

THE NATIONAL
Horticultural
MAGAZINE



Amaryllis evansiae

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The National Horticultural Magazine

VOL. 36

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No. 2

APRIL 1957

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Cover Illustration: *Amaryllis evansiae* Traub et Nelson.
(Engravings furnished by the Louisiana Society for Horticultural
Research through the kindness of Mrs. U. B. Evans,
Mrs. Robert Lee Emery, Jr. and Mrs. Eugene Truax.)

The National Horticultural Magazine

The National Horticultural Magazine is a quarterly journal, being the official publication of The American Horticultural Society, Incorporated. It is devoted to the dissemination of knowledge in the science and art of growing ornamental plants, fruits, vegetables, and related subjects. The Journal is printed by Monumental Printing Company at Thirty-second Street and Elm Avenue in Baltimore, Maryland, and is entered as second class matter in the post office of that city in accordance with the Act of August 24, 1912. Additional entry for Washington, D. C., was authorized July 15, 1955, in accordance with the provisions of Section 132.122, Postal Manual. Subscription to the Journal is included in membership, which is \$5.00 a calendar year.

Original papers increasing the historical, varietal, and cultural knowledges of plant materials of economic and aesthetic importance are most welcomed and will be published as promptly as possible. Material of lasting interest appearing in related journals will be reprinted as available. Publications received for the Library will be reviewed and made available to members after publication of the reviews. These books are designated "Library" following the prices in the book reviews. Reviews of private collections will also be accepted and published. These books, however, are not available for loan to members of the Society.

Manuscripts should be prepared to conform to the style adopted in the latest number of the current volume. The nomenclature used in manuscripts, whether treating horticultural or botanical subjects, should be in conformance insofar as possible with the Codes published by the International Association for Plant Taxonomy. They should be typewritten with double-spacing, leaving a one-inch margin at the left for editorial direction to the printer. Footnotes to text statements should be avoided unless they are absolutely necessary. Usually the information can be included in the text, parenthetically if necessary, without making the reading too cumbersome. Footnotes to tables are often necessary and should be designated by small Roman letters. Literature citations, footnotes and illustration legends should be on a separate sheet. Authors are requested to give for each citation, the author, or authors, year of publication, full title or citation without abbreviation of the journal or volume, in the case of journals, the beginning and ending pages; of books the edition number and the number of pages, the name and address of the publisher.

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Additional 100s	1.65	1.87	3.30	5.06	6.05	1.65

The Journal is issued for the quarters commencing with January, April, July, and October. Manuscripts must reach the Editorial Office at the Society's Headquarters three months before publication is desired.

Missing numbers will be replaced without charge provided claim is received in the Editorial Office within thirty days after publication date.



The hospitable main door of the north entrance to Virginia House, in whose jambs are initials and dates carved by hand. Over this entrance is an oriel window of ten lights, having at its top a balustrade in carved stone whose silhouettes vaguely suggest chimeras. The large bay of twenty-four lights extends almost entirely across the north facade of the west wing, and is its chief architectural feature. Above is a delicately-designed balustrade, divided by four uprights carrying graceful hollow finials. Over the balustrade is "Elizabeth's Window," slender mullions dividing its eight lights, and with somewhat unusual rounded panes. Crowning the window is a pediment in which appears the arms of the Queen, placed there to commemorate her visit to the Priory in 1572. To the west of the house, and entered by a hidden path through the heavy boxwood, is a close called "Madam's Garden."

Virginia House and Gardens

ELIZABETH CABELL DUGDALE, *Custodian*

On a height overlooking James River in the city of Richmond, Virginia, but a few miles west of the place where the English colonists came to rest in 1607, Virginia House today reminds us of the homes the first settlers left behind them. The hospitable residence, the home of the late Honorable Alexander W. Weddell and Mrs. Weddell, was named "Virginia House" by Mr. Weddell for his native state and for his wife, Virginia Chase Weddell.

The house is built primarily of material from the Priory of the Holy Sepulchre, first erected in 1125 at Warwick, England, and designed originally to accommodate a society of Regular Canons. With the dissolution of monasteries, the Priory was taken from the Church, given to the laity, and reconstructed as a residence in 1566 by its first lay owner, Thomas Hawkins. In 1572, Queen Elizabeth I visited Hawkins in his new home. Thereafter he was privileged to display the Royal Arms marking her visit. These arms now appear over the north library window at Virginia House.

In all, more than a dozen proprietors inhabited this ancient building, each making some slight changes in the structure until, like many old English houses, it became Jacobean, Elizabethan, and Tudor. An early purchaser in 1709 was Henry Wise, the Royal Gardener to King William III and Queen Anne, whose elaborate plans for the Warwick Priory grounds were discovered recently and published in the *British Country Life*, (January, 1948).

The remains of the Priory were purchased by the Weddells in 1925 from the last English owner, Thomas Lloyd, who since 1910 had tried in vain to sell the entire estate. The Weddells learned of this sale, strangely enough, from an advertisement in the *New York Herald*.

As fifteen years had elapsed since it had first been placed on the market, much of the original material, paneling, and glass had already been sold, but the Weddells bought what was left of the partially demolished structure and shipped it to Virginia. The present house was then designed by the late Henry G. Morse of Essex Fells, New Jersey, in the manner of a home of the Elizabethan period, somewhat along the lines of the original building.

The greater part of the interior of the house, the carved paneling, and staircase are from the Tudor period, while the stones used in the building are thought to be of a much earlier date. A number of these stones are marked with the old guild emblems. It is possible that the inscription in Latin carved over the front door may even go back to the time when the house was a monastery. Translated, the inscription reads, *For it is Thou Lord only that makest us to dwell in safety.*

In furnishing the house, many of the pieces were obtained for the Weddells by the well known connoisseur, Charles Duveen, better known as "Charles of London." While most of the furniture is English of the Jacobean and Elizabethan periods, it must be remembered that Vir-



*Looking west from the Loggia. The large stone tablet and the crown above it were at one time parts of the Houses of Parliament, and removed in the course of repairs. On the tablet are carved various symbols of sovereignty and a prayer for the King's safety: *Salvum fac, Domine.**

gma House was first of all the *home* of the Weddells and, like any other home, reflects the travels and interests of the owners. Thirty years were spent by Mr. Weddell in the Foreign Service of the United States. His last two assignments were as Ambassador to Argentina and Ambassador to Spain, and are manifested in the old Spanish furniture and *objets d'art*. In the home of a gracious Virginia gentleman and his lady, southern hospitality was enjoyed at Virginia House by many distinguished visitors to Richmond.

The gardens at Virginia House were designed by the well known landscape architect, Mr. Charles F. Gillette of Richmond, the main plantings being made in 1929 with subsequent additions through the years. While the interests and desires of the Virginia Historical Society may have served to take the place of an "elder son" with Mr. Weddell, the garden was the "daughter" of the mistress of the house. Here Mrs. Weddell's daylight hours were spent, and the chief assistance given here by the "master of the house" was in the removal of wild onions and dandelions.

The garden has an air of age beyond its actual creation as most of the material was large when planted. The holly hedge (*Ilex opaca*) at the front, now more than seven feet in height, is as much as ten feet wide in places. The tree box (*Buxus sempervirens arborescens*) in the forecourt, probably the largest boxwood to be moved in this part of the state, created quite a sensation with the tree-moving equipment as it passed through the streets of Richmond in 1931. Another boundary of great beauty is the old English boxwood (*Buxus sempervirens suffruticosa*), one of the handsomest hedges in this neighborhood. Conveniently near the kitchen is the herb garden where may be found the mint bed started from slips brought from the garden at Mount Vernon when Mr. Weddell was a member of the Mount Vernon Ladies' Association.

Madam's garden, with the adjoining Loggia and Bowling Green, furnishes an ideal spot for the annual Garden Party

given each spring for the members of the Virginia Historical Society. At the back, the upper terrace and flagged court lead on the right to the Azalea Garden and the Rose Garden, with the main steps leading to the left and the sunken garden which was formed from the soil left over when excavating for the basement. In the center of this garden, the Water Garden, planted with lotus, sagittaria, and *Iris kaempferi*, is the chief point of interest. An oblong pool at one end filled with water-lilies is balanced by a round pool and fountain at the other end where a small niche in the wall shelters an ancient statue of St. Francis of Assisi beholding "Mother Nature" and her creatures. All is overshadowed by an historic weeping willow, a shoot from the one which used to guard the tomb of Napoleon at St. Helena.

The *parterre* garden, originally planted with thyme, heuchera, veronica and other small plants, is now completely overgrown by the boxwood. Four small lead figures portraying the seasons, Spring, Summer, Autumn, and Winter, give distinction to this area. Perhaps the handsomest plants in the sunken garden, however, are the four *Photinia serrulata*, which are a beauty to behold in the early spring when the new growth is tinted from red through the copper tones; later the white blossoms unfold, so fragrant as to be overpowering, and, finally, the clusters of coral berries which last far into the next spring. These berries, unlike the seed of most broadleaf evergreens, germinate quite rapidly and the tiny plants begin to appear in two or three weeks. Seeds scattered by the wind and the birds often come up in the walks and beds.

On the edge of the great lawn, the *Magnolia soulangeana* burst into bloom with the first warm spring days, usually to be wiped out overnight by an early frost. Here, guarding the entrance, are two amusing caricatures, one of Louis XIV, the other his contemporary, Mohammed IV. These gnomelike figures came from Palermo, Sicily, and remind the visitors again of the wide travels of the owners.



The Sunken Garden. Looking east from underneath the willow tree across the water garden (above). Looking west from the eastern end of the water garden showing the large plants of Photinias (opposite page, top). A view of the east end of the sunken garden (bottom).



Following the steps which lead to the meadow, you come at last to the wild garden where there once existed an old rock quarry. An inscription carved on a huge stone dedicates this garden to the memory of a close friend and neighbor, Mr. T. C. Williams, whose property adjoins on the west. There his widow still resides as is shown on the garden plan, "Bessie's 'Agecroft Hall.'" In the wild garden you will find a pool bordered with ferns and wild flowers. This garden is planted entirely with native flora. It is truly a haven for birds and wild life. Steps cut from the old stone ledges lead to a winding path which ends at last at the old James River Kanawha Canal, where our early Virginia forefathers transported their hogsheads of tobacco to the Richmond market.

Retracing your steps and following the curve of the meadow up the hill, you come to what is known as the "tea garden." A unique sun-dial is centered in this garden where tulips, English daisies, lilies, and marigold follow in succession.

Ascending three steps, you return to visit the rose garden bordered with dwarf box. Roses have never seemed to be entirely happy in the garden at Virginia House; perhaps the radiation from the many brick walls has added to their discomfort.

Up a few more steps, you enter the azalea garden where an ancient baptismal font serves as a bath for the birds which flock in great numbers to eat the berries from the *Nandina domestica* and the





Selected ornamentals. Top, left: St. Francis in his niche; right: A corner of the tea garden overlooking the James River. Bottom, left: Copy of "The Birth of Venus" from the original in the Museo delle Terme in Rome; right: Wall fountain on the terrace opposite the music room, inscribed: Bibe et ande.

The Rose Garden during Garden Week in Virginia.



Viburnum setigerum. In the background in the shade may be found a wealth of *Danae racemosa*, locally called "Poet's Laurel," although horticulturally it is known as the "Alexandrian Laurel." Two large and picturesque *Cedrus atlantica* spread their branches over the garden. These occasionally produce great cones which are exquisite until they dry and shatter. Approaching the south side of the house from the garden, you will see an *Eleagnus pungens*, trained espalier, which reaches to the top of the house. In October these fragrant blossoms perfume the whole garden.

No word picture can portray the many vistas and shady nooks—under the pergola, in the orchard, or even in the kitchen garden where rows of flowers are planted for cutting and use in the house.

The Weddells had no children, therefore it was their plan from the beginning to give the house to the Virginia Historical Society, they in turn retaining only a

life interest. This formal presentation was made on May 31, 1929.

In 1948, when the Weddells met an untimely death in a railway accident, the property passed to the Virginia Historical Society, to be used by them for meetings and entertainments and to be opened to the public with a small admission charge as a "Museum home."

At the end of your tour you will find the tablet erected to the memory of the former owners.

VIRGINIA HOUSE

The Gift of
ALEXANDER WILBOURNE WEDDELL

and

VIRGINIA CHASE WEDDELL

to

Virginia Historical Society
"THAT THE PAST MAY INSPIRE
THE FUTURE."

The Jamestown Festival, celebrating the 350th Anniversary of America's first permanent English Settlement, will be held from April 1 through November 30. Thirty daily pageantry, drama, and colorful events will be featured at Jamestown, Virginia, where the colonists struggled against the wilderness. Replicas of the ships which brought the first settlers to Virginia are again tied to "Trees along the shore" as described in Captain John Smith's diary. The triangular James Fort has been reconstructed as it was in the seventeenth century. Here Americans may see the small thatch-roofed houses of "wattle-and-daub" construction in which their ancestors lived. Old Jamestown Island, the New and Old World Pavilions, Chief Powhatan's Lodge, soldiers in the seventeenth-century uniforms parading daily on the Mall, and the Glasshouses of 1608 are only a few of the things to be enjoyed daily at this Festival.

"Virginia House" story is presented in observance of this Festival in order to inform the reader that he may also revisit an example of what our earlier ancestry may have given up to make the Jamestown landing possible.

Amaryllis evansiae

IRA S. NELSON¹

This is the first of a series of articles to be published in the bulletin² about plants that were collected in South America in 1954. It is concerned with a new species collected in the Province of Santa Cruz, Bolivia.

Dr. Hamilton P. Traub has diagnosed its status as new to science and has tentatively placed it in the *A. belladonna* L. alliance. The name *Amaryllis evansiae* was selected to honor Mrs. U. B. Evans and her daughter, Mariana Evans Applegate, for their foresight and determined efforts which resulted in bringing new *Amaryllis* breeding stock to American horticulture. A technical description is being prepared for a taxonomic journal³ as a final step in making this name valid.

Amaryllis evansiae is a variable species indicating that it is young as species go. Perhaps in the far distant future it will eventually settle down to a single form. Meanwhile horticulturists can rejoice in its variability, and hybridizers can have a heyday with its gene complex.

The bloom scapes of this delightful species give an airy feeling of gracefulness which is a refreshing contrast to our modern hybrid *Amaryllis*. Although there is no set flower form, the blossoms may be divided into two general groups. The wide-segmented group with segments overlapping for more than half their length gives a full-faced appearance. The narrow-segmented group with segments overlapping for less than half their length presents a star-like or even spider-like appearance.

Within both groups the color range varies from a light cream to a pale yellow. These pastel colors are often suffused with green in varying degrees. Like the 'Peace' rose, *A. evansiae* may develop a blush as the blossoms mature. The degree of blushing will vary from none at all to almost enough to change the final color of the flower to solid pink. Throat color is also variable, ranging from green to yellow. With some clones the throat color may actually be green when the flower first opens and yellow by the time the flower is ready to wither. Several clones exhibit a pink star, or rudiments of one, in the throat.

Most of the clones have segments which are ruffled along their edges. Some, however, are perfectly plain. The ruffling together with the horizontal or even slightly upturned posture of the flowers adds to the quality of gracefulness.

Scapes will range from fourteen to twenty inches in height with individual flowers that are from four to six inches across. The informal shape of the flowers makes them appear somewhat smaller than their actual measurements. Usually two or three flowers are produced per scape. However, some scapes produce four and even five flowers. The number of scapes per bulb is usually two.

The leaves of *A. evansiae* are strap-like, being widest at about one-third of the distance from the tip to the base. They are moderately V-shaped in cross section. Leaf color is medium to light green and the leaf surface is smooth and somewhat glossy.

The globe-like bulbs of *A. evansiae* have very short necks and are covered with a ruddy brown outer coat. The bulb

¹Publications Committee, Louisiana Society for Horticultural Research, Lafayette, Louisiana.

²Reprinted from Bulletin No. 1 of the L.S.H.R., March, 1956.

³*Amaryllis evansiae* sp. nov. Traub & Nelson, *Baileya*, Vol. 4, No. 2, pp. 85-88, 1956.

size is small in comparison to the bulb size of our modern hybrid *Amaryllis*. Bulbs found in the jungle seldom reached a diameter greater than two inches. Under pot culture the writer has bloomed this species on bulbs no larger in diameter than a twenty-five cent piece.

The vegetative-reproduction mechanism of *A. evansiae* is most remarkable. Even small bulbs one year from seed produce bulblets. The parent bulb produces rhizomes at the juncture of the scales and basal plate. These eventually grow to the surface of the soil where they terminate in bulblets. The number of bulblets thus formed may vary from none to twenty, although four to eight is the usual number produced by mature bulbs.

The elevation in which *A. evansiae* was found is estimated at between 1400 and 2400 feet above sea level. Not having access to an altimeter, these figures could be in considerable error particularly in the upper range. Colonies were found on the open sandy plain, in recently cleared jungle that was planted to cultivated crops and beneath the undergrowth of the deciduous jungle. One small colony was found growing on a rock ledge on the side of a cliff between bromeliads. The bulbs were exposed but the roots were covered with a shallow layer of rotting vegetation.

The soil in which *A. evansiae* was found growing varied. In all cases it had good internal and external drainage. Its reaction was probably slightly alkaline if the quantity of snails present is an indicator.

Little is actually known about cultural requirements best suited to *A. evansiae*. Dr. Hamilton P. Traub has grown it under lath in beds and pots at La Jolla, California. It has done well for him. Mrs. U. B. Evans has grown it at Ferriday, Louisiana, under the shade of trees. She covers it during the winter with a heavy mulch which remains until frost danger is over. Here it has gone through several hard freezes without damage to the bulbs.

The writer has grown it in pots which were placed under lath during the frost-free months and kept in the greenhouse during the remainder of the year. It has performed well as a pot plant. Some difficulty with bulb rot was encountered following over-watering. The most satisfactory soil mixture used to date consists of one part crushed oyster shell, two parts sand and six parts muck (rotted native peat) from the New Orleans area.

Optimum fertility levels are not known. However, it responded well to fertilizer treatment given to the run of pot plants in the greenhouses at Southwestern Louisiana Institute. It is the opinion of the writer that the most important cultural factor is good drainage. Internal drainage of the soil is extremely important in the development of roots.

The best planting depth is not yet known; however, the bulbs, which were completely but shallowly covered, seem to grow better than those left partially exposed above the soil.

The Louisiana Society for Horticultural Research was organized in June, 1954, by amateur gardeners and horticulturists interested in fostering the introduction and development of new plant materials suitable for Louisiana gardens. The Society is a non-profit, educational organization.

The first project of this membership organization consisted of financing a plant exploration trip by Ira S. Nelson, Professor of Horticulture, Southwestern Louisiana Institute, Lafayette, Louisiana, to South America and principally to Bolivia.

Due to the diversity, as well as the great wealth of material discovered and brought back from this expedition, the results of this first project cannot be fully known or evaluated for several years.

The Society publishes bulletins from time to time to acquaint the members and the interested public of explorations and with the progress of plant development resulting from these explorations. The first bulletin was published last year and this paper is reprinted from it.

