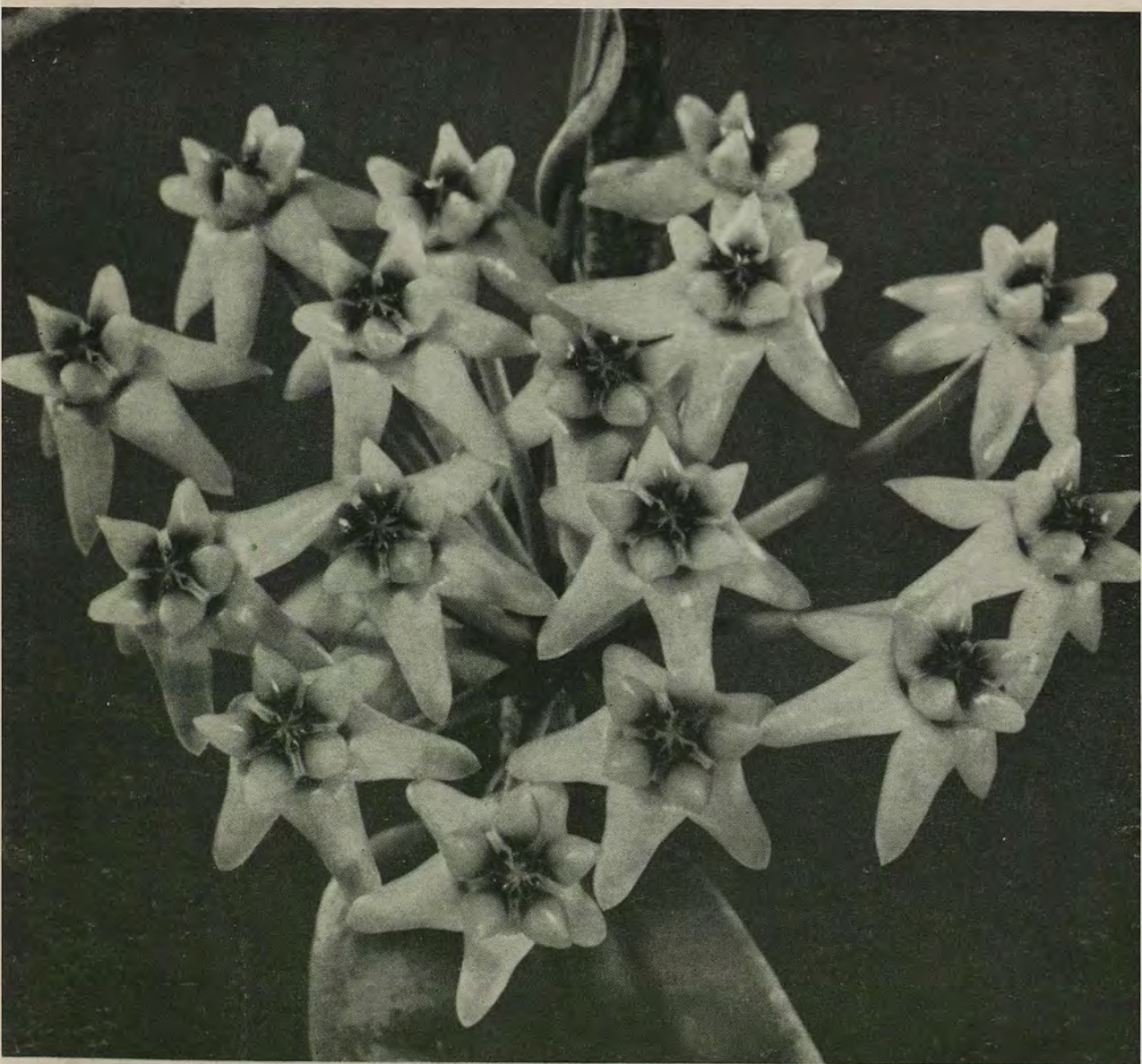


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(HENRY TEUSCHER)

Hoya darwini

(See page 50)



ARNOLD ARBORETUM

Figure 12

*Paperbark Maple, *Acer griseum**

Peeling of the reddish-brown bark is characteristic

(See page 17)

The Best of the Dogwoods

DONALD WYMAN

Speak of dogwoods, and most gardeners immediately think of two or three species which are popular small trees, but there are many more species and varieties in this interesting and ornamental clan. In fact, American nurserymen today are offering approximately forty-five species and varieties, while over sixty-five are growing in the Arnold Arboretum at Jamaica Plain, Massachusetts. Not all are outstanding ornaments, but those that are, or with further trial may prove themselves to be, certainly are worth careful consideration by the interested gardener.

Visitors who may have made a May pilgrimage to Valley Forge, Pennsylvania, when the Flowering Dogwood (*Cornus florida*) is at its height of bloom, feel that this one species is the most important. There special efforts have gone into making an extensive planting of these beautiful trees as a living memorial to the Revolutionary soldiers who wintered there almost two centuries ago.

On the other hand, people who live in the Pacific Northwest are familiar with the beautiful Pacific Dogwood (*C. nuttallii*) which does so well along the West Coast but does not grow well in the East.

