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CLEMATIS LANUGINOSA

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OCTOBER COVER ILLUSTRATION

Clematis lanuginosa

The prestige of the genus *Clematis* in the gardens of Europe was radically changed when Robert Fortune found *C. lanuginosa* near Ningpo, China, and introduced it to cultivation in 1850. This charming species, with large pale lavender flowers four to eight inches across became the parent of many of our loveliest hybrids, but few of them surpass it in beauty, and it continues to vie with them in gardens and nursery catalogues to this day.



Callicarpa dichotoma

LILIAN A. GUERNSEY

Polyethylene Bags for Plant Propagation

Raymond A. White, Jr.*

In recent years, there has been a great expansion in agriculture in tropical regions, especially in the production of perennial crops for which they are known in world commerce, such as coffee, cocoa, tea, oil palm, fruits, spices, etc. This has required large-scale production of plants by commercial, public, and private organizations. In many cases, the field plantings are established with one-year-old, balled nursery plants. These plants, numbering in the millions, customarily were dug, wrapped in banana leaves and stalks or other plant materials, and backed or head-loaded to the field.

In order to produce such plants more cheaply (by cutting down labor costs and time-consuming nursery work digging, wrapping, transplanting, etc.); to produce better plants in less time and planted in the field with less loss and shock, various plant containers have been introduced and tried. These have consisted of locally made fiber baskets, metal cans, pressed fiber pots (with or without impregnation of fertilizers), tar paper pots or rolls, and wood veneer pots or rolls.

About five years ago, a local manufacturer introduced to Central America polyethylene bags, especially designed and made for nursery purposes which, so far, have had general acceptance; indeed, they have been the planters' and farmers' answer. Up to now, these have proved to be the cheapest (less than one cent a bag) and most serviceable container for all-purpose nursery use, whether used with seeds, cuttings or root stocks later to be grafted. The bags are light (weighing fifteen pounds a thousand) and occupy relatively little space, thus afford no problem in storage and transportation. The third year they were on the market, in one Central

American country alone, the company sold seven million bags to coffee growers and two million bags to the government and farmers for forest trees, not counting those sold for use with other crops.

The plastic extruders using polyethylene can make tubing of any thickness (0.001 to 0.006 inch) and resulting bags of any desired size (general maximum width, twenty-seven inches), but the punching of holes needed can only be done by manufacturers especially equipped for this type of product; otherwise, this must be done by hand by the purchaser. The bag found to be best is known as the "square bag"; that is, the two sides fold inward; thus, when filled with soil the bag stands up on a flat bottom. The size most commonly used has lay-flat measurements of nine by twelve inches or, when in use and filled with soil, the bag measures six inches in diameter and almost twelve inches high. They are generally made of black polyethylene, 0.002 inch thick, and have a large "V" cut (one and one-half inches) in the bottom for the tap root and drainage. The sides are gridded with three-eighth inch holes, one and one-half inches apart, for aeration and drainage. The bags have proved to be very durable in use and easily transported, with no losses under normal conditions. Other sizes used are: six by ten inches, weighing eight pounds a thousand; six by twelve inches, weighing ten pounds a thousand; seven by twelve inches, weighing eleven pounds a thousand; and nine by fourteen inches, weighing seventeen pounds a thousand. The approximate size of the plant when ready to be set in the field will naturally determine bag size needed. These bags vary in price from six dollars to sixteen dollars a thousand, the price depending mainly on size of bag and quantity ordered.

Experience in the tropics has shown that bags of clear plastic deteriorate and become brittle after three or four

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U. S. DEPARTMENT OF AGRICULTURE

Coffee nursery. Coffea arabica seedlings planted in polyethylene bags filled with soil. Seedlings grow here 6 to 10 months and then are transplanted to field with root system intact. Artificial shade made of bamboo slats.

months of exposure to light (ultra-violet rays). Where bags are exposed and needed for a longer period of time, polyethylene with additives to prevent deterioration, such as three percent carbon black, or five percent titanium dioxide, is recommended. Other additives, mostly metallic dusts, are undergoing experimentation, the object being to have durability without excessive heat absorption. Black bags have been found to be serviceable for several years; however, they have the disadvantage of retaining, rather than reflecting, heat. This probably would present no problem in temperate zones, but at low elevations in the tropics it could be detrimental.

The bags are filled by hand or machine with compost or specially prepared soil, then located in the nursery area in the form of usual nursery beds;

that is, in rows ten bags wide, with two-foot paths between. (If the area occupied by the bags is extensive, provision is made for the movement of vehicles and/or farm machinery.) If it is found that at this spacing plants become too spindley at time for field planting, it is no problem to place the bags somewhat apart, when such large plants are used. In the case of later grafting, they can be arranged in single or double rows, or in any other convenient arrangement.

If nurseries are without shade, it is advisable to bank soil up around the outer rows of bags, not for support but to prevent undue heat absorption. If shade is required, artificial shade can be constructed and later removed; or, as is sometimes done, the bags are placed under ideal natural shade, which affords them no competition, and removed to

areas of less or no shade when necessary. This can be done at little cost and without inflicting major hardship on the plant. Many growers put them under banana plants and when shade is no longer needed the banana plants are cut down, the mats being left to grow again for the next season.

Some ingenious farmers who have no spraying or overhead irrigation installations, but who do have natural running water on the farm, have solved the watering problem by throwing up a small ridge of soil around the flat nursery site, or, with a tractor blade, digging out slightly the area required. Then water is run through, flooding the area when needed, to a depth of from one to several inches. Another method is to maintain the area flooded to a depth of one inch or so, with a water gate at the outlet.

When planting direct with seed, it is advisable to cover the bagged soil's surface with light mulch, to keep it from crusting. Customary roguing of seedling stock is accomplished by planting two or three seeds per bag; later all but the best ones are removed. Diseased plants can be quickly and easily removed from the rest; if soil insects are a problem, soil can be treated before being bagged. If the soil is light, dry, and well-worked, such as that prepared for bagging machines by soil shredders (fertilizers, fungicides, and insecticides being added at the same time when necessary), it is best first to place a few dry leaves in the bottom of the bag, so as to contain the soil. It is important that the bags be well filled and tamped to prevent later

settling; if the bags are not well filled, watering will cause the free plastic edges to flatten over the soil, resulting in mechanical damage to germinating seeds and insufficient water absorption or excessive run-off. It is not recommended that the plastic may not break but will stretch out of shape. Bags should be lifted by holding sides and/or bottom.

After being transported to the field by wagon or headload, the bags are cut away from the plant at the moment of planting, or in the planting hole, and discarded. Bags left on the plants do not deteriorate for a long time; this inhibits plant growth, at least at first, and causes root malformations. Some farmers prefer to use a razor, removing only the bottom two-thirds of the bag, leaving the upper "ring" in place. This prevents washing of the soil from the base of the plant, has a tendency to encourage roots to grow deeper, and helps water penetration at the base of the plant.

Using plant containers does necessitate the expense of hauling large quantities of soil. In the tropics, however, nursery sites generally become unproductive after one or two years' use. The practice has been to change the nursery site periodically—which is not the usual practice in temperate zones—which usually means having to clear land anew and moving farther away from the central headquarters. The expense of bringing soil to the site is thus partly off-set by being able to use a permanent, central nursery area where permanent improvements, such as roads, sheds, and water systems are possible.

A Portfolio of Conifers

Coniferous trees are among our most useful landscape plants. They have become a part of garden design in nearly every civilized country from the tropics to the arctic. Their unique range of adaption and graceful habit varies from prostrate to stately trees more than a hundred feet high. Their use varies from bonsai culture to foundation plantings and park trees, not to mention their tremendous economic value as timber trees.

The natural habitat of the wild species of conifers and the innumerable elite clones that are maintained by means of vegetative propagation give the gardener a wide choice of form, growth rate, and even price range. No landscape planting appears finished without the inclusion of one or more conifers.

This portfolio of sixteen illustrations

does not by any means exhaust the variation magnitude of this ancient plant group. The intention is to remind the reader of some species and varieties thought to be among the world's plant treasures.

Several informative articles on the conifers have appeared in *The American Horticultural Magazine*. "The Gotelli Arboretum of Dwarf and Slow Growing Conifers," by William T. Gotelli, published in October 1960, describes many of the known varieties and illustrates eighteen. (This magnificent collection together with the garden ornaments has now been given to the U. S. National Arboretum.) "Our Deciduous Conifers," 9 illus.; "Forms of Pines," 28 illus.; and "Species of Arborvitae," 7 illus.; all by Arthur D. Slavin were published in the early thirties and may be read at most horticultural libraries.



FREDERICK G. MEYER

Cryptomeria japonica

The Japanese *Cryptomeria*, a native of Japan, is extremely variable, although almost without exception a beautiful tree in cultivation. Depending upon exposure, trees may winterburn only to recover quickly with the first days of spring. The selection commonly grown as 'Lobbi' is doubtfully distinct from other variants which occur spontaneously among seedlings. Grown widely along the Atlantic seaboard from Boston southward but not really successful in the midwest in most places. On the Pacific coast it is widely grown. Specimen illustrated is growing in Washington, D. C.



ARNOLD ARBORETUM

Cedrus libani subsp. stenocoma

The Turkish Cedar is a native of the Cilician Taurus mountains of southeastern Turkey. The Turkish subspecies remains more or less columnar, never attaining the broad umbrella habit typical of the Lebanon tree. Introduced by Professor Sargent of the Arnold Arboretum. Hardiest species of the genus. Specimen illustrated is growing near Boston, Massachusetts.



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***Juniperus chinensis* 'Columnaris'**

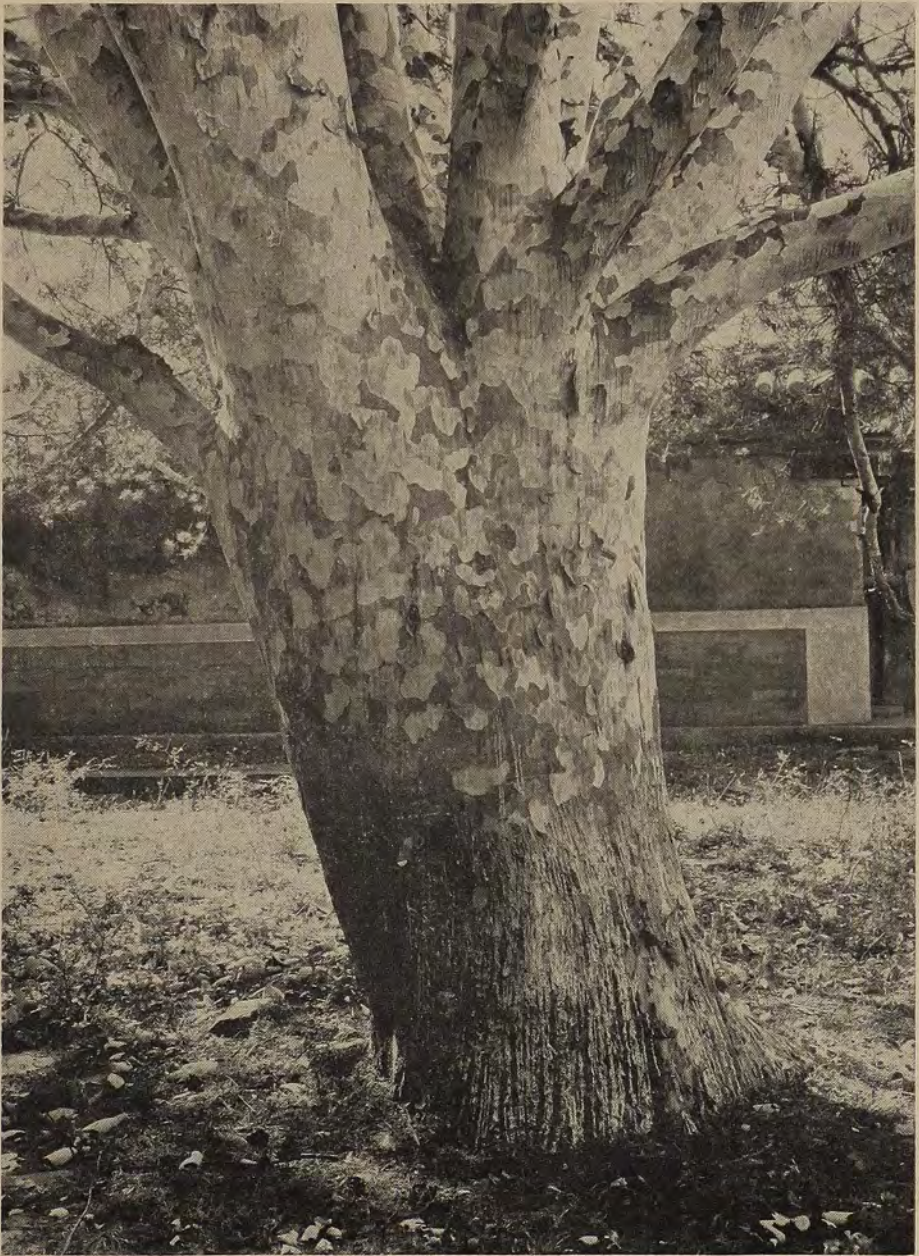
The Columnar Chinese Juniper is a handsome columnar conifer of much garden merit. A seedling selection from material sent by the intrepid plant explorer F. N. Meyer from China in 1905. Distributed as Plant Introduction 18577 by the U. S. Department of Agriculture, this selection has proved extremely useful for screening purposes as a high hedge plant. An ultimate height of 25 feet may be attained. Highly successful in the middle and eastern parts of the country.