Amaryllis evansiae

Sam Caldwell





*A well-defined hedge of Thuja occidentalis
at Wellesley, Massachusetts.*

(All illustrations prepared from photographs of the Arnold Arboretum)

Hedges for North America¹

DONALD WYMAN²

Everyone interested in gardening considers the planting of a hedge at one time or another. There are times when only a privet or barberry hedge is contemplated, possibly because these varieties make up the hedges used on neighboring properties. On the other hand, when one of the better materials like hemlock is used in a hedge and planted in a situation where it thrives consistently, then there is interest and beauty derived from that hedge for years. In fact, there is no better nor more beautiful hedge available than one made of well-grown hemlock. It is satisfactory as a hedge and beautiful as an ornament three hundred and sixty-five days each year. Fortunate is the person who knows this and uses it. Many ornamental shrub and tree varieties can be grown in hedge form. In order to make hedges more beautiful by using interesting and diverse plant materials, let us consider some of the important factors to be contemplated at the time the hedge is being planned, and then let us consider the many, many plants which can be utilized for making good hedges in this country.

A hedge is a line of plants grown in either a natural or an unnatural clipped form, hence there should be some good reason for growing them in this way. A line of well-grown shrubs or trees allowed to grow in their natural form unquestionably results in a much more beautiful line of plant material. One of the foremost reasons for using plants in a clipped hedge is to form a barrier in order to keep people and animals within (or without) the property limits, particularly on the small property where space is at a premium. Sometimes a background is needed for a perennial border or as a for-

mal line of demarcation between one part of the property and another; or sometimes a long flowering hedge is desired to mark the limits of a property. Regardless of the purpose for which the hedge is planned, it should be very clearly defined before the hedge material is selected, for there are plants which can be chosen to best serve each special purpose.

There is a second reason for giving the purpose careful consideration at the start. If a three-foot barrier hedge is to be used, then the mature width of the hedge should be planned to be at least three feet. If a fifteen foot screen planting is desired, in order to have a hedge that is well grown, a space on the ground nearly fifteen feet wide should be allowed for the hedge to grow sufficiently wide for that height. Even a hemlock hedge might be allowed only three feet in width if it is to be kept three feet high, whereas the same hedge might need nearly fifteen feet of ground space if allowed to grow fifteen feet in height. This matter of allowing sufficient width for the hedge is a very important matter. It is of the utmost importance to understand it thoroughly before the hedge is planted in order to allow sufficient space for future growth. Many of us have seen old Norway spruce hedges allowed to grow ten to fifteen feet tall, and only allowed a three to four foot space to increase in width. The result is a narrow hedge that soon gets open and devoid of branches at the base and there is nothing that can be done to coax more branches from the base. One must, therefore, select a hedge which at maturity can be kept well within the limits set for it.

A windbreak or screen frequently is given considerably more room than a formally clipped hedge, for the windbreak or screen is frequently allowed to grow unclipped.

¹ Revised and reprinted from the July 1946 issue of *The National Horticultural Magazine*.

² Horticulturist, Arnold Arboretum, Jamaica Plain, Massachusetts.

When the purpose of the hedge is known, then its height and width can be determined, and not until then. It is only after these items have been definitely decided that the plant material can be selected and the hedge can be placed. As an example, take a paved walk through the garden along which the hedge is to be planted. Should the hedge be three or six feet from the edge of the walk? If a three-foot yew hedge is desired, then the ditch must be dug two feet from the walk. Know the purpose the hedge is to serve, its desired height when fully grown, then determine its exact location. One other very important point is never to plant a hedge exactly on a property line. If this is done, some disagreeable neighbor might, at some future time, chop down that half of the hedge on his property. He would have a legal right to do so. If, however, the hedge was so planted that at maturity all plants were within the property line, then the owner would have full jurisdiction over it at all times.

Planting

In planting hedges it is best to dig a ditch. In general, the ditch should be about 18 inches wide and from 12 to 18 inches deep for small hedges, but for larger hedges and evergreens these dimensions might well be doubled. If the soil is poor, make the ditch larger, fill it with good soil, fork in some well-rotted manure or other humus, spread the roots, cover them carefully with soil and firm the soil until the surface is almost up to the surrounding grade. If the plants are set a trifle low, water will flow towards the hedge. A surface mulch around the plants prevents the soil from drying and baking. As in any other transplanting operation, the tops should be cut back considerably to compensate for the roots lost in digging. The young hedge plants should be cut back to within a foot of the ground at least if they are deciduous, preferably more if possible, because the lower the plant stock at this time, the sooner it will become bushy and well branched at the base. After planting is completed, the entire hedgerow should be well watered.

Hedges should be planted in well-drained soil and so situated to receive a maximum amount of sunlight. This is most important, for, though certain types of hedges will withstand shade better than others, shade is one of the chief reasons why some hedges are scraggly and uneven.

Spacing

Individual plants may be spaced from 18 to 36 inches apart, depending on the kind and size of the plants, and the quickness of effect desired. There is no necessity for planting closer than 18 inches except possibly with some of the dwarf types.

Since privet and barberry are cheap, most people can well afford to place them close together, at 18 inches. On the other hand, evergreens cost considerably more; but, in order to meet the increased expense of this type of hedge, the home owner can space the plants farther apart, at 36 inches, and wait several years for a permanently close and compact hedge. If he is in a hurry for the permanent effect, he buys larger plants and spaces them 18 inches apart. The important point to remember is that in a few years the ultimate effect of both hedges will be the same. The only difference will be that the closer planted hedge will look its part a few years sooner.

Another method of obtaining quick results in a hedge is to plant two rows, 18 to 24 inches apart, the plants in one row being opposite the spaces in the other. This, of course, makes a wider hedge and insures the filling in of the bare spot made by a dead plant.

One of the purposes in planting a hedge is to keep dogs off the property. This object is easily accomplished by a mature, closely planted, thorny hedge, but the same thing can be done with a young hedge which is not thorny and where the plants are spaced far apart. A strip of chicken wire, from 2 to 3 feet high, is staked up through the center of the young hedgerow, and by the time the wire begins

to disintegrate, the plants will have grown sufficiently to present a barrier themselves. If a hedge must be grown in a shady place and the resulting growth is always more or less open at the bottom, it is a good plan to keep a strip of chicken wire in position in this way. It is not seen, and it keeps the animals out.

Some hedges of white pine, hemlock, beech, spruce, and other tree types, fifty years old, and only about 5 feet tall, which were originally planted 18 inches apart, are still in perfect condition, fully demonstrating that tree types can be closely planted in hedge form and still be effective after half a century.

Care

Fertilizing is often necessary, since the more hedges grow, the more often they will have to be sheared. However, if the soil is poor or a young hedge needs added stimulus to attain the desired height, a mulch of well-rotted manure can be placed around the base of the plants or worked into the soil. This can be done either in the fall or in the spring. A mixed fertilizer (5-10-5) could be applied at the rate of 5 to 10 pounds for each 100 feet of row depending on the size of the plants. For old, mature plants it may be possible to make an even stronger application, but this should be done only after a previous trial application.

Most deciduous hedges can be treated far more ruthlessly than they have been. When they grow old and open at the base, it would be far better to cut them down to within a few inches of the ground than to try to force additional branches by the use of fertilizers and added care. The cold winter of 1933-34 clearly demonstrated this important point to many home owners. All privet hedges and even barberry hedges were injured in many sections of New England and New York. Other plants had their tops killed entirely. Most of these plants came up again from the roots, many of the hedges that were cut back to the ground in the early spring were more dense and more compact at

the end of the first growing season than they had been for many years. Consequently, an old and worn-out deciduous hedge should be cut in the early spring before the buds begin to swell, leaving only a few inches growth at the base. A bushy, vigorous hedge will result in short order. This does not apply to evergreen hedges, for they frequently do not respond to such rigorous treatment.

Pruning at Planting Time

Many shrubs can be trimmed so that they will grow into good hedges. Various hedge demonstration plots are sufficient evidence that this is true. In the hedge demonstration plot at the Arnold Arboretum there are at least 80 of the 115 hedges which can be classed as good. Some kinds of plants require more trimming than others, but only those that are easily trimmed make good hedge plants. There are enough of these to make hedge planting a very interesting and varied part of landscape work.

Trimming should start with the very young hedge. Usually it is advisable to start with plants three feet or less in height, for such plants are easily trained to grow in proper hedge form. The ideal hedge plant is one that branches directly from the base, each branch being clothed with lateral branches from the ground to the top of the plant. This makes for a very dense habit of growth and a good hedge. Many plants do not have this form when bought from the nursery for they are frequently grown with a single stem or trunk, with many of the lateral branches removed. Such plants will grow satisfactorily, but the growth will be all at the top and not at the bottom near the ground. It is in this area that the side branches must be forced while the plant is yet young, for, as it grows taller and older, it becomes increasingly difficult to force adventitious buds at this point.

Consequently, it is usually a good practice, especially if all plants have just been purchased, to cut off the tops of the hedge plants at six inches or a foot above the

ground as soon as they have been planted. Admittedly, this is very hard for most gardeners to do, for it means cutting off a great deal of what they consider "good specimens." However, a "good specimen" is not wanted in hedge making. A hedge plant is grown differently, as explained above, and the best time to start growing properly branched hedge plants is at the beginning.

Suppose a hawthorn hedge has been decided upon. Five-foot specimens are obtained from the nursery and when they arrive, it is noted that all are grown with a single trunk and no lateral branches on the trunk for the first two feet. If such plants are not pruned at planting time, there may always be that two-foot space at the bottom of the hedge where there are no branches. In addition, the single trunk may become injured to such an extent that the entire top part of the plant may die. If these same plants are cut off at six inches or a foot above the ground as soon as they are planted, side shoots would be forced out from that part of the trunk remaining, or from the ground in such a manner that the plant eventually would have several main stems clothed with lateral branches from the ground on up.

Most of the deciduous shrubs and trees recommended for use in hedge making are of the type that will respond to such a severe type of pruning. I have cut off the trunks of such trees as beech, pin oak, sycamore, Norway maple, Lombardy poplar, the Asiatic elm and others—trees that were six to eight feet tall with a trunk diameter of at least two inches when they were received for hedge planting—cut them off six inches from the ground, and, during the first growing season, many buds were forced out from each trunk, so that they later developed into well-branched, bushy hedge plants.

Unfortunately, it is not often possible to treat evergreen hedge plants in this manner. They are slower in their habit of growth and frequently seem unable to form new leaf buds on wood that is old

or large and devoid of foliage. It is a good policy never to prune evergreens back to wood that has no leaves, for, if this is done, the chances are that the branch or stub may die. In buying evergreen plants for hedge making, it is essential to have them well branched at the base, thus avoiding a great deal of trouble later.

Shape

The shape of the hedge is very important, for many an otherwise good hedge is spoiled because the owner tries to keep it too narrow at the base. In general, all hedges should be wide at the base and narrow at the top. This is especially true of evergreen hedges. Unfortunately, there are many Norway spruce hedges in this country which are excellent examples of how not to prune a hedge. It may be that they were planted too close to walk or road, then as they increased in height they were clipped perpendicularly and were forced to grow within too narrow limits. When this is the case, the lower branches die because of lack of light and air and practically nothing will bring out new branches in their place. The result is a very poor hedge, open at the base and sometimes open as high as the eye level. Such hedges should be removed and replanted in such a way that the new plants will be allowed to grow nearly as wide as the mature hedge is high.

Anyone familiar with pruning trees knows that it is usually the shaded inner branches which are weakest and often need to be cut out. Such is the case with hedges, especially with evergreens. Hence it is always advisable to trim them so that the lower branches receive some light, and this is most easily accomplished by having them wider at the base than at the top. There are certain vigorous-growing hedge plants like the privet and the Japanese barberry, which, when growing in good soil, can be trimmed with perpendicular sides and still remain well branched at the ground level. However, even these, when growing in poor soil, will make better hedges if trimmed so that

the lower branches are wider or longer than the upper branches.

Personal preference dictates the actual shape of the finished hedge. Some like a more or less rounded hedge, others may prefer a triangular hedge with a flat top. This type is easier to trim than the rounded form, but there is the possibility, in regions where the snowfall is heavy, that the rounded form may shed the snow better with less injury resulting to the plants.

When to Trim

Many a gardener has vigorous-growing privet in mind when he thinks of trimming. Such plants grow so fast that they must be trimmed several times a season. However, not all hedges are like this. There are many which need be trimmed only once each year and some which only need trimming once every two or three years! It all depends on the age of the hedge, the kind of plant material and the general purpose for which the hedge is grown.

As has already been explained, the deciduous hedge is best cut to within six inches or a foot of the ground immediately after planting. The first year of growth, the plants are left unmolested in order that they may make a maximum growth. The second year, some may need a heavy pruning, but most certainly all will need a pinching back of the branches in order to force lateral growth which makes for density. Especially is it important at this time to keep the terminal shoot or leader restrained. Trees like beech, maple and sycamore have strong leaders, and these must be restrained in order to make the plant become more dense at the base. If the leaders are not restrained at this early date, the plant will grow high rapidly, but lateral growth (which is necessary for dense foliage especially at the ground level) will be retarded. The third year of growth, most plants will need a normal trimming.

Evergreens should not be cut back harshly. Hence, the pinching back of terminal shoots is most essential in order to produce lateral growth. Most evergreens have strong leaders and these must be restrained in order to make the hedge become bushy. Once the small hedge has become fairly well filled in at the base, then it can be allowed to grow moderately in height.

The amount of growth to trim off depends on the kinds of plants used and their age. For instance, one would expect to trim off more material from a privet or honeylocust hedge than one would from a boxwood hedge. If the plants have not reached the height at which they are to be permanently maintained, then more growth should be left on.

If the hedge has reached the height at which it will be maintained, then it may be trimmed back to within an inch (or less) of the previous year's growth. Even this is impossible to keep up indefinitely, for it is obvious that under this condition the hedge will still enlarge. Sometimes it is necessary to cut back to two-year or three-year-old wood. One should be very cautious in doing this, as some plants will not respond to such severe trimming as well as others, but a little experimenting on this score, with the particular type of hedge grown, will soon show whether or not this severe pruning can be done. With deciduous hedges at least, it is usually possible to cut them back to near the ground level when they become overgrown, and thus a new hedge is started again.

A young hedge which has not yet reached its full height is best trimmed during the actual growing season in late spring, for as elongating shoots are pinched back, lateral buds are forced into immediate growth.

For the mature hedge, trimming can be done at any time, but during or immediately after the actual growing season is best. This is often in late June or very early July in the northern United States.

At this time the growth is over for a while at least and so one trimming will suffice for a long period. Then, too, any further growth which takes place will have sufficient time to harden before cold weather. If trimming is done in late July or August (in the northern United States), such young growth as is forced out may be too tender and so be killed during the winter, leaving unsightly dead spots in the hedge. Certainly any heavy trimming, especially that done to evergreen hedges, should be done in the spring. Shaded branches are frequently the least hardy, and a heavy fall trimming, resulting in the exposure of a number of shaded branches, might result in serious winter injury to the hedge, whereas the same heavy trimming given in the spring would leave plenty of time for young shoots to grow and harden off properly before winter. The same caution should be taken in heavily trimming a hedge just prior to a long hot, dry spell in the summer. Such a trimming had better be advanced a few weeks into late spring in order to allow new growth to develop and shade the most vulnerable spots.

Trimming once at the end of the growing season is usually sufficient for all but the most vigorous-growing hedges such as privet, honeylocust and osage orange. It may be that a few shoots will grow and need trimming here and there before fall, but these would not be sufficient to necessitate a heavy trimming in the fall. In any event, the object of each and every trimming is to remove the terminal buds and so force lateral buds into growth, thus increasing the density of the foliage of the entire hedge.

Kinds of Hedges

The selection of the proper kind of plant material for the hedge will save much trimming. For instance, if it is desired to have a hedge four feet high, *Euonymus alata compacta* would be ideal, for, once established, it only needs a slight trimming *once every other year* or so. Privet, honeylocust, linden, beech, all need considerable pruning to keep them in proper

form at this height. Some hedge materials that need little clipping are *Cornus racemosa*, *Taxus media hicksi*, *Berberis thunbergi erecta*, *Thuja occidentalis* 'Little Gem' and several others.

There are some plants used in flowering hedges such as forsythia, Chinese lilac, Van Houtte spirea, which are kept unclipped until the flowers have faded when they are given a single annual trimming. After this clipping the branches are allowed to grow untrimmed the rest of the year, resulting in branches a foot or so long by the end of the growing season; it allows sufficient time for the formation of many flower buds, so that in the spring these hedges are covered with long graceful shoots of flower clusters. Such hedges can only be considered as "formal" immediately after they are clipped. They do take up considerable space, hence their use is limited, but when fully clothed with flowers they are outstanding indeed.

In completing this discussion, one other possibility should be presented. A Canada hemlock hedge can be one of the most beautiful of clipped hedges, or it can be allowed to grow for a year or two without any clipping and become one of the most graceful of the informal or unclipped types. The long, arching branchlets which grow quickly in a year or two will easily be two feet long and lend a very beautiful and graceful effect to the entire hedge. When they grow out of proportion, then they may be sheared off and the hedge once more becomes "formal." In this way a hemlock hedge (and some others likewise) may be "formal" or "informal" at the owner's whim, thus affording a landscape feature which of its very nature yields varied interest for years.

Hedges for Different Purposes

Accompanying this article is a list of plants which can be used in making good hedges. Not all are hardy in all parts of the United States, but some can be found in every area except the extremely warm parts of the country. An additional list of evergreen hedge plants is included

for these particular subtropical areas. It is impossible in the allotted space to give all the information concerning such a very large group of plants.

The method taking the least space is merely a listing of the plant names and a recording of numbers after each name showing some of the uses to which that particular plant may best be put. It should be definitely stated here that all the plants listed (with the exception of some recommended for shelterbelt planting) can be used in clipped hedges. Those listed as dense make the best clipped hedges. Plants which have been found to be unsatisfactory in hedge making for particular reasons are not included. One example is the Mugo pine, which really makes an excellent low-clipped hedge, but it is so susceptible to scale infestation that it has been eliminated from this list. An example of a plant with which one should be very careful is *Ribes alpinum*. The staminate form does not carry the white pine blister rust. The pistillate form does and should not be used. Both forms make excellent low-clipped hedges.

Hardiness is a topic which had to be entirely omitted. The reader will have to rely on his own knowledge for this. *Abelia grandiflora* makes a marvelous hedge, evergreen in some sections of the South and deciduous in others, but not satisfactorily hardy north of New York City. Everyone knows the meritorious characters of *Buxus sempervirens* as a hedge but some may be unfamiliar with the fact that *Ilex crenata convexa* is the best substitute for this in New England. Many such interesting items as these have had to be omitted.

