases in plants. Symptoms are generally mottling, yellowing, and lack of vigor. Once a plant is infected, it should be destroyed to prevent spread of the virus to healthy plants. Viruses are generally spread by insects or by handling the plants.

Flowering Plants

Achimenes is a summer flowering plant arising from a thickened underground stem called a rhizome. The rhizomes are planted from March to May and placed in a sunny window. Partial protection from the sun may be necessary during the summer. After flowering the plant is allowed to dry and the rhizome is stored in the pot or in dry sand at 45 to 50° F.

African-Violet (Saintpaulia), probably the most popular flowering house plant today, is especially well adapted to the average well heated home. A night temperature of 68 to 70° F. and a day temperature up to 75° F. is preferred. The night temperature should never drop below 60° F. since chilling may prevent flowering, cause the leaves to curl downward around the edges and turn a pale-green color, and weaken or even kill the plant.

Good light is necessary to grow quality plants but avoid direct sunlight in



Fig. 9. An African violet with multiple crowns or growing points.



Fig. 10. Five separate plants obtained by dividing the African violet shown on page 15.

midday except for the period from mid-November to mid-February. Excessive light will produce sunken sunscald spots on the leaves and flowers. Poor light may result in wonderful foliage but no blooms.

Keep the soil moist, using water of room temperature. Do not let cold water touch the leaves and keep the plant out of the sun when the foliage is wet or the upper leaf surface will become spotted. Single crown plants

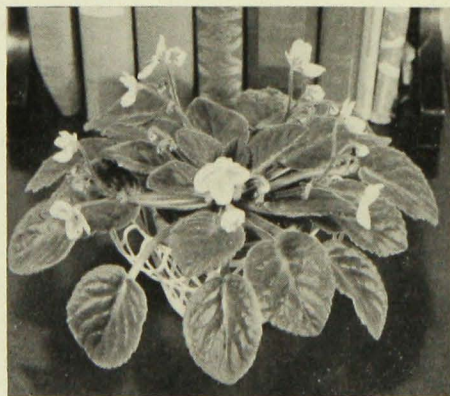


Fig. 11. A well grown single crown specimen of the African violet variety, Stylish.

bloom more freely and produce better appearing plants. Propagation is by leaf petiole cuttings and divisions.

Old plants sometimes become tree-like with a thick trunk-like stem below the rosette of leaves and flowers. Such plants may be renewed by severing the top from the base at a point just below where the lowest leaves are attached to the stem. Place plant top in a saucer of water and new roots will develop in about a month. The shortened plant is ready for potting after new roots develop.

Amaryllis (*Hippeastrum*) is planted from October to March with the bulb two-thirds above the soil level. Use a pot with a diameter of not more than 3 inches greater than that of the bulbs. Best growth is obtained in full sun at a minimum temperature of 60° F. and with a good supply of water.

After flowering has ceased, keep the plant actively growing. Place it out in the garden when danger of frost has passed. The pot may be plunged in the ground or the bulb may be planted directly in the ground in a partially shaded location. Good summer care helps insure reblooming year after year. It should be brought indoors before frost in the fall.

Although the amaryllis can be kept in continual growth, most people prefer to dry off the plants in early fall since the foliage is not especially attractive. If the bulbs were planted directly in the garden, dry them off after lifting and store in a cool location until about January 1 when they are potted. If the bulbs are grown in pots continually, repot in fresh soil about January 1. Be careful not to injure the fleshy roots. Dormancy may be broken by watering.

Azalea (*Rhododendron*) lasts longest if purchased with many buds and only a few open flowers. Bright light or direct sunlight and a constant moisture supply are preferred.

After the plant has flowered, keep it in a bright window until the danger of frost has passed. At this time plunge

Fig. 12. *Amaryllis*, an especially colorful flowering plant for the home.

the pot in the soil out-of-doors and in a partially shaded location. Be sure to keep the soil moist. Prune the plant before July 1 to keep it well shaped.

Before frost bring it indoors and keep in a cool, well lighted location until January 1. At this date place the plant in a warm bright window for forcing into bloom. The cool period permits development of the flower buds and results in a uniform floral display. Since an acid soil is required, acid peat moss is very satisfactory.

Balsam (*Impatiens*) may be grown from seeds or cuttings. The plants grow best at a temperature of 65° F. and with good light. Pinch to obtain well shaped plants. They may be set out in the garden after danger of frost.

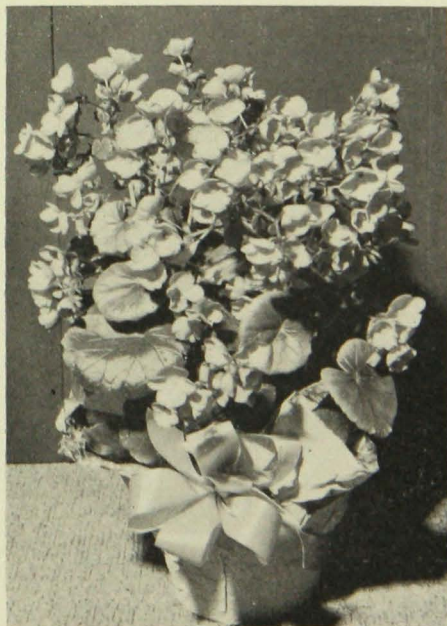


Fig. 13. *Melior begonia* with an attractively decorated pot.

Begonias

Wax, Perpetual, or Everblooming Begonia (*Begonia semperflorens*) prefers full sun during the winter but partial shade during the summer. It likes a uniform supply of water and thrives best with a minimum night temperature of 60° F. The plant will fail to flower when a night temperature of 70° F. or more is maintained during the short day period. It is a good bedding plant and may be carried over the winter by means of cuttings taken from the base of the plant in late summer.

Calla Lily Begonia (*B. semperflorens albifoliis*) is a unique type which is a bit more difficult to grow than the everblooming variety. It should not be grown in direct sunlight.

Melior or Christmas Begonia (*B. socotrana*) lasts for several months if it had many buds when purchased and it is properly cared for. It should be kept in full sun at a cool (50° F.) night

temperature. Keeping the plant too dry greatly shortens the life of the blooms. Although it is not the easiest begonia to grow, it is possible to reproduce it by cuttings in late March. The cuttings are grown to flowering specimens for the following Christmas. Avoid direct sun in the summer.

Holland or Bardse Begonia has larger flowers than the melior type and some blooms are double. Culture is similar to that of the Melior Begonia.

Miscellaneous begonias, most of which are of the fibrous rooted type, require sun or bright light and a uniform moisture supply. Partial shade is preferred during the summer.

Tuberous begonias (*B. tuberhybrida*). Plants must be started indoors for outdoor bloom. The tubers are planted in shallow containers of peat, sand, or vermiculite in March and April. Place the hollow side of the tuber up with the top exposed. Keep moist, but not wet at 70° F. Once the plants are well started, they are planted in 6- or 8-inch pots using an organic soil mix and placing the tuber just below the soil surface. Grow at 60° F. to 65° F. and shade from strong sun.

Place outdoors in a protected location when warm weather arrives. In late summer or early fall the plants are dried by a gradual reduction of the water supply. When all growth dies down, remove the tuber from the soil,

dry in sunlight for a day or two, remove all parts of the old stem and store in dry peat moss, vermiculite, or sand at 38° to 45° F. over the winter.

An alternate method is to store the tubers in soil. The pots are turned on their sides and not watered.

Browallia (*B. speciosa*) makes an attractive blue-flowered house plant which can be grown in sunny or partially shaded windows. Sow seed from June to August for bloom in late winter or early spring.

Calceolaria should be purchased with both buds and open flowers. This plant requires a bright location, abundant moisture, and a night temperature of 50° F. (if possible) for a maximum life. It is an annual and should be discarded when flowering has ceased.

Calla Lily (*Zantedeschia*) is often grown as a pot plant; the white being planted in August and the yellow in November. These plants will grow continuously if permitted to do so. One rhizome is planted per pot. Callas prefer a sunny or bright location and an abundant moisture supply. The white prefers a 55° F. night temperature and the yellow a 60° to 65° F. night temperature. In June the plants are dried off and kept as cool as possible.

Camellia prefers a moist soil, a bright location, and a high humidity—especially during the flowering period. During the fall and winter prior to flowering a night temperature of 40° to 50° F. is recommended. Following flowering 50° F. is the best temperature. Excessively high temperatures induce bud drop, faded flower color, and smaller blooms. An acid soil is required.

Chenille plant (*Acalypha hispida*). This plant is grown for the bright red flowers in pendant spikes. It requires a

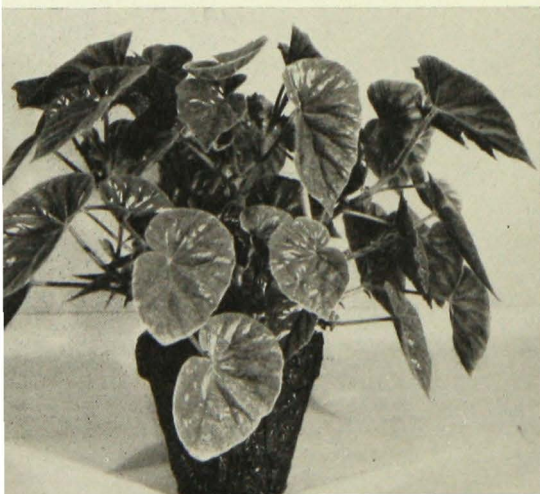


Fig. 14. Steel begonia, one of the toughest begonias for house plant purposes.

moist soil, full sun, and a minimum temperature of 60° F.