People who have made a hobby of arranging flowers have come to realize that the Cornelian cherry (*C. mas*) is one of the best of this entire group for "arrangements," especially for those made early in the season when branches cut from garden plants are forced indoors for precocious bloom.

Then there are those shrubs with colored twigs, some of which are outstanding all winter long. The native Red Osier Dogwood (*C. stolonifera*) is colorful, but the true Siberian Dogwood (*C. alba sibirica*) is even more brilliantly colored. It is unfortunate that this variety has be-

come badly mixed in the American nurseries. We have been disappointed many times in ordering plants from American sources under this name, only to find when the plants arrive that they were not true Siberian Dogwood, but rather *C. alba*, the European *C. sanguinea*, or one of the native Americans with red or reddish twigs (*C. stolonifera*, *C. amomum*, or *C. baileyi*).

The Arnold Arboretum obtained plants purporting to be that of Siberian Dogwood from nearly thirty-six sources in this country and abroad, noted the considerable mix-up, found the true variety and re-introduced it to American sources. The true Siberian Dogwood is hard to distinguish from the species on purely botanical characteristics but is recognized by the fact that the twig color is a more brilliant red, making it more worth-while as an ornamental for winter display.

Even native American species are frequently mis-identified. Such is the case sometimes with *C. stolonifera* and *C. amomum*. Both have reddish twigs, but *C. stolonifera* is usually the more desirable of the two for ornamental planting because of its stoloniferous habit of growth, lower size and greater hardiness. One nurseryman was propagating thousands of *C. amomum* (with brown pith) and labelling it *C. stolonifera* (which has white pith) before he realized his rather serious error.

It is also probable that these shrubby types can hybridize, one with the other, so it becomes increasingly important to realize the differences between the species and offer them for what they really are.

In order to do this so that comparisons can be made, it seems advisable to divide the plants into tree types, large shrub types—from seven to twenty feet—and low shrub types. Since nearly forty species and varieties have some merit for landscape planting and another fifty are

Horticulturist of the Arnold Arboretum, Harvard University, Jamaica Plain, Massachusetts, and President of the American Horticultural Society.



ARNOLD ARBORETUM

Cornus controversa

either inferior to the selected group or no better ornamentally, only those that are worthy of consideration for landscape planting will be discussed here.

Tree Types

There are six species of dogwoods that are trees in this group recommended for landscape use, four of them being natives of China or Japan (*C. capitata*, *C. macrophylla*, *C. controversa*, and *C. kousa*), and two natives of North America (*C. nuttallii* and *C. florida*). The least hardy, seldom planted in the United States (except in protected gardens on the Northwest Pacific Coast), is the Evergreen Dogwood (*C. capitata*), a rounded, evergreen to semi-evergreen tree growing about forty feet tall with small flower clusters and four to six pale yellow bracts an inch and a half to two inches long. The flowers appear in June and July and the red, strawberry-like fruits appear in the fall. The tree is very tender and can be grown only in those parts of the country relatively free of frost and high summer temperature.

The Largeleaf Dogwood (*C. macrophylla*) is a forty-five foot tree hardy

from Long Island southward, with large leaves four to seven inches long and as much as three and a half inches wide. The flowers are small, in yellowish-white clusters about four to six inches wide but without conspicuous bracts. Even though it is not superior to *C. controversa* in flower, it may have merit in some situations because the flowers appear in July and August, at a time when few other trees bloom. Certainly it has merit as a foliage tree.

One of the taller of the dogwood trees growing up to sixty feet high, is the Giant Dogwood (*C. controversa*). This is perfectly hardy as far north as Boston, where it does well. The leaves are alternate; unlike those of most dogwoods; the flowers are small and similar to those of the shrubby types. The fruits are bluish-black berries and the autumn foliage color is red. The branches are produced in tiers or layers, as are those of some of the other dogwood tree types. All in all, this is superior to the native alternate-leaved Pagoda Dogwood (*C. alternifolia*) which is not recommended because it is frequently susceptible to a serious twig blight.



ARNOLD ARBORETUM

Cornus kousa variegata

The last of the exotic tree types worth growing is the Japanese or Kousa Dogwood (*C. kousa*) or its Chinese variety, the Chinese Kousa Dogwood (*C. kousa chinensis*). This is a small tree, only about twenty-one feet tall, with very definitely layered branching and it is hardy as far north as Boston. The Chinese variety is supposed to have larger flower bracts. Those of the species are supposed to be an inch and a half long and about an inch wide, while those of the Chinese variety are supposed to be up to three and a half inches long and up to an inch and three-fourths wide. These two kinds are definitely mixed in nurseries, however, and are very difficult to tell apart. My suggestion is to use the Japanese species which is slightly more cold hardy than the Chinese variety and fertilize it well. This treatment will probably result in just as large flower bracts as those of the Chinese variety. At least, this has been our experience in the Arnold Arboretum.

The fruits of the Japanese Dogwood are large, red, raspberry-like affairs, all borne erect on the upper sides of the horizontal branches, as are the flowers. The foliage turns a dull red in the autumn. This tree is definitely one which, if possible, should be observed from above, to obtain the best view of the flowers. As the flowers fade, the bracts sometimes become tinged with red, but this depends upon either the situation or the climate or both. The variety named *variegata* has variegated leaves, but is not especially outstanding.