The numbers after the plants in the following lists will refer to these groups:

1. *Evergreen*:—Plants in this group keep their leaves most of the winter in those regions where they are used.
2. *Dense*:—Plants in this group grow dense foliage with a minimum amount of care.
3. *Thorny*:—Either stems or leaves thorny, making good barrier hedges.
4. *Low*:—Can be grown as very low hedges with minimum pruning.
5. *Flowering*:—Because of profuse flowering, these hedges can be grown as informal flowering hedges, with trimming once a year (or even once every other year if desired).
6. *Colored Fruits*:—Trimming removes the majority of the flowers and fruits, yet the plants in this group have so many bright-colored fruits that, with the right trimming, some fruits will remain to give color and interest.
7. *For Poor Growing Conditions*:—Some hedges must be planted where growing conditions are difficult and plants in this group may succeed where the others would fail.
8. *Narrow, Columnar and Upright*:—Naturally growing this way, not all make good hedges for the terminal growth is so strong that often it is difficult to force lateral branches at the ground level.
9. *For trying situations in the Midwest*:—A special group found to be best suited to the extreme heat, cold and drought conditions of the midwest.
10. *Windbreaks and Screens*:—A special group of tall-growing vigorous plants, many of which are not suited for low, clipped hedges but which will grow rapidly into a windbreak or screen and can be kept clipped or unclipped.
11. *For the coldest parts of the United States and Southern Canada*:—These plants should be used in the coldest parts of the country where most of the other plants listed may be injured by the extreme cold.
12. *For Shelterbelts on the northern Great Plains*:—Plants for a particular type of windbreak in a very difficult area. Many plants in this group will not make low, clipped hedges, and are only mentioned here for this special type of windbreak.
13. *For Southern Gardens*:—The farther south one goes, more kinds of plants can be used. Many not listed in this group will do very well in the South. Most of those in this group are not reliably hardy north of Philadelphia. (*Tsuga caroliniana* is an exception.)



Buxus sempervirens suffruticosa, Williamsburg, Virginia.

Ilex crenata hedge, Federal Reserve Building, Washington D. C.





Taxus cuspidata hedge, Lancaster Institute of Horticulture,
Lancaster, Massachusetts.

Clipped bamboo hedge.



List of Hedges for the United States and Canada

(Except the Subtropical Areas)

- Abelia grandiflora* 5, 13
Abies concolor 1, 2
Acanthopanax sieboldianus 2, 3, 7
Acer campestre 2
Acer ginnala 2, 10
Acer negundo 12
Acer platanoides 10
Acer platanoides columnare 8, 10
Acer platanoides schwedleri 10
Acer rubrum columnare 8, 10, 11
Acer saccharum monumentale 8, 10, 11
Amelanchier alnifolia 12
Aronia arbutifolia 6
Baccharis halimifolia 6, 7
Berberis aggregata 2, 3, 6
Berberis buxifolia 1, 2, 3
Berberis buxifolia nana 1, 2, 3, 4
Berberis circumserrata 2, 3, 6
Berberis darwini 1, 13
Berberis dictyophylla albicaulis 2, 3, 6, 13
Berberis gilgiana 2, 3, 6,
Berberis julianae 1, 2, 3
Berberis koreana 2, 3, 6
Berberis mentorensis 2, 3, 6
Berberis stenophylla 1, 2, 3, 13
Berberis thunbergi 2, 3, 6, 7
Berberis thunbergi atropurpurea 2, 3, 6, 7
Berberis thunbergi erecta 2, 3, 4, 6, 7, 8
Berberis thunbergi minor 2, 3, 4, 6, 7
Berberis triacanthophora 1, 3,
Berberis verruculosa 1, 2, 3,
Betula populifolia 2
Buxus microphylla japonica 1, 2, 4
Buxus microphylla koreana 1, 2, 4
Buxus sempervirens and vars. 1, 2
Buxus sempervirens suffruticosa 1, 2, 4
Caragana arborescens 7, 9, 10, 11
Caragana pygmaea 7, 9,
Carpinus betulus 2, 8, 10
Celtis occidentalis 11, 12
Chaenomeles japonica 2, 3, 4, 5
Chaenomeles lagenaria 2, 3, 5, 7
Chamaecyparis pisifera vars. 1, 2,
Cornus alba 6, 11
Cornus mas 2, 6.
Cornus racemosa 2, 6, 7
Cotoneaster lucida 4, 6
Crataegus crus-galli 2, 3
Crataegus oxyacantha 2, 3
Crataegus phaenopyrum 2, 3, 6
Cryptomeria japonica lobbi 1, 2, 8, 13
Cupressus sempervirens 1, 2, 8, 13
Elaeagnus argentea 11, 12
Elaeagnus angustifolia 3, 7, 9, 12
Euonymus alata 6
Euonymus alata compacta 2, 4, 6
Euonymus fortunei radicans 1, 4
Euonymus fortunei vegeta 1, 4, 6
Euonymus japonica 1, 2, 13
Fagus grandifolia 2, 10
Fagus sylvatica 2, 10
Fagus sylvatica fastigiata 2, 8, 10
Forsythia intermedia and vars. 5
Fraxinus pennsylvanica lanceolata 11, 12
Gleditsia triacanthos 12
Hibiscus rosa-sinensis 1, 5, 13
Hibiscus syriacus 5
Hippophae rhamnoides 3, 6, 7
Hydrangea arborescens grandiflora 5
Hydrangea macrophylla 5, 13
Hypericum species 4, 5
Ilex aquifolium 1, 3, 6, 13
Ilex cornuta 1, 3, 6, 13
Ilex crenata and vars. 1, 2, 13
Ilex opaca 1, 3, 6, 13
Ilex vomitoria 2, 6, 13
Juniperus chinensis and vars. 1, 2, 6
Juniperus scopulorum and vars. 1, 2, 6,
8, 10, 12
Juniperus virginiana and vars. 1, 2, 6, 8,
10, 11, 12
Lagerstroemia indica 5, 13
Larix laricina 11
Lavandula officinalis 2, 4
Ligustrum amurense 2, 4, 5, 6, 7
Ligustrum japonicum 1, 2, 4, 6, 7, 13
Ligustrum lucidum 1, 2, 4, 6, 13
Ligustrum obtusifolium regelianum 2, 4,
5, 6
Ligustrum ovalifolium 2, 4, 5, 6, 7, 13
Lonicera fragrantissima 2, 6,
Lonicera maackii 2, 6,

- Lonicera maacki podocarpa* 2, 6, 10
Lonicera nitida 2, 4, 13
Lonicera pileata 2, 4, 13
Lonicera tatarica 2, 5, 6, 7, 9, 12
Machura pomifera 2, 3, 7, 9, 10
Mahonia aquifolium 1, 3, 5, 6
Mahonia fremonti 1, 3, 5, 6, 13
Michelia fuscata 1, 5, 6, 13
Morus alba 10, 13
Myrica cerifera 1, 6, 13
Myrtus communis 1, 2, 5, 13
Nandina domestica 1, 2, 5, 13
Nerium oleander 1, 5, 13
Osmanthus ilicifolius 1, 3, 6, 13
Pernettya mucronata 1, 2, 4, 13
Philadelphus coronarius 5, 7
Philadelphus lemoinei 'Avalanche' 2, 5
Philadelphus lemoinei erectus 2, 5, 8
Physocarpus intermedius parvifolius 2, 9
Physocarpus monogynus 7, 9, 11
Physocarpus opulifolius and vars. 7, 11
Physocarpus opulifolius namus 2, 4, 7, 11
Picea abies 1, 2, 10
Picea abies maxwelli 1, 2, 4
Picea glauca 1, 2, 9, 10, 11, 12
Picea glauca conica 1, 2, 4
Picea omorika 1, 2, 10
Picea orientalis 1, 2
Picea pungens and vars. 1, 2, 9, 11, 12
Pinus nigra 1
Pinus resinosa 1, 10, 11
Pinus strobus 1, 2, 10
Pittosporum tobira 1, 2, 13
Plumbago capensis 13
Poncirus trifoliata 3, 7, 13
Populus alba 7, 9, 10, 11, 12
Populus alba pyramidalis 7, 8, 9, 11, 12
Populus berolinensis 10, 11, 12
Populus laurifolia 10
Populus nigra italica 7, 8, 9, 10, 11, 12
Populus simoni 7, 9, 10, 11, 12
Populus tremuloides 10, 11, 12
Prinsepia sinensis 2, 3, 11
Prinsepia uniflora 2, 3
Prunus americana 12
Prunus laurocerasus and vars. 1, 2, 10, 13
Prunus lusitanica 1, 6, 10, 13
Prunus tomentosa 5, 6
Prunus virginiana 11, 12
Pseudotsuga taxifolia 1, 2, 9, 10
Pyracantha coccinea lalandi 2, 3, 5, 6, 13
Pyracantha cremulata 1, 2, 3, 5, 6, 13
Quercus ilex 1, 2, 10, 13
Quercus imbricaria 2, 10
Quercus macrocarpa 11, 12
Quercus palustris 10
Quercus phellos 2, 10
Quercus robur fastigiata 8, 10
Quercus virginiana 1, 2, 10, 13
Raphiolepis umbellata 1, 13
Rhamnus cathartica 2, 3, 7
Rhamnus frangula 2, 6, 10, 11
Rhododendron obtusum amoenum 1, 4, 5
Ribes alpinum (staminate form) 2, 4, 9, 11
Rosa multiflora 2, 3, 5, 6
Rosa rugosa 2, 3, 5, 6, 11
Rosa setigera 3, 5, 6
Rosa virginiana 3, 5, 6, 11
Salix alba 11, 12
Salix pentandra 12
Severinea buxifolia 3, 4, 13
Spiraea arguta 5
Spiraea prunifolia 5
Spiraea thunbergi 5
Spiraea vanhouttei 2, 5
Syringa chinensis 5
Syringa josikaea 2, 5, 10, 11, 12
Syringa persica 5, 9
Syringa villosa 2, 5, 10, 11, 12
Syringa vulgaris 5, 9, 10, 11, 12
Tamarix odessana 5, 13
Tamarix parviflora 5, 13
Tamarix pentandra 5, 13
Taxus baccata and vars. 1, 2, 6, 13
Taxus baccata erecta 1, 2, 6, 8, 13
Taxus baccata fastigiata 1, 2, 6, 8, 13
Taxus baccata repandens 1, 2, 4, 6
Taxus canadensis stricta 1, 4, 6
Taxus cuspidata 1, 2, 4, 6, 8
Taxus cuspidata nana 1, 2, 4, 6,
Taxus media hicksi 1, 2, 4, 6, 8
Thuja occidentalis 1, 2, 8, 10
Thuja occidentalis 'Douglas pyramidalis'
1, 2, 8, 10
Thuja occidentalis 'Little Gem' 1, 2, 4,
Thuja occidentalis robusta 1, 2, 10
Thuja orientalis and vars. 1, 2, 10, 13
Tilia cordata 10
Tsuga canadensis 1, 2, 10
Tsuga caroliniana 1, 2, 10, 13
Ulmus pumila 2, 7, 9, 10, 11, 12
Viburnum dentatum 6
Viburnum lantana 2, 6,
Viburnum lentago 2, 6, 11
Viburnum opulus nanum 2, 4
Viburnum prunifolium 1, 2, 6, 10
Viburnum tinus 1, 13



Passing the clipped *Ilex aquifolium* sentinels guarding the entrance to this charming garden in Hedcote, England (bottom), one will find a low-clipped hedge of *Buxus* serving as a border plant and then elegant specimens of *Carpinus betula* on their naked supports (center), *Buxus sempervirens* displaying the art of topiary and also clipped as boundary plants (top).

*Evergreen Hedges for the Extremely Warm Parts of the United States
(Southern Florida and Southern California)*

Dwarf

Berberis buxifolia nana
Buxus microphylla japonica
Buxus sempervirens suffruticosa
Cuphea hyssopifolia
Euonymus japonica microphylla
Lonicera nitida
Myrsine africana
Punica granatum nana

Medium

Acacia armata
Acacia longifolia
Acacia verticillata
Berberis darwini
Berberis pruinosa
Berberis stenophylla
Berberis xanthoxylon
Carissa edulis
Carissa grandiflora
Diosma ericoides
Escallonia macrantha (in trade as *E. rubra*)
Escallonia rockii
Eugenia uniflora
Euonymus japonica
Feijoa sellowiana
Grevillea thelemanniana
Griselinia lucida
Hebe buxifolia
Hebe cupressoides
Hebe elliptica
Hebe traversi
Ilex aquifolium
Ilex cornuta
Ilex crenata
Lantana camara
Leptospermum laevigatum
Ligustrum japonicum
Mahonia aquifolium
Mahonia nevini
Mahonia pinnata
Myoporum acuminatum
Myrtus communis
Myrtus ugni
Osmanthus aquifolium

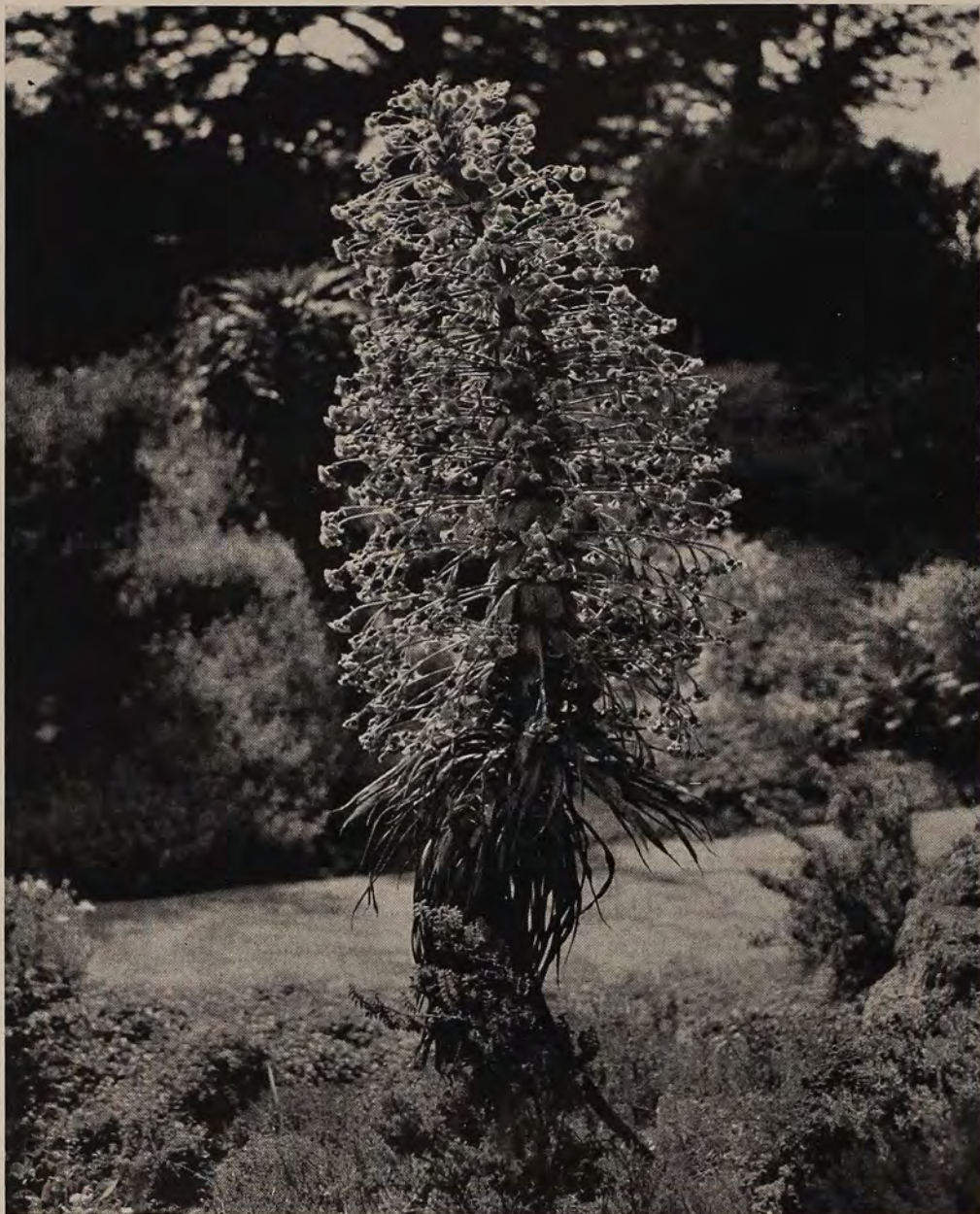
Pittosporum tobira
Psidium cattleianum
Rhamnus alaternus
Rhamnus californica
Teucrium fruticans
Viburnum suspensum
Viburnum tinus
Viburnum tinus lucidum

Tall Broad-leaved Evergreens

Buxus balearica
Buxus sempervirens
Catha edulis
Ceratonia siliqua
Cocculus laurifolius
Coprosma baueri
Coprosma robusta
Dodonaea cuneata
Duranta repens
Eucalyptus polyanthemus
Eugenia paniculata
Eugenia paniculata australis
Eugenia smithi
Ligustrum henryi
Ligustrum japonicum
Ligustrum lucidum
Ligustrum ovalifolium
Metrosideros robusta
Myrica californica
Olea europaea
Phillyrea latifolia media
Pittosporum crassifolium
Pittosporum eugenioides
Pittosporum tenuifolium
Pittosporum undulatum
Pittosporum viridiflorum
Prunus caroliniana
Prunus ilicifolia
Prunus laurocerasus
Quercus agrifolia
Quercus chrysolepsis
Quercus ilex
Quilliaja saponaria

Conifers for Tall Hedges

Chamaecyparis lawsoniana
Cupressus macrocarpa
Libocedrus decurrens



Charles E. Crompton

Wilkesia gymnoxiphium.

Wilkesia gymnoxiphium, the Iliau

ELIZABETH McCLINTOCK

The Iliau, a bizarre-appearing member of the sunflower family, is a rare endemic plant of Kauai in the Hawaiian Islands. Its botanical name *Wilkesia gymnoxiphium* commemorates Captain Charles Wilkes, commander of the United States South Pacific Exploring Expedition on which the first collection of the plant was made by members of this expedition when they visited Kauai in 1840. The second part of the plant's name means literally "naked sword" and presumably refers to the fact that the plant resembles the silverswords, also of the Hawaiian Islands, but lacks the characteristic silvery coating of hairs on the leaves and stems. The Iliau is unique in being the only species in its genus, but it is related to the silverswords and greenswords of the genus *Argyroxiphium* which occur on the islands of Hawaii and Maui.

Dr. Sherwin Carlquist* reported seeing the iliau growing in the Waimea Canyon region of Kauai in the summer of 1953. He described it as growing only in the drier parts of the rim of the canyon where open spots occur in the *Metrosideros* forest and also on steep cliffs on the northern side of Kauai at Kalalau Pali. Waimea Canyon is formed of fissures on Waialeale Mountain. The canyon, colored similarly to the Grand Canyon of the Colorado River, is ten miles long and one mile wide. Waialeale Peak with an elevation of 5,080 feet has a tremendous rainfall and is definitely the wettest spot in the Hawaiian Islands. However, according to Dr. Carlquist, the iliau grows in occasional pockets of dry forest between 3,000 and 4,000 feet. The plants in flower were about twelve to twenty feet and ten to twelve years old. He noted that, although a few lateral shoots may form at the base of the plant when it is young, these never develop and so the plant is monocarpic, that is, it flowers only once and then dies.