Christmas cactus (*Schlumbergera bridgesi*), **Easter cactus** (*Schlumbergera gaertneri*), and the **Thanksgiving cactus** (*Zygocactus truncatus*) grow best when kept constantly moist, except in autumn when they should be watered thoroughly but allowed to become moderately dry between waterings. They prefer sunshine and form flower buds at a 55° F. night temperature regardless of day length or at a night temperature of 63 to 65° F. during short days. Flower buds may drop if the temperature is too high or the light intensity too low. No flower buds will develop when the night temperature is maintained at 70 to 75° F.

Chrysanthemum plants purchased from the florist require abundant moisture and a bright location. Partially opened flowers of the colored varieties will not develop their full color when kept out of sunshine. The flowers of the chrysanthemum are among the longest lasting of flowering pot plants, especially when kept as cool as possible at night.

Plants purchased in full bloom in the spring may be cut back to a point 4 inches above the soil after flowering and then planted in the garden. Only early blooming varieties will bloom again out-of-doors in the fall, however.

Plants growing in the garden may be potted in late August or early September for flowering in the home, but they should be kept out-of-doors as long as possible because they require full sun. The chrysanthemum is not a satisfactory house plant when not in bloom.

Cineraria culture is the same as for *Calceolaria*.

Crossandra prefers a bright location, moist soil, and a minimum temperature of 70° F. The foliage turns yellow when kept too cool.

Crown of Thorns (*Euphorbia splendens*) is a spiny plant which resembles

a cactus, but is closely related to the poinsettia. It is tolerant of a wide range of conditions, but prefers full sun and a moderately dry soil in November and December.

Cyclamen plants require sunshine and a cool (50° F.) night temperature. Plants with many buds as well as open flowers will last longest. Water them when the soil appears dry at the surface, but avoid getting water in the crown of the plant. Wilting of the plant at high temperatures when the soil is dry will usually result in yellowing of the leaves. Bud blasting and yellowing of the leaves will also occur if the night temperature is too high or the light intensity too low.

After flowering the plant may be kept dry until June. At this time replant the corm (fleshy bulblike structure) in fresh soil, being careful to keep the corm half above and half below the soil line. If grown properly, it will bloom again the following winter.

Easter Lily requires bright light and abundant moisture. It will thrive at a variety of temperatures but a 60° F. night temperature is preferable. Single bulbs may be planted in a 5- or 6-inch pot before Christmas, although they do not force as easily in the home as do most bulbs. They may be started at once without benefit of cold storage.

After the plant has bloomed, keep it watered until the foliage yellows. When weather permits, plant it in the garden in a well drained location, covering the bulb with 6 inches of soil. The bulb will rest until mid-summer when new growing shoots will appear. If fall frost is late, the plant may bloom again in the fall. In following seasons, expect a flower crop in mid-summer.

Lily bulbs are usually winter-hardy but it is advisable to cover the area with a straw mulch, especially in northern Minnesota.

Fuchsia will make an interesting house plant if grown in full sun in a cool room, and it will flower in the

shade during the summer. Good drainage is essential.

Gardenia requires full sun and a night temperature near 60° F. Buds will form but fail to develop at a night temperature of 70° F. or more. High temperature and low light intensity induce bud drop. An acid soil is required and a high humidity is beneficial.

Geraniums (Pelargonium) are available in a wide variety of types. They require full sun, cool temperature, and moderate watering for successful pot plant culture. Propagation is by cuttings.

Martha Washington Pelargoniums will not flower unless the night temperature is below 60° F.

Gloxinia (Sinningia speciosa) thrives best in bright light but should be protected from the direct rays of the mid-day sun after May 1. It prefers a warm (65 to 70° F. at night) atmosphere, a moist soil, and good air circulation. Bud blasting or rot is usually associated with poor air circulation, too dry an atmosphere, insufficient or irregular watering, or insect injury. Legginess is due very often to overwatering when the tuber is first started. Insufficient light also induces leggy, spindly growth.

Unless the plant is a newer variety which prefers to be kept in constant growth, keep the soil dry until the foliage dries after the plant has finished flowering. Then store the tubers in their pots or in sand or peat at a minimum of 50° F. In February or March replant the tubers in fresh soil and start them at a 70° F. temperature. Tubers usually bloom in 4 months.

Hibiscus includes numerous species and varieties with large attractive blooms. They are especially effective in planters in front of "window walls" in modern homes where year-round flowering and fairly large plants are desirable. These plants prefer a night temperature of 60 to 65° F., bright light, and a moist soil.

Hyacinth—See section on forcing spring flowering bulbs, page 22.

Hydrangea plants require a lot of water, especially when in bloom. They prefer full sunlight, and the blooms last longer when the plant is kept cool at night.

If the plant is to be carried over for another season, cut back the stems to 3 to 5 inches from the ground after blooming has stopped. When weather permits, plunge the pot directly in the garden remembering to lift the pot every few weeks and to water in dry weather. Repot the plant in a slightly larger pot either when moved outdoors or in late August. Leave the plant outdoors until the first light frost. Store in a cool (35° to 40° F.) dark place until January 1. Keep the soil just moist enough to prevent shriveling of the stems. Most, if not all, of the foliage will drop during this period. Any remaining leaves should be removed. Then move the plant to a cool (60° F. at night), sunny window.

Hydrangeas require fertilization during forcing. The flower color of some varieties will range from blue, when grown in an extremely acid soil to pink, when grown in a slightly acid soil. The quality of homegrown hydrangeas seldom equals the quality of greenhouse grown plants.

Italian Bellflower (Campanula isophylla) is often erroneously called Star of Bethlehem. Its habit of growth makes it well suited to hanging baskets. This plant requires a bright location, plenty of moisture, and a cool (50° to 60° F.) night temperature. Flowering shoots should be removed at pot level when the flowers fade.

Kalanchoe (Kalanchoe blossfeldiana) should be kept in bright light or full sunshine. The scarlet flowers are appropriate for Christmas or St. Valentine's Day. A variety with cream-colored flowers is also available. The compact growing varieties are the most popular. This plant may be kept in active growth



Fig. 15. The Kalanchoe makes a compact, interesting house plant.

for flowering the next year, but fresh plants are usually better.

Orchids are not usually good house plants unless special provisions are made to satisfy their cultural needs. Orchids can be grown in glass cases located in bright windows since the humidity can be kept at a higher level in this way. Detailed references should be consulted before attempting to grow orchids in the home.

Oxalis should be kept in a sunny window at a temperature between 50° and 60° F. Water it normally, but avoid maintaining an extremely wet soil. A slightly alkaline or neutral soil is best.

Poinsettia (*Euphorbia pulcherrima*) is usually purchased in full bloom. It requires bright light and should not be allowed to wilt or it will lose some of its leaves. Do not subject poinsettias to drafts, sudden temperature changes, or temperatures below 60° F. Temperatures above 75° F. also shorten the life of the blooms.

Plants may be carried over for a second year by drying them after flowering and storing them in a cool, well ventilated place. In May cut back the plants to a point 5 inches above the ground line, repot them in fresh soil, and return them to a bright window to renew active growth. When night temperature does not drop below 60° F. out-of-doors, the pots may be plunged in the garden in a location partially protected from the midday sun. Plants may be pinched until September 1 to keep them short, but pinching the same shoot more than once will result in small flowers.

At the approach of cool nights take the plants indoors and keep them in a sunny, airy location with a night temperature of 60° to 65° F. Higher night temperatures or exposure to artificial light after sunset following October 10 will delay or prevent flowering.

The quality of homegrown poinsettias seldom equals the quality of greenhouse grown plants.

Primrose (*Primula*) culture is the same as for *Calceolaria*.

Rose requires full sun, abundant moisture, and a night temperature around 60° F. Plants with the buds partially open when purchased last the longest. Most varieties sold by florists as holiday pot plants will make good garden plants. After the plant has bloomed, cut off old flower clusters and keep the pot plant in active growth in a sunny location until weather conditions permit placing in the garden. Such roses should be protected during the winter, however, or they may fail to survive.

The **Shrimp plant (*Beloperone guttata*)** is grown for its unusual flowers and bracts produced in drooping terminal spikes. Frequent pinching is required to keep the plant from becoming too leggy. It prefers full sun and a night temperature of 50 to 55° F.

Forcing Spring Flowering Bulbs

Well known types of bulbs such as tulips, narcissi (daffodils), hyacinths, and crocus, as well as less familiar types such as grape hyacinths, scillas, and even lilies-of-the-valley, may be planted in pots for flowering in late winter and spring. To insure success, only bulbs of good quality and size and varieties adapted to pot culture should be used.

The bulbs are potted in shallow pots called bulb pans containing a soil with a good water-holding capacity and good drainage. One part of sand may be substituted for one part of organic matter in the soil mixture suggested for flowering plants on page 3. Use a soil low in nutrients and manure that is well rotted, as the bulbs require only a limited nutrient supply during forcing. Too high a nutrient level may rot the bulbs.