FREDERICK G. MEYER

Larix decidua

The European Larch is a native of the mountains of central and northern Europe. The soft, fine texture of the leaves cannot be compared with any other conifer; the leaves are deciduous. Old specimens are as picturesque in winter as those clothed in summer green. Extremely hardy in all northern areas of the country and perhaps the most durable species for general cultivation. Specimen illustrated is fifty feet tall, growing at Wilhelmshöhe, Kassel, West Germany.



U. S. DEPARTMENT OF AGRICULTURE

Pinus bungeana

The Lacebark Pine, showing a close-up view of the trunk and a portion of the main branches of the finest and largest of the lacebark pine trees at Chuang Wang's Tomb. Tzu Chia un, Chihli, China.



F. N. MEYER

Pinus bungeana

"The most noble specimen of a white barked pine tree yet seen by me. Growing in the Yen fu tse temple in Chu fu, China. Measures sixteen feet in circumference, six feet above the ground. I estimate its age at fifteen or sixteen centuries, though the Chinese say it is much older. For noble, serene, impressiveness, I have not seen a tree yet, that can be compared with this white barked pine." F. N. Meyer, 1907.



FREDERICK G. MEYER

Pinus bungeana

In habit, specimens of the Lacebark Pine are normally multibranched from the base and develop a round head. Specimen illustrated is about twenty-five years old and is growing in the U. S. National Arboretum, Washington, D. C.



J. OHWI

Pinus thunbergii

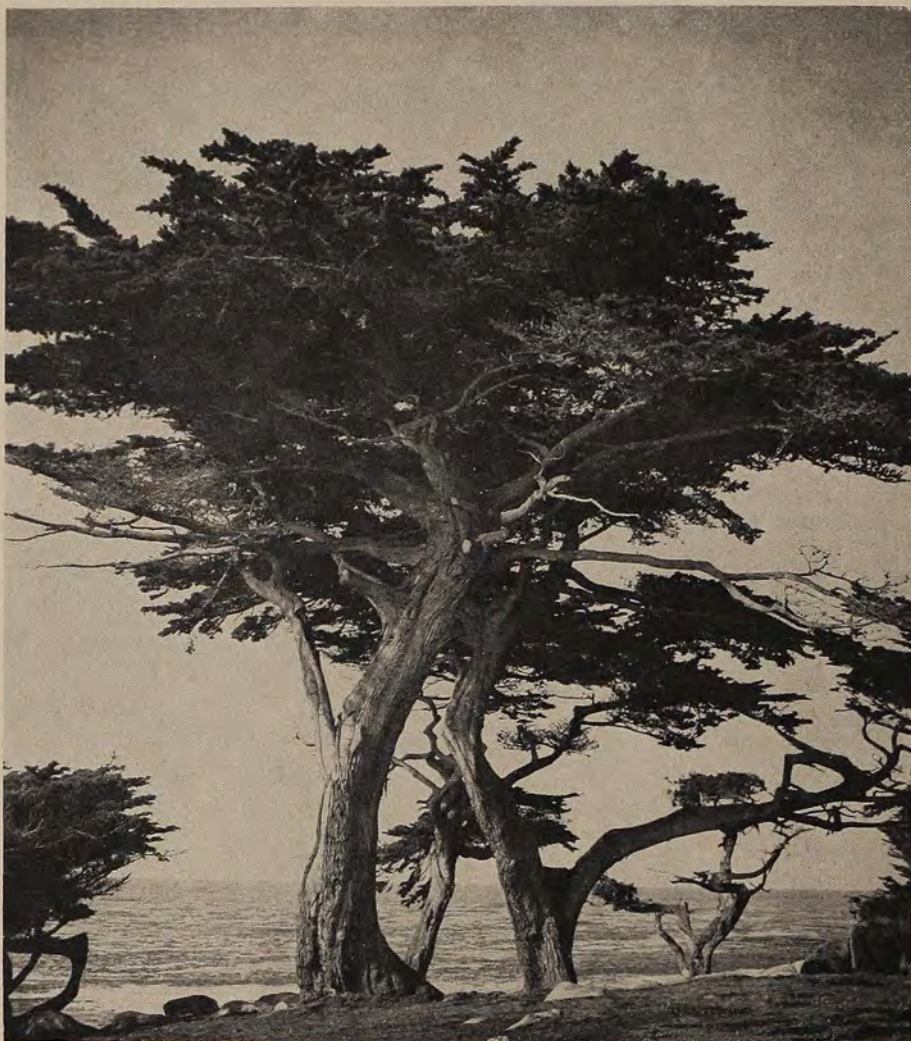
The Japanese Black Pine is native of coastal districts of Japan, exclusive of Hokkaido. It is highly salt tolerant, adapted to a wide range of maritime climates, and is one of the most useful conifers for coastal planting. Illustration is of a native stand on the Kii Peninsula, Japan.



W. H. HODGE

Araucaria araucana

One of the most bizarre conifers in cultivation is *Araucaria araucana*, the Monkey Puzzle. It is native of the Andes mountains in moist temperate areas of southern Chile and adjacent Argentina, and it is the hardiest species of the genus. Specimens in cultivation may ultimately reach fifty or more feet in height. In this country, it grows best along the Pacific Coast, west of the mountains from British Columbia south to California. Specimens may survive in parts of the Atlantic states from Washington, D. C., southward, but the extremes of winter and summer do not suit this plant in eastern United States. Specimen illustrated is growing in Portland, Oregon.



W. H. HODGE

Cupressus macrocarpa

The Monterey Cypress is restricted in natural distribution to the Monterey Peninsula, California, and is one of the rarest of North American trees. It is cultivated as a windbreak tree along the Pacific Coast as far north as British Columbia and is grown in western Europe, New Zealand, and in some other areas of the world. Wild specimens on the Monterey Peninsula are illustrated.



LONGWOOD GARDENS

Taxodium distichum

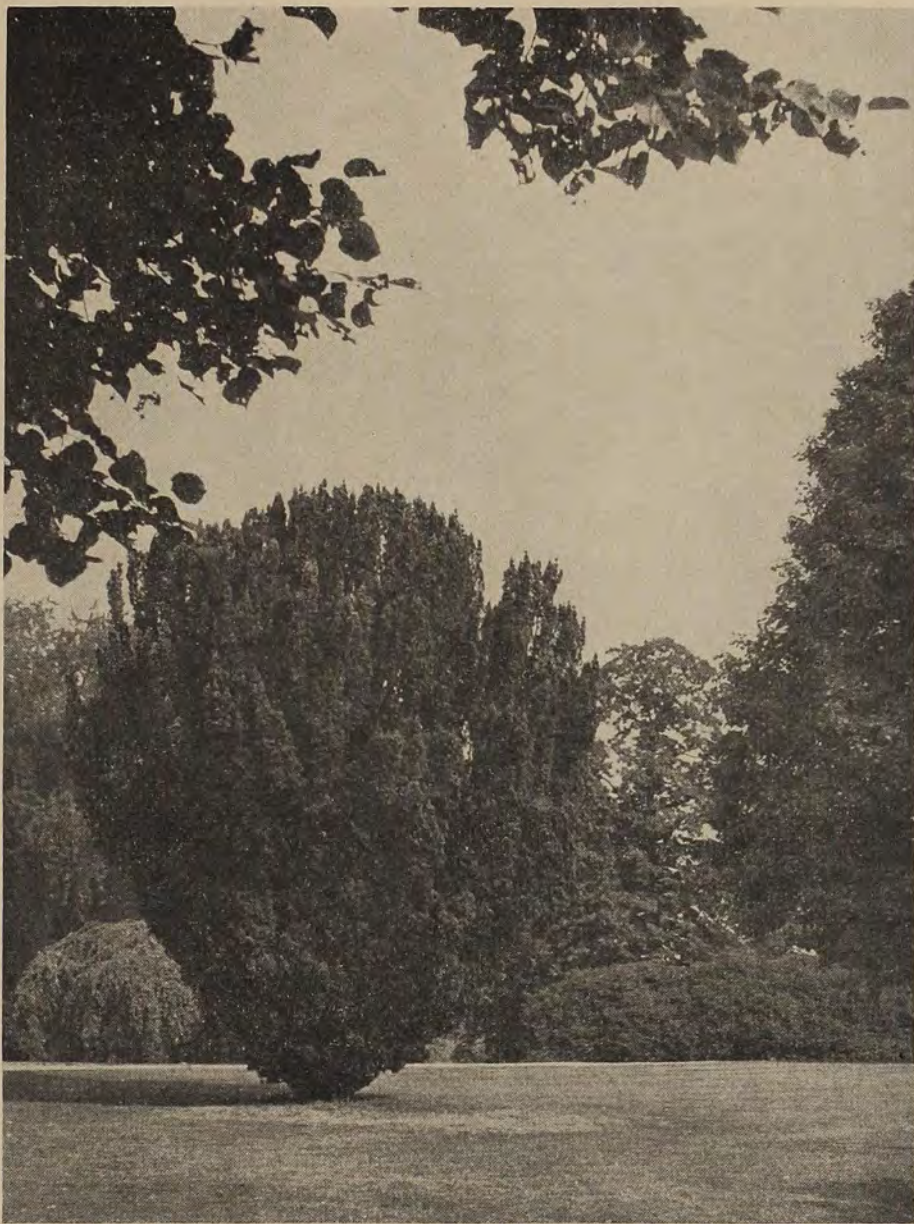
A noble native American conifer of the southern United States from eastern Texas, southern Illinois, to Florida and Delaware. The Bald or Swamp Cypress is unsurpassed as a landscape subject; few conifers are more elegant in full growth. It makes an extremely handsome specimen plant for accent purposes. Normally the plant is columnar, a characteristic of the species which recommends it for use around modern houses. An ultimate height of thirty or more feet may be attained. Near water "knees" may develop. Old specimens in Longwood Gardens, Kennett Square, Pennsylvania, are illustrated.



LONGWOOD GARDENS

Abies nordmanniana

The Nordmann Fir is a native of the Caucasus mountains and Turkey; ultimate height is in excess of thirty feet. The characteristic pyramidal habit of the tree and the dark green glossy foliage are traits that recommend this species for ornamental purposes. One of the most heat and drought tolerant species of *Abies* for some areas of the country, especially east of the Mississippi River, where most species of true fir are unsuccessful in cultivation. Specimen illustrated is growing in Longwood Gardens, Kennett Square, Pennsylvania.



FREDERICK G. MEYER

***Taxus baccata* 'Fastigiata'**

A distinct selection of the Irish Yew, first grown in Ireland about 1780. The dense rather formal fastigiata habit and the deep green leaves are the chief distinguishing characteristics of this plant. Mature specimens reach twenty feet in height under favorable climatic and soil conditions. The Irish Yew is recommended where an erect evergreen tree is required, particularly to accentuate the monotony of modern one story dwellings. It thrives along the Atlantic seaboard from New York southward and along the Pacific coast. Specimen illustrated is growing in Kalheupink Park, Oldenzaal, Netherlands.



FREDERICK G. MEYER

Picea breweriana

Brewer's Spruce is the rarest of North American spruce trees. Endemic of the Siskiyou Mountains of northern California and adjacent Oregon. The one-inch needles are longer and softer than in most species of spruce, and the pendulous branches are distinctive characteristics of this elegant tree. Old native specimens attain over a hundred feet in height. Still rarely cultivated in this country, but this spruce is frequently planted in western Europe where it grows extremely well, especially in the Netherlands and West Germany. Specimen illustrated is growing in Pinetum Blijdenstein, Hilversum, Netherlands.



U. S. DEPARTMENT OF AGRICULTURE

Araucaria excelsa

The Norfolk Island Pine, although not a true pine, is one of the most refined of all coniferous trees. It is endemic of a small island in the southwestern Pacific east of Australia. The symmetry of the branches in young specimens quickly identifies this tree. Old specimens may reach 150 feet in height. The only conifer that is commonly grown as a house plant in this country. It is hardy only in tropical and subtropical regions. A specimen growing in California is illustrated.



FREDERICK G. MEYER

Tsuga diversifolia

Native of mountains in Japan except Hokkaido, this handsome tree is more dense in habit and darker green than Tsuga canadensis. It is hardy and grows rapidly over wide areas from the lower midwest to the Atlantic seaboard. Specimen shown is growing at the Plant Introduction Station, Glenn Dale, Maryland.