Considering the warm and comparatively dry native habitat of the iliau, it is

not surprising that it should grow to maturity and flower in California. A plant of the Iliau flowered in the Strybing Arboretum and Botanical Garden in Golden Gate Park, San Francisco, in the summer of 1956. The plant was grown from seed given by Dr. David D. Keck to Mr. Eric Walther of the Strybing Arboretum. The flowers were yellow but all of one kind, ray flowers being absent, and therefore they did not greatly resemble a sunflower, although such is the family relationship. The lower part of the flower heads and the branches bearing them were densely glutinous. The leaves, borne below the paniculate flowering branches, were united at their bases into a sheath which envelops the stem for about two inches. The sheaths of the younger leaves overlap one another. The lower portion of the stem is woody at maturity and devoid of leaves. The plant, which was set out in the Arboretum about three years ago, was about six or seven years old at the time of flowering. Since flowering, the plant died without producing seeds.

The University of California Botanical Garden, Berkeley, has four plants of the Iliau, one of which flowered in the summer of 1956 at a younger age than the plant in the Strybing Arboretum. The Berkeley plants were grown from seed collected in August, 1953, by Sherwin Carlquist at Kokee, elevation 3,000 feet, on Kauai. They were kept in four-inch pots for about two years before being set out in the Botanical Garden. Although they were in a rather stunted condition from having been grown in the small pots, they made a rapid growth after being placed in the ground. Perhaps the warmer summer climate of Berkeley was more conducive to a rapid growth than the cool, foggy summer of San Francisco.

The Iliau, because of its unusual appearance and the endemic nature of its geographical distribution, is a novelty of considerable interest. Its cultivation by two botanical gardens in the San Francisco Bay Area demonstrates that it can be grown in California.

*Personal communication and "Maui, Kauai, and five silverswords" in *Pacific Discovery* 8 (3): 4-9, 1955.

Rootstock Problems In Propagating Dwarf Pear Trees

K. D. BRASE*

The pears belonging to the genus *Pyrus* may be divided into two groups—the occidental (species from Europe and north-western Asia) and the oriental (species from eastern and northeastern Asia). Only one species, *Pyrus communis*, the common pear of Europe, is of importance in the occidental group, if one wishes to grow high-quality pears. Its native home regions are free from temperature extremes and its pure varieties do best in cool, moist, but well-drained soils. The numerous varieties cultivated in the temperate regions of Europe and America belong to this species.

The oriental group supplies several species, among which, the sand pear, *P. serotina* ssp. *culta*, is of the greatest importance. By crossing this subspecies with *P. communis*, it has given hybrids having the ability to withstand heat and drought. These hybrids show fire-blight resistance in some instances.

Dwarf pear trees, in comparison with dwarf apple trees, have received much less attention. What are the reasons for this? Scions of all our present-day apple varieties appear fully compatible with the dwarfing apple rootstocks now used. In contrast, the scions of certain popular pear varieties either fail to grow or make a weak graft union with the rootstock recommended as the dwarfing medium. But there are still other reasons why dwarf pear trees have not received the attention they might deserve.

Many pear varieties are very susceptible to fire blight, a bacterial disease that sometimes kills the tree outright. Furthermore, the exacting requirements of the European pear, as to soil and climate, make pear growing more difficult. Shortage or excess of moisture, extreme heat or cold, are all detrimental to the dwarfing rootstock used for pears.

A dwarf fruit tree can be produced by grafting a scion of the desirable fruiting variety onto the rootstock of a special dwarfing variety, or, in certain instances of incompatibility between the scion and the rootstock, by grafting or budding the fruiting variety on an interstock that is compatible with the dwarfing rootstock. (See figure 1.) Usually, in the case of the apples, several different rootstocks are available in the same genus. With pears, however, thus far no satisfactory dwarfing rootstock has been found in the species *P. communis* and it is necessary to use dwarfing rootstock of the related quince genus (*Cydonia*).

The quince clone known as Angers is being used by commercial plant propagators, but there is little doubt that it is no longer of a pure line, mixtures having occurred during its long existence. Selecting from the Angers quince and the common quince has given new clonal selections now known as Angers quince EM selection A and common quince EM selections B and C.

These three clones have been studied at the New York State Agricultural Experiment Station at Geneva. The results

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of these studies indicate that rootstocks of EM selection A should be given first choice. Rootstocks of EM selection C have the greatest growth-restricting effect on the varieties grown upon them. Growth restriction is so strong that maintenance of satisfactory growth may become a problem with some pear varieties growing on this selection. Also, EM selection C is highly susceptible to a leaf-spot fungus and, if not carefully sprayed, plants will be defoliated in midsummer before they can be budded to the desired pear varieties. Quince EM selection A has escaped serious leaf spot infection, even without spraying, under the test conditions.

Since a dormant bud of a *P. communis* variety must unite with a rootstock belonging to the genus *Cydonia*, in the propagation of a dwarf pear tree, it is understandable that compatibility may not occur. Some pear varieties, for instance, 'Bosc,' 'Clairgeau,' and 'Waite,' will fail entirely to grow on the quince rootstock, while others, such as 'Bartlett,' 'Clapp's Favorite,' and 'Beurre Dumont,' will grow but fail to give a strong graft union. In contrast to this, there are still other pear varieties, such as 'Anjou,' 'Hardy,' 'Duchess of Angouleme,' 'Flemish Beauty,' and 'Old Home,' that unite well and make a very strong graft union. The latter ones, therefore, particularly 'Hardy,' should serve as interstocks between the rootstocks and uncongenial varieties (1) making it possible to unite those varieties that otherwise fail when bud grafted direct to the quince dwarfing rootstocks. (See figure 2.)

Certain German research results published in 1953 and 1954 are also of interest. Friedrich (2) found that when 'Beurre Hardy' was used as an interstock between the rootstock of EM selection A and the grafted top of 'Bartlett,' the transpiration rate of the 'Bartlett' leaves was reduced, thus also reducing the moisture

requirements of the tree. Schmadlak (3) observed marked varietal differences in the behavior of pear trees on quince rootstocks when the latter had been injured by frosts in the severe winter of 1953-1954. Two-year-old pear budlings of the varieties 'Alexander Lucas,' 'Clapp's Favorite,' 'Nordhauser Forelle,' 'Madam Verte,' 'Paris,' and 'Kostliche v. Charneu,' grafted on EM selection A died the following spring after growing a few shoots. Budlings of the variety 'Hardy,' which, according to studies carried on in Germany, has a low transpiration rate, survived longer than the other varieties and, in some cases, long enough to allow the rootstock to develop a new root system. When used as an interstock, 'Hardy' also reduced the mortality rate due to frost injury to the quince rootstock of the other varieties tested.

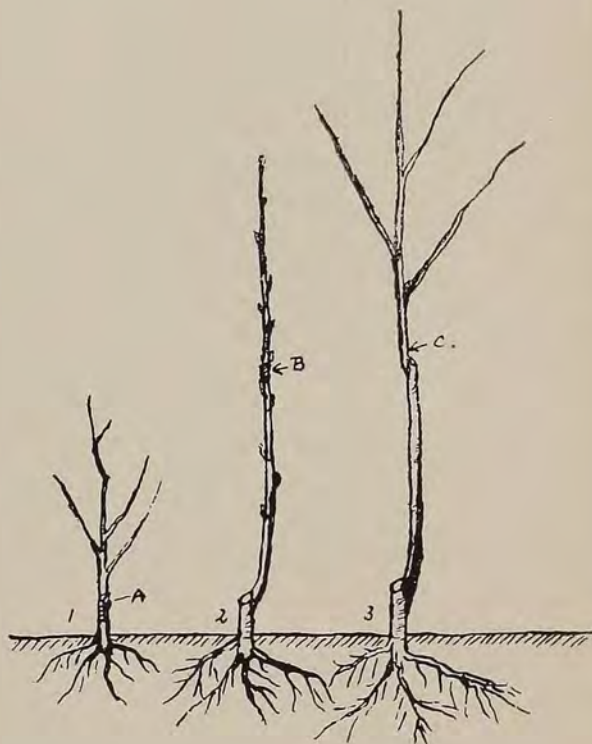


Figure 1. Propagating steps in double working a pear variety incompatible with the quince dwarfing rootstock. 1A: compatible pear variety budded to quince rootstock. 2B: the summer following budding at 1A, incompatible variety is budded into whip of compatible variety at B. 3C: double worked two-year-old tree, with fruit-producing branches.



Figure 2. Quince rootstock (right) and one-year budlings of a compatible pear variety budded to a quince rootstock. Incompatible variety has been budded into the compatible one (arrow).



Figure 3. Dwarf pear tree, variety 'Bartlett' has been top worked on the many-branched interstock of 'Old Home.' Arrow, at left, points to the last remaining 'Old Home' branch which has been budded to 'Bartlett.' Branches on the right, budded the preceding year, are now bearing.

Attention should also be given to another pear interstock, namely, 'Old Home.' The fruit of this variety is of little or no value, but the tree escapes fire blight and is compatible with the quince dwarfing rootstock. For these reasons, 'Old Home' has been tested as a suitable blight-resistant frame for dwarf pear trees. Instead of using just a short stem piece, as is done with 'Hardy' or other interstock varieties to receive the buds of the desired fruiting varieties, the 'Old Home' budding is allowed to develop two or three well-spaced lateral branches. These branches and the leader branch are then budded or grafted to the blight-susceptible variety that has to form the fruit-bearing top. Budding is done during the summer after the desirable branches have developed. If grafting is practical, this is done the following spring. Whichever method is selected to produce the fruit-bearing top, the point of the union should be the same—about twelve inches from the main trunk. (See Figure 3.)

A many-branched, dwarfed fruiting tree can be developed very quickly on the blight-resistant frame of the interstock. The main objective of this procedure, however, is to prevent the blight organism from entering the main trunk and killing the tree. Even though it can invade the fruit-bearing top, the blight does not enter the 'Old Home' frame. Should a branch be killed down to the graft union, it is simply cut off, and the remaining healthy 'Old Home' branch regrafted. As far as is known, 'Old Home' is compatible with the varieties mentioned above.

Dwarf pear trees having an 'Old Home' blight-resistant frame might be planted

deep enough so that gradually roots can develop from the 'Old Home' trunk. This can be accomplished by placing the 'Old Home'/quince graft union about six to eight inches below ground level. Scion rooting is slow and consequently the dwarfing influence of the quince rootstock will not be overcome right away. Such a scion-rooted tree, however, would become free growing eventually. The quince root system, in the meantime, will have helped to bring the tree into fruit production much sooner than would have been the case if a standard pear seedling rootstock had been used. A scion-rooted 'Old Home' frame should have the advantage of protecting the root system from fire-blight infection.

Successful dwarf pear trees can be grown if points discussed in this article are taken into consideration. Incompatible varieties should always be grown on a compatible interstock that in turn is growing on Angers quince EM selection A. Dwarf pear trees require very little pruning—primarily that necessary in shaping the tree.

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Camellias In Descanso Gardens

JOHN L. THRELKELD AND MARK J. ANTHONY¹

To live and work with fifty thousand camellias the year round is to learn a great deal about them. Their most exacting requirements as well as their general needs become second nature to those responsible for their culture. Such is the case with those of us responsible for the care of the tremendous planting of camellias in Los Angeles County's Descanso Gardens in La Canada, California.²

Camellia japonica

The major portion of the planting is devoted to approximately five hundred different varieties of *C. japonica*. It is not the purpose of Descanso Gardens to collect some of each of the known varieties of camellias, but rather to select the outstanding ones introduced year after year to develop a garden of the very finest types for display *en masse*.

The initial planting of camellias was with the idea of cut-flower production rather than landscape effect. Consequently, many of the older plantings were placed very close together, creating literally a jungle of camellias so thick as to be impenetrable. Later plantings received more thought and proper spacing to allow room for full development.

There is little consideration of color combinations, continuity or growth characteristics. The plantings were installed to fit the ground space—beneath and around trees, between gullies and in open spaces—giving no thought to alignment or particular placement.

The camellias form a background beneath wide-spreading California Live Oak trees against which many other types of flowers are planted along trails winding through the forest. Compatible flowers include Fuchsias, Begonias (all kinds, including tuberous), Ferns, Primroses, Clivias, Daphnes, Dogwoods, Red Buds, and, of course, the beautiful Azaleas and Rhododendrons. *C. japonica* is quite at home under the oaks when the lower branches of the trees are kept removed. The soil is built by oak leaf drop, twigs, underbrush and erosion from the surrounding San Rafael Hills. It is rich, black and loamy.

There are certain varieties of camellias which, through the years, have proved to be the most outstanding ones in the collection. The top three, listed in their proper order, are 'Elegans' (Chandler) in all of its forms, 'Daikagura' in all of its forms, and 'Gigantea.' These three varieties are grown in great abundance in every section of the gardens, giving an abundance of flowers from early season to late. They are used as the backbone of the gardens—each producing flowers of amazing size, color and texture year after year under varying conditions.

The most extreme conditions of cold to which these plants have been subjected occurred in the winter of 1948 when the temperature reached 19 degrees Fahrenheit. Although open flowers were blackened by the freeze, no buds, leaves or bark were damaged at all.

The most extreme heat to which these plants were exposed occurred in September of 1955 when the temperature reached 114 degrees, with humidity of eight to ten

¹Superintendent and Assistant Superintendent, respectively, of Descanso Gardens.

²See article on Descanso Gardens in January 1956 issue of *The National Horticultural Magazine*.



Mr. Mark J. Anthony demonstrating the prescribed method of planting Camellias. Note the pedestal of earth on which the root ball is placed. The surface of the root ball is slightly elevated above the surrounding soil level. The soil mixture should be filled to ground level and tamped solid. Surface roots may then be covered with mulch materials. Water may be retained by soil mounds, boards, bricks, rocks, etc.

per cent. The heat period lasted for about two weeks with the temperature soaring above a hundred degrees each day. During such extreme conditions, irrigation water was depleted, and practically no water was applied. None of the three above-mentioned varieties showed any adversities to these extremes.

Certain varieties, however, did indicate their intolerance to extreme conditions. The plants of 'Pink Perfection,' for instance, showed no vegetative damage to either heat or cold, but did drop about eighty per cent of the flower buds during the bloom season of 1955-1956, showing their objection to the extreme heat. There were no ill effects from the cold of 1948.

The plant which showed the most damage under all conditions was the very famous and wonderful 'Alba Plena.' Both flowers and buds were damaged considerably by cold, while the foliage was damaged by the heat. It recovered and went on to produce its gorgeous flowers in succeeding years. Even though it is more tender than other varieties, we would still place it in our list of the top ten.

Referring more specifically to the 'Pink Perfection' variety, our experience with it has been rewarding under certain conditions. Basically it can be said that 'Pink Perfection' is not particularly happy anywhere in Southern California except under such natural conditions as are found in Descanso Gardens and similar areas. It consistently produces best results during years of higher than average rainfall and lower summer temperatures. There are probably more 'Pink Perfection' plants being grown in Southern California than all other camellias combined, but the tendency is now away from it, and it is certain in coming years to fall from grace as gardeners become acquainted with better performing varieties.

There are many of the lesser known varieties which I am sure are equal to the over-all performance of the three outstanding ones mentioned above, but years of experience in growing will be necessary to arrive at conclusive evidence.

Regarding the cultural requirements of *C. japonica*, certain basic conditions

must be provided before one should consider planting them in any quantity.

First, adequate protection from the elements in Southern California is a must—such as a cover of trees, preferably evergreen oaks or other small-leaved trees which can provide a good leaf mulch without being messy. A shield planting branching from the ground up in the direction of the prevailing wind is also advisable. Any good, dense native shrub can provide that protection. For basic landscape planting, a north or east exposure is preferable. A lath structure—although not particularly attractive from the standpoint of landscape effect—is efficient in protecting camellias.

Soil conditions should be similar to those provided by Nature. A depth of at least two to three feet of soil is essential. Where conditions less than ideal exist, effort should be made to provide those conditions by using a mixture of one-third parts each of good loamy soil, well decayed leaf mold, and coarse peat moss. Add to this, soil sulphur and superphosphate in the quantities of one four-inch pot full of superphosphate and one three-inch pot full of soil sulphur to one wheelbarrow full of mixed soil.

In all cases when planting camellias, the root ball should be placed on a solid foundation which will not settle. A good method is to dig the hole only the depth of the root ball, leaving a pedestal on which to place the plant, bringing the top of the root ball either to or slightly above ground level. The necessary depth can then be obtained by digging deeper at an angle away from the pedestal and filling around it with the prescribed mixture.

Good drainage is an essential requirement. Very little is to be realized by digging a deep hole beneath the root ball and filling it with rock, broken pots or other coarse material unless a sandy, well-drained layer can be reached at a relatively shallow depth. It is much easier to provide drainage by planting in raised beds. In such cases, beds can be formed by the use of Redwood boards, rock, bricks or other materials to retain the

soil, varying in depth from four to eighteen inches, depending upon the degree of drainage required. Run-off can then be at ground level rather than into sub-soil hardpan which will eventually reach the saturation point and cause the plant to die from stagnation and lack of aeration. In extreme cases, drainage tile can be laid beneath the surface to carry off excess water.

Other cultural requirements include proper mulching, irrigation, fertilization, pruning, and pest control.

Our findings on mulch materials indicate that coarseness of texture, such as would be had from undecayed oak leaves, broken twigs, coarse, coniferous wood shavings, undecayed pine needles and other acid-forming leaves, would be ideal. Of course, those materials may be used singly or in mixtures. The depth should be at least two inches—and on large, well-established plants, up to four or six inches in depth.

Shallow mulches should be renewed each year with fresh material. The old material, which will include fallen flowers and camellia leaves, can be used in compost. This compost never should be used anywhere near camellias because of petal-blight spores which composting will not kill. Where a deep mulch is used, the top couple of inches should be removed and replaced each year to get rid of debris and disease-bearing spores.

One should always be certain about the chemical reaction of any materials used in mulch. For instance, most soft-wood tree leaves upon decomposition form alkaline residues which should be avoided on all acid-loving plants. The same thing would apply to the use of certain shavings. Birch, Maple, Oak and most broad-leaved tree shavings are alkaline in reaction, whereas Redwood, Pine, Fir and other coniferous woods are either neutral or acid in reaction. It should be noted that all materials in the process of decomposition take nitrogen from the soil. If mulch materials are not renewed before decomposition sets in, extra nitrogen should be supplied.

A mulch serves many purposes. Primarily, of course, it conserves moisture and keeps roots cool. Also, benefits are derived from reduction of weed growth and the prevention of fungus spores from coming in contact with the soil.

Various other methods have been experimented with in mulching, such as the use of tar paper laid on the ground, rocks and mixtures of peat moss, leaf mold and other horticultural products. We have found, however, that nothing compares with good, coarse, natural materials.

On the subject of irrigating camellias, in all cases where possible, overhead sprinkling is preferred. Where a deep mulch is used, a considerable amount of water will need to be applied to give penetration to the soil. Experimentation with the different types of sprinklers will determine the proper amount. Ideally speaking, soil moisture should be in evidence within one inch or so of the soil's surface and enough to penetrate to the deepest root—except in cases where the water is run only enough for foliage syringing.