The two native American dogwood tree species are, of course, the most popular. The Pacific Dogwood (*C. nuttallii*) is native from British Columbia to Northern California and can grow to seventy-five feet, making it the tallest of all the dogwood clan. Incidentally, it has also been termed by some the best of the native American flowering trees. The small flowers are surrounded by four to six large flower bracts, making the entire flower cluster four or five inches across. In this also, the flower bracts frequently fade to a soft pink. The fruits are red. It is unfortunate that this species does not thrive in the eastern United States.

There is a variety of this called *C. nuttallii eddiei* which was discovered grow-

ing wild in 1918 by H. H. Eddie, a nurseryman of Vancouver, British Columbia. It resembles the species in every respect except that the leaves are variegated an attractive green and gold in a spotted or mottled effect. It also tends to bloom a second time during August, as do many plants of the parent species.

The Flowering Dogwood (*C. florida*) is native over a wide part of the eastern United States. A few plants have been found even in the woods of southern New Hampshire, but this is about its northernmost limit, for flowering, at least. This species can grow forty feet tall, and can live to be nearly a century old, but to attain such trees, plants would require good care to remain in good condition. The merits of the Flowering Dogwood are well known and need not be stressed here. As a specimen flowering and fruiting tree, it is one of the best. Its horizontal branching habit, its vivid red autumn color, spectacular fruit that may persist after the leaves fall, all combine to make it of ornamental interest every season of the year. There are some varieties more or less well known, which are worthy of particular note.

Cornus florida varieties

'Cherokee Chief'—Plant Patent No. 1710 in 1958 by Ike Hawkersmith, Winchester, Tennessee, with flower bracts listed as a "rich ruby red" and new growth reportedly reddish. This variety, unfortunately, was grown and distributed under the name ('Super Red') by several growers in the Winchester, Tennessee, area shortly before it was patented under the name 'Cherokee Chief.'

'Cherokee Princess'—a selection of the white-flowered species.

'Fastigiata'—the original tree has been growing in the Arnold Arboretum in Boston, Massachusetts, since 1910. It was distributed to fifteen nurseries in 1954 and probably to others before that. The branching is definitely fastigiate, making it possible to plant this clone in gardens where space is limited. This grows twice as tall as it does wide, but in most *C. florida* trees the proportions are just the reverse.



ARNOLD ARBORETUM

Cornus florida fastigiata

- As far as I can tell, the variety 'Ascending,' patented in 1952, is almost identical.
- 'Gigantea'—found and named by Paul Vossburg, Westbury Rose Company, Westbury, L. I., New York; on the nearby Phipps estate about 1932, with flower bracts reportedly six inches from tip to tip.
- 'Magnifica'—also found on the Phipps estate about 1926 "with full, rounded bracts about four inches from tip to tip."
- 'New Hampshire'—selected from a tree in Atkinson, New Hampshire, for its apparently greater flower bud hardiness, by Heinrich Rohrbach, Heatherfells Nursery, Andover, Massachusetts.
- 'Pendula'—originally described in 1887 for its pendant branches. A well grown tree, does make a good specimen, somewhat stiffly branched but still interesting.
- 'Pleuribracteata'—with six to eight and often more, flower bracts, flowers more or less aborted; originated in Orange County, North Carolina, before 1914.
- 'Salicifolia'—with narrow, almost willow-like leaves and short, twiggy growth, making a tree smaller and denser than the species. Henry J. Hohman of Kingsville Nurseries, thinks highly of this variety and has proved to me that complimentary statements I have made about it in the past should be corrected.
- 'Welchii'—selected by Mark Welch, a nurseryman, about 1920. Leaves are sometimes a combination of green, creamy white and pink. A sparse bloomer, the foliage often burning in full, hot sun, nevertheless very pretty in a lightly shaded situation, coloring well in the fall. Sometimes it will revert to the green-leaved species. Mr. Hohman has an excellent form of this which he calls the "Kingsville form" with better color and a better grower. The variety 'Aureo-variegata,' listed by Brimfield Nursery, Wethersfield, Connecticut, in 1958 is identical with the "Kingsville form."
- 'White Cloud'—A seedling selection made by Wayside Gardens, Mentor, Ohio, before 1946. It flowers profusely when very young, sometimes a creamy white.
- 'Xanthocarpa'—A variety with yellow fruits, known since 1919.
- C. florida rubra*—Probably first found and noted by Marc Catesby in Virginia about 1731. This is not so cold hardy as the species and the color of the flower bracts apparently varies considerably from a washed-out pink to a deep red and may even vary on the same tree from year to year. It has been found several times in the wild. The cultivar 'Prosser Red' was found by Bruce Howell of Knoxville, Tenn., about the time of World War I, about three miles from his nursery on property owned by Brown Prosser. This has been grown, off and on, ever since, but most have discontinued growing it because the flowers are small and it grows slowly. Also the leaves are a dark reddish green when they first appear, so that when the plant is in bloom there is not any great contrast between the flowers and the foliage. Young plants are also reported as slow to bloom.