Hyacinths and narcissi are planted as close as the bulbs will allow. Tulips are planted at the rate of five or six bulbs per 5-inch pan, or six to nine bulbs per 6-inch pan. Place the flat side of the tulip bulb against the side of the pan so that the first leaf spreads over the outside of the pan. As a general rule, bulbs other than the three just mentioned are planted so as to leave as much space unoccupied by bulbs as the bulbs already occupy in



Fig. 16. The King Alfred narcissus forced before an adequate root system had developed

the pan. Water the soil thoroughly after planting the bulbs.

Place the pans in a cool basement at a 40 to 50° F. temperature for a minimum of 10 to 12 weeks. Hyacinths prefer a 50 to 55° F. temperature until the new shoots are 1½ inches above the bulb. The soil must be moist while in storage.

If a cool basement is not available, the pans may be placed outdoors in a trench 10 to 12 inches deep, and on a 2-inch layer of sand or gravel to insure good drainage. Fill in around and over the pans with sand, leaving a 2-inch layer covering the top of the pan. Cover the sand with a 10-inch layer of soil



Fig. 17. Hyacinths with top and root development indicating they are ready for forcing.

and place a 10-inch mulch of sawdust, leaves, or hay over the soil.

Beginning in January, or when the roots are well developed, bring the pans into a warm room for forcing. Best growth is obtained in full sun and in a moist soil. When in full bloom, remove the plants from the sun to a bright location. Early during the forcing season it may be wise to keep hyacinths in the dark for a few days, or to place a heavy paper around the plant (on the outside of the pot rim) to draw the flower stalk up above the leaves.

After the plant has flowered, leave the foliage on the bulb, apply a complete fertilizer, and keep the bulb in active growth until it yellows. At this point dry the soil. These bulbs may be planted in the garden in the fall, but get fresh bulbs each year for indoor forcing.

Paper white narcissus, lily-of-the-valley, Roman hyacinth, hyacinth, and a few other bulbs may be grown in pebbles rather than soil, if the water level is kept just below the bottom of the bulbs. A little charcoal may help to keep the water fresh. Paper white narcissi and lilies-of-the-valley are usually placed directly in the sun, while the hyacinths may benefit from storage in a cool dark location until the roots are 2 to 3 inches long, especially in the early part of the forcing season. Special vases or bottles are available for holding hyacinth bulbs.

When window space is at a premium, bright basement window sills are often useful for growing the bulbs to the flowering stage, as well as for maturing the foliage after flowering.

Planning in advance will enable the householder to have a continuous display of flowers during the bulb-forcing season in late winter and early spring.



Fig. 18. Potted tulips add color and a feeling of spring to the home. When purchasing plants select those with tight buds as shown above so they will have a longer life in the home.

Recommended Varieties

Tulips: Variety	Color
Bellona	Yellow
Denbola	Red edged with white
Fiery Star	Red
Golden Harvest	Yellow
Golden Show	Yellow
Paul Richter	Red
Pax	White
Red Pitt	Red
White City	White
Narcissi: Cheerfulness (poetaz)	
Golden Harvest	King Alfred
Paper White (tazetta)	

With the other types of bulbs, such as hyacinths and crocus, the varieties generally available are satisfactory for pot plant culture.

Fruiting Plants

Avocado (*Persea americana*) is often grown from seed because it is an interesting novelty. The seed, which may be

obtained from the fruit, is soaked in water to remove the outer covering. Then the seed is suspended with the

large end down and the base just touching water. An easy method is to stick three toothpicks into the sides of the seed to support the seed in the proper position in a water glass or similar container. A less interesting but equally satisfactory method is to plant the seed in a sandy soil, covering it with $\frac{1}{2}$ inch of soil. Fruiting of plants grown in the home is uncommon. It prefers bright light, moist soil, and a minimum temperature of 60° F.

Citrus plants include oranges, lemons, and grapefruits which have fragrant white flowers and attractive fruits. A few that are suitable for the home include *C. mitis* the Calamondin Orange, *C. taitensis* the Otaheite Orange, and *C. limonia meyeri* the Dwarf Chinese Lemon. They prefer a sunny location, moist soil, and a night temperature of 55 to 65° F. The flowers last longer at the lower temperature.

Jerusalem Cherry (*Solanum pseudocapsicum*) is obtained from the florist when full of fruit. It lasts much longer if kept at a night temperature of 50° F. Place in bright light and keep the soil moist. Too dry soil or escaping gas in the home may cause dropping of the leaves and fruit.

Coral Berry (*Ardisia crispa*) an attractive, slow-growing plant, should be



Fig. 19. Fruit on an attractive specimen of *Aglaonema marantifolium maculatum*. This plant is similar to, but larger than, the variegated Chinese evergreen.

grown at a minimum of 60° F. The plants may be grown out-of-doors in partial shade during the summer if adequate moisture is provided. A slightly sandy soil of relatively low fertilizer content is most satisfactory. Older plants develop coral berries which last for a year or more.

Ornamental Pepper (*Capsicum frutescens*) should be exposed to full sun at a minimum temperature of 55° F. Lack of water will cause rotting of the fruit and loss of foliage.

The fruits may be dried for seasoning purposes, but should be used sparingly as they are quite "hot."

Pineapple (*Ananas species*) can make satisfactory house plants although they do not commonly bear fruit in the home. The crown of leaves atop the fruit may be cut off, rooted in sand,



Fig. 20. Pineapple plants bearing fruit are sometimes available at greenhouses.

and potted. There are several species and varieties and the variegated forms make showier house plants. Plants bearing young fruit are sometimes available in commercial greenhouses. Young plants started from suckers at the base of older plants may bear fruit quicker than plants started from the crown on top of the fruit. If fruiting is an objective, replant in a larger pot whenever the plant becomes root-bound. An open, well drained soil, bright light, moist air, moist soil, and a minimum of 60° F. are preferred.

Variegated Chinese Evergreen (*Aglaonema commutatum*) will bear long lasting clusters of berries which are green at first and gradually turn yellow, orange, and finally red in color. It grows best with a minimum temperature of 65° F. and a good water supply. It is extremely durable and will do well even in relatively dark locations. This plant is attractive for its foliage as well as its fruit.

Several varieties of ***A. marantifolium*** also produce attractive red fruits.

Foliage Plants

Foliage plants are used in homes to provide decorative effects, interest, and beauty over an extended period. The objective is to keep the plants alive and in good condition and yet avoid rapid growth. Limiting the water and nutrient supply and providing adequate light usually gives the desired result.

A relatively easy method for maintaining foliage plants in good condition while limiting growth is suggested by the New Jersey Agricultural Experiment Station. Place ½ inch of gravel or pieces of broken flower pots in the bottom of a decorative container. Then place the potted plant inside the decorative container. The top of the inner pot should be approximately 1 inch lower than the top of the outer container, and at least ½ inch of space should remain between the two pots. Pack this space and the area above the inner pot with peat moss to within ½ inch of the top of the outer container. When water is required, the peat moss over the inner pot is temporarily pushed away from the soil. The peat moss is moistened occasionally to keep it from becoming dry and dusty. A similar procedure may be used for planters and room dividers. Plants handled in this manner require fertilizer applications a maximum of twice a year.

Artificial plants do not provide equal satisfaction and are not recommended, except for a few locations such as near outside doors and in very dark areas where the use of supplementary light is highly impractical.

Abutilon (Flowering Maple) includes a group of old-fashioned green and variegated plants. They prefer a sunny location, low temperatures (55 to 60° F.), and a moist soil.

Acalypha (Copper Leaf) requires a high soil moisture content, full sun, and a minimum temperature of 60° F. Propagate from cuttings in late summer.

Acorus gramineus (Sweet Flag) and the white striped variety **variegatus** will grow in sun or shade, but they require plenty of water.

Aglaonema (Chinese Evergreen) is one of the toughest house plants available. It prefers good light, a minimum temperature of 65° F., and a good supply of water. The plant can exist in poor light even at high temperatures, however, and will also grow in water or in a dry soil.

Several species are available. ***A. modestum***, the most common form, is generally sold under the name ***A. sim-***



Fig. 21. A cross section view showing how smaller pots can be supported in a planter. A layer of gravel is placed on the bottom of the planter. The area between the pots is filled with peat moss.

plex. Both species have solid green foliage, but the leaves of *A. simplex* are more oblong and narrower with a twist, thinner in texture, and deep green and glossy with depressed veins. *A. 'pseudo-bracteatum'* is the showiest species with long leaves that are deep green variegated with light green, yellow, and creamy white, and white stems. *A. roebelini*, often called *Schismatoglottis* by the florist, is very attractive with its broad, gray-green leaves variegated with dull silver. *A. commutatum* and *A. marantifolium* are discussed under fruiting plants.

Alternanthera (Joseph's Coat) includes several dwarf varicolored forms which are suitable for terrariums. They prefer bright light, moist soil, and a minimum temperature of 65° F.

Aphelandra squarrosa louisae is a showy plant with striking white veins on shiny green leaves and bright yellow flowers in the fall. Provide moderate

light, a minimum temperature of 65° F., and a moist soil.

Araucaria excelsa (Norfolk Island Pine) is an interesting evergreen with needlelike leaves borne on branches rising in whorls at regular intervals along the stem. An extremely tolerant plant, it will survive in cool or warm, light or dark locations. Best growth is obtained in the sun with a temperature of 65° F. and a moist soil.

Asparagus of two types is grown. *A. plumosus* (Fern Asparagus) has very fine needlelike dark green leaves with twisting stems. *A. sprengeri* (Sprenger Asparagus) has coarse yellow-green needlelike leaves and drooping stems; it produces red berries in good light. Best growth is obtained in full sun in the winter and bright light in the summer. Keep the soil moist and the temperature between 60° and 70° F. Propagation is by seeds.