Camellias require lots of water when in bloom as the flowers use a great quantity. Frequent light spraying overhead on warm days will greatly improve lasting qualities of the flowers.

When the soil is proper for growing camellias, it is loose and friable and will allow quick penetration of water. This is especially important in areas having chemically treated water of high alkaline salt content. Light watering will allow a build-up of these alkaline salts and chemicals which will eventually become toxic to the plants, resulting in loss of vigor, lack of bloom and ultimate death. When water is applied each time to penetrate to the deepest root, a leaching process prevents this toxic salt buildup. Camellias can be grown in areas where the water is not compatible if this process is followed consistently.

Care should be taken not to water camellias overhead when the direct sunlight is upon them, as foliage burn is sure to result. Watering is best done in the early morning or early evening. In very

large plantings, even night-time irrigation may very satisfactorily be done.

Camellias are much more drought resistant than most gardeners give them credit for being. The degree of drought that plants can stand varies with varieties.

As mentioned earlier, 'Pink Perfection' will not tolerate drought to any degree in most sections of Southern California. In areas where higher day-time humidity abounds, however, 'Pink Perfection' will thrive and bloom on less irrigation than most varieties. Most cases of bud drop are the result of an unbalance between humidity and soil moisture content during the bud-forming stage in late summer.

Other varieties such as 'Herme,' ('Jordan's Pride'), 'Kumasaka' and 'Elegans' (Chandler) seem to bloom consistently regardless of humidity or soil moisture content, although in extreme drought conditions smaller flowers and weaker colors may result.

A basic understanding of plant growth requirements will help to realize a plant's needs. The most nutritious soil, the best planting mixture and the most judicious fertilizing will be entirely ineffective where soil moisture is not in proper balance, because all nutrients must be in liquid solution before the plant's system can absorb it.

The fertilizer requirements of camellias planted in the proper manner are not too exacting, but young plants in the process of becoming established should be fed consistently with a complete plant food. The basic fertilizers used on lawns, shrubbery and trees are perfectly acceptable to camellias in most areas not having high alkaline or sodium content in the water. The necessary acid can be provided by the use of soil sulphur. The best recommendation on soil sulphur use is on a year-round basis instead of just through the growing season. Granular soil sulphur can be applied in small quantities up to four or five times a year, depending on the area and degree of acidity required. Give the first feeding early in April as flower buds are formed on the first cycle of growth.

The best pH growing range for camellias is between 5.5 and 7.0 on the pH scale. In the high alkaline areas, up to four pounds of sulphur to a hundred square feet over the entire year may be required. In lesser alkaline areas, half that amount for the entire year can be applied at from three to five different times.

Descanso Gardens is very fortunate in having a private source of very high quality water. The pH range is neutral, while the sodium content is very low. The only difference between the Descanso water and other soft water may be in a slightly higher than average Boron content. Experiments are anticipated to determine the effects of extra Boron on camellias.

Alkaline excesses can be easily identified from the foliage which becomes brown around the edges with brown spots immediately back of the tip with, oftentimes, a general yellowing of the foliage.

Certain minor element deficiencies can be determined by leaf or soil analysis. However, such a condition would be extremely rare where the above-mentioned planting method was followed.

In any fertilizing program it is well to remember that frequent feeding in small quantities is preferable to heavy feeding at infrequent intervals.

Exceptional results have been realized in Descanso Gardens by using some of the newly formulated slow-acting fertilizer materials. At one application per year at the beginning of the growing season the elements are released at a very slow rate over the entire growing season, which gives the same results as frequent feeding with small amounts.

The new formulations of fertilizer compounds and their ease of application completely out-date the trend to mix one's own fertilizer. Certain materials such as cottonseed meal have been used successfully for years, and the results cannot be denied. However, present labor costs and drives for economy cannot tolerate an incomplete plant food or time-consuming mixing and distribution.

Foliar feeding of camellias is yet to prove its merit in Descanso Gardens.

Here again, the frequency of application and labor cost would over-shadow any favorable result in a large-scale operation.

The pruning requirements of camellias are low—depending upon the placement of the plants. Camellias are naturally well-shaped plants requiring little discipline of character once they are established. In cases where a camellia gets out of line, however, don't hesitate to bring it into shape. The best pruning procedure is to select the individual offending branch and remove it in its entirety or in part to gain the desired appearance. Do not prune them into perfect shape with hedge shears.

Pruning can be done at any time when active growth has stopped. It is best to prune during the blooming season, however, when the flowers on long branches can be used for interior flower arrangements.

Camellia foliage, as such, is excellent in bouquet use whether it is flowering or not. Almost any kind of flower will be more beautiful when used with camellia foliage, and the foliage will last for several weeks if kept in fresh water. Most gardeners who have sufficient space plant a few lush-growing camellias for the specific purpose of foliage cutting. In fact, some commercial growers raise them by the thousands for foliage only, which is sold at flower markets in major cities.

In Southern California, 'Eureka' is by far the best for such cutting. This variety can be cut very severely, leaving only a half dozen leaves, and will recover to be cut heavily again the following year. Of course, plants which are cut heavily should be fed heavily and watered generously.

Disbudding of camellias is sometimes necessary to get good, well-spaced flowers on some varieties. Disbudding camellias is somewhat different from disbudding other types of flowers such as Chrysanthemums, Carnations, etc. With camellias it is wise to leave buds of different sizes rather than to select only the largest terminal buds. If disbudding is done soon enough, all flowers will be about the same size anyway, but the blooming season will

be extended by leaving large, medium, and small-sized buds.

Disbudding should be done in September or as early as possible when the heavy bud set can be distinguished. Buds can be picked easily by a twist of the fingers. Clusters of not more than three different-sized buds should be left. This practice is especially important to growers who enter flowers in shows for competition. For garden color only, or for home use, it is not too important.

The pests on camellias are few. The most serious are insects which deform or deface the leaves in their early growing stages, thus giving the plant an unsightly appearance for the remainder of the time those leaves will be on the plant.

The most common insect of this type is aphids which attack the new growth in the early spring by sucking the sap and causing the leaves to curl and be disfigured. These aphids can be easily controlled by the use of any good contact spray as soon as they are noticed. If the leaves have already curled when they are found, control is more difficult, oftentimes necessitating dipping branches into an insecticide solution.

Another common leaf-deforming insect is leaf curler which hatches from an egg in an overhanging tree and lowers itself by a web to the camellias or other plants below. This tiny worm proceeds to eat until it is full and then goes into a pupa stage by spinning a web around itself. It attaches the web to the tender new leaf and curls the leaf to form the outside of the protective coating. The leaf is distorted from then on. The best and only control is to determine the time of the hatch in the trees and spray them with any contact spray before they descend.

Another leaf-damaging insect is the Brachyrhinus Beetle. This insect lives in the ground around the base of the plant and comes out only at night to feed on the leaves. Many other animals and insects get blamed for this damage because the casual observer never sees the insect; just the damage done by it.

These and other soil pests are easily

controlled by application of Chlordane Dust around the base of the plant rather than by actual leaf application.

There are other pests, such as the grasshopper and other leaf-chewing insects, but the damage they do is rare and inconsequential. Their control is in applying a stomach poison to the foliage.

Insecticides should be given thorough investigation before being used on camellias. Camellias are slow to react to any adversity and may take as long as six months to show the damage from faulty or incorrect spray material. There are so many brand names of insecticides and so many different combinations that it is impossible here to recommend a special material. It is suggested that, when insect damage appears, a local entomologist or horticulturist be questioned for recommendations on the correct material to be used in the respective area.

Much controversy has been had over the use of DDT on camellias. Some gardeners claim to have used it with no harmful results, while others can show definite harm to plants by its use. In Descanso Gardens our experience with it has indicated that some damage can result, so we don't use it.

There are some fungus diseases that cause concern in camellia culture. Petal Blight has, within the past five years, become a serious problem in Southern California as well as in other sections of the country. The disease does not seem to affect the health or the vigor of the plant in any way. It merely blasts the flowers as soon as they are open. This disease is identified by the dark brown discoloration of an even pattern from the inside out. Weather discoloration will be irregular, discoloring the outer edges of the petals with spots at random.

A degree of control has been had by the use of some of the newer fungicides. However, the best control is by a practice of clean gardening. The fungus spores spread from fallen flowers which come in contact with the soil. Tiny fungus fruiting bodies spring from these flowers and emit spores which are carried by the wind to flowers in the vicinity. These spores

germinate and in a matter of hours discolor and ruin every flower they touch.

The first requirement to control this disease is to remove affected flowers and burn or otherwise completely dispose of them. Gardeners who practice the method of mulching described previously should never have this disease to any serious degree. Outbreaks will be strictly isolated and can be controlled by removal of debris and replacing with fresh mulch.

The effects of Oak Root Fungus (*Armillaria mellea*) on camellias are varied—at least in Descanso Gardens. *Wherever oak trees are found in nature, Oak Root Fungus may also be common.* This is a soil-borne organism which attacks the roots of plants, spreading throughout the root structure and into the trunk, causing the ultimate death of the plant. It is first noticed when all at once one branch or trunk of the plant withers and dies. Shortly, another branch may wither and die, and then almost overnight the entire plant will be dead.

The mistaken idea is had by many that Oak Root Fungus attacks and kills a plant almost instantly—which is not the case. Some plants will actually grow and thrive with Oak Root Fungus in their system for many years, particularly trees. Sudden death occurs when an adversity of one kind or another sets in.

The most common adversity in camellias is excessive planting depth. Crown Rot may set in and general suffocation, caused by excessive soil, will weaken the plant to such an extent that Oak Root Fungus will quickly come in and finish it off. There has never been a camellia killed by Oak Root Fungus in Descanso Gardens where at least one other cause of death could not be found. There is no known treatment for live plants infected. Soil may be sterilized after dead or infected plants have been removed.

In certain parts of the camellia belt, Phomopsis Blight or Die Back causes some concern. It seems to affect the 'Alba Plena' and 'Daikagura' varieties here more than others. This disease is sap borne and is extremely difficult to control. It can be spread by pruning shears from

one plant to another. As the dead wood is removed, the shears should be dipped in a sterilizing solution after each cut. Spraying the plants with Bordeaux Mixture after pruning will prolong the life of the plant for a while. Recent experiments, using some of the antibiotic drugs, have proved one hundred per cent effective in Pear Blight control, which is also sap borne. Perhaps the same treatment would be effective on this disease. Where this disease is most prevalent, it is suggested that local State or County agencies be contacted for the best suggested control.

Many camellia growers are concerned about the displacement of chlorophyll in certain camellia leaves. The appearance will be leaves of mottled green and yellow color. Usually one branch will be affected, but occasionally several branches or an entire plant. This condition is currently described as being a virus disease. Considerable experimentation has been done by agricultural experimental stations but to date no effective means of control has been devised.

Any time that chlorophyll is either destroyed or displaced in a plant, lack of vigor is bound to pursue. Virus-affected camellia leaves do not respond to regular treatment for chlorosis.

One of the worst effects of this disease is in flower variegation. Many plants which have borne solid-colored flowers have turned to irregularly-blotched variegated flowers when this virus infection is found. Research is continuing, and, unless an effective means of control is found, it may be that future generations will have only variegated camellia flowers.

Camellia propagation is done in many ways. The most common method is propagation by cutting, which will be discussed here. Propagation by seed and grafting is discussed later in this article.

Generally speaking, only the most common types of camellias are grown by cuttings because several buds are necessary per cutting, whereas in grafting only one bud is necessary. Camellias propagated by both cuttings and grafts always reproduce the same type of flower as the plant from which the cutting or graft was made

—except in rather rare cases where there is a color or form variation which is called a “sport.”

Some varieties, such as ‘Montironi Alba,’ sport very freely with red, white and variegated flowers, while other varieties sport very rarely, often-times only once. If the grower is fortunate enough to recognize this unusual sport flower, he can mark it for propagation by either cutting or grafting methods in the proper season and have a distinctive new variety. Outstanding examples of “sports” include ‘High Hat,’ a light pink sport of the popular ‘Daikagura’; ‘Gaiety,’ a solid red sport of ‘Gigantea’; and ‘C. M. Wilson,’ a light sport of the ‘Elegans’ (Chandler) variety.

Propagating camellias by cuttings should be practiced only when it does not matter if a few cuttings are lost. Obviously in the case of a valuable sport, the more sure method of propagating by grafting would probably be followed.

A camellia cutting is made by removing the tips of strong, upright or lateral branches with a sharp knife or shears when the wood of the new growth is well hardened—in June or July for cold frames, or as late as November and December for hot beds or greenhouse propagation. The cutting should be up to three inches long including two or three buds.

The basal cut should be at an angle about an eighth of an inch below a bud or node. At least two leaves should be left intact at the terminal. Some propagators prefer to cut one or both of these leaves in half. We have found leaving one leaf whole gives better results because the plant growth process of photosynthesis takes place even in the propagating bed.

Cuttings should be kept moist at all times from the moment they are taken from the plant until inserted in the rooting media. Moist burlap bags make good receptacles for cuttings. Where cuttings are to be shipped over a considerable distance, layers of wet newspaper, peat moss, or both, should be alternated with the cuttings and packed in firm cardboard cartons.

Labeling of an individual cutting is easily done by writing on the reverse side of the leaf with a ball-point pen or a soft-leaded pencil. Packing in moist sealed plastic bags is also very efficient.

Several different rooting media are used successfully for camellia propagation. The one most favored in Descanso Gardens is a mixture of one-half each peat moss and clean, sharp, coarse sand to which a small amount of powdered charcoal has been added. Other ingredients which can be used include insulation mica mixed with sand, or coarse silica materials, sharp sand, or combinations of the above. Whatever the medium, it should be moistened thoroughly and tamped solid in a flat or appropriate box to a depth of approximately two and a half inches.

To insert the cutting, a standard kitchen case knife can be used to cut the medium in a straight line. The cutting can then be inserted in the cut and pressed firmly into place with the finger tips. One hundred to two hundred cuttings can be placed in a standard eighteen-inch square flat, depending on whether the leaves are cut or entire. The cuttings should then be watered again and placed in the propagating bed which may be either a cold frame outdoors, a hot bed, or a standard greenhouse.

For summertime propagation, camellia cuttings can be placed in a lath house or under a dense shade tree. In such cases, another flat—the same size as the one containing the cuttings—should have the bottom removed and the frame placed over the cuttings, resting on the cutting box. Frosted or white-washed glass should then cover the cuttings to create a miniature cold frame. Frequent syringing of the foliage is advisable, particularly in hot weather. However, care must be taken not to over-water cuttings.

Some propagators have increased their percentage of success by dipping cuttings into a hormone solution or powder before inserting into the medium. We have found several types of these preparations to be very beneficial.

After several weeks—depending on weather conditions or greenhouse controls

—callousing and rooting should take place. As soon as several roots have sprouted per cutting, transplanting to pots can then be done. In a loose medium, transplanting is a simple process of merely lifting the cutting from the medium with the fingers and gently placing the cutting into a three-inch red clay pot.

The potting mixture can be the same as recommended for outdoor planting: one-third peat moss, one-third leaf mold and one-third good, clean soil. No fertilizing should be done for several weeks after the cutting is transplanted. The potted cutting can then be grown on in containers, shifting to large sizes each time the roots begin to circle the pot.

One of the prime requirements of propagating camellias is infinite patience. The propagator who anxiously lifts his cuttings looking for roots every other day after they are inserted is almost sure to fail. The only attention the cutting should have during the incubation stage is to remove fallen leaves or stems which obviously are beginning to shrivel or rot.

Only after six to eight weeks have elapsed should an investigation be made, and then by a very gentle tug on a cutting with the first and second fingers. If the cutting is rooted, it should feel secure. If not, it should easily pull out.

Aeration of cuttings during the incubation period is very beneficial and essential. The frames or glass covering can be left intact for the first week to ten days, and then aeration should be given for a few minutes each day, using fifteen minutes as a basis and allowing more or less depending on heat and relative outdoor humidity. Humidity should never drop below fifty per cent during aeration, and should be kept as high as practical during the incubation period.

Temperature control is important during winter propagation. A minimum of 50 degrees Fahrenheit should be observed. The more constant a temperature can be kept in winter propagation, the better will be the results. Warm water application is beneficial to raise the temperature of the medium.

A number of other methods of propa-

gation have been practiced successfully in addition to the above described method. The constant mist method is perhaps one of the most promising. In this method, sharp coarse sand alone is usually used at a depth of from three to six inches. The sand is placed on two inches of fine rocks or pea gravel which allows free percolation of water. The cuttings are inserted in the sand in the same way as in conventional methods of propagation. Mist sprayers are then turned on to supply a constant fine mist over the cuttings during all of the daylight hours—and even twenty-four hours a day during periods of considerable temperature variation. A number of universities, experimental stations and arboretums have information available on the mist method of propagation.

Both of the above-mentioned methods of propagation are adaptable to commercial or backyard hobby requirements.

There is one other method which should be mentioned which the city lot gardener can use to propagate just a few plants. In this method a standard nine- or ten-inch red clay flower pot is filled half full of a mixture of sand and peat moss. A few cuttings—up to fifteen or twenty which can be of different varieties with the names written on the leaves—can be inserted in the medium. A small pane of glass can then be placed across the top of the pot, creating a miniature greenhouse. The pot can then be placed wherever convenient—perhaps on the patio, under a tree, or on the north side of a building. Moisture can easily be supplied by setting the pot in a shallow pan of water. Sufficient aeration is usually provided by the porous pot; therefore removal of the glass is unnecessary until rooting has taken place.

Potting of cuttings should be performed in the same manner as described earlier. However, in the home garden the young plants can be planted in the gardens as soon as they reach sufficient size to be distinguishable from other plants. And, of course, they should be protected from pets or wayward bicycle routes.

To summarize: The requirements of

camellias are simple. There are few plants that give so much for so little. The fifty-thousand camellias in Descanso Gardens serve as a beacon to home gardeners everywhere to show the way to gardening in cooperation with Nature.

*Best Varieties of Camellia japonica
Grown in Descanso Gardens*

- 'Adolphe Audusson.' Very large, semi-double. Both Red and Variegated forms.
- 'Alba Plena.' White. Large, formal double.
- 'Amabilis.' White. Medium, flat, single with heavy center stamens.
- 'Anita.' Light Pink striped Carmine. Medium large, semi-double.
- 'Are-Jishi.' Dark Salmon Rose. Large, full peony form.
- 'Arrabella.' Orange Red. Large, semi-double.
- 'Bella Romana.' Light Pink striped and splashed with Carmine. Medium large, rose form double.
- 'Berenice Boddy.' Light Pink with deeper Pink underpetals. Medium large, semi-double.
- 'Bessie McArthur.' Clear Pink. Large, semi-double with large petals.
- 'Big Beauty.' White, blotched and dashed Pink. Large semi-double to semi-peony form.
- 'Blood of China.' Deep Salmon Red. Large, semi-double to loose peony form.
- 'Brooklynia.' Pink to Pink and White. Large, formal double with down-curved petals.
- 'California.' Light Rose Red. Very large, semi-double with broad, thick petals.
- 'Candidissima.' White. Medium, formal double.
- 'Captain Martin's Favorite.' Deep Pink splotched White. Large, formal double.
- 'Carolyn Tuttle.' Rose Opal Pink. Medium large, full peony form.
- 'C. M. Hovey.' Dark Red. Large, formal double.
- 'C. M. Wilson.' Light Pink sport of Elegans (Chandler) variety.
- 'Colletti.' Red blotched White, varying from nearly solid Red to nearly pure White. Medium, peony form.