It is of interest to note that J. H. Eddie of H. M. Eddie and Sons, Vancouver, British Columbia, writes that he has a cross of *C. florida* and *C. nuttallii*. This hybrid, originated by his father, H. M. Eddie, has pendulous branches, leaves like those of *C. florida* but slightly larger, and flowers like those of *C. nuttallii*. Some of the blooms measured were six inches between the bract tips. This needs further trial, and testing in the United States.

Medium and Large Shrubs

Of the six species in this group, two are natives of Europe (*C. mas*, *C. alba*); one is a native of China (*paucinervis*) and three are natives of the eastern United States (*C. anomum*, *C. racemosa* and *C. stolonifera*). The tallest of the group is the Cornelian cherry (*C. mas*) which may be a tree up to twenty-four



ARNOLD ARBORETUM

Cornus mas 'Flava'

feet in height, but is usually much lower and is grown as a shrub with many stems from the base. It is truly an excellent ornamental, with profuse small yellow flowers opening before the forsythias bloom in the spring and bearing elongated cherry-like fruits which can be used for making preserves. The autumn color is reddish. There is a plant in the Arnold Arboretum which is over seventy years old and which has never been pruned or treated for any pest, so it is a shrub that will be long-lived and require little care. Hardy up to southern New Hampshire, this can be used as a specimen, as a hedge (for it responds well to clipping) or as a large shrub for the background.

Flower arrangers like it because cut branches brought into a warm room force well in the late winter and are easily worked into many types of arrangements indoors. There is a white-fruited form 'Alba'; a yellow-fruited form 'Flava' and a variety with yellow leaves, *aurea*. There is also the form 'Aureo-elegantissima,' formerly called *elegantissima*, which has leaves with a creamy white to red variegation, but it is not a very vigorous grower. Another form 'Variegata,' has leaves with a white margin. The variety 'Nana' has been described as a "spherical bush," originating in France before 1879, but I have never seen it. Several European nurserymen list this plant, but when we have received specimens so named, they have always turned out to be *C. pumila*, a low-growing type of dogwood with black fruits and little ornamental merit.

The next tallest in this shrubby group is the Gray Dogwood (*C. racemosa*), an American native growing up to fifteen feet tall, but usually is seen in gardens under this height. It is as hardy as *C. mas*, grows vigorously from the base with rather slender stems and so can be used in clipped hedges. The flowers are in flat white clusters up to two and a half inches in diameter, in mid June. These are followed in early summer by small white berries on red stalks, which are most attractive, appearing earlier than most of the other dogwood fruits.

The Littleleaf Dogwood from China (*C. paucinervis*) is not quite so hardy as the other two just mentioned. The fruits are black, sometimes the foliage is half

evergreen, and it is usually under nine feet in height.

The Silky Dogwood (*C. amomum*) is native in the eastern United States, grows about nine feet tall, is as hardy as *C. paucinervis* (it can be depended upon only up to the warmer parts of Massachusetts) and is not so good an ornamental as *C. alba sibirica*. It is mentioned here because it is so widely found and has been collected and planted as a poor substitute for the Siberian dogwood. The fruits are bluish to almost a grayish color and the twigs are not nearly so red as are those of the Siberian dogwood.

The Siberian Dogwood (*C. alba sibirica*) is a native of Europe. If properly cultivated the young stems will be a more brilliant red than any other hardy woody plant with colored twigs. Considerably under nine feet tall, this plant, to look its best each winter, should have the older branches cut back at the base of the ground in the early spring. Thus, young vigorous shoots are forced into growth. It is also hardy throughout the United States and in all but the coldest parts of Canada. The flowers are small and white, borne in flat umbels about two inches in diameter; the fruits are white (sometimes slightly bluish) and very effective in the fall. An advantage this has over *C. stolonifera* is the fact that it does not tend to spread by underground stolons.

Because the variety *sibirica* has better red stems, the species (*C. alba*) need not be grown. There are other varieties of *C. alba*, however, which are also worth cultivating. *C. alba* 'Argenteo-marginata' is one, with its white-edged leaves. In fact, from a short distance, there is enough white in the foliage of this variety to make it a decided white-and-green color, distinctly different from the solid greens of most other shrubs. 'Gouchaulti' is a variety with leaves streaked with yellow and red hues, making it also a shrub to use for its contrasting foliage. 'Spaethii' has leaves irregularly variegated with deep yellow, and some consider this the handsomest of these varieties. I have always liked 'Argenteo-marginata,' for its white-and-green foliage has a cool appearance that is restful even on the hottest summer day.

The Red Osier Dogwood (*C. stloni-*



ARNOLD ARBORETUM

Cornus alba 'Argenteo-marginata'

fera) is the last of the species in this medium-sized group. It also is a native of the eastern United States, seldom grows more than seven feet tall and, like *C. alba*, is hardy in all but the coldest parts of Canada. It differs in that its twigs are not colored such a brilliant red. It tends to spread by underground stolons and so takes over space and is perfectly at home in moist to wet soils, hence this species is excellent for planting on banks or beside a stream or pond. For strictly specimen planting, *C. alba sibirica* or one of the other forms of *C. alba* should be selected, but for naturalistic planting in wet soils, the Red Osier Dogwood is the species to choose every time.