Gardens In Ancient Mexico

Carolyn S. Langdon

For a public park a twentieth century landscape designer has planned a fountain in the form of a metal tree, its brass and aluminum leaves glinting through the water's spray. At the edge of the little lake workmen are creating a floating island from a wooden raft covered with topsoil mixed with peat and garden fertilizer. From the distance come the raucous sounds of brilliant peacocks. Suddenly, with Cortez in ancient Mexico, we see trees gleaming with ornaments of gold and silver in the sixteenth century temple gardens of Aztec priests, chinampas lush with fine vegetables and gay flowers, and the brilliant aviary of Montezuma's own terraced garden.

The Spanish adventurer first passed luxuriant "floating gardens" in the Lake of Texcoco when he crossed the five-mile long stone causeway to Tenochtitlan in 1519. While ancient native legends told of floating raft gardens, those found by the Conquistadores were, like many of the fields of the common people, really reclaimed swampland. Because the early Aztecs had not dared to venture far to cultivate their crops, they had laboriously piled up beds of sod or mud from the bottom of the lake, supporting the sides with reeds and strengthening them with interlaced roots of pruned willows planted about the edges. In such island beds, or chinampas, varying from 7 to 40 feet wide by 20 to 100 feet long, they raised several crops a year—both vegetables and flowers—for the great market. Sometimes a small tree shaded the hut of the gardener in charge.

As the population increased and rich valley land became scarce, other gardeners terraced the steep hillsides, irrigating them with aqueducts and canals. Here, as on the chinampas, they planted together maize and climbing beans, peppers, and red and yellow tomatoes—large, pear-shaped, and cherry-sized.

They also raised pumpkins, squashes, and gourds, as well as the fine cotton and mild tobacco so pleasing to the Spaniards. Women scattered the seed and helped with the harvest, while men performed the heavier labors of the field. Women also aided the priests with seed selections to improve maize and other food plants like the highly esteemed sunflower whose seed provided an edible oil. All but soldiers and great nobles cultivated the land, and public taxes were often paid in produce. Even Montezuma himself had orchards and vegetable gardens, though he felt it unkingly to grow plants for use or profit and seldom visited them.

On the terraced hillsides of the Cordilleras, even on the table land above, the Aztecs also grew the Mexican agave whose leaves were made into paper and fruit into an intoxicating drink. As in the valley below, gardeners cultivated here the guava, the avocado with its oily fruit, the large melon-like papaya, and the prickly pear cactus.

In pyramidal temples covered with white stucco, Aztec priests offered sacrifices on feast days to the deities of rain, growing plants, and the soil. The god of flowers, Dios de los Flores, was worshipped. Shrines were decorated with flowers. Women and children wearing garlands of flowers formed processions, while dancers pelted each other with blooms in symbolic games. To provide these, great beds often of sweet-scented roses, waxy white and scarlet bouvardia, or intensely blue browallia were grown on hilltop terraces about the temples. Here, too, were the trees hung with decorations of real gold and silver so coveted by the Spaniards.

While some of Montezuma's advisors lived high on the hillsides, others had large, low stone or stuccoed houses along the principal paved street of the city. As if their love of color was not satisfied by brilliant poinsettias in the

broad terraced gardens between the buildings, they covered roof tops with beds of yellow single marigolds and red-purple zinnias to provide nosegays for visitors. Cortez had thrilled at the gorgeous view of these city gardens from the heights of the temple. Later he was to find every house a fortress, every terraced roof crowded with combatants, every garden an entrenchment to be destroyed.

As befitted the ruler, Montezuma owned extensive gardens, but his favorite was the fragrant hill garden of Chapultepec, his summer residence. Between the water cypress at its base and the groves of larch and oak at the summit, flower covered terraces appeared almost like hanging gardens. Near statues of Montezuma and his father, trellises supported blue morning glories and honeysuckle haunted by humming birds. The frangipani tree dripped sweet-scented reddish blossoms. Yuccas provided night odors.

More magnificent was the tropical botanical garden which he had inherited from Montezuma the Elder who in 1450 had restored the garden of his ancestors. From the coast the first Montezuma imported, along with experienced gardeners, the greenish-yellow vanilla orchid, the showy magnolia and delectable cacao trees, their roots in earth bundled in finely woven mantles. After an elaborate sacrificial planting ceremony, the transplants soon bloomed more luxuriantly than before. Now statues of his forefathers carved from rock, irrigation channels, fountains, and rest houses

were surrounded by tropical palms, tree ferns, and acacias.

At Ixtapalapan, Montezuma had still another garden in which a terrace adjoining the rooms of the house overlooked a large orchard. From the aviary scarlet cardinals, golden pheasants, and royal green parrots vied with gaudy flowers. Beyond the square stone fish pool surrounded by a broad tiled walk were the small gardens of aromatic herbs which Montezuma liked best. Double dahlias, yellow and red, provided tonic roots and a treatment for epilepsy. Bold spotted scarlet tigridias were used as a purgative. Court physicians experimented with herbs trying out their concoctions on the Aztec nobles. A little crimson velvet herbal of 1552 with brilliantly beautiful plates and fine clear script learned from Spanish missionaries still testifies to their extensive knowledge.

As a dispirited captive facing inevitable doom, the once proud Montezuma was often permitted by Cortez to visit his gardens. Wearing a cloak of his habitual blue or white and golden soled sandals, the dignified Indian was borne on his litter up the broad winding stone stairs to the summit of Chapultepec. Below him lay the Valley of Mexico with its sparkling lakes, willowed shores, and the snow-capped volcanoes beyond. There the humble reed framed garden of the peasant at the margin of the lake and the rich man's palace garden on the hillside alike paid tribute to the ingenuity of his people, gardeners who had truly "made" this horticultural paradise.



ARNOLD ARBORETUM

Trial Plots at the Case Estate

Ground Cover Trials at the Arnold Arboretum

Donald Wyman

The Ground Cover Demonstration Plots at the Arnold Arboretum were first laid out in 1950. This was done on a piece of land in Weston, Massachusetts, that had been a cow pasture for at least eighty years. At first only fifty different plants were tried. These plants were set out in plots six feet square with two-foot spaces in between, and laid out in long lines of twenty-five with grass walks separating the lines. The area is mostly in the full sun. The plots receiving some shade during the day are those in the first row along a stone wall bordering the property, so that it is possible to grow only a limited number of those plants which actually require shade.

During the thirteen years since the plots were first planted, interest in them

has grown and many additional plants have been added. There are at least 165 different kinds of plants in these plots now. Some of the original ones have not proved satisfactory for one reason or another. Nor has it been possible to grow everything that might be serviceable as a ground cover, since hardiness, site factors, and availability of plants govern what can be grown.

Many plants have proved to be extremely good ground covers over the years, while others have failed for one reason or another and still others have proved only moderately fair when grown under the prevailing conditions in these plots. The following plants are noted as being among the best ground covers in these trials up to this point.



ARNOLD ARBORETUM

Phalaris arundinacea 'Picta'

**Extremely Vigorous
Good Ground Covers**

A fast-spreading ground cover is frequently wanted to fill quickly an area, and there are some that will do just this. In certain situations they can be so fast spreading, however, as to become weeds unless they are vigorously restrained. *Aegopodium podagraria* (Bishop's Goutweed) is certainly in this group. The variegated variety is less vigorous.

Vines, such as *Akebia quinata*, *Hydrangea petiolaris* and *Lonicera japonica* 'Halliana,' are certainly in this group, although *Lonicera henryi* is not so vigorous as is the Hall's variety of the Japanese honeysuckle. The Ribbon Grass (*Phalaris arundinacea* 'Picta') is a vicious spreader in good soil and should be best kept only in poor, dry soils where it will grow only about eighteen inches tall. The dwarf Polygonum, known in the trade as *Polygonum Reynoutria* (actually *P. cuspidatum* 'Compactum') is about the worst of all, since its underground roots seem to have a quality of rejuvenation even though it is repeatedly pulled out, year after year, where it is not wanted.

Euphorbia cyparissias, the Cypress Euphorbia, grows only about eight inches tall and has very fine foliage, but it also spreads very rapidly in good soil. *Convallaria majalis* (Lily-of-the-Valley) is known to all gardeners. With a little shade, this plant can spread very rapidly and encroach on other plants.

Perhaps the best of the herbaceous ground covers in our trials has been the *Epimedium grandiflorum* (Longspur Epimedium), growing about nine inches tall and making a dense mat that keeps out all the weeds. A plot of this has never needed any special attention whatsoever during the past ten years and is still one of the densest of all the herbaceous plants in these trial plots.

Pachysandra terminalis (Japanese Spurge) is the best of all the evergreen ground covers, of course, when given some shade. It just so happens that this has done about the best of all the ground covers in these demonstration plots, probably because it is growing at the base of a wall where it has fifty percent shade.

Other woody ground covers in this fast-spreading category would be *Cotoneaster horizontalis* (Rock Cotoneaster); *Euon-*



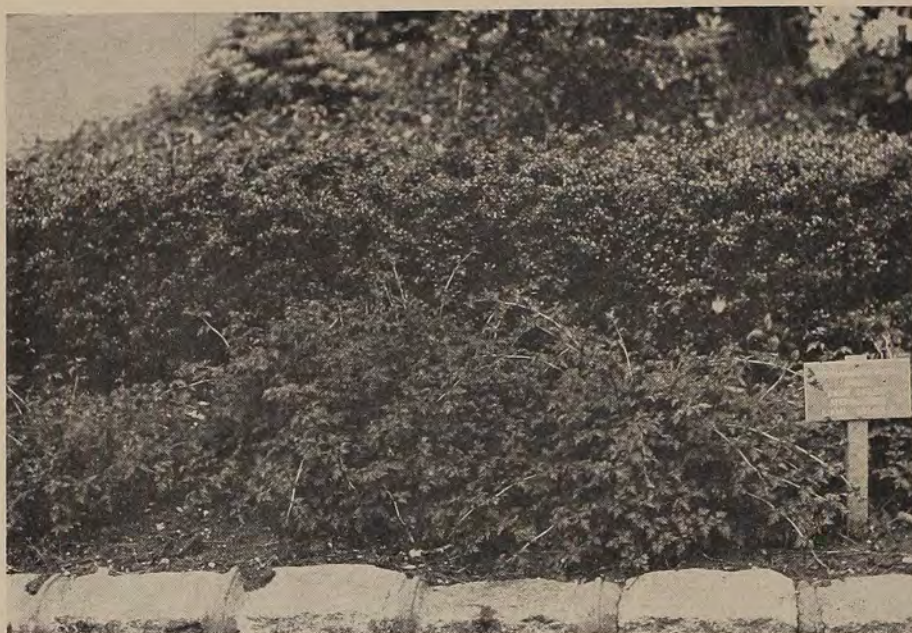
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Pachysandra terminalis



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Forsythia 'Arnold Dwarf'



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Stephanandra incisa 'Crispa'



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Juniperus horizontalis 'Douglasii'

ymus fortunei 'Colorata' (Purpleleaf Wintercreeper) the best of all this genus for ground cover purposes, since it will grow well either in the full sun, where it does best, or in some shade; *Forsythia* 'Arnold Dwarf', which is proving to be excellent on irregular banks in full sun because of its quick-rooting qualities; *Rosa wichuraiana* (Memorial Rose), an old-fashioned favorite and still among the best for bank planting; and, last but not least, the new *Stephanandra incisa* 'Crispa', which may grow two feet or more in height, but makes such a dense mass of foliage that no weeds of any kind can get established. One other point about it is the fact that if it does become too tall, it can easily be cut back to any desired height in the early spring.

More Good Ground Covers, Less Vigorous

Over the years, well over 250 different kinds of plants have been tried as ground covers in these plots. It is not possible to give a detailed description of all here, but there are some that have continually done well under these conditions. It is recognized, however, that the conditions in this particular site certainly are important in governing what can or cannot be grown. Some of those discussed here may not do well under different conditions, and certainly it is not implied that these are the only ground covers that will do well. For instance, *Juniperus conferta* (Shore Juniper) is an excellent ground cover, but it does not appear in the records of our plots merely because we could never find enough plants to make a plot of it.

Good evergreen ground covers, as they have performed for nearly ten years in these plots, are *Arctostaphylos uva-ursi* (Bearberry); *Asarum europaeum* (European Wild Ginger), which needs some shade and a little bit of soil moisture to do best; *Galax aphylla*, the excellent little southern ground cover requiring shade much of the time and often doing marvelously in the North when shaded by some large rhododendron. It will not do well in the full sun unless the atmosphere is continually moist, as it is in Bar Harbor, Maine. *Gaylussacia brachycera* (Box Huckleberry) is a very slow-growing plant, but the low height and small evergreen leaves, as well as its ability to grow in the full sun, make it excellent where rapidity of growth is not a desired factor. The same is true of *Vaccinium*

vitis-idaea (Shore Cowberry). *Thymus lanuginosus* (Woolly-Mother-of-Thyme) is the lowest of these evergreens and, of course, popular over a wide area of the country. It is used as a ground cover for small spots only.