- 'Daikagura.' Bright Rose Pink spotted White. Large, peony form. (Also Red form).
- 'Daitarin.' Light Rose Pink. Large, single with mass of petaloids in center.
- 'Daybreak.' Light Pink. Medium, full peony form.
- 'Debutante.' Light Pink. Large, full peony form.
- 'Donkelarii.' Red marbled White in varying degrees. Very large, semi-double.
- 'Dutchess of Sutherland.' White, sometimes with Pink stripe on one petal. Large, flat, semi-double, sometimes with curled inner petals.
- 'Duchesse De Caze.' Flesh Pink veined Pink and edged White. Medium large, full peony.
- 'Eleanor Hagood.' Pale Pink. Medium to large formal double.
- 'Elegans' (Chandler). Rose Pink with center petaloids often spotted White. Very large, anemone form. (Also Variegated form).
- 'Elena Nobile.' Flame Red. Medium, rose form double.
- 'Ella Drayton.' Dark Red. Medium large, formal double.
- 'Emperor of Russia.' Scarlet. Large, mult-centered double to peony form.
- 'Eugene Lize.' Light Rose Pink marbled and splashed White. Medium large, semi-double to peony form.
- 'Fimbriata.' White Large, formal double with fringed petals.
- 'Finlandia.' White. Large, semi-double with swirled and fluted petals. (Also Blush and Variegated forms.)
- 'Firebrand.' Scarlet. Large, semi-double with large petals.
- 'Flame.' Deep Flame Red. Large, semi-double. (Also Variegated form.)
- 'Fred Sander.' Sport of Tricolor (Siebold). Crimson with curled, fimbriated petals.
- 'General Dwight Eisenhower.' Deep Red. Large, full peony to anemone form.
- 'General George Patton.' Bright Pink. Large, rose form double.
- 'Gigantea.' Red marbled White. Very large, semi-double, rose form double, anemone form to peony form.
- 'Glen 40.' Deep Red. Large, formal to rose double. (Also Variegated form.)
- 'Glenn Allan.' Deep Rose Red. Medium large, semi-double.
- 'Governor Earl Warren.' Rose Red. Large rose form double to loose peony form.
- 'Governor Mouton.' Oriental Red spotted White. Large semi-double to loose peony form.
- 'Grandiflora Rosea.' Deep Pink. Large, semi-double with crinkled petals.
- 'Hana-Fuki.' (Mrs. Howard Asper): Soft Pink, sometimes blotched White. Large, cupped semi-double.
- 'Herme' (Jordan's Pride): Pink petals with irregular White border and streaked deep Pink. Large, semi-double.
- 'High Hat.' Light Pink sport of Daikagura.
- 'Iwane.' Rose Red mottled White. Large, semi-double.
- 'Joshua E. Youtz.' (White Daikagura): White. Large peony form to formal double.
- 'Kiku-Toji.' Deep Red blotched White. Medium, formal double.
- 'Kimberley.' Carmine with Red stamens. Medium, cupped single.
- 'Kishu-Tsukasa.' (Captain John Sutter): Deep Rose Pink and White. Large, formal double.
- 'Kumasaka.' Rose Pink. Large, rose form double to peony form.
- 'La Reine II.' Rosy Crimson. Small, semi-double.
- 'Lady Clare.' Deep Pink. Very large, semi-double.
- 'Lady Mary Cromartie.' Deep Rose Pink. Large, semi-double to loose peony form with stamens intermixed with center petals.
- 'Lallarook.' (Laurel Leaf). Pink marbled White. Large, formal double, sometimes with incurved petal edges.
- 'Latifolia Var.' (Fanny Bolis): Variegated form of Latifolia. Soft Rose Red blotched White.
- 'Lindsay Neill.' Dark Red marbled White. Large, semi-double to loose peony form with stamens among twisted petals.
- 'Lotus.' White. Very large, semi-double of Water-Lily form.



The canopy of the ancient live oaks provide a restful spot for man and an ideal one for growing 48,000 camellias in Descanso Gardens.

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- 'Magnoliaeflora.' Blush Pink. Medium large, semi-double.
- 'Margarete Hertrich.' White. Large, formal double with numerous small petals.
- 'Margaret Higdon.' Rose Red, sometimes showing white-margined petals. Large, semi-double.
- 'Mathotiana.' (Julia Drayton): Scarlet. Very large, rose form to formal double.
- 'Mathotiana Alba.' White, sometimes tinged Pink. Large, formal double.
- 'Meredith Lake.' White with pale Lilac overtone. Medium, semi-double.
- 'Mme. Hahn.' Bright Pink. Large, semi-double.
- 'Mrs. Charles Cobb.' Dark Red. Large, full double peony form.
- 'Mrs. Freeman Weiss.' Pink. Large, loose semi-double with wavy petals and intermixed stamens and petaloids.
- 'Mrs. K. Sawada.' Delicate Pink. Medium large, formal double.
- 'Mrs. Tingley.' Salmon Silver Pink. Medium, formal double.
- 'My Darling.' Light Pink. Medium small single.
- 'Nagasaki.' Rose Pink Marbled White in varying degrees. Very large, semi-double with large outer petals and a few small center petals lying flat.
- 'Nobilissima.' White with Yellow shading. Medium, full peony form.
- 'Pax.' White. Large, formal double.
- 'Pink Ball.' Soft Pink. Medium large, full peony form.
- 'Pink Dawn.' Deep Pink. Medium large, formal double.
- 'Pink Perfection.' Shell Pink. Medium, formal double.
- 'Pope Pius IX.' Cherry Red. Large, formal double with many small, rounded petals which are progressively smaller toward center.
- 'Pride of Descanso.' (Yuki-Botan): White. Very large, semi-double to loose peony form.
- 'Pride of Greenville.' Bright Red. Large, full peony form.
- 'Purity.' White. Medium large, rose form to formal double.
- 'Reg Ragland.' Red to Red and White. Large, full semi-double with smaller, upright center petals.
- 'Richard Nixon.' White shaded Pink and striped Rose Pink. Large anemone form with outer row of upright, crinkled petals.
- 'Rosea Mundi.' Deep Pink. Large, wavy-petaled, irregular semi-double.
- 'Rosea Plena.' Rose Pink with dark veins. Medium large, formal double.
- 'Rosea Superba.' Deep Pink. Very large, rose form to formal double.
- 'Salmon Queen.' Salmon Pink. Medium large, formal double to full peony form.
- 'Surusumi'. (Starlight): White. Large single.
- 'Sweeti Vera.' White and pale Pink. Large, peony form.
- 'Te Deum.' Dark Red. Very large, variform (semi-double, irregular peony form to formal double).
- 'Tinsie.' Red outer guard petals and White peony center. Small, anemone form.
- 'Victory Maid.' White. Medium variform (semi-double, rose form double to formal double.)
- 'Ville De Nantes.' Sport of Donckelarii. Dark Red blotched White. Large, simbricated semi-double.
- 'White Empress.' White, Very large, semi-double with fluted petals.
- 'White Princess.' Cream White. Large, peony form.
- 'Woodville Red.' Deep Strawberry Red. Very large, peony form.
- 'Yohei-Haku.' (Albatross): White. Large, formal double to peony form to anemone form.

Ten Best Red Varieties

- 'Adolphe Audusson'
- 'C. M. Hovey'
- 'Flame'
- 'Fred Sander'
- 'Glen 40'
- 'Governor Mouton'
- 'Mathotiana'
- 'Mrs. Charles Cobb'
- 'Pope Pius IX'
- 'Te Deum'

Ten Best White Varieties

- 'Alba Plena'
- 'Candidissima'
- 'Imura'
- 'Joshua Youtz'
- 'K. Sawada'
- 'Lotus'
- 'Mathotiana Alba'
- 'Pax'
- 'Pride of Descanso'
- 'White Empress'

Ten Best Pink Varieties

- 'Berenice Boddy'
- 'C. M. Wilson'
- 'Debutante'
- 'General George Patton'
- 'Hana-Fuki' (Mrs. Howard Asper)
- 'High Hat'
- 'Lady Clare'
- 'Lallarook'
- 'Magnoliaeflora'
- 'Mrs. Tingley'

Ten Best Variegated Varieties

- 'Adolphe Audusson Special'
- 'Colletti'
- 'Donckelarii'
- 'Elegans' (Chandler) var.
- 'Flame' var.
- 'Gigantea'
- 'Iwane'
- 'Nagasaki'
- 'Reg Ragland'
- 'Sweeti Vera'

Ten Best Camellia Japonica of all Colors

- 'Adolphe Audusson Special'
- 'Alba Plena'
- 'Daikagura' (all types)
- 'Debutante'
- 'Elegans' (Chandler) (all types)
- 'Gigantea'
- 'Glen 40'
- 'Herme'
- 'Kumasaka'
- 'Lallarook'

Outstanding New Varieties of Camellia Japonica

- 'Carolyn Tuttle.' Rose, Opal, full peony flowers similar to Debutante. Interesting crinkled pointed foliage.

'Descanso Blush.' A new 1957 introduction, developed locally. The faint blush pink color blends with the white as the flowers age. A good-sized semi-double to peony flower with fine lasting quality.

'Reg Ragland.' Giant Red and White semi-double that took most of the prizes at our 1956 Camellia Show.

'Richard Nixon.' Very large, strong-blooming, early white peony form with vivid Red markings.

'S. Peter Nyce.' A striking new sport of Nagasaki which is highly marbled with white.

Camellia Sasanqua

Throughout the camellia world, with the exception of the Orient, the *Camellia sasanqua* species has played a secondary role to *C. japonica*. Modern American horticultural interest is rapidly bringing the *C. sasanqua* at least on a par with *C. japonica*. Great emphasis is being made in the development of new types of *sasanquas* and of hybrids having this species in their parentage.

Camellia sasanqua is described generally as being a smaller-leaved type of camellia with generally smaller and often single flowers. It blooms early, often showing its first flowers in late September and early October in Southern California. Although most flowers are single or semi-double, there are some very beautiful flowers which are full double. 'Mine-No-Yuki' (White Doves) and 'Jean May' are classic examples of these doubles.

All have fragrant flowers, varying from very slight to heavy, rather musky odors. The general habit is loose, airy, and very artistic. Many Oriental silk paintings are of *C. sasanqua* because of its naturally artistic appearance.

Here some varieties, such as 'Mine-No-Yuki,' grow almost prostrate, being wider than high. Others are quite willowy, growing to considerable height with long, slender, arching branches sometimes hanging to the ground. Still others are strong, upright growers, varying in shape from globular to pyramidal.

C. sasanqua, generally speaking, seems

to prefer semi-shade and the same conditions as other camellias, but some people believe they are tolerant to more adverse conditions.

While the flowers are smaller and more fragile than those of *C. japonica*, they make up for their lesser size in brilliancy of color and profusion of bloom. It is not unusual to see an entire branch so thickly covered with flowers as to almost cover the leaves from view.

The cultural requirements of the *C. sasanqua* are no more exacting than those of *C. japonica* as described earlier. The only difference would be in the foliage bath requirements. So often in Southern California fall days in November and early December become quite warm and dry. Under such conditions the flowers will wilt quickly unless the humidity is kept relatively high in the vicinity of the plants.

Foliage baths should be frequent under such conditions, using very fine sprays which will not damage the fragile flowers. Of course, the same requirements of not watering overhead in the hot sunlight should be followed. Sprinkling should be done in the early morning or late afternoon. During the heat of the day, the humidity can be raised by sprinkling the ground around the plants, taking care not to wet the foliage or flowers.

As a cut flower, *C. sasanqua* is of rather minimum consequence, but we feel that great possibilities exist in using *C. sasanqua* as cut foliage with the flowers intact. The flowers of most varieties in a semi-open condition will continue to open, when cut. They are very artistic and adapt themselves particularly well to flower-arrangement use.

This species is a very heavy seeder. Growth is relatively rapid from seed and the root is very hardy. Consequently it may be well to consider seed production of camellias at this point.

First, let us consider the reasons for growing camellias from seed. The primary purpose is for the development of new varieties. Closely observed and pro-

duced hand-pollinized seeds will produce, in most cases, attractive flowers. *C. sasanqua* is not so heavily crossbred as is *C. japonica*, consequently the possibilities of getting superior seedlings among *C. sasanqua* are better than in other types of camellias.

As mentioned earlier, American hybridists are doing a great deal of work on this species. Crosses are being made between *C. sasanqua* and *C. reticulata*, *C. sasanqua* and *C. saluenensis*, *C. sasanqua* and *C. japonica*, and perhaps many others. *C. sasanqua* has many characteristics which, if combined in other species, would do a great deal to improve the lot. The most sought after characteristics are: early bloom, foliage and growth character, hardiness, profusion of bloom and fragrance.

Once the desired characteristics of the cross are determined, the necessary pollen is gathered from the male parent plant for application to the female parent. Oftentimes this is difficult because the one species will bloom much earlier than others and it becomes necessary to plan a long time in advance in order that pollen may be gathered and stored to carry over from one bloom season to the next.

It is felt here that pollen storage is best accomplished by using small gelatin capsules placed in vials containing a layer of chloride of lime and a layer of cotton on which is placed the capsule containing the pollen. The vial containing the pollen is then closed tightly and stored in a cool, dry place. Chloride of lime will absorb moisture and prevent pollen spoilage. The pollen capsule must be very carefully labeled in order to achieve desired results. This can best be done by a capsule-numbering procedure with a written key.

At pollinating time the crosses can best be made by using a camel's hair brush dipped in the pollen and applied to the stigma of the receptive flower. Pre-pollinizing is generally practiced in camellia breeding; that is, selecting a flower for pollinizing before it has ever opened and before the stigma is receptive in order to be sure that open pollinization has not occurred.

The selected flower is emasculated—which is a process of removing the petals and stamen with small clippers, leaving the stigma exposed. The pollen is then applied to the stigma and the emasculated and pollinated flower is then covered very carefully with either a paper or a cellophane bag which is securely tied around the base of the flower to protect it from further pollinization by insects or wind. When the stigma becomes receptive, the preapplied pollen is there ready to travel down the style and into the ovary, causing fertilization.

The seed begins to grow in a pod which will ripen the following fall—generally in October or November. Each seed pod contains one to several seeds varying greatly in size from as small as a pea to as large as the end of your finger. As soon as the seed is ripe, the pod will begin to split. Gathering should be done at that time and the seeds planted as soon as possible.

In order to obtain a heavily branched root system, it is best to place the seeds in a jar containing moist peat moss—the size of the jar depending upon the quantity of seed to be germinated. The jar should be sealed and placed in a dark room at normal room temperature. After about two to three weeks the seed should be inspected and those seeds having sprouted a root should be picked out from the peat moss and the very tip of the tiny root pinched with the fingernail. This pinching will cause heavier branching of the root system thus forming a plant more readily adaptable to container growing.

This tiny sprouted seed should then be placed on soil, either in a small pot or in a flat along with other seedlings. Every few days after germination starts, the jar should be dumped out and inspected for sprouted seed. The seeding soil should be one prepared of a weed- and disease-free mixture including peat moss, leaf mold and good soil in equal proportions. The germinated seed should be placed, about half exposed, in the soil and watered in.

As the tops begin to grow in the pots or flats, the root system will develop. The

sturdiest seedlings should be transplanted into larger containers to keep them from becoming stunted by a lack of root space. Within one year these seedlings can be transplanted to one-gallon cans or pots of comparable size.

Much has been done by the use of artificial lighting to hasten the bloom of seedlings to determine their value. When using artificial light to force growth and bloom, certain requirements should be adhered to. The first requirement is a heated and humidified greenhouse. Plants must have rest the same as animals. Therefore, continuous lighting is not advisable. The ideal situation for light forcing is to have an automatic time clock which will turn on lights over the seedlings about 2:00 a.m. and automatically shut off at daylight. More or less continuous feeding can be performed during this forcing procedure, using a liquid or any basic fertilizer. First flowers have been reported by certain experimenters in as little as sixteen months on *C. japonica*. *C. sasanqua* should perform in equal fashion.,

There is as yet controversy regarding the advisability of forced lighting and feeding in seedling production. In many cases the flowers on forced seedlings are smaller and do not have the character that normally grown plants would give. The grower has to determine the values he is seeking in order to decide which method of growing is best.

In all cases the color would be true to form in forced growing, so if desired characters of color were being worked for, forced growing could give that determination in a relatively short time. Also, a certain flower form could be determined in this manner. Once a desired form or color is recognized, then grafts can be made from the forced plant onto a well-established camellia understock and more ideal growing conditions can be given.

In commercial production of camellias—particularly for new types—speed is of the essence. For the home gardener or amateur enthusiast, regular growing procedures can be followed with a great deal of satisfaction. As much as six years' time may be necessary to observe flowers

from a garden-grown seedling camellia. By following a consistent program of seed production, however, the amateur can have new seedlings coming into bloom each year.

Many of the most famous camellias being grown today have originated in just this manner in the gardens of amateur growers who work with plants for the sheer enjoyment of it. In the case of at least one of Southern California's most famous introducers of new camellias, no artificial hybridizing is planned; all production is from open-pollinated seeds—the pollen parent in all cases being unknown. Some very remarkable results have come from these open-pollinated seedlings, particularly in *C. japonica*.

Even with the advanced growing developments in camellias and with the literally thousands of varieties which have been introduced, the growers feel that there is still a great deal to be done in camellia development—particularly since the advent of the varieties of *C. reticulata* from Kunming, China, which will be discussed in detail later in this article.

Camellia breeding as a hobby is one of the most fascinating phases of gardening for the busy professional person. It is particularly interesting to note that in plant breeding of any type, the amateur who has good basic ideas has a very good chance of producing an outstanding new variety usable in commerce.

Certain publications are extremely valuable to the amateur in determining his basic needs. This information is available through all camellia organizations and societies throughout regions where camellias are grown.

Other purposes of camellia seed production in this country include the growing of certain types of plants as understock for grafting. In most cases it is felt that seedling understock has a sturdier root system for grafting than cutting-grown plants. This will be especially true as certain new species of camellias become available for this purpose. Experiments are now under way in Descanso Gardens to determine the usability of newly intro-

duced species for the sole purpose of understock—much the same as the Ragged Robin Rose is used in rose production. Experimentation will determine the advisability of such a procedure and can be reported on at a later date.

Another purpose of growing camellias from seed is in field planting for foliage production. This would apply more to *C. japonica* than to the *C. sasanqua*.

In China, Japan and perhaps other sections of the Orient, camellias are grown by the millions for their seeds which are processed for their oil content. Camellia seed oil is used primarily as a hair dressing in the Orient and as an edible oil for cooking.