The yellow-stem variety should also be mentioned, *C. stolonifera* 'Flaviramea.' This has been known since 1900, and has all the good characteristics of the species and brilliant yellow twigs, in addition. Like many other shrubs, the older stems should be removed every few years, cut off at the ground in the early spring, to force from the base vigorous young growth which will, of course, be more brightly colored.

Dwarf Dogwoods

The smallest of all the dogwoods is the little Bunchberry Dogwood (*C. canadensis*), a native throughout eastern North America and even eastern Asia. Anyone familiar with the mountains of the eastern part of the country will recognize this nine-inch-high plant, usually growing in dense mats as a ground cover, its small head of yellow flowers surrounded with four to six large white bracts, and later followed by the edible bright red berries in the late summer. The leaves are evergreen and whorled about the stem. It grows only in the cool, moist climate of the mountains and when tried elsewhere must be given protection from drought and too-hot sun, else it will fail miserably.

A taller dwarf is the Kelsey Dwarf Dogwood (*C. stolonifera* 'Kelseyi'). This grows about eighteen inches tall and was found in 1927 and introduced by the Kelsey Highlands Nursery of East Boxford, Massachusetts. It has red stems and is densely branched, so it has some use as a low plant.



ARNOLD ARBORETUM

Cornus racemosa

These, then, are the better ones of the dogwood clan to grow as ornamentals. Of course, not all should have a place in every garden, but since there are twenty-one trees, fourteen shrubs and two dwarf shrubs among their number, at least one or two might be considered by every gardener, depending upon the area where his garden is located and the specific situation he might have available. It is obvious from the foregoing discussion that most of these recommended trees

and shrubs are of ornamental interest for at least two seasons (because of flowers and ornamental fruits) and that the majority could be said to have a third season of interest because of good foliage or interesting bark coloration. Trees and shrubs of interest for such a long period might well be given prime consideration in every garden, especially the small garden where space is limited and plants selected should be ornamental for a maximum length of time each year.

Lapageria in Oregon

DONALD W. STRYKER

One day in 1948 as I strolled through the Rhododendron section of the University of California Arboretum in Berkeley, I was astonished to see pendant from an oak tree a spray of rosy red waxen bell-shaped flowers—*Lapageria rosea*! I had read about this Chilean climber and had seen photographs, but it was love at first sight, and the beginning of an affair that continues to this day.

Although the literature* of horticulture has ample references concerning the cultivation of this plant in England, little has been written on its cultivation in this country. It is my purpose here to set down some of my experiences with this unusual and distinctive plant.

Having discovered *Lapageria*, I was disappointed to learn that no plants were available from the Arboretum, but I managed to obtain a specimen from England in the spring of 1949, and in 1959, I acquired a splendid collection of plants when the Arboretum at Berkeley was reducing its stock. These plants had been grown from seed which resulted from hand pollination of flowers in a garden in Chile by Paul Hutchison, who was there as a member of a University of California botanical expedition.

The small plant sent to me from England arrived in very poor condition, but I potted it in a mixture of sand, peat, and leaf mold, about equal parts, with just enough loam to hold it together, and put it on a heated bench in the greenhouse. When growth started, I used a mild solution of manure water as a fertilizer and the plant responded very well,

* Most of the European notices of *Lapageria* began in the middle 1800's soon after the introduction of the plant into England, but with almost as many reports from France, fewer and later from Germany. They are all agreed that the plant is beautiful, that it does better in the ground than in containers of any sort, with a soil that is mostly loose in character, humusy in nature, and quick draining. The recommendations are almost uniform for shade rather than sun, ample water during growing and flowering, and some discussions of propagation. As seed was not immediately available, division was admitted, and layering discussed at length. Later the discussions included reports on plants that grew out of doors in various parts of Britain, with an almost uniform report on walls, mostly north or northerly. Still later reports brought data on the use of cut flowers and their esteem with florists. By the end of the 19th century the plant had almost disappeared from print, so that the total pattern in history may be about to repeat itself here, in this country.—Editor.

soon crowding the bottom of the pot. I moved the plant into a "half barrel," and the roots were not long in matting the bottom of even this, some 18 or 20 inches deep. I do not know how deep the roots would grow if not confined.

This original plant, which has now been here for 12 years, is tremendous, making new shoots each year that grow as much as 15 to 18 feet. And contrary to what has been written, it *does* flower on these new shoots! The tip of the shoot, extending back often as much as two feet, contains one or two flowers in each leaf axil, making a veritable garland of flowers.

The plants respond very well to pot culture if the soil mixture is quite porous. I use the same mixture as with my original plant but with slightly more leaf mold. Plants in the ground do very well in an almost complete leaf mold and rotten wood compost. On the other hand, I have planted *Lapageria* in straight soil with only the addition of a bit of peat moss. One specimen planted thus in the fall sent up, the following April, a shoot which came from the ground a full two feet from the original plant and which grew to nearly 18 feet and produced 35 flowers by August.