The low-growing junipers are all excellent and are especially dependable in urban areas where hot and dry soils seem to be the rule. *Leucothoe* and *Mahonia* may both be thought of as too high for normal ground covers. Perhaps they are, but they have excellent evergreen foliage and may be pruned to retain heights of two feet. *Pachistima canbyi* and *Potentilla tridentata* (Wineleaf Cinquefoil) are others that are low, slow-growing in the full sun, but which make good mats of evergreen foliage over the years. The common *Vinca minor* is also in this group, although in some places it is not fully evergreen.

Deciduous shrubs which have proved their merit in this group of "good ground covers," most of them in plots that are at least ten years old, are *Aronia melanocarpa*, *Calluna vulgaris*, *Cotoneaster adpressa* and its variety *praecox*. Special mention should be made of the native *Xanthorrhiza simplicissima* (Yellow Root), which can grow in either sun or shade, providing the ground is on the moist side. There is a plot of this in the Arnold Arboretum which is seventy years old and has never required any special treatment. Only a few woody weed plants must be occasionally pulled when they appear, but the entire planting is dense in growth and an even two feet tall. In the fall the orange autumn color of the foliage is excellent and the plant spreads well by underground roots.

For sandy soils that are dry and frequently in the full sun, *Rhus aromatica* (Fragrant Sumac) has proved very good in these trials, as would be expected. It withstands poor, dry soils and, when it grows about eighteen inches tall, can be cut down to the ground and started over again.

Two other deciduous shrubs need special mention in this group, *Indigofera incarnata* 'Alba' and *I. kirilowii*. The former is a native of China and Japan and grows about eighteen inches tall. The roots survive the winters in Boston, even though the above-ground parts may be killed. It flowers on the current year's growth with small, upright racemes of white pea-like flowers, but the roots make



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Juniperus chinensis var. *sargentii*



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Juniperus sabina 'Tamariscifolia'



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Gaylussacia brachycera



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Vinca minor



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Indigofera incarnata 'Alba'

a dense interlocking mass that can hold any soil. Strangely enough, it is practically impossible to obtain this plant from commercial sources in this country or in Europe. The other species, *I. kirilowii*, is taller growing and is not so dense, but the flowers are rose-colored in five-inch spikes. Both these should be given wider trials in this country. Neither require any attention whatsoever after they are once established, unless it is to cut them to the ground in the early spring with brush scythe or mower.

Herbaceous ground covers which have performed well over the years in these plots would include *Ajuga reptans*, *Cerastium tomentosum*, *Gypsophila repens* 'Rosea', *Glechoma hederacea* (provided it is given a small amount of shade), *Polygonum affine* and *P. bistorta*. Both these *Polygonum* species are good, mat-forming plants especially for dry soils in the full sun, and once established, need no further attention. *Polygonum affine* is only about six to nine inches tall and *P. bistorta* grows to about eighteen inches tall and is somewhat coarser in texture.

Armeria arctica has proved about the best of these grass-like plants that grow in dense mats, and of course the *Festuca glauca*, or Blue Fescue, which grows in clumps, makes a colorful ornamental and an interesting ground cover when it is planted closely together, for it does not spread rapidly. The clumps merely enlarge as time goes on. *Galium mollugo* (White Bedstraw) is a dense, easily grown herbaceous cover and most of the Hostas are excellent when grouped closely in the shade. In the full sun, under the conditions in these plots, the foliage will burn in the summer, but for care-free growth, the Hostas could easily be at the top of any list and their summer flowers add considerable interest, also.

Coreopsis auriculata 'Nana' is just what its name implies, a dwarf Coreopsis that seldom grows over eight inches tall, with orange flowers in the summer that are in bloom for four to six weeks. It spreads, though not rapidly, and if planted in clumps about ten inches apart, it will soon make a dense mat of herbaceous foliage.



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Gypsophila repens 'Rosea'



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Dianthus gratianopolitanus

Dianthus gratianopolitanus, the common Cheddar Pink of England, is the only *Dianthus* in these experiments which grows so closely and so well that weeds just do not have a chance to start growing. It may be that the clone we have is an unusually good one. It came from a Connecticut nurseryman a few years ago in an envelope with the note, "This will be one of your best ground covers in a few years' time." It has performed well, being practically evergreen and forming a dense mat of gray-green foliage only a few inches tall. The few pink flowers are interesting, but have not been outstanding in this plot.

Tiarella cordifolia (Alleghany Foam-flower) and *Vancouveria hexandra* (American Barrenwort) have both done well as herbaceous ground covers needing practically no attention. The former grows less than a foot high and has erect racemes of white flowers in May and the latter also has white flowers from May to June. Being somewhat tender, it does best if given some shade, but the Alleghany Foam-flower has done well in these plots, even though growing in the full sun.

Good Ground Covers Until Grass Seeds In

Everyone who gardens is familiar with plants of this nature, but try as we will, we have been unable to keep grass out of these plants for more than a few years. It is not that the grass grows in from the edges, but it actually seeds in from surrounding areas. Hand pulling for a year or so keeps it restrained, but eventually, in our experience at least, it does take over. These plants are: *Dianthus deltoides*, *D. plumarius*, *Liriope spicata*, *Lysimachia nummularia* and *Phlox subulata*. All are good covers for a few years, but eventually the upkeep is so time-consuming that the easiest thing to do is to discard them and plant over again in weed-free soil.

Plants Unsatisfactory as Ground Covers

The plants in this group have not proved to be satisfactory ground covers in these trials. Only about fifty are mentioned here, though there have been many more that have failed, chiefly because they were lacking in hardiness. In

other areas and under a different set of growing conditions, they might do better. Most of them were replanted several times, merely to make certain that they were poor ground cover materials here at the Arnold Arboretum.

Ajuga genevensis 'Rosea'—beautiful in flower, but does not spread well.

Ajuga reptans 'Variegata'—excellent for 2-3 years; then the species seeds in and must be removed by hand.

Alyssum saxatile—poor as ground cover.

Arabis alpina—must be replaced every few years.

Arenaria stricta—poor, clump-like growth.

Armeria montana—does not spread well, plants show dead spots in center after a few years.

Artemisia stelleriana—too coarse in texture

Athyrium filix-femina—only satisfactory in shade and moist soil.

Campanula carpatica—plants must be replaced frequently.

Carex morrowii—not completely hardy.

Ceratostigma plumbaginoides—starts growth very late in the spring.

Cytisus decumbens—has not proved a vigorous spreader under our conditions.

Cytisus purpureus—ungainly.

Dicentra eximia—does not spread satisfactorily.

Draba sibirica—must be replanted every 3 years.

Duchesnea indica—large spots die every other year.

Euonymus fortunei 'Kewensis'—very susceptible to scale, not for large areas.

Euonymus fortunei 'Minima'—very susceptible to scale, not for large areas.

Euonymus fortunei 'Radicans'—very susceptible to scale.

Euonymus fortunei 'Silver Queen'—spreads very little; individual plants die.

Euonymus obovatus—untidy appearance.

Filipendula hexapetala 'Flore-pleno'—does not spread satisfactorily.

Gaultheria procumbens—only satisfactory in moist acid soil in shade.

Genista tinctoria 'Plena'—must be replaced frequently.

Geranium sanguineum—good only in moist soil and shade.

Glechoma hederacea 'Variegata'—requires full shade and moisture.



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Dianthus gratianopolitanus



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Tiarella cordifolia

- Heuchera sanguinea*—does not spread satisfactorily.
- Hypericum buckleyi*—makes an excellent mat-like growth, but does not root readily; hence spot killing occurs if ice settles on it in winter for long periods.
- Hyssopus officinalis*—poor growth.
- Iberis*—several species showed ungainly growth, making poor ground covers.
- Iris cristata*—excellent until iris borer takes its toll.
- Lavandula officinalis* 'Nana'—grows in clumps.
- Leiophyllum buxifolium* — does not spread well.
- Mazus reptans*—parts die periodically.
- Mentha piperita*—too ungainly for a neat ground cover.
- Mitchella repens*—not for dry soils in full sun.
- Nepeta mussinii*—too coarse.
- Pachysandra procumbens* — grows in slowly expanding clumps.
- Parthenocissus quinquefolia*—ungainly.
- Polemonium reptans*—has always performed poorly.
- Primula polyantha*—requires shade and moisture.
- Pulmonaria officinalis*—dies repeatedly.
- Ranunculus repens*—double-flowered variety is not sufficiently vigorous; the single-flowered species might be satisfactory.
- Rosa* 'Max Graf'—too coarse in growth.
- Rosa paulii*—too coarse in growth.
- Rubus laciniatus*—too coarse in growth.
- Saponaria ocymoides*—not satisfactory.
- Satureja montana*—poor under existing conditions.
- Teucrium chamaedrys* — growth and hardiness are erratic.
- Teucrium chamaedrys* 'Prostrata' — grows in clumps, does not spread.
- Thymus serpyllum*—good for small spots only, not large areas.
- Tussilago farfara* — very poor as a ground cover, since it dies to ground by summer. Our planting eventually died completely after about 10 years.
- Veronica officinalis*—has not performed satisfactorily under our conditions.
- Vinca minor* 'Multiplex' a weak grower.
- Viola* 'Jersey Gem' died within 2 years.

Here, then, are some of the best ground covers which have proved themselves during the thirteen years of these trials, together with some of the plants that have failed to make the grade. Many others are growing here, many others have also failed, but there is not space to mention them all.

These trial plots are on the Case Estates of the Arnold Arboretum (Weston, Massachusetts) and are always open to the public. Those home owners interested in selecting ground covers for their gardens would be helped by visiting the Case Estates plots to make on-the-spot comparisons of these plants.

Planting Street Trees in California

O. A. Matkin*

The overall objective of planting a street tree is to place in a suitable site a young plant which will ultimately provide beauty and protection for many along a public thoroughfare. The procedure can be relatively simple and straightforward in many instances, but can also be complicated and troublesome in many others.

An intelligent approach to planting a street tree will involve first, determining whether any serious soil problems exist. Following this, the routine of excavation, placing the plant in position, securing the plant in position by backfilling and staking, and supplying water and mineral nutrient can take place.

Soil problems which might exist fall into two classifications. One is physical and the other chemical. Physical problems include hardpan, low water permeability rate due to high clay or compacted soil, the presence of excessive rock, or a high water table. Chemical problems might involve salinity, sodium excess, boron toxicity, excessive lime and nutrient deficiencies. These problems can be identified by first making a physical examination of the site and/or referring to survey information available from government agencies. Chemical problems can be best assessed by laboratory analyses. It is often very helpful if other plant material in the area can be observed for growth characteristics to provide a biological assessment of the growing conditions.

Common methods of excavation include drilling of holes with auger, use of back-hoe, and trenching. If the backfill soil is to be amended, the larger the hole, the better. Where native soil is well suited to plant growth, there is little advantage to digging a large hole. Common practice is to provide a hole twice the diameter and one and one half times the depth of the root ball. Some archi-

tects believe that excessive excavation below the root ball is undesirable since the backfill apt to result in subsequent settling problems.

Adequate drainage in the planting hole is frequently a problem. Where hardpans or highly impervious soils restrict water percolation, vertical or slanted borings can be extremely helpful. These borings should be backfilled with a fine sand or a suitably amended soil so that percolation will be fairly rapid. Using rock and gravel in the bottom of a hole, particularly at shallow depths, is an extremely poor practice since it causes a waterlogged condition just above the interface. (Rock or gravel is best used as a mulch on the surface or as a channel from the surface to lower depths in providing deep water application.)

The walls of a planting hole should preferably be rough and not slick or sealed. Ordinarily this is no problem unless water is used in the drilling operation. Architects frequently insist that no water be used to soften hard soils during the digging operation. Presumably pre-wetting followed by ample period of drainage would be satisfactory.

The next step in planting a street tree is the positioning of the plant in the hole. The root ball should be placed on a firm, friable base. It is sometimes helpful to apply superphosphate and/or iron sulphate in the bottom of the hole since this may be the only opportunity to insure the presence of these elements in that region. The planting depth is normally specified to be no greater than the previous plant soil line. Tissue developed above the soil during previous growing is susceptible to attack by organisms if covered by soil. Prior to backfilling, the plant can be adjusted for desired exposure.

Where possible, backfill soil should be an amended mix prepared at the site or off-site using non-toxic organic amendments with native soil plus appropriate

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fertilizers. Where native soil is highly objectionable, a prepared mix can be made using a more suitable soil of fairly similar texture. The state highway specification recommends manure at a ratio of one part to three parts soil. To this, one pound of iron sulphate is added for each plant hole. It has been our experience that the use of more than one part manure to ten parts soil is apt to result in a saline condition. Of course, with ample leaching irrigations, this condition could be relieved. Salinity could constitute a restricting influence on initial plant growth. Iron sulphate does have an advantage as a soil amendment as well as supplying the element *iron* which is often stimulating to root activity.