Aspidistra elatior (Cast-iron plant) is a very rugged plant that has been grown for a good many years. There is also a white striped variety, **variegata**. Although the plant will survive almost any condition in the home, best growth is obtained when the plant is given medium to bright but not direct sunlight, a generous water supply, and a temperature of 60° to 70° F.

Aucuba japonica variegata (Golddust Plant), with its gold-spotted, dark green leaves, will withstand temperatures down to freezing. The variety **goldeana** is especially attractive with the center of the leaf a golden-yellow and the border green. Provide plenty of water, sun or bright light, and a temperature below 75° F.

Bromeliads are a family of durable plants that will survive unfavorable conditions better than any other plants. **Ananas (Pineapple)**, **Billbergia**, **Cryptanthus (Zebra Plant)**, **Dyckia**, **Tillandsia (Spanish Moss, etc.)**, and **Vriesia** are some of the more common Bromeliads. Many of them store a supply of water in their center, vase-like cups which may double as a cut flower container in the home. The water should be replaced regularly when used for flowers. Some forms produce attractive blooms and others may have showy foliage. This group deserves more consideration as a source of house plants. In general, they grow best in bright light, a night temperature of 60° F. and a well drained soil.

Buxus sempervirens (Boxwood) is quite tolerant of varied conditions but prefers a sunny location and a cool night temperature.

Caladium requires a 65° F. minimum temperature, bright light, and a uniformly moist soil. After the foliage dries in the fall store the tuber in dry peat moss or sand at a 65° F. temperature. Tubers are usually started in March or April although low humidity in the home may make forcing difficult.



Fig. 22. Caladiums have very colorful foliage. Note the wooden tub used as an attractive outer pot.

A temperature of 80 to 90° F. is preferable for starting the tubers.

Chameranthum igneum is a low, spreading herb with beautiful, dark, brownish-green leaves that have red to yellow veins. It requires a 65° F. minimum temperature, moist air, filtered light, and moist soil.

Chlorophytum (Anthericum or Spider-plant) prefers a moist soil and sun or partial shade.

Cissus grows best in bright light at a minimum temperature of 60° F. Provide a well drained soil and plenty of water. Numerous types are available including the popular **C. rhombifolia (Grape Ivy)**, the fast growing **C. antarctica (Kangaroo Vine)**, the slow-growing, smaller, self-branching **C. antarctica minima (Miniature Kangaroo Vine)**, and **C. discolor (Begonia Ivy)**, the showiest of the group which is most attractive when young. The last requires moist air and is not as easy as the others to grow in the home.

Codiaeum (Croton) requires full sun except during the summer to develop full leaf color. Provide a uniform supply of water and a minimum temperature of 65° F. Crotons are available in a wide variety of leaf shapes and colors.

Coleus requires full sun to develop its best foliage color. Pinch to induce branching, and keep the soil moist. It can be planted in the garden during the summer.

Cordyline terminalis (Ti Plant) prefers a minimum temperature of 60° F., and sun or bright light. Never allow the soil to dry out. However, it is relatively tolerant of reduced light intensity. Some variegated forms are exceedingly colorful. Propagation is by cuttings, and a 4-inch section of the main stem is sufficient to produce a new plant.

Cyperus alternifolia (Umbrella Sedge) grows in either sun or shade if there is a constant water supply.

Dichorisandra reginae resembles a slow-growing, upright, wandering-Jew with attractive foliage markings. It prefers a minimum temperature of 60° F., moist air and soil, and moderate light.

Dieffenbachia (Tuffroot or Dumbcane) must be kept on the dry side at

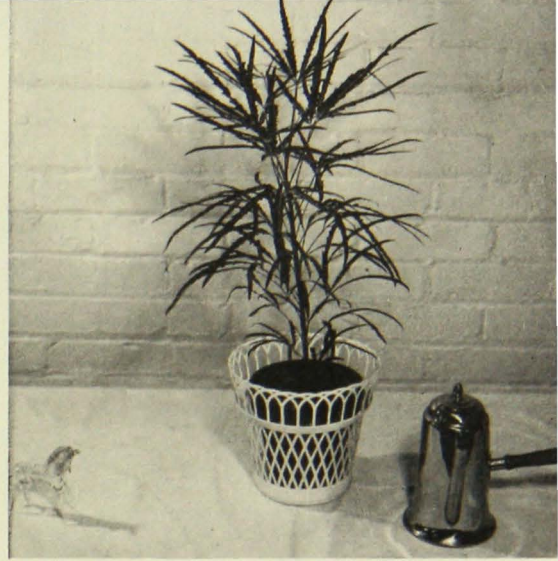
a minimum temperature of 60° F. Although the plant is tolerant of poor light conditions, growth is best in bright light. The best varieties include **D. picta** (Spotted Dumbcane) with yellowish-white blotches on dark green leaves; **D. picta** 'Rudolph Roehrs' (Roehrs Dumbcane) which has a chartreuse leaf blade blotched with ivory and edged in green; and **D. bausei** which has yellowish-green leaves marked with white and dark green spots and dark green margins. **D. picta** **superba**, **D. exotica**, and **D. 'Janet Weidner'** with high degrees of white variegation on the dark green leaves; **D. 'Mary Weidner'** with limited ivory spotting on the dark green leaves and petioles that are highly spotted; **D. amoena** with some white coloring along the veins. The last named is especially durable and will withstand a somewhat lower temperature than the others.

Dizygotheca (**Aralia**) **elegantissima** (False Aralia) has graceful, palmately compound, metallic, red-brown leaves,



Fig. 23. The various leaf patterns and growth habits of the *Dieffenbachia*. 1. *D. 'Janet Weidner,'* 2. *D. amoena*, 3. *D. 'Mary Weidner,'* 4. *D. picta* 'Rudolph Roehrs,' 5. *D. picta*, 6. *D. bausei*.

Fig. 24. *Dizygotheca elegantissima* (False Aralia) offers graceful foliage and eventually develops into a large plant. Plastic, open worked pot covers with waterproof bases are popular and practical.



and prefers a minimum temperature of 65° F., moderate light, and moist soil.

Dracaenas grow best in bright light at a minimum temperature of 65° F. and in a moist, well drained soil. Good types for the home include ***D. fragrans massangeana*** (**Massange Dracaena**), which has broad strap-shaped green leaves with a gold band down the middle of each leaf; ***D. godseffiana*** (**Spotted Dracaena**), a small type with dark green leaves spotted with pale yellow; ***D. godseffiana*** '**Florida Beauty**' which is highly variegated with ivory markings; ***D. hookeriana*** '**rothiana**' (**Roth Dracaena**), an especially tough plant with rich green leaves and a somewhat wavy leaf margin; ***D. sanderiana*** (**Sanders Dracaena**), a medium sized type which has broad white bands bordering its gray-green foliage; ***D. sanderiana*** '**Margaret Berkery**', a robust plant of medium size with waxy deep green

leaves and a broad white band in the center of the leaf; and ***D. deremensis warnecki*** (**Warnecki Dracaena**), with white stripes down the center of gray-green leaves.

Dyckia culture is the same as for *Cryptanthus*.

Episcia which has been called the Flame Violet is not really a violet. This relative of the African-violet has the same cultural requirements as the



Fig. 25. *Dracaenas* are variable in appearance. 1. *D. sanderiana* 'Margaret Berkery,' 2. *D. sanderiana*, 3. *D. hookeriana* 'rothiana,' 4. *D. godseffiana* 'Florida Beauty,' 5. *D. deremensis warnecki*.



Fig. 26. A group of *Episcia*. All of them produce young plants on runners. 1. *E. dianthiflora* (note the delicate white flower), 2. *E. cupreata variegata*, 3. *E. cupreata* 'Harlequin,' 4. *E. cupreata* 'viridifolia.'

African-violet except that it desires a little more light. *Episcias* are grown primarily for their foliage effect. Numerous species and varieties are available with foliage in shades and combinations of green, bronze, silver, copper, and purple. Most types bear scarlet flowers at certain times of the year.

Euonymus (Spindletree) prefers bright light, cool temperatures, and a good water supply. Several attractive, variegated dwarf forms are available. It is subject to red spider.

Fatsia japonica is also called *Aralia sieboldi* by florists. Culture is similar to that for *Fatshedera*.

Fatshedera lizei, which resembles an upright English Ivy and the variegated variety **F. lizei variegata** grow best in cool locations under the same conditions required by **Hedera (English Ivy)**.

Ferns all have similar cultural requirements, with the exception of **Platycerium bifurcatum (Staghorn Fern)**. This variety is usually wired to a piece of bark or wood to which some *Osmunda* fiber has been attached. It will

Fig. 27. Three plants with interesting foliage— from left to right, *Fatsia japonica*, which was crossed with *Hedera helix* (English Ivy) to produce the middle plant, *Fatshedera lizei*, and a young specimen of *Schefflera actinophylla*.





Fig. 29. The variegated rubber plant.

survive temperatures as low as 40° F. with no ill effects. Submerge in water at frequent intervals to prevent drying out.