Soil is less important than shade. When planted outdoors, *Lapageria* loves to grow up into and under the branches of trees, just as in its native Chilean forests, but I have never found any shoots attempting to grow out into full sunshine.

It likes plenty of water while growing and especially when flowering, and responds well to a humid atmosphere. The foliage should be wet down thoroughly during excessively hot days.

As far as feeding is concerned, I find that *Lapageria* planted in the ground in a good mixture of leaf mold and peat with good fibrous loam needs only an occasional application of any "complete" fertilizer. I use one that is soluble in water, and apply it about three times during the growing season after soaking the roots thoroughly.

My garden near Langlois, Oregon, is approximately a mile and a half from the Pacific ocean, so that the climate is normally mild. Since I have planted *Lapageria* outdoors, however, the temperature has gone as low as 20 degrees—12 degrees of frost—but only the new growth on the tips of the shoots was damaged, and only that which had grown beyond the protection of the lath house had to be cut back. One plant higher on the hill under an oak tree was not injured at all. The same structure or foliage which shields *Lapageria* from the sun should provide protection from the occasional frosts of mild climates, and plants killed back to the ground by a freeze sent up new growth in the spring in instances where the roots were protected, according to the experience of Maurice Amsler in an English locale similar in climate to Oregon's coast.

I have also talked to a friend who has done some mountain climbing in Chile, and he tells me he has seen plants covered with snow. This naturally protects them, but he also stated that he has seen plants frozen down to almost ground level, where snow covered them, and that in the spring new growths appeared and the plant was not actually hurt.

Also, I once moved a flat containing seedling *Rhododendron* from under a large *Lapageria* plant in the greenhouse, out into a quite cold area. During that winter this flat froze solid, yet in the spring I discovered dozens of small *Lapageria* seedlings coming up all over this flat! The fruit had fallen into the flat and I had not noticed it. Thus it would seem that *Lapageria* is far more hardy than is suspected.

To further test this idea, I have given plants to friends in Portland and also some of the other areas in the Willamette Valley, with the understanding that they be planted out in a fairly protected area but where if a really hard freeze came, they would be subjected to it. I have suggested that the roots of the plant be protected with a heavy mulch in such conditions but that would be all. Then we shall know if the plant will come back, like an *Asparagus*, to which, of course, it is closely related.

Lapageria has traditionally been grown in cool greenhouses, but plants I have sold have been grown successfully as house plants.

I am very cautious about doing any trimming of *Lapageria*. When by accident the tip of some of the new shoots have been broken, I have noticed that often the shoot will not produce an offshoot for two years or more, and then it will send out several along the stem—always from a leaf axil, but one never can tell in advance from which ones. *Lapageria* seems to resent being cut back and will sulk and not send out any growth at all for as much as a year. I try to cut out only the dead wood or shoots that are superfluous. The growth from the old shoots is often wiry and difficult to train, so I try to keep all of the strong new growth trained separately in order to better control the side growths which produce the most blossoms.

Slugs and snails are voracious enemies of *Lapageria* and must be completely controlled. The only insect which has attacked my plants is orange tortrix, which briefly infested the greenhouse until eliminated by DDD.

Propagation of *Lapageria* is most difficult from cuttings, and the roots often take two years to form even when the preferred method of layering is used. I have propagated almost exclusively—and with excellent results—from seed, except when I have developed an outstanding clone, when I propagate by layering.

I was unable to obtain any volunteer seed from my original English plant, but Paul Hutchison sent me pollen of a particularly fine white clone which he had named "White Cloud," and from application of this pollen on my plants I have acquired some very fine forms. With these and the mature plants acquired from the University of California I started an extensive program of hybridization. The results are most gratifying. Using pollen of "White Cloud" on other whites, I now get a great percentage of white-flowering plants. Selecting the largest flowers and putting pollen of the darker shades of rose to red, I now have some very fine deep colored forms. My *Lapagerias* now range in color from the purest of whites to white petals under greenish or yellowish sepals to pink sepals, to very soft pale pink sepals and petals to shades of almost a clear red.

To date I have not found a single plant with inferior flowers. I use as seed parent only the largest, best-colored

forms growing here and for the most part put pollen of whites on white, pink on pink, etc. We have had some extraordinary flowers on some of the seedlings and these we hope eventually to name and propagate as clones.

I have found that seedlings, if well cared for, usually will flower in their second year, producing only one or two blossoms, but in their third year they become well established and start to send out strong flowering shoots. Since there are many plants, inside and outside of the greenhouse, I have flowers over the entire year. The heavy flowering season for all plants, however, is from July to November.

Lapageria makes a novel cut flower. I once gave a rather long branch of flowers to a garden club member for use in a display, and she later cut it into three sections for her friends. Nearly

three weeks later these ladies were kind enough to write and thank me for the flowers and informed me they were still in good condition! I have heard that the plant was grown in Europe before World War I as a source of cut flowers for corsages. I have given blossoms to two local florists who have been quite enthusiastic about the plant in their work.

Lapageria has had the reputation of being most temperamental. I have a plant list for Southern California published in the 30's which includes *Lapageria* in several sections but in the category of those plants which "rightfully belong to those who work with some knowledge of plants or who knowingly enter into the experimental." My experience is quite to the contrary. While it cannot be left to fend for itself, *Lapageria* seems to do equally well in a greenhouse, a lath house, or planted outdoors in mild climates.