Recommendations for soil amending by this laboratory usually specify peat moss or a nitrogen stabilized wood by-product. Quantities are often as high as fifty percent by volume with appropriate fertilizers included on the basis of analytical data. Manure is seldom recommended and we note that specifications by architects often specifically indicate that manure shall *not* be used.

Placement of soil around the root ball deserves some consideration. The soil should, of course, be firm, but should not be excessively tamped as this may very well reduce the porosity and result in poor root growth. Natural settling as attained by gentle application of water is the best and safest approach. Flooding or other vigorous application of water which results in puddling is to be avoided. Flooding often separates the soil components, resulting in layers of silt and clay which will restrict water and air movement. There is no need to be overly concerned about air pockets except as they may result in subsequent settling.

Since water is the best vehicle for bringing about natural settling of soil, the ideal procedure would probably include spray application of water to moist backfill soil as it is placed in position. A final thorough application of water in a basin should effect fairly complete and permanent settling. In one set of specifications reviewed, it was recommended that after backfilling, a pipe be

inserted into the bottom of the hole and water forced into the hole at that point. This would obviously result in water gradually filling the hole from the bottom if applied at high enough rate. In soils of good drainage this might not be so easy to accomplish. It should be, however, an effective method of settling the soil, as one would be sure that all soil was thoroughly wetted.

Inserting vertical drainage tile with exposure to the surface and backfilled with rock or gravel has merit in getting water down to a greater depth than surface applications might readily permit. In problem soils, this approach should be considered.

After planting, particular care should be taken to see that the root ball is adequately watered. This is the one zone which will tend to dry rapidly since water is being removed by the plant roots. Sharp differences in soil texture between root ball and surrounding soil can create specific problems in water movement into the root ball. It is sometimes helpful to place a five gallon can with a nail hole at the bottom next to the tree trunk in order that the can may be filled and the water slowly applied to the root ball.

Factors which might restrict the plant from taking off rapidly include water logging and root pathogens. As a precaution against the pathogen problem and also to supply some stimulation, the initial watering should include a soluble fungicide, which will penetrate the soil, plus iron, preferably in the form of a chelate. For instance, for each hundred gallons of water applied, two fluid ounces of Morton's Soil Drench plus a quarter pound of Sequestrene 138 Fe has proved satisfactory. No advantages have been found in the use of hormones or special bacterial inoculants.

A final consideration in the establishing of the new planting should be that of climatic conditions. Planting should preferably take place when there will be the minimum stress on the plant. Thus, fall through spring represent the best planting times for most trees. Other periods may be equally satisfactory if sufficient attention is given to moisture requirements of the plant.

Sphagnum Moss, Artificial Light, and Plastic Film for Seed Germination

R. E. WESTER*

Moisture and temperature are perhaps the two most critical factors for seed germination. The optimum levels for seed germination often coincide with conditions necessary for growth and development of various root-rot and damping-off organisms. Use of shredded sphagnum moss as a seeding medium (2, 4, 5, 6),** however, makes it possible to maintain proper moisture conditions for seed germination and still control damping-off caused by various fungi.

For the amateur horticulturist who hesitates to sterilize the soil with heat or chemicals, shredded sphagnum moss is an excellent substitute in which to sow the seed. Sphagnum moss does not require sterilization before use because commercially processed sphagnum is free of damping-off fungi. Because it is hygroscopic, it tends to keep tiny seedlings moist during the initial stages of development without frequent waterings. Excessive watering of seeds in soil is not only conducive to damping-off but may injure or expose the seedlings at this critical stage (Figure 1).

Sphagnum moss is an acid medium naturally buffered at about pH 4.3. Acidity apparently does not hinder germination of many kinds of seeds. Although damping-off fungi will rarely be encountered in sphagnum moss, there are heavy populations of non-pathogenic fungi and some bacteria that cause no difficulties.

Over the years good germination results have been obtained at the U. S. Plant Introduction Station, Glenn Dale, Maryland, involving some 2,500 species in 300 genera when the seeds are sown in sphagnum. Seeds of a number of genera, such as those in ERICACEAE, which often present germination problems, are readily grown in sphagnum moss. Seeds

of *Andromeda*, *Bruckenthalia*, *Calluna*, *Enkianthus*, *Erica*, *Gaultheria*, *Leucothoe*, *Menziesia*, *Pernettya*, *Pieris*, and *Vaccinium* in repeated sowings have invariably germinated successfully. Seeds of saxifragaceous genera such as *Astilbe*, *Bergenia*, *Deutzia*, *Escallonia*, *Heuchera*, *Philadelphus*, and *Schizophragma* may germinate before it is essential to apply additional water to the sphagnum. Holly seeds do exceptionally well in sphagnum, but the moss may deteriorate somewhat during the year or two that they often require to break dormancy. Seeds of *Camellia* and related genera germinate readily in sphagnum, and, because of their large size, seedlings can be easily transplanted along with the moss into individual containers of more sphagnum.

Sphagnum moss is an easy and pleasant medium to handle, for it is devoid of debris or soil. Before use as a seeding medium, however, the thread-like moss must be shredded to a fine consistency. This may be done in small amounts by rubbing the damp moss through coarse window screening. Shredded sphagnum can also be purchased already prepared for seed sowing.

Sphagnum may be used alone or mixed with an *equally sterile* medium, such as perlite. This latter material, which originates as a mineral expanded at high temperatures, has exceptionally good moisture-holding properties and gives excellent aeration.

When mixed with sphagnum, perlite results in heavier rooted seedlings and permits more easily controlled growth when liquid fertilizers are used. If sphagnum is used alone, it is not essential to apply nutrients when the seedlings are to be transplanted promptly. Seedlings do not become tall or spindly in sphagnum or the sphagnum-perlite mixture. It has been possible to obtain strong vigorous plants of tomatoes, lettuce, salvia, and petunias from 2-month-old seedlings which remained in satis-

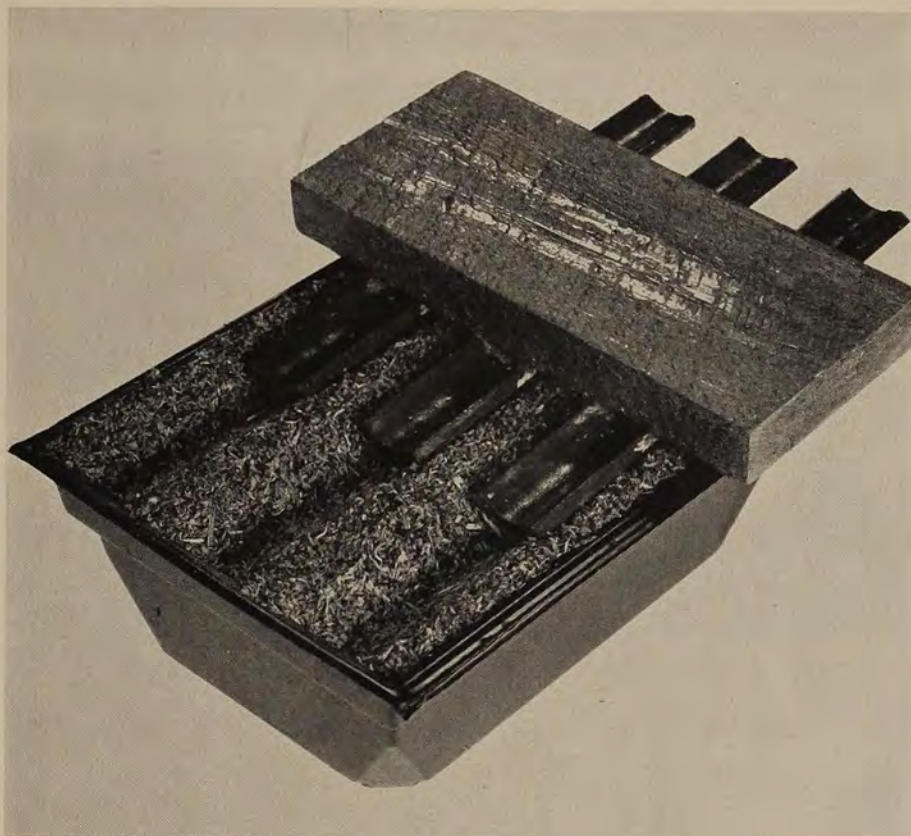
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**See references given at the end of this paper.



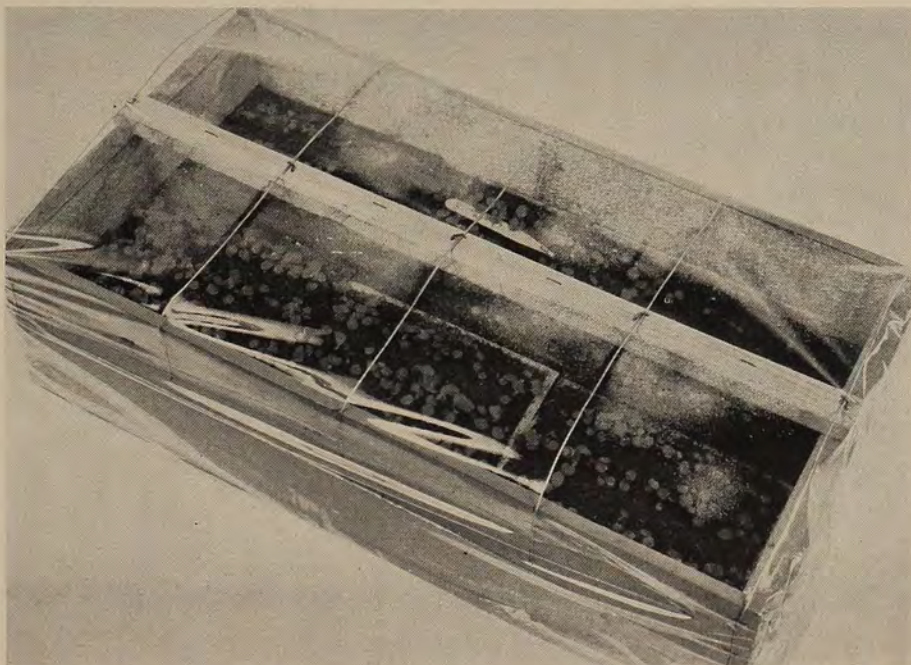
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Figure 1. A sprouting seedling requiring constant moisture is very susceptible to damping-off fungi.



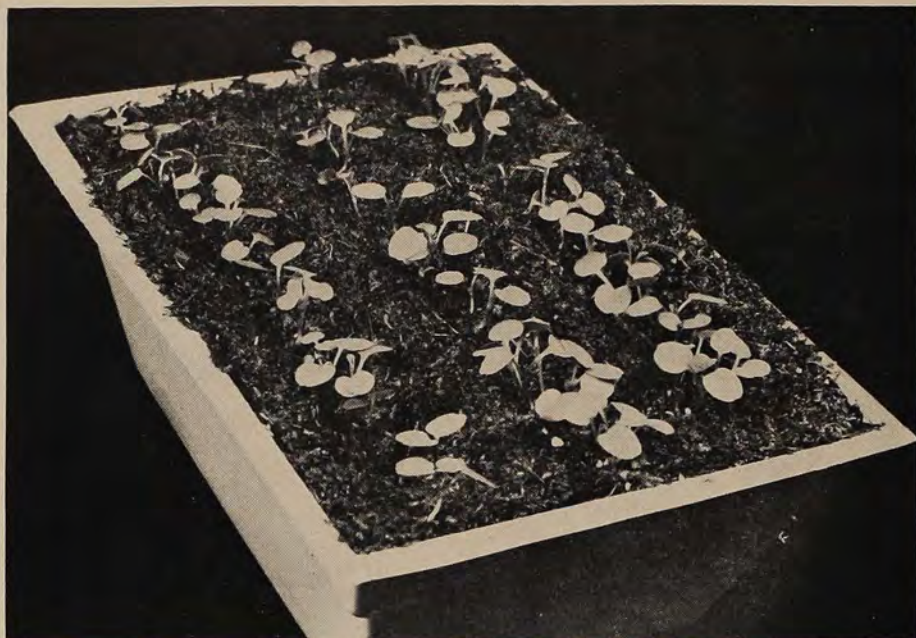
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Figure 2. Jig used to make furrows in sphagnum moss.