The above prescribed methods of growing camellias from seed will apply to all species except some newly introduced types which may require special handling. Special inquiry is recommended on all new introductions unless enough seed is available for experiment.

Best Camellia Sasanqua Grown in Descanso Gardens

- 'Apple Blossom.' White blushed Pink. Single.
- 'Briar Rose.' Soft, clear Pink. Single.
- 'Brilliancy.' Bright Cherry Red. Large, single with cluster of stamens in center.
- 'Choji-Guruma.' Rose Pink with Pink petaloids. Anemone form.
- 'Cleopatra.' Rose Pink. Semi-double.
- 'Floribunda.' White edged Lavender. Single.
- 'Fuji-No-Mine.' White. Large, double.
- 'Gin-No-Sai.' White. Medium, double.
- 'Hinode-Gumo.' White, spotted Scarlet. Large, single.
- 'Hiokoshi.' Crimson splashed and marbled White. Large, single.
- 'Hugh Evans.' Pink. Medium, single.
- 'Jean May.' Shell Pink. Large, double.
- 'Kenkyo.' White flushed Pink, becoming White when fully open. Large, single.
- 'Ko-Gyoku.' Pink bud opening Pinkish White. Medium, rose form double.
- 'Lavender Queen.' Lavender Pink. Large, single.

- 'Mine-No-Yuki.' White. Large, peony form.
- 'Momozono-Nishiki.' Rose shaded White. Large, semi-double with curled petals.
- 'Narumi-Gata.' White shaded Pink. Large, cupped single.
- 'Okina-Goromo.' White shaded Pink. Medium, single.
- 'Papaver.' Soft Pink. Large, bell-shaped single.
- 'Rosea.' Deep Rose Pink. Medium large, single.
- 'Rosy Mist.' Pink. Large, single.
- 'Ryomen-Beni.' Dark Pink. Single.
- 'Slenderlee.' Watermelon Pink. Medium, single.
- 'Snowflake.' White. Large, single.
- 'Splendor.' Delicate Pink with darker Pink toward edge. Very large, semi-double.
- 'Tanya.' Deep Rose Pink. Single.
- 'Velvety.' Crimson Red with velvety overcast. Single.
- 'Versicolor.' White center edged Lavender, with soft Pink in between. Medium, single.
- 'Willow Leaf.' White margined Pink. Medium, single.

Ten Best Camellias Sasanqua

- 'Briar Rose'
- 'Cleopatra'
- 'Gin-No-Sai'
- 'Jean May'
- 'Ko-Gyoku'
- 'Narumi-Gata'
- 'Rosea'
- 'Rosy Mist'
- 'Slenderlee'
- 'Versicolor'

Camellia Reticulata

While Research Director at Descanso Gardens, Dr. Walter E. Lammerts performed research work necessary to determine that there were several varieties of the *C. reticulata* species growing in the interior of China. Manchester Boddy, the founder of Descanso Gardens, authorized the expenditure of moneys to determine if these plants were available for import to the United States. After much correspondence, lapse of time, and at considerable expense, a shipment of twenty new varieties of *C. reticulata* was received in

Descanso Gardens in March of 1948 from Kunming, China. Unfortunately, several varieties were lost because of fumigation.

Coincidentally, Mr. Ralph Peer, a widely noted camellia enthusiast in Hollywood, made basically the same discoveries and the same importation at approximately the same time as the Descanso Gardens' importation.

Many of the varieties that Mr. Peer imported were also lost by fumigation, but, fortunately, the ones he saved were of the ones Descanso Gardens lost. By putting varieties together, eighteen of the initial twenty varieties which were shipped were saved and propagated.

The first flowers from the original plants were seen at the time of the shipment's arrival. Although the flowers were far from perfect, their size and unusual color was enough to inspire the growers to give excellent culture throughout the ensuing year. The following flowering season in 1949 produced some of the most spectacular flowers ever to be viewed in this country.

Many of the varieties grew rapidly from grafts and bloomed when only one and two years old. Certain varieties, such as the 'Noble Pearl,' produced flowers measuring almost eight inches in diameter on very small plants. Practically every other variety produced flowers very nearly as large as the 'Noble Pearl.'

Colors varied from dark, velvety red and full formal double, such as the 'Purple Gown,' to an orchid rose color in the smaller variety known as 'Chrysanthemum Petal.' There were other variations in color from the red and white variegated 'Lion Head' and 'Chang's Temple' to the solid pink of the 'Willow Wand,' 'Moutancha' and 'Butterfly Wings.' The flowers seemed to have the unusual characteristic of changing form even after opening fully. Certain center petals rise and fall, causing the flower to actually change appearance and shape. The colors change very little, however, from the fresh flower to the faded flower.

All of the original plants were growing on the common *C. japonica* 'Alba Plena' understock. Since 'Alba Plena' is difficult to grow from cuttings, it was thought strange that it would be used as understock. Recent evaluations have indicated that 'Alba Plena' was used because of its neutral characteristics. Other understock plants having a more mixed heritage could conceivably cause the flowers to show more or less variegations of color than desired.

The imported Kunming *C. reticulata* varieties have been growing under natural garden conditions for three to four years, and a great deal is yet to be learned about them. To date it has been determined that here they will stand at least any conditions of adversity that the *C. japonica* will survive under. It is strange, however, that the flowers on garden-grown plants in many cases are not as large and spectacular as those grown under nursery conditions in containers.

The *C. reticulata* varieties in Descanso Gardens are plants grown from the original grafts taken from the parent plants which arrived by air. The original plants all died within a very short period because they were so completely stripped of new growth for scions each year. Likewise, many of the plants grafted from the original plants seemed to lose their vigor from too much propagation.

Our experience has been that *C. reticulata* object strenuously to heavy pruning. The foliage being grown in containers is often very sparse, giving the plants a straggly appearance which is the only point not in their favor. In growing under ordinary conditions the plants have a tendency to grow more dense and assume a better shape.

The cultural requirements do not seem to be too different from those for *C. japonica*, but the design placement of these plants is quite different from that of other camellias. They cannot be used as a basic shrub for home landscaping, with the exception of the variety 'Moutancha' and one or two others, as the growth will

eventually produce small trees. The best landscape use is in a shrub border around a lawn or park area. In areas of relatively high humidity they should be planted in the open as specimen plants. Placement instructions will be given in the check list to follow.

It is as yet inadvisable to plant *C. reticulata* in public areas except in places where close supervision can be maintained at all times when the plants are in bloom. The spectacular flowers are a temptation for picking. Too often the plants will actually be stripped of flowers and foliage by a few disrespectful people. Much consideration nevertheless should be given to their growing for public building use in the future. Certain of these varieties will grow tall enough that the lower branches could be out of reach of tempted hands.

Many years before the importation of the Kunming *C. reticulata* varieties, one of the varieties had been grown in England, California, and the Southern States called 'Captain Rawes,' which is certainly an outstanding camellia in every way. It seems to perform well in most places where it is grown—even growing and blooming profusely in a section of Wales where the temperature reaches near zero. Some adverse reports on this variety came from the colder sections of the southern United States where difficulty in holding buds was reported.

The Descanso Gardens' collection of 'Captain Rawes' includes approximately one hundred plants. Without exception, this variety has proved to be very outstanding under any condition to which it has been subjected. It is propagated by practically every camellia specialist nursery and should be included in every camellia collection.

Although it is not as rapid in its growth habit as some of the Kunming importations, it does grow to quite large proportions and consequently should be given ample room in which to develop. A plant eighteen feet tall and twelve to fourteen feet wide within twenty to twenty-five years would not be unusual.

The varieties of *C. reticulata* react rather strangely to being grown under artificial conditions. Artificial light seems to cause the flower colors to separate, and the flowers which bloom under artificial light are smaller—even to one-quarter normal size. Such reactions will result even during a ten-day indoor flower show.

The flowers seem to be very prompt in registering any condition by which the plant may not be benefitted. Too much or too little fertilizer will show promptly in the flowers. Likewise, great variation in soil moisture will cause great variation in the flowers.

As mentioned previously, *C. reticulata* is propagated almost exclusively by grafting. It may be profitable to touch briefly at this point upon this phase of camellia propagation.

The first requirement of grafting is to have good scions available. In all camellias the best scions are those which grow at the very tips of the upright or lateral branches, rather than the weak, spindly branches which grow underneath the plant or away from the light. The scion is best taken in January and February from wood that has not been exposed to heavy frost. At that state of development the wood is as near complete dormancy as camellias ever get. The scions should be taken by cutting a minimum of one and a half inches of the tip off within a quarter inch of the next bud. The scion's length may vary according to the growth area between buds. Shorter scions will take, but a more vigorous plant will result from scions of at least an inch and one-half in length.

Scions can be stored and transported in a number of ways when grafting cannot be done right at the moment the scions are taken. For short periods of time, the scions can be wrapped in moist layers of newspaper. For shipment, they can be packed in moist peat moss wrapped in waxed paper. One of the most satisfactory methods of shipping scions over great distances is to cut an Irish potato in half and insert the broken end of the scion

into the potato which will supply the needed moisture for a considerable length of time.

There are many methods of grafting, but the most common and most successful one is the "cleft" graft. In this form of propagation, understock should be selected for a good trunk rising four to six inches straight from the ground. The diameter of the trunk may vary, but the minimum size should be slightly larger than a lead pencil.

The top of the understock plant is cut off four to six inches above the ground—the cut being made on a ten or fifteen degree slant. The cut should be smooth in all cases to avoid bruises or uneven surface. On small understock, pruning shears will serve this purpose; on large plants, a sharp pruning saw should be used. The cutting instruments should be sterilized after every cut to insure against the spread of any sap-borne disease. In all cases, the cut should be smoothed with a very sharp grafting or pocket knife.

At the back of the cut another shallow cut should be made almost level, to properly expose the cambium layer which is the very thin, green strip between the wood and the bark. A sturdy pocket knife or a cleaver can then be used to split the stump right down the middle to a depth sufficient to receive the scion. The scion is then prepared by cutting downward to the base of the scion, exposing the wood on both sides. The cut should be in a wedge shape which will fit snugly inside the split stump. The cambium layers of both the scion and stump must fit together in order for growth union to take place.

The scion must then be held in place by a strip of rubber which is wound tightly around the trunk at the point of incision. Horticultural supply dealers have special grafting rubbers available for this purpose. The scion should have at least one, and preferably two, leaves intact.

A wide-mouthed Mason jar should then be placed over the scion in firm contact with the soil, creating a miniature

greenhouse, well protected lath house, or in the shade of a dense tree. Little watering will be necessary during the grafting time as transpiration will be very minute.

After a period of from six to ten weeks, callousing will take place over the point of union, which indicates that the graft has taken. Once union has taken place, the jar can be loosened from the soil to allow a small amount of air to penetrate. The graft should be watched closely and the jar removed entirely as soon as the new signs of top growth are apparent. Removal should be in late afternoon or evening to allow overnight hardening. Foliage syringing on warm days would be beneficial. If the new growth wilts at any time, the jar should be placed back on the scion and removed gradually until the plant can again be fully exposed.

So far in camellia grafting, the types of understock used have consisted of what has been available. This includes everything from seedling-grown *C. japonica* and *C. sasanqua* to every kind of cutting-grown camellia, and in many cases shabby, root-bound plants unfit for sale. Experimentation is now under way in Descanso Gardens to determine a more ideal type of understock.

Camellia Reticulata Varieties
Grown in Descanso Gardens

'Buddha.' (Plant Patent No. 1215). Rose Pink. Very large, irregular semi-double with erect, wavy petals. Vigorous, upright growth. Allow 8 ft. spacing; will probably reach height in excess of 20 ft.

'Butterfly Wings.' Rose Pink. Very large, irregular semi-double with broad, wavy petals resembling wings of butterfly in shape. Slender, open growth. Allow 6 to 8 ft. spacing. Height up to 20 ft.

'Captain Rawes.' Carmine Rose Pink. Very large, irregular semi-double. Allow 8 ft. spacing. Height up to 20 ft.

'Chang's Temple.' Pink variegated White. Large, irregular peony form with wavy, spiraled petals. Vigorous, compact growth. Allow 6 to 8 ft. spacing. Height up to 20 ft.

'Chrysanthemum Petal.' Light Carmine Pink. Medium large, rose form to formal double with fluted petals. Slender, open growth. Approximately same growth characteristics as *C. japonica*.

'Confucius.' Orchid Pink. Large, high-centered semi-double with intermingled petaloids and stamens in center. Medium, compact, upright growth. Allow 8 ft. spacing. Height in excess of 20 ft.

'Cornelian.' Deep Rose Pink heavily marbled White. Large to very large, irregular semi-double to peony form with wavy, crinkled petals and a few petaloids in center. Vigorous, compact growth. Allow 6 to 8 ft. spacing. Height up to 20 ft.

'Crimson Robe.' Carmine Red. Very large, semi-double with wavy, crinkled, crepe-textured petals. Vigorous, spreading growth. Allow minimum of 8 ft. Height up to 20 ft.

'Lionhead.' Deep Turkey Red striped and blotched White. Large to very large, irregular peony form with heavy, crinkled petals near base, arching over and covering center as flower develops. Vigorous, compact growth. Allow 6 to 8 ft. spacing. Height up to 20 ft.

'Moutancha.' Bright Pink veined White and striped White on inner petals. Large to very large, formal double with wavy, crinkled, crepe-like petals. Medium growth. Approximately same growth characteristics as *C. japonica*.

'Noble Pearl.' Oriental Red. Large to very large, semi-double with large, heavily textured, outer petals and crinkled inner petals. Compact growth. Allow 5 to 6 ft. Height up to 20 ft.

'Osmanthus Leaf.' Orchid Pink. Medium, rose form double. Vigorous, slender, open growth. Allow 6 to 8 ft. spacing. Height up to 20 ft.

'Pagoda.' Dark Scarlet Red. Large, deep, rose form double. Compact growth. Allow 5 to 6 ft. spacing. Height up to 20 ft.

'Professor Tsai.' Rose Pink. Medium, semi-double with undulate petals. Allow 6 to 8 ft. spacing. Height up to 20 ft.

'Purple Gown.' Purple Red with pin stripes of White to Wine Red. Large

to very large, formal double to informal peony form with wavy petals. Compact growth. Allow 6 to 8 ft. spacing. Height up to 20 ft.

'Shot Silk.' Brilliant Spinel Pink. Large, loose semi-double with wavy petals. Vigorous growth. Allow 8 ft. spacing. Height in excess of 20 ft.

'Takeiyeh.' (Large Osmanthus Leaf). Deep Carmine. Large semi-double to peony form. Vigorous growth. Allow 6 to 8 ft. spacing. Height up to 20 ft.

'Tali Queen.' Deep Pink lightly splashed White. Very large, irregular semi-double with very large, heavily textured outer petals and wavy inner petals interspersed with clusters of stamens. Allow 6 to 8 ft. spacing. Height up to 20 ft.

'Wild Form.' Shades of Pink, ranging from Lavender to light Salmon Pink. Medium to large single. Vigorous, compact, upright growth. Generally not available for garden culture.

'Wild Form.' Rose Pink, crinkled crepe textured. Very large single. Vigorous growth. Generally not available for garden culture.

'Willow Wand.' Light Orchid Pink. Large, rose form double to irregular semi-double with wavy petals of silky, velvety texture. Vigorous growth. Allow minimum of 8 ft. spacing. Height in excess of 20 ft.

Five Best of New Camellia Reticulata Varieties

- 'Buddha'
- 'Butterfly Wings'
- 'Crimson Robe'
- 'Noble Pearl'
- 'Willow Wand'

Other Camellia Species, Hybrids and Camellia Relatives

Following is a list of camellia species, hybrids and relatives represented in Descanso Gardens, with comments on their performance and usability. It should be noted that the surface has not been scratched in recognizing the values of camellia species other than those commonly grown, such as *C. japonica*, *C. sasanqua* and *C. reticulata*. Many of the

species have characteristics which would greatly compliment garden varieties if they could be hybridized into them.

C. saluenensis:

Perhaps outstanding in this category is the *C. saluenensis*, which is a rather slow-growing plant with small leaves and small flowers. The leaves are deeply veined and serrated, very thick and hard surfaced. The flowers are tubular shaped—white and delicately shaded pink. Some seed variations may bloom deep pink. It is a free seeder and seems to be quite compatible with other species, including *C. japonica* and *C. reticulata*.

The main values to be received from varieties of this species as a hybridizing parent are hardiness, the tubular-shaped flower, and excellent growth habit.

There are currently several hybrids being grown by collectors which originated from this species. 'Cornish Snow,' which is represented in Descanso Gardens, is a cross between *C. saluenensis* and *C. cuspidata*. It is extremely vigorous, growing up to three feet in one season. The flowers are very profuse in the early spring and are white with a pink cast.

Another hybrid, 'J. C. Williams,' is represented in the species collection. It is a cross between *C. saluenensis* and *C. japonica*. The flowers are small, but larger than those of *C. saluenensis* and very nearly the same color. It is also quite vigorous and free flowering.

C. cuspidata:

Next in the list is *C. cuspidata*. This species is not new to American gardens. However, it has never reached the point of great distribution. Gardeners who have it cherish it very highly for its unusual, narrow, pointed leaves, its compact habit of growth, and the tiny "tea-like" flowers. The flowers are approximately one inch in diameter, single, white, and show a small tuft of yellow stamens. They are borne profusely all along the stems and certainly will add great interest and color to any garden.

This species has been used considerably for hybridizing, being one of the parents of the aforementioned 'Cornish Snow.' Dr. Walter E. Lammerts, while with Descano Gardens, created a hybrid known as 'Hybrid L,' a cross between *C. cuspidata* and *C. japonica*, which is vigorous, having grown to nearly eight feet in six years from grafts. The foliage and flower both closely resemble those of *C. cuspidata* except on a larger and more lush scale. This hybrid is especially valuable from the standpoint of floral decoration as the foliage makes interesting background for any kind of flower and is very attractive in itself when in bloom.

C. vernalis:

Recent research into nomenclature has indicated that two varieties formerly listed as *C. sasanqua* varieties are probably hybrids of the *C. vernalis* species. They are 'Dawn' and 'Hiryu.' Both varieties are quite vigorous, having very small leaves and a dense habit of growth. 'Dawn' is a semi-double, white flower sometimes tinted with pink. 'Hiryu' is deep crimson red, rose form double flower. Both of these varieties perform exceptionally well in any camellia-belt garden.

C. hiemalis:

The species *C. hiemalis* is now thought to include the varieties 'Showa-No-Sakae' and 'Shishi-Gashira.' Both of these camellias have formerly been listed as hybrids of *C. sasanqua*. They are extremely ornamental, having beautiful full double flowers. 'Showa-No-Sakae' is a soft pink, occasionally marbled white, while 'Shishi-Gashira' is a bright red. The growth habit of both of these plants is very loose and sprawly, adapting the plants especially well for espalier work or for pegging down as ground cover. For foreground or foundation planting, these two varieties are unexcelled.