A Rarely Cultivated Pitcher Plant

W. H. HODGE

Plants producing pitcher-shaped leaves, used as pitfalls both to snare prey and to digest such additional nutrients, are not unfamiliar subjects in horticulture. They occur in three plant families, one native to the western hemisphere (SARRACENIACEAE), one to the Old World tropics (NEPENTHACEAE), and one to Australia (CEPHALOTACEAE). Several species of our native American pitcher plants (in the genus *Sarracenia* in eastern North America, and *Darlingtonia* of the northern California and southern Oregon coast) are occasionally grown as greenhouse or garden plants; the numerous species and hybrids of *Nepenthes* of the Eastern tropics are perhaps even more familiar, being collectors' items for conservatory culture; but attractive little *Cephalotus follicularis*, the West Au-

stralian pitcher plant and the only species in its family, is the rarest of the pitcher plant lot, seldom seen in cultivation.

Although occasionally grown as a prized plant in collections at European or British botanic gardens, this species until recently has apparently not been cultivated in this country. As a result of horticultural exploration in 1958, the writer was able to collect this rarity in the field in West Australia and living plants are now established at Longwood Gardens.

Cephalotus follicularis grows in a botanical paradise—the southwest corner of Australia—in an area noted for its wealth of unusual native plants. There it was apparently first seen and collected



W. H. HODGE

Cephalotus follicularis growing in peaty soil in the wild near Denmark, West Australia. The overstory of grasses and sedges were cut back so as to show the pitcher leaves.

by Archibald Menzies, naturalist of the Vancouver's expedition of 1791. Even at home the range of this little pitcher plant is localized for although it occurs along the coast from the Pallinup River west to Busselton, it actually is common only in the districts just west of Albany. Because of this, it is sometimes called the Albany Pitcher Plant. Its native haunts are part of a land with a Mediterranean-type climate characterized by mild temperatures with frostless, wet winters (May to October) and rather dry summers.

For a stranger to find plants in the wild is not always an easy matter for although *Cephalotus* grows in peaty soil in moist open spots along streams and swamps, its earth-hugging rosettes are hidden beneath an overgrowth of grasses and sedges which usually dominate the

scene. It is said to prefer free-moving soil water for successful growth and this appears to be the case. All plants observed by me were growing a rod or two away from the open water of a swamp, but the roots were definitely above the water table and growing in a fibrous mat of plant remains.

Like our own native pitcher plants, *Cephalotus* produces compact rosettes of leaves arising from a main taproot. Older plants form long underground stems from which secondary rosettes are produced at some distance from the parent. A single plant rosette stands no more than two to three inches above the surface of the ground. Unlike our American pitcher plants, two types of leaves are produced. One is a normal, flat, somewhat fleshy, green foliage leaf, ovate or elliptical in shape and produced in the



G. HAMPFLE, LONGWOOD GARDENS

Closeup of a cultivated specimen of Cephalotus, growing in sphagnum in a terrarium, and showing details of normal leaves (center, above) and pitcher leaves.

fall in the center of the rosette; these function as photosynthetic over-wintering leaves. The other leaf type is the curious little carnivorous pitcher which appears on the outer margins of the rosette in late winter and spring in ample time to be ready to trap prey in the main insect-hunting season of summertime.

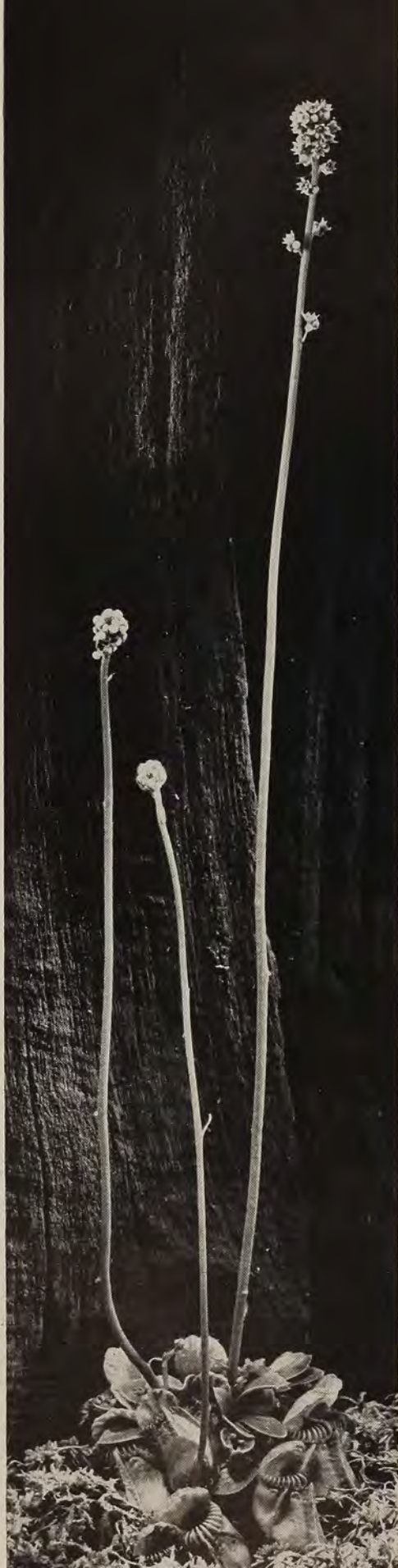
The diminutive pitchers (actually transformed leaf petioles) are elegant structures, well designed for holding water for trapping such terrestrial game as ants. Three girder-like structures aid not only to strengthen the one-to-two-