Most other ferns thrive well in a soil containing at least 50 percent organic matter. Keep them in bright light but out of direct sunlight, at a 65° F. minimum temperature, and in a moist soil. Some of the more popular types include *Asplenium nidus* (Birdsnest Fern), *Cyrtomium falcatum* (Holly Fern), *Nephrolepis exaltata bostoniensis* (Boston Fern) and other varieties, including 'Fluffy Ruffles' and 'whitmani' and *Pteris* (Table Ferns)—the smallest of the group. *Adiantum* (Maidenhair Fern) will not thrive in the home unless the plant is kept in a humid atmosphere.

Ficus (Rubber Plant or Fig) is best suited to a temperature above 60° F. and a moist soil. Although growth is best in bright light, the plants will endure poor light. The main types include *F. elastica* (India Rubber Plant); *F. elastica* 'decora' (Showy Rubber Plant) with larger, broader, and heavier leaves; *F. elastica* 'doescheri' and varie-

gata, variegated forms; the bold large leaved *F. lyrata* (*pandurata*) (Fiddleleaf Fig); *F. pumila* (*repens*) (Creeping Fig), a small leaved creeper; and *F. radicans variegata*, a showy variegated creeper.

Fittonia is a spreading plant with attractive leaves which requires warmth, humidity, and bright light. There are two forms, *Fittonia verschaffelti argyroneura* (Silvernerve Fittonia) and *Fittonia verschaffelti* (Rednerve Fittonia).

Geogenanthus undatus (Seersucker Plant) is a low-growing, compact plant with quilted and striped leaves. Provide a minimum temperature of 65° F., a soil rich in humus, moderate light, and a moist soil.

Grevillea robusta (Silk-Oak) grows into a large plant with lacy, gray-green leaves. It will tolerate temperatures



Fig. 28. Fiddleleaf fig may be used where a tall narrow plant is desired. Older plants develop side branches and make a broader plant.

down to 50° F. and prefers a dry soil and bright light.

Gynura aurantiaca (**Velvet Plant**) is an attractive novelty because of the profusion of reddish-purple hairs borne on green leaves. It does best in a moist soil in full sun. Pinch to keep compact.

Hedera canariensis variegata, known as '**Gloire de Marengo**,' has large, attractive, variegated green to slate-green to creamy-white foliage. Best growth is obtained in a moist atmosphere and bright light. This form is more sensitive than most **H. helix** varieties when grown as a house plant.

Hedera helix (**English Ivy**) grows best in bright light although it is tolerant of poor light. A cool temperature is preferred to discourage insect attack. A large selection of varieties includes the following: **H. helix conglomerata** (**Japanese Ivy**), an upright form with small closely crowded leaves; '**Curlilocks**' and '**Ivalace**' with curled leaf margins; '**Green Ripples**'; '**Maple Queen**'; '**Merion**

Beauty'; '**Needlepoint**'; '**Pittsburgh**'; '**Pixie**'; '**Rochester**'; **H. helix scutifolia** (**cordata**), **Sweetheart Ivy**; **H. helix minima** and '**Shamrock**' which requires a moist atmosphere; and the variegated forms '**Golddust**,' '**Glacier**,' and '**Goldheart**.' **Goldheart**, which has dark green leaves with a golden-yellow center, will lose its variegation if fertilized too frequently.

Helixine soleirolii (**Baby's Tears** or **Irish Moss**) prefers bright light and ample soil moisture. It occasionally dies down and then after a period of rest grows back.

Hoya carnosa (**Wax Plant**) likes a minimum of 60° F., with sun or bright light, and the soil should be allowed to dry between waterings. **H. carnosa variegata** (**Variegated Wax Plant**), which requires a slightly higher temperature, has attractive white leaf margins. Both are climbers and should be provided with a suitable support. **Hoya** is also attractive for its flowers. Water less frequently during its rest period in the fall.

Iresine (**Bloodleaf**) should be grown in full sun with a moist soil and a temperature around 60° F. It may be a poor house plant during the winter because of lack of light. Prune the plant for a better shape.

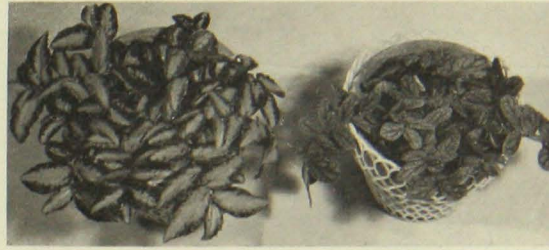
Lonicera japonica aureo-reticulata (**Yellownet Japanese Honeysuckle**) is a trailing plant with green leaves and yellow veins and is useful in window boxes. Provide moderate to bright light, and a moist soil, but avoid high temperatures.

Malpighia coccigera (**Miniature Holly**) is not a true holly. It will withstand



Fig. 30. The various forms of *Hedera*. 1. *H. helix* 'Goldheart,' 2. *H. helix scutifolia*, 3. *H. helix* 'Maple Queen,' 4. *H. helix* 'Curlilocks,' 5. *H. helix* 'Needlepoint,' 6. *H. helix* 'Glacier,' 7. *H. helix* 'Golddust,' 8. *H. canariensis variegata* 'Gloire de Marengo.'

Fig. 31. Two interesting creeper plants—*Pellionia daveauana* on the left and *Pellionia pulchra*.



temperatures as low as 50° F., and likes moist air and bright light.

Maranta (Branded Maranta or Prayer Plant) is so named because its leaves fold up at night. Keep the plant in bright light with a moist soil at a 65° F. minimum temperature. Vigorous new growth usually starts in February and replaces the old foliage. Encourage the new growth by removing the old foliage when the new shoots first appear. **M. leuconeura massangeana** has striking foliage with bands of reddish-brown around a bluish-green center on the upper surface and a red-purple underside. **M. leuconeura kerchoveana** has grayish-green foliage with chocolate to dark green blotches on the upper surface and a blotched red underside.

Mimosa pudica (Sensitive Plant) is notable because of the ability of its leaves and petioles to fold down or droop temporarily when touched. It prefers bright light, a dry soil but moist air, and a night temperature between 50 and 60° F.

Myrsine africana (African Boxwood) resembles boxwood but is more graceful and has red stems. Provide bright light, moist soil, and a night temperature of 50 to 60° F.

Nephtytis afzeli (Arrowhead) is a trailing or climbing plant with green sagittate leaves. It prefers a moist soil, a night temperature of 65° F., and moist air. Many plants thought to be in this genus are really **Syngoniums**.

Palms do fairly well in poor to bright light but should not be in direct sun in summer. Keep the soil moist. A 60° F. minimum temperature should be maintained except when light is very poor (50° F.). **Chamaedorea elegans 'bella'** (**Neanthe bella**), **Howea (Kentia) belmoreana (Belmore Sentry Palm)**, **Howea**

(Kentia) forsteriana (Forster Sentry Palm), and **Phoenix roebelinii (Miniature Date Palm)** are palms generally grown as house plants.

Pandanus veitchi (Veitch Screwpine) tolerates unfavorable conditions, but much of its variegation will be lost if the soil is kept dry. A minimum temperature of 65° F. and a moist soil are preferred. Keep in bright light but avoid direct sun in the summer.

Pellionia, a trailing plant, prefers bright light, a moist soil, and a minimum temperature of 60° F. Two species are generally grown: **P. daveauana** with leaves that are brown-purple to blackish with a pale green center area, and **P. pulchra** with leaves that are light to grayish-green with a network of brownish to blackish veins.

Peperomias will withstand a great deal of neglect but should not be kept wet or the plants will rot. They thrive best in bright light, although they will tolerate poor light even at high temperatures. However, variegation will be less in poor light. Avoid direct sun in summer and temperatures below 60° F.

Preferred species include **P. obtusifolia (Ovalleaf Peperomia)** with solid green leaves; **P. obtusifolia variegata (Variegated Ovalleaf Peperomia)**, which is predominantly golden-yellow with green areas; **P. sandersi (Watermelon Peperomia)**, which has red petioles and silver stripes on the leaves; **P. 'Astrid'**, a bushy plant with waxy, light green, spoonlike leaves; **P. caperata (Emerald Ripple Peperomia)** a sturdy species with corrugated deep green leaves; **P.**



Fig. 32. A group of Peperomias. 1. *P. sandersi*, 2. *P. griseo argentea*, 3. *P. caperata* 'Emerald Ripple', 4. *P. verschaffelti*, 5. *P. rubella*, 6. *P. obtusifolia* variegata, 7. *P. fosteri*.

polybotrya (Coinleaf Peperomia) an upright species with shiny, shield-like, green leaves; ***P. fosteri***, a creeper with short, elliptic, dark green leaves with light green veins and slender red stems; ***P. verschaffelti*** which has broad silver bands between the recessed yellow veins on the bluish-green leaves; ***P. griseo argentea (hederaefolia)*** which produces a bushy rosette of glossy, silver leaves with sunken purplish-olive veins; and ***P. rubella***, a miniature form which requires a fairly high humidity.

Philodendron is probably the most popular of all foliage plants today. This plant grows best in a moist soil and in bright light. Leaf and plant size is reduced by poor light as well as by the lack of nutrients. A minimum temperature of 65° F. is recommended. Most philodendrons are climbers and do well when provided with a support which can be kept moist. Leaves will yellow or become spotted from lack of water, too small a pot, low temperature, poor drainage, or other cultural shortcomings.