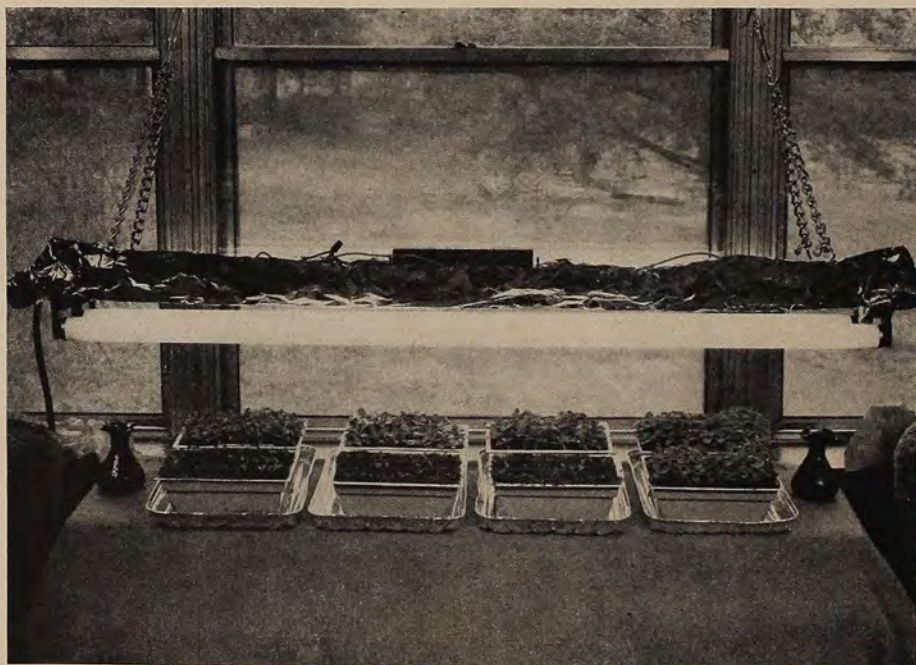
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Figure 3. Plastic cover conserves moisture and eliminates need for watering of seeds during the germination period.



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Figure 4. Vigorous stocky seedlings growing in sphagnum moss under fluorescent lamps in front of windows in a living room where night temperature is 60° F and day temperature is 70 degrees.



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Figure 5. Seedlings of cabbage growing in sphagnum moss, in the absence of damping-off fungi, ten days after sowing and ready for transplanting.

factory condition for transplanting for the entire period. This would not be possible if the seedlings had remained in flats where regular soil mixtures had been used for starting the seedlings.

In pure sphagnum moss it has been possible to keep seedlings of woody plants, such as holly, azaleas, and rhododendrons, in a static condition for three years or longer without any damage to the resulting plants. It is not necessary to add fertilizer during these three years.

The sphagnum moss or perlite-sphagnum moss mixture is pressed to a smooth, firm seedbed. One-half-inch furrows are made with a jig (Figure 2). The moss is watered thoroughly and allowed to drain. Seeds are then sown in the furrows and covered five days later with a thin second layer of sphagnum or perlite-sphagnum mixture.

Following the seeding the flat should be sprinkled and covered with a plastic film (Figure 3) which is left on the flats until seedlings start to sprout. Plastic film (3) is light, transparent, does not shatter, and prevents excessive evaporation of the moisture as well as allows interchange of gases in the air.

Seed flats prepared as described and placed under fluorescent light in front of a window where light (Figure 4) and temperature are suitable usually require no further attention until the seedlings are ready to be transplanted (Figure 5). They are transplanted when they have developed their first true leaves or later.

For starting seedlings knowledge of light effects is important (1, 7). A fixture carrying at least two 40-watt fluorescent lamps (Figure 4) is recommended. With a good reflector light intensities of 500- to 800-foot-candles should prevail in the area within six inches of the lamps. Such intensities are

about the minimum for most kinds of seedlings, but with care in providing correct temperatures satisfactory seedlings can be produced. Temperatures in basements are usually too low for germination of most seeds. Suitable temperatures usually occur in other parts of the house, such as the kitchen, living room, or a solarium. Additional light intensity provided by daylight through the window results in stockier seedlings.

The best seedlings are grown within six to eight inches of the fluorescent lamps because of their high light intensity and low heat output at that level. Incandescent lamps should not be used as a light source to start seedlings because the heat and far-red light from this kind of lamp will cause the plants to be long-stemmed and spindly.

If temperature under the light is maintained at 60° F. at night and 70 degrees during the day, excellent seedlings of the many different kinds of ornamental annuals and vegetables can be grown with only two 40-watt fluorescent lamps.

References

1. Downs, R. J., H. A. Borthwick, and A. A. Piringer. Light and Plants. *USDA Misc. Pub.* 879. 25 pp. 1961.
2. Creech, J. L., R. F. Dowdle, and W. O. Hawley. Sphagnum moss for plant propagation. *USDA Farmers Bulletin* 2085. 10 pp. 1955.
3. Spice, H. R. Polythene Film in Horticulture. *Faber and Faber, London.* 176 pp. 1959.
4. Stoutemyer, Vernon, Claude Hope, and Albert Close. Sphagnum for seed germination inhibits damping-off losses on unsterilized soil. *Nat. Hort. Mag.* 20 (2):111-120. 1941.
5. Stoutemyer, V. T., Claude Hope, and Albert Close. Sphagnum moss as a seedling medium. *Nat. Hort. Mag.* 22 (4):170-174. 1943.
6. Stoutemyer, V. T., A. W. Close, and F. R. Reid. Sphagnum moss as a medium for growing plants. *Nat. Hort. Mag.* 23 (1):32-38. Jan. 1944.
7. United States Department of Agriculture. Plant Propagation with Artificial Light. *ARS Series CA-34-76.* 1962.

A Book or Two

Miniature Flower Arrangements and Plantings

Lois Wilson. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1963. Illustrated. \$6.50. (Library)

A book for the flower arranger who does arranging in a "small" way. The author traces the history of miniatures in art to modern forms including Bonsai. Next the arranging of flowers in miniature containers of many kinds is discussed. Containers suggested include the usual kinds found around the home to the unusual kinds as seed pods, buttons and small items found in the hardware store. Suggestions are given on the growing of miniature house plants and the use of these for home decoration. Lists of kinds and sources of miniature plants are included. The two chapters on the use of miniatures as instructional material for children and adults will be most interesting to those who teach.

A History of Garden Design

Derek Clifford. Frederick A. Praeger, Publisher, New York, N. Y. 1963. 232 pages. Illustrated. \$13.75. (Library)

The author has written a very explicit introduction that all should read before attempting to read the text. His point of view is clearly stated and although he says that he cannot be "trapped into a definition" one becomes well aware of his point of view as the reading continues in the text proper.

It is a valuable book and one that is a pleasure to read, and to look at as well. If the text must fall into "over-simplifications" at times, the author underlines them clearly.

Let me repeat, this is a book that concerns itself with design, not with plant materials save in a secondary way, when they are an inevitable part of the design.

It is arranged in a somewhat historical fashion, with brief discussions of the earliest types of gardening of which we have records, and then proceeds to the discussion of styles as they grew out of the requirements of the owners, or patrons, within the landscape and climate of the particular country. This is a most fruitful plan and is well worth reading for its own sake.

The present day gardener in this country, may find little in the book that will immediately apply to his own small needs, but if he will master the basic truths as outlined, even his own small plot will benefit. For us, possibly the discussions from page 184 to the end will be of greatest benefit.

The professional landscape architect, may and should find much of his past thinking clarified and enriched. The text may give him courage to refuse some of his clients and their whimsical wishes. It may give him a basic sense of further search for an American style, though there is no reason to believe that our vast country should have one style and one style only.

For the present reviewer, the most interesting portions have to do with reassessments of the value of the contributions made by various designers through more recent years, compared to the ancients. The arguments for such reassessments are convincingly presented. The one question that will arise for this country, is possibly whether we will ever have any private person or persons who can afford to have built and to maintain any garden of the scope of these models, as discussed. Times have changed here as elsewhere, and the sociological aspects of the times will determine much. The last chapter of the book is vital.

There are interesting illustrations that clarify the text and its discussions; there is a long list of books for reading if desired and an index that will hasten ones discoveries should the reader become impatient before he has gone far, and demand a more immediate discussion of *his own* ideas for designing.

B. Y. M.

1001 House Plant Questions Answered by Stanley Schuler

Stanley Schuler. D. Van Nostrand Co., Inc., 120 Alexander Street, Princeton, New Jersey. 1963. 278 pages. Illustrated \$5.95. (Library)

An easily read book on growing plants in the home with information being supplied by using the 1001 questions with answers. The first section is made up of 158 questions on general culture together with their answers. The second section includes the remainder of the questions and answers which cover the growing of 258 general groups and specific types of plants. In such a question-answer scheme, the questions will not always fit what the reader wants to know. It is necessary to read all questions and answers on a specific plant in order to get some general information on it and even this is sketchy for many. The third section consists of lists of plants suggested for different cultural conditions, or those with specific characteristics as growth habits, foliage, size, flowers or fruits.

CONRAD B. LINK

(Books available for loan to the Membership are designated: (Library). Those not so designated are in private collections and are not available for loan. Books available for sale to the Membership are designated with the special reduced price and are subject to the usual change of price without notice. Orders must be sent through the American Horticultural Society accompanied by the proper payment. Please allow two to three weeks for delivery. Those not designated for sale to the Membership at reduced prices can be purchased through the Society, however, at the retail prices given. In these instances the full profit is received by the Society to be used for increased services and benefits of the Membership.)

Handbook of Wild Flower Cultivation

Kathryn S. Taylor and Stephen F. Hamblin. Illustrated by Catherine R. Hammond. The Macmillan Company, 60 Fifth Avenue, New York 17, N. Y. 1963. 307 pages. \$6.95. (Library)

This should prove a helpful book for those wishing to work with plants collected from the wild.

The first chapters are devoted to planning a wild flower garden, satisfying the needs of the plants selected for the garden, propagation and information on collecting from the wild.

The remaining two-thirds of the book are devoted to the plant families and plants found within the group with descriptive materials on the plants, their natural habitat and some propagation hints. The delightful line drawings help to further identify the plants described.

The appendix includes selected books on wild flowers, trees, shrubs, and ferns of North America, lists of plants by cultural requirements—which I myself found fascinating—and a glossary—general and illustrations index—a book to own or give.

F. P. K.

International Camellia Journal

Charles Puddle, Editor. Published by the International Camellia Society, Bodnant Gardens, Tal-y-Cafn, Colwyn Bay, Denbighshire, United Kingdom. Vol. 1, No. 1, Dec. 1962. \$3.00 a year. (Library)

This is the first issue of the International Camellia Journal, published by the International Camellia Society. Introductory articles tell of the society, its founding and officers. These are followed by articles on camellia culture in several parts of the world as well as articles on the genus and several species, since one of the objectives of the society is to encourage an exchange of information between camellia enthusiasts of the world. Information may be obtained from the editor of this new journal.

The Education of a Gardener

Russell Page. Atheneum Publishers, 162 East 38th St., New York 16, N. Y. 1962. 363 pages. Illustrated. \$10.00. (Library)

Somewhat autobiographical, this book deals mainly with garden design and Russell Page is certainly qualified on this subject.

The book covers gardens he has made in Switzerland, Italy, and Southern France, although further examples of his work are to be found in England, the United States, and other parts of Europe.

Mr. Page describes themes, sites, and plantings of trees, shrubs, and flowers. The town garden and the water garden, or, more accurately, water in the garden, which ranges from a mirror laid on the ground to give depth and interest by reflecting trees and sky, to a series of yard-square stone-edged pools, each with its tiny

water jet to sparkle in the sun with its splashing are described.

A fellow member of the A.H.S., Mr. Arthur Radcliffe, has written after reading this book, "Very aptly named, *The Education of a Gardener* in a rambling, fascinating, very readable way leads us along nature's trail until we see that author develop into a master gardener. We learn how style, composition, and perspective in a seemingly simple way evolve into such an arrangement of plant materials that the most pleasing garden pictures are developed, and we are carried along in a most charming way as picture after picture unfolds from Mr. Page's vivid descriptions for our enjoyment."

F. P. K.

American Rose Annual 1963

Editor—L. G. McLean. Published by American Rose Society, Columbus 14, Ohio.

The 1963 annual of the American Rose Society continues to carry articles of interest to all levels of rose interest, from the grower of a few plants to the person afflicted with "rosarian-itis" as described in the first article and to the commercial rose grower and breeder. Articles of general interest include those concerned with fertilizing roses, methods of propagation and the rose diseases, mildew and viruses. The exhibitor of roses will be interested in the article "Refrigerating for Showing" and judging. The rose gardener and collector will read the articles on the use of roses in the garden, on rose varieties and species with interest. The rose breeder will find the articles on pollination, on "the Rose Gene pool," and "Factors Influencing Seed Set in Roses" of value in his work. The world-minded rosarian will enjoy stories on rose culture in the south; in California; Australia; New Zealand; the USSR and "Under the Southern Cross." The annual concludes with the "New Roses of the World" and the "Proof of the Pudding," descriptions of the newer varieties and experiences in growing them from test garden reports.

Conrad B. Link

Exotica 3

Alfred Byrd Graf. Roehrs Company, Rutherford, New Jersey. 1963. 1828 pages, 12025 illustrations. \$38.00. 2 vol. ed. \$45.00. (Library)

Most persons who are familiar with the first and second editions of this work, and what plantsman isn't, are aware that the work is predominantly an encyclopedia of photographs of species, varieties and cultivars of tropical and subtropical plants. This new edition is the same, only much more so, and contains 12,025 illustrations (nearly all photographs) with 291 in color, whereas the second edition boasted 7600 illustrations with 231 in color. The 1478 pages of illustrations are, for the most part, from good to excellent, and will prove of great value for identification purposes.