C. maliflora:

The variety 'Betty McCaskill' is commonly grown in Southern California. Recent research has indicated that it belongs to *C. maliflora*. The flower is a small

semi-double, light pink, borne in profusion. The foliage is small and compact. This plant is a "must" in every collection.

C. taliensis:

Among the newly introduced camellia species, *C. taliensis* is certain to achieve a position of lasting interest. The leaves of this species are extra large, often six inches long and an inch and a half wide. They are light green in color and rather thin in comparison to other camellia leaves. The flowers closely resemble Tea flowers, but are larger. The plant begins blooming as early as October and increases its display slowly until mid-February when it bursts out all over in a glorious display of its single, white, musty-fragrant flowers. The branches become almost completely engulfed in a shower of flowers.

It is a good seeder and a very vigorous grower. Perhaps the main value of this plant will be for understock production. Experiments are under way here to determine the compatibility of *C. taliensis* to other species of camellias for grafting purposes. As a garden shrub for background in a shady spot, this magnificent species needs no improvement.

C. pitardii:

The species *C. pitardii* is new to this country and as yet has not been used for any particular purpose. Horticulturists in China have realized great benefits from this plant in their hybridizing programs—particularly with *C. reticulata*. 'Buddha' is one very outstanding hybrid which has been produced by a cross between *C. reticulata* 'Lion Head' and *C. pitardii* which will be on the commercial markets very shortly. This new hybrid came in with original shipment from Kunming. Those who have seen 'Buddha' growing here have almost unanimously proclaimed it as one of the finest camellias they have ever viewed.

It is hard to imagine that this species is one of the parents of this magnificent hybrid because of the tremendous contrast between the two. The leaves of *C.*

pitardii are small, light green and of rather heavy texture. The plant is compact and of rather slow growth. The flowers are small, single, tubular shaped and are a medium pink color. It is a good seeder and probably has many other good points which would greatly increase interest in hybridization where it is used.

C. oleifera:

C. oleifera is of particular interest because of its early, free-blooming habit. It very closely resembles *C. sasanqua* in every form except that the leaves are not glossy but dull. It is grown extensively in the Orient for its oily seed which is processed for cooking oils and cosmetic uses. Its use in hybridizing may be rather limited because of its close similarity to *C. sasanqua*.

C. oleosa:

The species *C. oleosa* has had a struggle for existence in Descanso Gardens. Although the plants in the collection are nearly seven years old, they are still little larger than the normal gallon-can size *C. japonica*. The plants for the first time, in the 1956-1957 season, are beginning to show a little vigor and growth. As yet, little is known about the species or its possible value to horticulture.

Thea sinensis (The Common Tea Plant):

The Tea plant begins blooming in September and blooms throughout the fall months. The flowers are small—one inch in diameter—single and paper white, showing a small tuft of yellow stamens. The leaves are medium sized to two and a half inches long and one inch wide of a dark, dull green. The plant is especially valuable as a hedge plant in a shady garden and can be trimmed severely and made to conform to any condition. The natural habit of growth is almost perfectly round and rather slow.

Near Relatives:

In the Descanso Gardens' species collection there are other near relatives to the camellia which have been given positions of prominence.

A near relative to the camellia group, *Gordonia chrysandra*, is a giant grower, very fast and lush. The plants are the same age as most of the others in the species collection—about seven years—but tower way above anything else. Two plants are at least fifteen feet high. The plants bloomed for the first time in the 1955-1956 season. The flowers are two inches in diameter, single, white and show yellow stamens. It blooms from October through January. It is a very heavy seeder, each capsule containing several dozen small seeds. It seems to like the same growing conditions as camellias except that it must be given considerably more room. It is absolutely intolerant, however, to trimming. Young plants will die with even the smallest amount of pruning to shape. They have not been damaged by a minimum temperature of 23 degrees since they have been growing here. The extreme heat of the 1955 summer had no adverse effect. For a large garden, this plant could be included as background material for camellias.

Another species of *Gordonia* represented in the collection is *Gordonia anomala*. It is a very low-growing, loose, sprawly and rather unattractive plant as yet. The individual leaves are large, lush and shiny. It has never bloomed, so proper evaluation is impossible at this point. It does propagate readily from cuttings, which is a point in its favor for reaching commercial production.

Franklinia alatamaha seems to be quite at home here. It has responded very well to all phases of garden care. The *Franklinia* is a deciduous plant, leaving very attractive gray branches during the winter months. The flower is an inch and a half in diameter, very pure white with yellow stamens. It has been in the collection for such a short while that a real evaluation is impossible, but we are sure that it is worthy of being grown in any collection.

One of the most unusual of all plants in the garden is *Teucheria spectabilis*. This plant is unusual, first because it blooms in August, and second because its

flowers are truly yellow. In the six or seven years it has been growing in Descanso Gardens it has bloomed twice, with a total of five flowers. The flowers are two inches in diameter, single, with very thick, leathery petals. The color is creamy white to golden yellow. Much experimentation with this plant is anticipated.

Hybrids:

Other hybrids are included in our collection which are of unknown origin.

'Apple Blossom' is a very fragrant, single, tubular-shaped, light pink flower. The foliage is very distinctive and different from any other camellia. 'Apple Blossom' has been propagated extensively by nurserymen for years and is an extremely valuable plant.

Other hybrids include the 'Judith' and 'Sukiya.' They are almost sure to have *C. japonica* blood in them. The flower is single, tubular shaped and pink in both cases.

'Kuro-Tsubaki,' or Black Camellia, is also a hybrid of unknown origin. The bush is very compact and slow growing, resembling *C. japonica* in foliage habit. However, the flower is a deep maroon—so deep as to actually be black at the petal tips and in the bud stage. The flower shape is tubular and semi-double.

Unknown Species:

There are two species in our collection whose names are unknown. One is a very vigorous, upright grower resembling *C. sasanqua*, though the leaves are smaller and the flowers larger—up to three inches—with very wavy margin petals. The flower is more loose because of the narrowness of the petals. The seed pods resemble those of the *C. sasanqua*. The plant reaches peak bloom in early February and is completely covered with white, spidery flowers.

The other unknown species is one of great character and interest. It has a very definite weeping habit of growth with long, arching branches that actually reach the ground. The largest plants in the collection are almost five feet high and give a

very unusual and interesting garden effect. The leaves are very thick and leathery. The surface is a dull, light green and the stems are reddish to brown. The flowers are single, pure white, two inches in diameter and slightly fragrant. Seed pods are distinctive, not resembling any of the other species except that they are shaped similar to the *C. sasanqua* but are not hairy. It is a free seeder and rapid grower.

Great public interest is displayed in the Descanso Gardens' Species Collection. The gardens' management is interested in expanding the collection to include other species which may be known in this country or abroad. Arrangements can be made for seed exchange with individuals or organizations who may be interested. No commercial transactions are possible.

Species and Hybrids Of Outstanding Qualifications

- 'Apple Blossom.' (Unknown Hybrid). Pink and White. Medium single.
- C. cuspidata*. White. Small single. Dwarf growth.
- C. maliflora*. (Betty McCaskill). Soft Pink tinted and margined Rose Red. Small semi-double.
- C. oleifera*. White. Small single. Pink and Red variations also in collection.
- C. pitardii*. Pink and White variegated. Medium single.
- C. saluenensis*. White tinted Pink. Small, tubular single.
- C. taliensis*. White. Medium single.
- 'Hiryu' (*C. vernalis*). Deep Crimson Red. Small rose form double.
- 'J. C. Williams.' (*C. saluenensis* × *C. japonica*). Pink shading to darker Pink. Medium single.
- 'Shishi-Gashira.' (*C. hiemalis*). Red. Medium semi-double to double.
- 'Showa-No-Sakae.' (*C. hiemalis*). Soft Pink, occasionally marbled White. Medium large semi-double to rose form double.

Landscape Uses of Camellias

Much has already been said about the different placements of camellias in the landscape and the requirements for proper growing. However, there are a few

attractive uses for camellias which should be discussed separately from cultural requirements.

One is the use of camellias in public areas. Because of their disease resistance and their tolerance to growing conditions less than ideal, cities in the camellia belt should give very thoughtful consideration to great plantings of camellias in their metropolitan areas. As slum removals make way for civic center expansion, most modern architects are including attractive landscaping for downtown buildings. Certain tall-growing camellias of great beauty, such as certain varieties of the *Reticulata* species, should be given consideration for such use.

Certain sun-tolerant varieties like the common *C. japonica* 'Covina' and many of the upright-growing *C. sasanqua* varieties can be used in sections where trees or other shade are not found. A recent report from Norfolk, Virginia, has indicated that the City Park Department has begun planting camellias in the parkways of residential districts and will even plant camellias up to ten feet inside property lines with the property owners' permission.

The camellia is one of the finest plants that could possibly be recommended for civic center beautification and parkway areas. Even in Southern California's arid climate, certain varieties of camellias would thrive in the open under a great many conditions. It should be noted that when camellias become accustomed to soft living with ample irrigation and regular feeding and all the care that the conscientious gardener can give them, they will react very adversely to sudden neglect. However, if a camellia is started and is grown under conditions less than ideal, very often it will grow on to great size and old age and bloom perfectly every year.

Camellias are at their best when growing in conjunction with other complementary plants. Select plants which like the same growing conditions as camellias—such as Azaleas, Rhododendrons, all

types of Ferns, and other plants as mentioned earlier in this writing. Groupings of several plants of a variety are recommended where space permits instead of individual variety plantings.

Never mix camellias with any plants that like a lime-sweet soil or that require a dry soil condition. And never forget that camellias do grow into large sizes and should be planted at least four feet apart. Boxed or potted camellias make welcome additions to any landscaped garden, particularly in areas where soil conditions are not favorable for growing them in the open.

Certain sprawly camellias adapt themselves exceptionally well to bank planting where they may actually be pegged down and grown as a ground cover.

Consideration should always be given to the natural shape which a camellia assumes.

Following are lists of camellias grown in Descanso Gardens which we suggest for various landscape uses:

Fifteen Camellias Which Collectively Will Give Flowers from September to May

'Adolphe Audusson.' (*C. japonica*). Mid-February to late March.

'Alba Plena.' (*C. japonica*). Mid-November to early March.

'Captain Rawes.' (*C. reticulata*). Late February to late March.

'Crimson Robe.' (*C. reticulata*). Late February to late March.

'Daikagura Family.' (*C. japonica*). Late October to mid-February.

'Debutante.' (*C. japonica*). Early January to mid-March.

'Elegans.' (Chandler) Family (*C. japonica*). Mid-January to mid-March.

'Elena Nobile.' (*C. japonica*). Mid-March to late April.

'Hiryu.' (*C. vernalis*). Early November to early February.

'Mathotiana.' (*C. japonica*). Early February to mid-March.

'Mathotiana Alba.' (*C. japonica*). Early April to May.

- 'Mrs. Charles Cobb.' (*C. japonica*). Mid-February to late March.
 'Showa-No-Sakae.' (*C. hiemalis*). Early October to mid-January.
 'Te Deum.' (*C. japonica*). Mid-March to May.
 'Yohei-Haku.' (*C. japonica*). Mid-September to mid-January.

Five Tall-Growing C. Japonicas

- 'Eleanor Hagood'
 'Elena Nobile'
 'Herme'
 'Kumasaka'
 'Purity'

Five Bushy C. Japonicas

- 'Blood of China'
 'Debutante'
 'Finlandia'
 'Mathotiana'
 'Pope Pius IX'

Five Spreading Camellias
 (Also Best for Espalier)

- 'Elegans' (Chandler)—*C. japonica*
 'Finlandia' Var. —*C. japonica*
 'Shishi-Gashira' —*C. hiemalis*
 'Showa-No-Sakae' —*C. hiemalis*
 'Tanya' —*C. sasanqua*

Sun-Tolerant Varieties

- 'Aspasia.' A variegated form of Emperor of Russia whose dark green, leathery leaves stand the sun very well.
 'California.' The parent plant of this variety has been growing for the last 30 years in full sun in a Southern California orange grove.
 'Covina.' This old-time variety is still the favorite for hedge or mass plantings in the sun.
 'Debutante.' Although the color is light pink, this variety does nicely in one-half morning sun.
 'Lois Hill.' A lavender camellia originated in Pasadena. It has been found to like a lot of sunlight.
 'Pink Perfection.' With about 4,000 plants of this variety to watch, we find the plants that receive one-half to three-fourths of a day of sunlight set more buds and bloom much heavier.

'Rose Queen.' Not only likes the sun, but has to have sun to keep it from dropping its buds.

'Tricolor.' (Siebold). Very tolerant variety.

'Victory.' One of the showiest large, semi-double reds found to grow well in a lot of sun.

C. sasanqua. Most varieties of this species.

The Future of Camellias

To predict the future of any plant, it is necessary to do research into past history and performance of a plant as far back as possible. Camellias have remained so universally popular that this research is extremely easy.

The first accounts of camellias being grown in the Orient describe them in such glowing terms as to place them in a class by themselves. In fact, they became so outstanding in their beauty as they were grown and developed that they were even taken out of general distribution and grown primarily in temple grounds and botanic collections, and reserved for nobility and for religious rituals. It is reasonable to assume that some varieties were even worshipped because of their great beauty and perfect form.

When first introduced to western civilization by roving sea captains, they were presented to royal families for special favors. Even in western gardens they were grown and protected from the eyes of common people.

As democracy spread throughout the civilizations of the world, camellias spread also until at the present time the camellia is such a garden item that in sections where the climate permits, at least one plant is to be found in practically every garden. Many gardeners have reached the point of specializing in camellias to the exclusion of most other plants except those which compliment the camellia.

From the very first camellia to arrive in the United States, special attention has been given to them, up to and including

the recent introduction of the 'Cinderella' camellia which is the first selection by an organization known as the "All-America Camellia Selections." The purpose of this group is to select the finest new camellia each year according to tests carried on in all sections of the Camellia Belt.

The first camellias to reach this country are still enshrined in a beautiful display garden in South Carolina.

Camellias moved west with the pioneers. It is almost certain that people bringing a prized camellia west deprived themselves of precious water in order to sustain the life of the camellia. Certain very old specimen plants growing in the vicinity of Sacramento, California, today bear witness to the westward movement in those early days.

To summarize the history of camellias, they have always been hallowed from the time the first wild seedling plant was found many centuries ago. They have never at any time decreased in popularity except for periods during war time when all other horticultural interests also waned.

With such a background it is very easy to predict the future of camellias. They are certain to continue increasing in popularity even to the point of being grown in areas where attempts have never before been made. With the advent of new species, such as the *C. rusticana* or 'Snow Camellia,' hybrids are certain to develop equal in hardiness to the hybrid Rhodo-

dendron which are currently grown coast to coast.

Camellias presently bloom from late September to early May in southern gardens. It can be anticipated in the future that this bloom season will be extended to encompass almost the entire twelve months. Color variations can be expected, such as the introduction of yellow and blue strains. Already hybridization possibilities exist in these color areas, and as more is learned about color isolation in plant breeding those characteristics are certain to emerge.

Camellias are already being grown ranging in size from three and four foot dwarfs, such as the *C. japonica* 'Iwane' and *C. cuspidata*, to the small tree forms of *C. reticulata*. Both low and high types of plants will surely be concentrated upon to develop variations of all types.

Camellias will be developed which are tolerant to heat, cold, drought and excessive rainfall. In fact, characteristics approaching perfection can be expected by camellia growers.

But through it all the camellia will always be given special attention. The gardener will always try to grow flowers which are bigger and better than his neighbors', and he can be expected to try to grow camellias under conditions not necessarily to their liking simply because of his intense desire to have them.

Indeed, it may be said that even a celestial garden would not be complete without the stately camellia.



ANNUAL MEETING

NOTICE TO ALL MEMBERS

The Annual Meeting, which all Members are entitled to attend—are cordially invited to attend—will be held Tuesday, May 14, 1957, at 8:00 P.M. in the Washington Post Auditorium, 1515 L St., N.W., Washington, D. C.

Officers and Directors will be elected.

As a special feature of this meeting, Dr. John Creech, a member of the AHS Board of Directors, will tell about his recent plant collecting expeditions in Japan and show many slides of his fabulous color photos.

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AMENDMENT TO AHS CONSTITUTION

In accordance with provisions of the Constitution, the following proposed Amendment, properly supported by signatures of five members and submitted at the March meeting of the Board of Directors, is called to your attention. You will be asked to vote on this Amendment in 1958:

Proposed Amendment to AHS Constitution: ARTICLE V: Officers and Directors, Section 2, shall be Amended by adding this sentence:

“Each Past President shall, upon retirement from the Office of President, automatically become a member of the Board of Directors for a period of four years.”

The objective of this Amendment is to provide the Society's Board of Directors with the services and counsel of Past Presidents—but at the same time, leave room on the Board of Directors for introduction of “new blood.”

A List of Organizations Affiliated With The American Horticultural Society

- American Association of Nurserymen
- American Begonia Society
- American Begonia Society, San Francisco Branch
- American Camellia Society
- American Gloxinia Society
- American Hibiscus Society
- American Iris Society
- American Peony Society
- American Rhododendron Society
- American Rhododendron Society, Middle Atlantic Chapter
- American Rose Society
- Bethesda Community Garden Club (Maryland)
- California Garden Clubs, Inc.
- California Horticultural Society
- Central Florida Horticultural Society (Orlando)
- Chester Horticultural Society (Virginia)
- Chevy Chase (D. C.) Garden Club
- Garden Center of Greater Cleveland
- Garden Center of Greater Cincinnati
- Garden Club of Alexandria (Virginia)
- Garden Club of Bellport, New York
- Garden Club of Chevy Chase, Maryland
- Garden Club of Danville (Virginia)
- Garden Club of Fairfax (Virginia)
- Garden Club of Virginia
- Garden Library of Michigan
- Georgetown Garden Club (D. C.)
- Green Thumb Garden Club (Virginia)
- Herb Society of America
- Holly Society of America
- Houston Horticultural Society
- Hunting Creek (Alexandria, Virginia) Garden Club
- Iowa State Horticultural Society
- Kenwood Garden Club (Maryland)
- La Salle Horticultural Society (Montreal)
- Manitowoc Men's Garden Club (Wisconsin)
- Men's Garden Clubs of America
- Men's Garden Club of Montgomery (Maryland) County
- Men's Horticultural Society (Tennessee)
- Michigan Horticultural Society
- Midwest Horticultural Society
- Moline (Illinois) Horticultural Society, Inc.
- National Capital Dahlia Society
- National Capital Garden Club League
- National Council of State Garden Clubs
- Neighborhood Garden Club (Virginia)
- New Orleans Garden Society, Inc.
- North American Lily Society
- Northern Nut Growers' Association, Inc.
- Ohio Association of Garden Clubs
- Pennsylvania Horticultural Society
- Perennial Garden Club (D. C.)
- Pittsburgh Garden Center
- Plainfield Garden Club (New Jersey)
- Potomac Rose Society (D. C.)
- San Francisco Garden Club
- Southern California Camellia Society
- Seven Seas Garden Club (Maryland)
- Takoma Horticultural Club (Maryland-D. C.)
- Talbot County Garden Club (Maryland)
- Washington (D. C.) Garden Club
- Worcester County Horticultural Society