Popular species include ***P. oxycardium (cordatum)*** (Heartleaf Philodendron) which is the most widely grown of all foliage plants; ***P. micans*** has silky-bronze, heart-shaped leaves that are reddish beneath, and is very susceptible to cold; and some of the large climbing types such as ***P. 'dubium' (radiatum)*** (Cutleaf Philodendron); ***P. 'Florida'*** which has deep green leaves cut



Fig. 33. The cutleaf philodendron, a climbing variety.



Fig. 34. The distinctive *Pittosporum tobira variegata* in a brass container.

Pilea prefers a moist soil, partial shade in summer and full sun in winter, and a minimum temperature of 60° F. *P. cadierei* (Aluminum Plant) has unusual silver markings on raised portions of the deep green leaves. The dwarf variety *P. cadierei* 'minima' makes a better house plant. *P. involucrata* (Pan-amiga or South American Friendship Plant) is attractive for its coppery red brown leaves and bushy habit; *P. microphylla* (Artillery Plant) is fine textured and has bright green leaves; and *P. 'Silver Tree'* has bronzy-green leaves with silver bands and dots and white, hairy stems.

Piper nigrum (Black Pepper) is a vine with dark blue-green foliage. Culture is the same as for philodendron.

Pittosporum tobira (Australian Laurel) is a tough, slow growing plant resembling the rhododendron. *P. tobira variegata* has attractive grayish-green leaves edged in white. Place in bright light and keep soil moist.

Podocarpus macrophylla maki (Maki Yew Podocarpos) with dark green leaves withstands adverse conditions and low temperatures very well. Water moderately.

Polyscias (Aralia) requires a minimum temperature of 60° F., moist air, and soil and bright light. *P. balfouriana marginata* has leathery semi-rounded green leaves with a white border and *P. guilfoyei victoriae* is a lacy plant with grayish-green leaflets edged in white.

Ruellia makoyana is an attractive, old-fashioned, spreading plant with foliage that is satiny olive-green shaded violet with silvery veins. It prefers a minimum of 60° F., moist soil and air, and bright light.

into five pointed main lobes and rough petioles; *P. guttiferum* with elliptic, oblong leaves; *P. hastatum* (Spadeleaf Philodendron); *P. panduræforme* (Fiddleleaf Philodendron); *P. pertusum* (Swiss Cheese Plant) which is the fast climbing juvenile stage of *Monstera deliciosa*; *P. squamiferum* with its rich, green, five-lobed leaves and olive petioles covered with green to red bristles; and *P. tripartitum* (Trileaf Philodendron).

The self-heading, nonclimbing species of Philodendron are less popular and generally require more space because they are wide spreading in habit. A few of these are *P. bipinnatifidum* (Tw'cecut Philodendron) *P. foesterianum*, *P. selloum*, and *P. undulatum*.

Leaves of young plants of *P. pertusum* are usually entire. Leaves on older plants sometimes return to the entire from the "cut" form, when growing conditions are unfavorable or when the plant grows beyond its support. A type of support which holds moisture is preferable for this species.



Fig. 36. A contrast in foliage types is seen in the lacy *Polyscias guilfoylei victoricae* in a plastic pot and the bold *Polyscias balfouriana marginata* in a pottery container.

Sanchezia nobilis glaucophylla, which has glossy-green leaves and yellow veins, prefers bright light and a moist soil. This plant grows best at temperatures over 60° F., although it often survives much lower temperatures in window boxes.

Sansevieria (Bowstring Hemp or Snake Plant) is really a succulent, but it is discussed under foliage plants because of its wide popularity. It is ex-

tremely tolerant and will withstand almost any adverse condition except low temperature and excess water. It will grow best at 65 to 70° F. in partial shade and in a uniformly moist soil.

Numerous forms are available including the tall *S. trifasciata laurenti* (Variegated Snake Plant or Congo Snake Plant) with yellow bands along the leaf margins. *S. zeylonica* (Ceylon Snake Plant) which is similar to the above except for the absence of yellow bands; *S. trifasciata laurenti* 'compacta' (Dwarf Congo Snake Plant) which has a shorter plant habit and hard, stiffer, blackish-green leaves with broad yellow bands on the leaf margins; *S. trifasciata 'hahni'* (Hahn's Dwarf Snake Plant), a rosette form with pale and dark green bands on the leaves; *S. trifasciata 'Golden hahni'* which is similar to the above except for broad cream to golden yellow bands along the leaf margins; *S. trifasciata 'Silver*

Fig. 35. Some forms of the durable *Sansevieria*.
1. *S. trifasciata* 'Silver hahni,' 2. *S. trifasciata* 'hahni,' 3. *S. cylindrica*, 4. *S. trifasciata laurenti*, 5. *S. trifasciata laurenti* 'compacta.'





Fig. 37. A large specimen of *Schefflera actinophylla*, a sturdy house plant.

hahni' which is also a rosette and has metallic pale silvery green leaves; and the novel *S. cylindrica* with its cylindrical grooved leaves.

Sarococca ruscifolia (Sweet Box) has small leathery dark green leaves, will withstand temperatures as low as 50° F., and prefers filtered light and a moist soil.

Saxifraga sarmentosa (Strawberry Geranium, Strawberry Begonia, or Mother of Thousands) gets its name from the many young plants produced on runners. The leaves are deep, olive-green with silver gray markings, while the attractive variety *S. sarmentosa tricolor* has dark green leaves edged with white and tinted pink. The species prefer a cool location and sun or partial

Fig. 38. The silver marble pothos thrives best if kept warm and dry.

shade, while the variety is more tender and prefers humid conditions and a dry soil.

Schefflera actinophylla (Australian Umbrella Tree) thrives very well if kept on the dry side in a warm room. It makes a good tubbed specimen.

Scindapsus (Pothos) is often confused with the heartleaf philodendron. *Scindapsis*, with ridged stems, should not be watered as freely as the smooth-stemmed philodendron which requires a constantly moist soil. A minimum temperature of 65° F. and bright light are preferred although the plants will survive indefinitely in poor light. *S. aureus* (Devil's Ivy) is a glossy green with limited yellow spotting. *S. aureus* 'tricolor' has a moderate amount of green with yellow and cream variegation. *S. aureus* 'Silver Marble,' 'Marble Queen,' etc. are highly variegated with white, grown at temperatures above 70° F., and watered less frequently than the preceding forms.

Selaginella kraussiana (Spreading Clubmoss) has the same cultural requirements as ferns.

Senecio mikanioides (German Ivy) requires sun or bright light and will withstand a night temperature as low as 50° F.





Fig. 39. The *Spathiphyllum* 'Clevelandi' with the long lasting white spathes. This plant should be more widely grown.

***Serissa foetida variegata* (Variegated Serissa)** has small green leaves with ivory white margins. It prefers sun or bright light and a moist soil.

***Siderasis fuscata*, sometimes sold as *Tradescantia fuscata*,** forms an attractive rosette of broad, oblong, olive-green leaves with a silvery center band and covered with brown hairs. This plant prefers high temperatures, filtered light and dry soil, but withstands less favorable conditions including low temperatures quite well.

***Spathiphyllum* 'clevelandi'** has glossy green leaves and white papery spathes. It prefers a minimum of 65° F., shade, and a wet soil.

Syngoniums are vine-like plants which usually have leaves the shape of an arrowhead. They grow in indirect light of high or low intensity at a minimum of 65° F. A moist soil is satisfactory, but growth is more compact when moisture is limited. Preferred varieties include ***S. podophyllum* 'Emerald Gem'** with dark green leaves and a compact plant habit. ***S. podophyl-***

***lum* 'Trileaf Wonder'** with light green areas in between the dark green margins, and ***S. podophyllum xanthophilum*,** known as '**Green Gold**,' which has yellow green leaves with narrow, green margins.

***Tolmiea menziesi* (Piggy-back Plant)** is unique because young plants arise at the junction of the leaf blade and the petiole. Growth is best in bright light and in a uniformly moist soil.

***Tradescantia* (Wandering-Jew)** roots readily in water and grows in moist soil or water. It does well in shaded locations. Green and several variegated types are available.

***Vinca major variegata* (Periwinkle)** is a trailing evergreen with green leaves edged in cream. It is resistant to low temperatures, but grows best in the sun, and in a uniformly moist soil at 60° F.

***Zingiber zerumbet* (Ginger)** is of interest primarily for its spicy fragrant leaves. This plant is well adapted to conditions found in the average home and prefers filtered light and a moist soil.



Fig. 40. *Tolmiea menziesi*, the piggy-back plant, is easy to grow.

Cacti and Succulents

Plants are classified as cacti according to their flower characteristics, and are usually recognized by their numerous spines and their absence of leaves. Succulents have fleshy leaves or stems but do not always possess spines. Almost all cacti are classified as succulents but not all succulents are cacti.

The slowest growing, toughest, and often most attractive types have been chosen for house plant purposes. They are used for specimen plants as well as in novelty dishes and dish gardens (see page 43).

A sandy, well drained soil should be used. Although plants in this grouping will survive quite well in poorly lighted locations, full sunlight is necessary for best growth and flowering, especially in regard to the cacti.