It seems odd that a scattering of native and hardy plants has been added to the tropical and

sub-tropical plants which make up the bulk of the included plants. There are, for instance, about 40 illustrations of conifers, and these are neither of typical specimens nor of the most commonly cultivated kinds.

Following the pictures is a 223-page section of very brief descriptions of illustrated plants arranged alphabetically by genera and species. There are also cultural indications but only for genera. Brief sections devoted to the use of plants in the home, a glossary of terms, plant families, insect enemies, plant geography, common names, index of illustrations, and a bibliography complete the 14 pound book.

Though many of the mistaken identifications which appeared in the second edition have been corrected, there are still errors in the new book, but these are unavoidable in a book of this scope. It is unfortunate that the definitions in the glossary are so brief and inaccurate as to be of little use and that the editing is very inconsistent. Common names and comments accompanying the pictures are set off in a variety of ways; by commas, parentheses, single quotes, and by parentheses and single quotes combined. Botanical varieties are sometimes correctly indicated by the abbreviation *var.* but at other times they are listed as trinomials or quadrinomials.

Despite these minor shortcomings, the book is an epic work and will prove of tremendous value to plantmen and amateurs, mainly for identification purposes. The book is expensive, but considering the quality and number of illustrations, and the tremendous amount of work that went into it, it is surprising that the price isn't considerably higher. The book is obviously a labor of love!

DONALD G. HUTTLESTON

The Geisha Story, with Doll-and-Flower Arrangements

Billie T. Chandler, Charles E. Tuttle Company, Rutland, Vermont. 1963. 56 pages. Illustrated in color. \$5.00. (Library)

A slim volume beautifully bound in brocade in which the author tells the story of the Geisha, her long and rigorous apprenticeship, the high standard of personal elegance and artistic performance she strives to attain.

The Geisha represents a tradition, a touch of glamour and romance, to be increasingly valued in this machine age.

Twelve color plates show Hakata dolls with plant materials and vases—they illustrate the Geisha Story in a charming manner.

F. P. K.

Shrub Roses Of Today

Graham Stuart Thomas, Phoenix House, Ltd., Strand, W.C.2, London, England. 1962. 240 pages. Illustrated in color, drawings, and black and white engravings. 42 shillings.

In many ways this is a very personal book. The name of Captain Thomas has long been associated with that of the rose and he has already given us several volumes of great value, even if his experience in culture has been in

Great Britain, which is far from what it might have been in this country. His correspondence must be vast; his patience in tracking down, legend, rumor and fact, endless; but his rewards are great and our pleasure vastly increased thereby.

Let it be said at once that the book is a finely produced volume, and the illustrations, all I believe from Captain Thomas, are superb. The color paintings are lovely and the pencil drawings have all the great quality of a silver point without losing their character as pencil drawings. The photographs are splendid.

The text depends finely on the plan and intent, made clear in the early part of the book, and the arguments are persuasive even in the portion under the head "The Appeal of the Rose." This is a text that could be and often is, mawkish and overly sweet. Not so here.

The book is divided, as the dust jacket points out, into three portions; the first part, general texts covering fashions, history, and all the familiar generalities; the second, the wild species and their hybrids but only within certain fixed limits; and the last section, with later developments after the introduction of the China Rose. After that, are several chapters on miscellaneous matters, even on culture, but the chapter on "Fragrance" disappointed this reviewer who had hoped that a writer with the wit and courage of the Captain would have coined some new terms that we all might borrow hereafter in speaking of scents. He follows tradition in making comparison to the scents of other flowers than the rose, and makes a prodigious list. As an English reviewer would put it, this small lack in no way mars an outstanding book.

The present reviewer has had no close association with shrub or species roses for many years, and at this writing has only one shrub rose in his garden, *Rosa chinensis* Mutabilis but if he were not so anicent, he would be sorely tempted to launch out again, with only one proviso, that he gather none of the roses that shed their leaves and stand naked all summer in our terrific heat. The loss of leaves in summer is barely hinted at in the book, and then usually indirectly but it is a fact, and in the old garden where Dr. van Fleet had his collection, many a bush stood naked from June till October, sometimes with only a few fruits to grace its shame. This of course is the fault of the climate, not the rose.

B. Y. M.

Manual of Vascular Plants of Northeastern United States and Adjacent Canada

Henry A. Gleason and Arthur Cronquist. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1963. lii + 810 pages. \$11.75.

A text-reference manual for the identification of vascular plants growing wild in the Northeastern United States and adjacent Canada, this standard flora is concise and easy-to-use in the laboratory or in the field.

The book covers the vascular plants, including ferns, grasses, trees, weeds, and wild flowers in the area extending from the Atlantic Ocean to

the western boundaries of Minnesota, Iowa, northern Missouri, and southern Illinois; to the southern boundaries of Virginia, Kentucky, Illinois, and the Missouri River in Missouri. In Canada the area covered includes New Brunswick, Nova Scotia, Prince Edward Island, and the parts of Ontario and Quebec south of 47 degrees north latitude.

A new work taking account of recent studies in the field, this book contains appropriate references to comparable pages in the *New Britton and Brown Illustrated Flora*, a three-volume reference upon which this portable edition is primarily based. It serves a useful and handy guide for layman, professional botanist or student—including foresters, conservationists, county agents, and the serious amateur botanist.

The Flower Arrangement Calendar, 1964

Helen Van Pelt Wilson. M. Barrows and Company, Inc., 425 Park Avenue South, New York 16, New York. 1963. 112 pages. 55 illustrations, 1 in color. \$1.50.

This is the eighteenth edition of the calendar made famous by Mrs. Wilson, as most of the flower arranging ladies will know. And, in pace with the times, there are 44 arrangements in the Japanese "styles" illustrating containers as charming as the overall arrangement. There is an illustration for each week of 1964 (plus a few more) on a left hand page, with a weekly calendar on the right hand side. The calendar has space for morning, afternoon, evening notes, and a full description of the plant materials used, and in many cases why such-and-such material was used.

Flowers of the South, Native and Exotic

Wilhelmina F. Greene and Hugo L. Blomquist. The University of North Carolina Press, Chapel Hill, North Carolina. 1953. 208 pages. Illustrated. \$5.00.

The copyright date given above is correct; and, while it is not a usual policy of the Society to twice review a book, we wish to note that this title is in print today. Many inquiries have come to hand regarding popular floras for the South, and we should like to say that this is a book that will interest every one save the most technically minded taxonomist—he, too, might well consider its excellencies.

The text is made up of brief paragraphs devoted to the plant families and follows the sequence used by Small in his *Southeastern Flora* and the Baileys for the exotic plants that are included.

The paintings and drawings are the work of Mrs. Greene and the text of Dr. Blomquist. The number of plants treated is five hundred and the reviewer wonders how any one could face such a task of choice, even if the preface states that "selection has leaned more to the objective side than to that of the sole preference of the authors." The botanical texts are clearly writ-

ten and for the layman above all others often with a very useful note that will be of value to gardeners. There are also included many bits of information that would be relegated to "remarks" in a more formal text, but which are of great value to the layman and gardener.

The illustrations fall into several categories. First, there are admirable line drawings in black and white that accompany each paragraph of description. There are no indications in the drawings themselves as to the amount of reduction necessary, but the actual size of the plant is mentioned almost uniformly throughout the texts. Second, there are the reproductions of paintings of individual species or pairs of species. Many of these are exotics; all are given common name captions. Third, there are reproductions of paintings in which a great number of plants are shown, in most cases, the collection being based on plants in bloom at one time in the given locality.

Whether one starts at the beginning of the book with the native plants interrupted occasionally by a plate of an exotic, or turns at once to the section on exotics does not matter. Or if one pleases, he can dip into the middle of the book with no less pleasure. There is an index as a further aid.

The Shrub Identification Book

George W. D. Symonds and A. W. Merwin. M. Barrows and Company, Inc., 425 Park Avenue South, New York 16, New York. 1963. 384 pages. Over 3500 illustrations. \$15.00.

The visual method for the identification of shrubs, vines, and ground covers are presented in this reference work by Mr. Symonds, and it serves as a companion volume to his *The Tree Identification Book*. Over 3500 illustrations fully capture every detail necessary for the practical identification of broad-leaved and needle-leaved shrubs and broad-leaved vines and ground covers at any season of the year. The author's unique system, based on details seen by the eye can be put to immediate use by anyone inexperienced or experienced in botany.

The book is divided into two parts: *Pictorial Keys*, designed for generic identification, and *Master Pages*, for species identification.

In the Pictorial Keys, thorns, leaves, flowers, fruit, twigs, and barks are grouped in separate sections, each forming a key. Within each key, these features are arranged for easy reference. For example, leaves with similar details are seen next to each other, so that they can be easily compared and their differences noted. Under each picture of a specific detail in the keys is a number which refers to a Master Page.

In the Master Pages, all the important features of each shrub are brought together for positive identification. Whenever a particular genus includes two or more species, these are shown together to contrast their differences.

The Shrub Identification Book is the most comprehensive work of its kind ever published. It is designed for everyone—the beginner or expert, the teacher or student of botany from elementary school through postgraduate work, and the professional botanist. It is printed by lithographic means and is undoubtedly the most professional job off any press in this country. All photographs were made by Mr. Merwin.

The Gardeners' Pocketbook

A Magnolia Seldom Seen in Cultivation

Magnolia pyramidata, a graceful tree to 45 feet, grows in rich damp bottomland. It is closely related to the better known *Magnolia fraseri*, though easily distinguishable from it by its smaller leaves, and by the petals which are distinctly narrowed to a claw at their base on *M. fraseri*. It has been reported from Georgia to Florida, and westward to Louisiana. The branches are somewhat ascending, though not always, thus forming a pyramidal crown.

Leaves deciduous, alternate more or less whorled at the end of the branches, five to eight inches long by three to four and a half inches wide, obovate or almost spatulate, short acuminate; base auriculate, vivid green above, paler to glaucous beneath, glabrous on both sides; petioles one-third to two inches long, green, sometimes reddish or brownish.

Flowers solitary on thick terminal peduncles, pleasantly fragrant, soft pure white, three and a quarter to four and three-fourths inches in diameter; petals narrowing toward the base; sepals considerably shorter; fruit cone-like, small, only two to two and three-fourths inches long.

Magnolia pyramidata blooms in April; the petals are short lived but the flowers appear in such a profusion that for every bloomed-out flower there seem to be two new ones.

I have found *Magnolia pyramidata* in Louisiana in Washington parish along the Pushepetappa Creek and have collected live and herbarium material in Mississippi in April and December of 1961. The herbarium specimen has been deposited in the USL Ornamental Horticultural Herbarium under following label:

"Coll. No. SO4206159. *Magnolia pyramidata* Bartr. In Stone Co. (Miss.) about 4 miles west of Benndale, between Miss. 26 and the Black Creek. Mixed woods, sandy clay pH. 6.7 Sigmond L. Solymosy. April 20, 1961."

I think the reader will be interested in the rich plant association of this relatively small area (not over 4 acres):

Magnolia grandiflora
Magnolia virginiana
Magnolia macrophylla
Magnolia acuminata
Magnolia pyramidata
Illicium floridanum
Cornus florida
Osmanthus americanus
Sassafras albidum
Prunus caroliniana
Castanea pumila
Hamamelis virginiana

A small arboretum by itself composed of twelve highly ornamental trees and shrubs. The occurrence of the five species of magnolias was most interesting, and more so, because there they were represented by several of the five species growing close to each other.

We like to underestimate the richness of our Gulf Coast flora; but some of the most cherished ornamentals of the world call their home the forests, swamps, and marshes of the Gulf States, eight out of the nine magnolias native to the United States come from that area. And there is still so much unexplored territory right at our back-door.

New highways, new settlements accompanied by the faithful servant of modern civilization—the BULLDOZER, are destroying uncounted acres of natural beauty. It would be senseless to try to stop development and progress but we could save and preserve the treasures of our woods by planting them in gardens, arboretums, or national parks. I know of five collecting areas in Texas, Louisiana, Mississippi and Alabama, that were completely destroyed by modern civilization in the past five years. I have been told not too long ago that trees have to make place for buildings because the trees die and the buildings stay . . . I am asking a question: For how long does a building stay? We don't build pyramids or acropolises anymore and even so, how old are our redwoods of the Northwest and the Mexican cypresses, how old are the cedars of Lebanon, and the oaks of Europe? Help us preserve our native plants.—S. L. SOLYMOSEY, *University of Southwestern Louisiana, Lafayette, Louisiana*. Reprinted by permission of Louisiana Society for Horticultural Research.