Keep the plants relatively dry during the winter, adding only enough water to keep the stems from shriveling. Water more frequently during periods of active growth and during the sum-

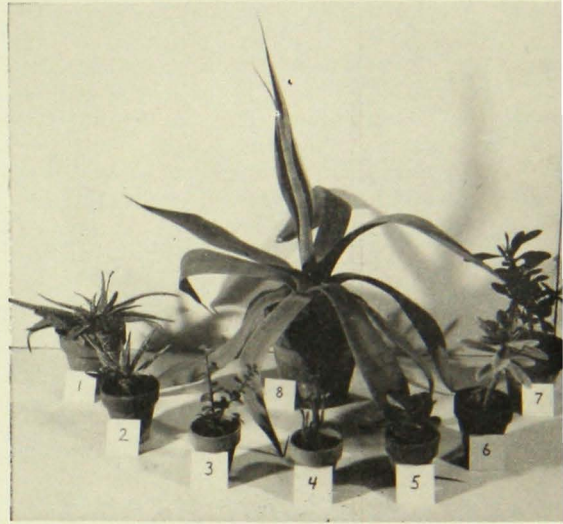
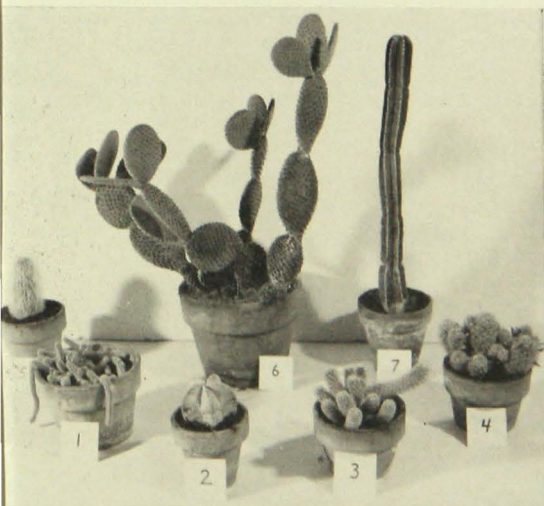


Fig. 41. An assortment of succulents. 1. *Gasteria verrucosa* (Deer's Tongue), 2. *Agave filifera*, 3. *Portulacaria afra* (Elephant Bush), 4. *Crassula lycopodioides* (Watch-chain Plant), 5. *Crassula arborescens* (Jade Plant), 6. *Kalanchoe tomentosa* (Panda Plant), 7. *Euphorbia splendens* (Crown of Thorns), 8. *Agave Americana* (Century Plant).



mer. Contrary to popular opinion the application of fertilizer at least a few times a year will improve growth if the plants are kept in a sunny location. A minimum temperature at 65° F. is desirable.

Fig. 42. An assortment of cacti. 1. *Chamaecereus silvestri* (Peanut Cactus), 2. *Astrophytum* (Bishop's Cap), 3. *Mammillaria* (Lace Cactus), 4. *Coryphantha runyonii* (has flowers and attractive red fruits), 5. *Cephalocereus senilis* (Old Man Cactus), 6. *Opuntia* (Beaver Tail), 7. *Lemaireocereus marginatus* (Organ Pipe Cactus).

POPULAR CACTI

Apocactus flagelliformis (Rat-tail Cactus)
Astrophytum (Bishop's Cap, Sand Dollar)
Cephalocereus senilis (Old Man Cactus)
Chamaecereus silvestri (Peanut Cactus)
Coryphantha runyoni
Echinocereus (Hedgehog Cereus)
Echinopsis (Easter Lily Cactus)
Epiphyllum (Orchid Cactus)—treated like a geranium.
Lemairocereus marginatus (Organ Pipe Cactus)
Mammillaria (Pincushion Cactus, Lace Cactus, Old Lady Cactus)
Opuntia (Prickly Pear, Beavertail)

POPULAR SUCCULENTS

Agave (Century Plant)
Aloe
Ceropegia woodii (Rosary Vine)
Crassula (Jade Plant, Scarlet Paintbrush, Watch-chain Plant)
Echeveria (Hen and Chickens)
Euphorbia splendens (Crown of Thorns)
Gasteria verrucosa (Deer's Tongue)
Haworthia (Cushion Aloe)
Kalanchoe (*Bryophyllum*, Air Plant, Panda Plant)
Portulacaria afra (Elephant Bush)
Sedum (Stonecrop Live-Forever)
Sempervivium (Houseleek)

Growing Plants Under Special Conditions

Water Culture

Most house plants can be grown in water where careful attention is paid to aerating the water, adding fertilizers, regulating acidity, and changing the solution every 2 or 3 weeks. Such manipulations usually involve far more work and trouble than growing the same plants in soil.

There are a few plants, however, that can be grown for long periods in tap water with very little trouble. This group includes the coleus, Chinese evergreen, devil's ivy, dumbcane (all species), English ivy, jade plant, philodendron, snake plant, sweet potato, tradescantia, and trileaf wonder. If the plants get too large for their containers, new plants can be started by placing cuttings in water.

A few pieces of charcoal will help to keep the water fresh. If green algae form on the roots, change the water and wash the roots. The use of a dark container which keeps light off the roots will tend to discourage the growth of green algae.

Artificial Light

Although plants require light, it is no longer essential to place them near a window. Artificial light may be used to supplement natural daylight in the home or to replace the natural daylight.

The difficulty in using artificial light as the only source of light is to get enough light without increasing the temperature too much. Fluorescent tubes give a high light efficiency with low heat. They give off two and one-half times as much light per watt as incandescent lamps. Heat output is the same in both types, but is less concentrated with fluorescent lamps because it is distributed along a long tube. Daylight or standard cool white tubes are recommended for overall use with plants. Combining fluorescent and incandescent light in the ratio of 3 watts of fluorescent to 1 watt of incandescent will increase flowering of plants grown entirely under artificial light. The fluorescent tubes should be backed by reflectors for most efficient use of the available light. Usually two 40-watt

tubes are placed in each reflector. Better results are obtained if the light fixtures are adjustable so that they may be raised or lowered depending on plant height. If the plants are grown in a special area such as a basement, painting nearby walls white will also increase the efficiency of the available light. Lights may be used for as long as 20 hours per day, but should not be kept burning constantly as this may prove harmful to some species. A time switch may be used to turn the lights on and off each day.

Usually, plants that grow in nature in reduced light will do best under fluorescent light. Certain conditions must be satisfied if plants are to be grown successfully under artificial light. Water only when the plants need moisture to avoid getting soft, leggy plants and to avoid the development of diseases. Do not allow the plants to wilt, however. Since plants under artificial light do not have as much light nor are they usually watered as often as plants in natural light, they require only one-third to one-half as much fertilizer. If plants still look weak and spindling when the above conditions are met, the temperature may be too high.

Plants grown at high temperatures require a higher light intensity and poorly lighted plants become soft, weak, and spindling unless grown in the lower limits of their temperature

range. Light requirements also vary with individual species and varieties.

African-violets grow especially well under fluorescent lights. Experimentation at Ohio State University has shown that African-violets grow best when tubes placed 12 inches above the plant tops are used for 18 hours each day. This will provide an intensity of approximately 600 foot-candles.

Gloxinias require 15 to 16 hours of light per day. The lights are placed 3 inches above young plants and 12 inches above older plants.

Seedlings are grown 10 to 12 inches below the lights which are kept on for 15 hours per day. If seedlings are spindling try increasing the light period to 18 or 20 hours.

Cuttings root well under lights kept on for 10 or more hours daily. The cuttings should be no less than 15 inches below the lights until rooted.

Foliage plants of a wide variety may be grown under artificial light. A combination of fluorescent and incandescent light is usually superior to either type of light alone. Incandescent light in addition to daylight fluorescent light is beneficial to the plants and takes away the cold appearance imparted to plants under this type of fluorescent light. The table gives detailed recommendations.



Fig. 43. An assortment of variegated plants. 1. *Pilea cadierei* 'minima' (Dwarf Aluminum Plant), 2. *Serissa foetida* variegata, 3. *Pandanus veitchi* (Veitch Screw Pine), 4. *Dichorisandra reginae*, 5. *Dracaena godseffiana* (Spotted Dracaena).

Number of months foliage plants will remain attractive under various light intensities based on a 16-hour day*

Light intensities in foot candles				Plant
15-25	25-50	50-75	75-100	
Months				
12	36	36		<i>Aglaonema commutatum</i>
	12			<i>Aglaonema marantifolium</i>
	12			<i>Aglaonema roebeleni</i>
	36	36	38	<i>Araucaria excelsa</i>
12				<i>Aspidistra elatior</i>
12		36	38	<i>Aucuba japonica</i>
	12			<i>Begonia metallica</i>
	12			Bromeliads
	30		36	<i>Chlorophytum</i>
			12	<i>Cissus rhombifolia</i>
12		26		<i>Dieffenbachia amoena</i>
12	12	12		<i>Dieffenbachia picta</i>
	12			<i>Dieffenbachia picta</i> R. Roehrs
30	36	36	38	<i>Dracaena deremensis</i>
12		36		<i>Dracaena hookeriana rothiana</i>
12				<i>Dracaena sanderiana</i>
			12	<i>Fatshedera lizei</i>
			12	<i>Ficus elastica doescheri</i>
			12	<i>Ficus lyrata (pandurata)</i>
		12		<i>Hedera helix</i> —Variety Maple Queen
	12			<i>Howea (Kentia) foesteriana</i>
	12			<i>Nephrolepis exaltata bostoniensis</i>
	12			<i>Peperomia obtusifolia</i>
	26	32		<i>Philodendron dubium (radiatum)</i>
12	30	36	36	<i>Philodendron hastatum</i>
12	24			<i>Philodendron oxycardium (cordatum)</i>
			34	<i>Philodendron panduriforme</i>
			36	<i>Philodendron pertusum (Monstera deliciosa)</i>
	12			<i>Pilea cadierei</i>
12				<i>Sansevieria species</i>
	30	36	38	<i>Schefflera actinophylla</i>
		30	36	<i>Scindapsus (Pothos) aureus</i>
			12	<i>Scindapsus (Pothos) aureus</i> Marble Queen
			12	<i>Spathiphyllum clevelandi</i>
12				<i>Syngonium podophyllum</i>
			12	<i>Tolmiea menziesii</i>

* Source: New Jersey Extension Bulletin 327.