The First of December, 1962

As I was planting pink tulips this afternoon (an afternoon of St. Luke's summer), I realized that it is the first day of December, and I got my record book and made a list of things in bloom. I had just been thinking how few flowers there are except for the very late chrysanthemums—that linger on almost until Christmas, the winter sweet (*Chimonanthus praecox*) which is just beginning to open, and *Camellia* 'Dawn', which is magnificent. But poking about I found an odd flower here, and another there until I was surprised to see what I had, and this in spite of frosts heavy enough to spoil the flowers of *Camellia sasanqua*, though a number of varieties are still presentable from a distance. *Moraea polystachya* presents a delicate lavender blossom almost every day, in spite of the fact that I have done nothing to deserve it. I did not lift those in the ground as I was told to do, and I forgot to bring the potted ones in out of the summer rains. *Oxalis crassipes* has a few flowers, as usual, and *Oxalis bowiana* is covered with large flowers of tyrian pink that seem unbelievable at this time of year. One zephyranthes is in bloom, a form or hybrid of *Z. candida*. It came to me from Dr. Flory. The leaves of *Cyclamen neapolitanum* are up, and two flowers still stand among them. The last flower of *Galanthus corycensis* is as fresh as a spring daisy. It has been in bloom continuously since mid-October. The six bulbs that I got four years ago (would they had been dozens) have not increased, but they seem to be holding their own. *Crocus laevigatus* 'Fontenayi' the last of the fall-flowering species has just come into bloom.

Viola patrinii repeats in November and December, sweet alyssum makes an extra effort. *Iberis sempervirens* 'Little Gem' puts forth some scraps of white, and there is an occasional flower on the little candy-striped verbena that appears in the Southern market bulletins. These make a winter nosegay.

A prostrate rosemary that Mrs. Chafil sent me is flowering on a dry wall. She warned me that it is tender and should be wintered inside, but I left it out, and it has been through one winter, and has spread to nearly a yard in diameter. It was killed soon afterwards by severe cold weather.

There is always a scattering of bloom at this time of year on *Spiraea arguta*, *Chaenomeles* 'Pink Lady', the autumn flowering *Prunus subhirtella* var. *autumnalis* and more than a hint of perfume from *Osmanthus fragrans*.

But the most beautiful thing in my garden at the moment is the strawberry tree, *Arbutus unedo*, hung with bunches of spectrum red balls while a few clusters of pearly flowers are still in bloom. This was brought about by my saying that it never fruits in our climate. It was severely cut back in the winter.—ELIZABETH LAWRENCE, Charlotte, North Carolina.

Note on Storage of Buckeye and Horsechestnut Seed

Sometimes one desires to store seed of horsechestnut (*Aesculus hippocastanum*) and buckeye (*A. glabra*) over winter. Germination of improperly stored seed is usually poor. Many of the nuts may decay in storage or immediately after they are planted. Drying to the point that seed coats become wrinkled must be avoided. Tests were made to determine whether storage temperature and use of a fungicidal seed dust would prevent losses. Mr. Robert Fisher, Horticulturist at George Washington's Mount Vernon, collected ripe seed from trees on the estate and sent them to me at Beltsville.

In 1960, seed apparently free of decay was placed in polyethylene bags on November 10 and stored at 31°, 40°, and 45° F. The lots were removed from storage and examined May 4, 1961. All counts given in the following are based on 100 seeds.

Stored at 31° F.

No seed sprouted in storage, 5 treated and 2 untreated seed decayed, 78 treated and 81 untreated seed germinated after planting on May 4. Seedlings from 69 treated and 73 untreated seed survived. Treatment with the fungicide was not beneficial.

Stored at 40° F.

One treated and no untreated seed sprouted in storage; 14 treated and 25 untreated seed decayed; 55 treated and 59 untreated seed sprouted after planting and 53 treated and 59 untreated seed produced seedlings that survived. Treatment with fungicide reduced storage de-

cay but did not substantially increase sprouting or seedling survival.

Stored at 45° F.

Six treated and 17 untreated seed sprouted in storage and the sprouts of the 6 showed chemical injury; 44 treated and 44 untreated seed decayed in storage; 44 treated and 35 untreated seed sprouted after planting; and 35 treated and 34 untreated seed produced seedlings that survived. Obviously storage at 40 or 45° F. was not satisfactory.

Seed collected from 1 horsechestnut and 4 buckeye trees were stored on 11/10/61 without fungicidal treatment at 31° F. Of 745 seed only 1 had decayed and none had germinated by 3/20/62 when they were removed from storage and examined. Seedling survival from samples was excellent. Both the horsechestnut and buckeye seed sprouted within a few days after removal from storage.—CURTIS MAY, *Pathologist, Crops Research Division, Agricultural Research Service, U. S. Department of Agricultural, Beltsville, Maryland.*

Magnolia watsonii

As magnolias are one of the features in the garden here, the opportunity some years ago to get a small plant of *Magnolia watsonii* was taken with alacrity. The plant was small, indeed, and it has taken many years to come in to flower. The first bloom buds appeared in 1962, just in time to be ruined with one of the freezes that did damage as well to all the young shoots.

In spring 1963, two flower buds appeared and managed to open safely after an even colder winter.

This is one of the species of magnolias that flowers with the leaves but the timing here seems earlier than that reported in Rehder's *Manual of Cultivated Trees and Shrubs*, even earlier than one might expect on account of location. In the text, the flowering period is given as May-June; here the blooms came in early April.

In comparing the descriptions given in Rehder and in Millais' *Magnolias*, our plant comes closer to the Rehder description. The sepals are pinkish, hang down so they are seen; but with our plant the petals were not nine, not six, as usual. Here the stamens were red only

on the filaments, with the anthers a dull brown. The carpels were not red when the bloom was fresh and did not turn red before falling, as neither flower has developed seeds.

The drawing in Millais shows eight petals, so possibly the plant is variable.

There is a very pleasant scent, variously compared by visitors here, but to the writer, it comes closest to that of *M. virginiana*.

If the future cultivation will induce more symmetrical growth, this will be a great addition.—B. Y. MORRISON, *Pass Christian, Mississippi.*

Cutting Back When in Bloom

Some plants such as dandelion, narrow leaved plantain, and white clover that grow as lawn weeds can be cut back while in bloom and be in good bloom again for the next lawn cutting. My small lawn is surrounded by a couple of acres of pseudo-lawn made and maintained by running a power mower every two weeks over whatever vegetation grows in the space. Among the kinds in it that can be cut in bloom and be flowering again for the next cutting are Queen Anne's lace, ox-eye daisy, moth mullein, and an unidentified native pedicularis. The growth along my lane is cut by scythe once or twice a season. There orange flowered milkweed and the common ironweed can be cut back in bloom and give good bloom again in a few weeks.

Not any of these, not even dandelion, can be depended on to bloom again when growing at the margin of its range. Such performance can be expected only of kinds growing well within their range.

There are various reasons why the gardener may find it worth while to do enough cautious experimenting to find out which kinds in his own garden will bloom later if cut back while in bloom or sometime before. One reason is to cause plants to bloom below eye level instead of above it, an advantage with ironweed. Another, as with boltonia and narrow-leaved sunflower, is to secure compact masses at flowering time instead of unsightly sprawling ones. Another is to retard flowering of a variety whose color would clash with other flow-

ers in the border, or to permit a color combination between two kinds that do not normally bloom together, as one of white sweet rocket and blue delphinium.

There are probably more kinds that will endure cutting back while in bloom than most gardeners suspect. The most surprising to me is bleeding heart. My large clump was in full bloom when cut to the ground by the late freeze of 1955. A few weeks later it made fresh growth that bloomed normally.—MAUD R. JACOBS, *South Carrollton, Kentucky*.

The Amarcrinums

The arrival of Cecil Houdyshel's fall catalogue, at the end of August, reminded me that it was time for the *Amarcrinums* to come into bloom. I looked out into the garden, and sure enough there was the first scape of Dorothy Hannibal, just poking through the broad leaves. In the 1962 catalogue this variety is almost half what I paid for it four years ago, but I don't repent my bargain, as my bulb is now a good clump. With me, this and the other *amarcrinums* flower only in the late summer and fall; Mr. Houdyshel says that in Southern California they bloom at all seasons.

Although the flowers are a deep rose, I can't see that Dorothy Hannibal is any finer than *Amarcrinum howardii*, but I am glad to have both this and Delkin's Find, for one or another usually has a scape or two in bloom from August to the end of October. They are the mainstay of the late border.

In my garden files I have a note (origin unknown) to the effect that *Amarcrinum howardii* was exhibited at an R. H.S. show in 1926, and that it won the Cory cup. It must not have made much of an impression in England, however, for Colonel Grey does not mention it in *Hardy Bulbs*, though he includes some that are less hardy. It was raised in Los Angeles by Fred Howard in 1921, and the same cross (*Amaryllis belladonna* × *Crinum moorei*) was made by Dr. Ragoneri at Florence. The flowers are like those of *Amaryllis belladonna*, rather than those of *Crinum moorei*—lily-like, with pointed petals, and not very wide open. They are vanilla-scented. My notes say that the foliage is evergreen,

and I am sure it is in California, but here it dies down in winter. I have had as many as sixteen flowers to a scape; as they open gradually the scapes last a long time. The scapes are from two to three feet tall.

Wyndham Hayward says that in the Southeast, Delkin's Find makes better growth than *A. howardii*. I was about to say that in my garden it does not bloom well enough to make it worth the space it takes, but just then I looked out and saw three scapes coming all at once. The flowers are slightly smaller than those of the other two, and a little paler. The clumps are less robust. Otherwise they are all much the same.

In my garden the *amarcrinums* grow in almost full sun, and in rather deep shade, and all do well; but I expect the flowers would last better if they had afternoon shade. I water them as they come into bloom, but they get very little fertilizer. I expect they would do better in richer soil. They seem to like being undisturbed. *A. howardii* has been untouched—except to peel off a bulb now and then for some one who admires it—for twelve years, and has made a fine clump.

I wonder if anyone has tried the *amarcrinums* in the north, and if there is any difference in their hardiness. Mr. Houdyshel says that Dorothy Hannibal is hardy in southern Indiana, so it should be able to withstand below zero temperatures. — ELIZABETH LAWRENCE, *Charlotte, North Carolina*.

Devilwood—

Osmanthus americanus

A member of the Olive Family, the Devilwood is one of the most attractive medium-sized trees of the Gulf Coast area. It grows equally well along swamps and on sandy hills. In Louisiana *Osmanthus americanus* is common in Washington parish where it grows to considerable sizes. In southwest Alabama, I have observed trees about forty feet tall with a trunk diameter close to one foot. Trees with multiple trunks are exceptionally attractive. The light gray or light brown bark with the contrasting dark green leaves and the very fragrant white flowers makes this plant a very desirable item for gardens and should be

used widely by landscape architects, but as it so often happens this tree is almost entirely neglected in its native country. It was introduced into European gardens in the latter part of the 18th century and has been grown there ever since.

Osmanthus americanus (L.) Gray

Synonyms: *Osmanthus floridanus* Chapm.; *Amaroles americana* (L.) Small; *Amaroles floridana* (Chapm.) L. E. Arnold; *Olea americana* L.

Common names: Devilwood, American Wild Olive.

Tree to 50 ft.; leaves opposite evergreen, leathery, stiff, elliptic to elliptic-lanceolate, apex usually acute but sometimes rounded, the base narrows down to the $\frac{3}{4}$ -inch long petiole, dark green and lustrous above, yellowish green beneath, about 4 inches long by $1\frac{1}{2}$ inches wide; flowers small abt. $\frac{1}{5}$ inch long, greenish-white, fragrant, borne on many-flowered axillary cymes; fruit a dark blue thin-skinned fleshy ovoid drupe of about $\frac{3}{4}$ inch long containing one hard seed.

Blooming time: depending on location from February to April; the fruit ripens in early fall.

Osmanthus fragrans, *O. ilicifolius* and their hybrid: *O. fortunei*, *O. armatus*, *O. delavayi*, possibly also *O. forrestii* are sold by nurseries and are extensively used in landscape work. Why the native *Osmanthus americanus* beautifies our woods alone instead of being planted—if not to replace, but to compete freely with its oriental relatives in our gardens is a question to which I cannot answer. The specimen planted on the USL Campus behind the Cypress lake grows very well; the unusual cold of January 1962 did not burn its leaves and the long lasting dry spell of last fall did not keep it from developing new shoots and leaves. It is my strong belief that the Devilwood will eventually find its way to southern gardens and parks.—S. L. SOLYMOSEY, *University of Southwestern Louisiana, Lafayette, Louisiana*. Reprinted by permission of Louisiana Society for Horticultural Research.

A Note of Correction

In his note "Two White Petunias for Greenhouse Display," appearing on page 120 in the April 1963 issue of *The American Horticultural Magazine*, Dr. Huttleston points out some items that should be corrected—Mrs. W. K. duPont was the founder's sister-in-law, not his sister, as printed; the diameters of the flowers should have been in centimeters instead of inches: 'Longwood' should read "over 10 cm. (4 inches);" and 'duPont' should read "8 to 10 cm. (3-4 inches)."

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