Fig. 45. An attractive planter—plants that are in good proportion to the container.

The following information may serve as a foot-candle guide. A person requires 20 foot-candles for casual reading, 30 foot-candles for prolonged reading, 40 foot-candles for sewing, and typists should have 50 foot-candles. If this guide is not adequate it may be possible to borrow a light meter from your local power company.

Dish Gardens and Planters

Dish gardens are plantings of small, relatively slow growing plants in open shallow containers. Since such containers seldom have a drainage opening, be careful not to overwater. If the container is deep enough, place a half inch layer of gravel, sand, or charcoal in the bottom under the soil to improve drain-

age. A thin layer of sand, colored gravel, or pebbles may be placed on top of the soil after planting to further improve the appearance of the garden.

Be careful to include in the same container only plants with similar cultural needs. Cacti and succulents are excellent subjects for dish gardens (see section on cacti and succulents, page 39). Other suitable plants include boxwood, dracaena (small type), euonymus, Irish moss, ivies, mother of thousands, pellionia, peperomias, miniature date palm, pilea, podocarpus, serissa, sweet flag, and wax plant.

Deep containers, often used for large plants, are usually referred to in the trade as planters. Such containers may be constructed of brass, wood, plastic, or pottery. Many modern homes have built-in planters in front of picture windows, near entry ways, in hallways as room dividers, or in other similar locations. Built-in planters should be



Fig. 44. An overgrown planter.

waterproof and rust proof and are usually made of stone, concrete, or metal.

Metal containers may be coated with an asphalt emulsion (tar is toxic to plants) to make the container waterproof, to prevent rusting, or to prevent a toxic effect if the container is made of copper. Such planters vary from 6 to 14 inches deep. Allow space to permit up to 2 inches of broken crock, charcoal, or stone in the bottom of the planter to provide good drainage. If the planter is deep enough, plants may be left in their original pots. Space between the pots is then filled with sphagnum or peat moss (see the introduction to foliage plants, page 25). When this system is followed, the plants may be rearranged at will and overgrown or poor ones may be replaced without disturbing the remaining plants.

Here again it is necessary to combine only plants with similar cultural requirements to insure a long lasting planting.

Cacti are not often used in planters, although some of the succulents prove very useful. Many of the small plants suggested for use in dish gardens are suitable for planters, and the following plants are also recommended: African-violet, Australian laurel, ardisia, gold-dust plant, aucuba, banded maranta, Chinese evergreen, croton, dumbcane, fatshedera, fittonia, philodendron (small types), piggy-back plant, Veitch screw-pine, snake plant, schismatoglottis, and scindapsus.

Terrariums

Terrariums are miniature gardens enclosed in glass. The glass enclosure may be a round glass globe, fish aquarium, brandy glass, bottle, or any similar container. Such gardens are especially useful for plants which require high humidity. Many of the plants other than cacti and succulents listed for dish

gardens also flourish in terrariums. Cuttings may be easily rooted in these containers because of the humid atmosphere.

A piece of glass is used to cover the top of the glass container. This cover should be constructed so that it may be moved to ventilate the terrarium when excessive amounts of moisture collect on the inside of the glass. The soil should be kept moist but not boggy. Keep the terrarium in bright light but never in direct sunshine.

Terrarium plantings are relatively easy to construct. Place a 1-inch layer of gravel, pebbles, broken crock, or charcoal under the soil to improve drainage. Line the sides below the soil level with sheet moss (available at your local florist), keeping the green side out to present a finished effect. Mound the soil higher on one side to provide a naturalistic setting. A soil containing one-quarter loam, one-half leaf mold or peat, and one-quarter sand is preferred. Use plants of equal rates of growth so the faster growing ones will not crowd out the slower plants. Overgrown plants may be pruned.

Native plants as well as cultivated plants may be used. The native plants include the following: bloodroot, dog-tooth violet, dutchman's breeches, evergreen seedlings, small ferns, ground pine, jack-in-the-pulpit, maidenhair fern, moss, mushrooms and toadstools, partridge berry, pitcher plant, ivy, wild strawberry, and wintergreen.

Cultivated plants suitable for the terrarium include African-violet, banded maranta, begonia, Chameranthum, Chinese evergreen, coleus, creeping fig, croton, dracaena (small types), fittonia, grape ivy, English ivy (small types), Irish moss, Joseph's coat, mother of thousands, palm (small types), peperomia, philodendron (small types), snake plant, scindapsus, selaginella, and wandering-Jew.

Suggestions . . .

PLANTS FOR LOW TEMPERATURE (50° to 60° F. at night)

Australian Laurel	Cyclamen	Kalanchoe
Azalea	Easter Lily	Miniature Holly
Baby's Tears	English Ivy Varieties	Mother of Thousands
Boxwood	Fatshedera	Ornamental Pepper
Bromeliads	Flowering Maple	Oxalis
Calceolaria	Fuchsia	Primrose
Camellia	Geraniums	Sensitive Plant
Christmas Begonia	German Ivy	Spindletree
Cineraria	Honeysuckle	Vinca
Citrus	Jerusalem Cherry	White Calla Lily

PLANTS FOR MEDIUM TEMPERATURE (60° to 65° F. at night)

Achimenes	Crown of Thorns	Peperomia
Amaryllis	Easter Lily	Poinsettia
Ardisia	English Ivy Varieties	Rose
Avocado	Gardenia	Shrimp Plant
Bromeliads	Grape Ivy	Silk-Oak
Browallia	Hibiscus	Ti Plant
Chenille Plant	Hydrangea	Tuberous Begonia
Christmas Cactus	Norfolk Island Pine	Velvet Plant
Chrysanthemum	Palms	Wax Begonia
Citrus	Pilea	Wax Plant
Copper Leaf		Yellow Calla Lily

PLANTS FOR HIGH TEMPERATURE (65° to 75° F. at night)

African-violet	Chinese Evergreen	Gloxinia
Aphelandra	Croton	Philodendron
Arrowhead	Dracaena	Scindapsus (Pothos)
Australian Umbrella Tree	Episcia	Seersucker Plant
Banded Maranta	Figs	Snake Plant
Cacti and Succulents	Golddust Plant	Spathiphyllum
Caladium		Veitch Screwpine

PLANTS THAT WILL WITHSTAND ABUSE

Arrowhead	Fiddleleaf Fig	Ovalleaf Peperomia
Australian Umbrella Tree	Grape Ivy	Snake Plant
Cast-iron Plant	Heartleaf Philodendron	Trileaf Wonder
Chinese Evergreen	India Rubber Plant	Tuftroot (D. amoena)
Crown of Thorns	Jade Plant	Veitch Screwpine
Devil's Ivy		Zebra Plant

PLANTS FOR EXTREMELY DRY CONDITIONS

Bromeliads	Crown of Thorns	Snake Plant
Cacti	Ovalleaf Peperomia	Scindapsus (Pothos)
		Wandering-Jew

VINES AND TRAILING PLANTS FOR TOTEM POLES

Arrowhead	English Ivy and varieties	Pellionia
Black Pepper	Grape Ivy	Philodendron
Creeping Fig	Kangaroo Vine	Scindapsus (Pothos)
		Wax Plant

PLANTS FOR LARGE TUBBED SPECIMENS

Australian Umbrella Tree	Fiddleleaf Fig	Philodendrons
Dracaenas	India Rubber Plant	Silk-Oak
False Aralia	and varieties	Tuftroot
Fatshedera	Palms	Veitch Screwpine

Special Exposures

SOUTH OR WEST WINDOWS

Amaryllis	Coleus	Oxalis
Azalea	Cyclamen	Poinsettia
Begonia (in winter)	Gardenia	Rose
Bloodleaf	Geranium	Sweet Flag
Cacti and Succulents	Lily	Tulip
Calla Lily	Easter Lily	Velvet Plant

NORTH WINDOW

African-violet (in summer)	Dracaena	Philodendron
Anthericum	Fern	Piggy-back Plant
Arrowhead	Dumbcane	Rubber Plant
Baby's Tears	Ivy	Scindapsus (Pothos)
Australian Umbrella Tree	Mother of Thousands	Snake Plant
Cast-iron Plant	Norfolk Island Pine	Tuftroot
Chinese Evergreen	Peperomia	Wandering-Jew

EAST WINDOW

African-violet	Gloxinia	Veitch Screwpine
Banded Maranta	Ivy	Serissa
Caladium	Peperomia	Silk-Oak
Dracaena	Philodendron	Tuftroot
Fatshedera	Rubber Plant	Wandering-Jew
Fern	Scindapsus (Pothos)	Wax Plant

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Asplenium	31	Echinocereus	40
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Cooperative Extension Work in Agriculture and Home Economics, University of Minnesota, Agricultural Extension Service and United States Department of Agriculture Cooperating. Skuli Rutford, Director. Published in furtherance of Agricultural Extension Acts of May 8 and June 30, 1914.

20M-5-61