inch-long vessel, but also serve as a sort of living "barbed-wire fence," directing insects upwards to the "one-way-only" orifice of the trap. A formidable barricade of down-pointing teeth at the trap mouth plus the usual slick slide surface on the upper inner walls of the pitcher assure that entering prey will seldom escape. Although the pitcher leaves are basically pale green, they have attractive purplish or maroon coloring which is prominent on the girders, the orifice teeth, and especially on the veins of the protective cap or hood.

Cephalotus would hardly be grown for its tiny buff colored flowers which appear in clusters at the summit of a tall twelve-to-twenty-four-inch leafless stem, reminding one of the inflorescence of our early woodland saxifrage (*Saxifraga virginensis*), which indeed is a not-so-distant relative. The tall, simple stalk is well designed to carry the flowers of this species up through the overgrowing mat of grasses and into a better position to assure pollination by those flying insects upon which it relies, not for food but for survival.

Although *Cephalotus* is botanically well-known, horticultural notes apparently do not exist and so a few remarks may be in order for the rare grower who may have the chance to cultivate this unusual species. Seed is apparently available for only a short time in season in the wild and is practically impossible to obtain unless a collector is on the remote spot in Western Australia at the proper season. Thus *Cephalotus* is most readily propagated vegetatively from plants collected in the field. Mature plants obtained near Denmark, West Australia, were shipped to this country by air in polyethylene bags. At Longwood Gardens they were potted up in several different soil mixes including peaty soil and ordinary live sphagnum. All pots were plunged in sphagnum on a greenhouse bench and kept under cool growing conditions. A few of the potted plants were plunged also in sphagnum inside a terrarium. Only the terrarium-grown specimens thrived, indicating the need for higher conditions of humidity than is available under normal greenhouse conditions. Special care should be given in terrarium culture to assure ample drainage which is apparently an important factor for good growth. *Cephalotus*, as noted above, is not a bog plant and definitely will not survive conditions where its roots stand in water. Our plants have flowered annually. In cultivation the production of flowers (usually in June) is followed by a falling off in vigor and it seems wise, in order to maintain good growth, to pinch off flower stalks as they appear, particularly since, in most cases, the species would be grown not for its flowers but for the unusual morphological features of its pitcher leaves.

The West Australian Pitcher Plant in flower, a greenhouse plant, growing at Longwood Gardens.



Some Shade and Ornamental Maples

Part 2

CURTIS MAY

Paperbark Maple (*Acer griseum* (Franch.) Pax, also called Cherry Bark Maple, reaches 25 feet or so in height. It was brought to the United States in 1901 from its native western China. It is hardy in plant zone 5. The tree usually forms a rounded rather open crown. Leaves are compound; each of the 3 leaflets is 1 to 2 inches long, pointed, and coarsely and bluntly toothed (Fig. 3-F). They turn red in autumn. The petioles are hairy. Flowers are relatively few and borne in a hairy corymb. The pendulous fruits hang on short stalks. The chromosome number of the vegetative cells is 26 according to Foster (8).

Seed germination is poor because of undeveloped embryos. Seed should be stratified in moist sand out-of-doors or refrigerated for a year before planting. Because of the poor seed germination and lack of other practical methods of propagation, the Cherry Bark Maple has not been planted extensively.

The light brown bark that separates in thin flakes in a manner similar to that of the paper birch is the most unusual characteristic of this species (Fig. 12).

Red Maple (*Acer rubrum* L.), also called Swamp, White, Scarlet, or Soft Maple, is native throughout most of the eastern half of the United States and has been planted in most States. The species is hardy in plant zone 3.

Red Maple trees may tower to a height of 120 feet, and the diameter of the trunk may reach 60 inches, however, in cities within its native range, a height of 50 to 70 feet at maturity would be considered normal. Red Maple trees may live for about 150 years, but the expected life span in cities would be 50 to 75 years. Uncrowded Red Maple usually develops a more or less rounded crown, but pyramidal and columnar varieties have been found and propagated.

The bark on young limbs and branches is smooth and light gray. It is darker and breaks into scales on older parts. The twigs are green at first and later red with numerous light-colored, corky spots called lenticels. Bark of the twigs lacks the pungent odor of bark of the twigs of silver maple.

The 2½- to 4-inch long leaves are dark

Figure 13. Staminate (left) and pistillate (right) flowers of the Red Maple are produced before the leaves from buds formed during the previous growing season.



green and shiny on the upper surface and light green and slightly hairy on the lower surface (Fig. 3-H). They have 3 or 4 sharply and irregularly toothed lobes. In most seasons the leaves brighten the autumn landscape with their brilliant scarlet, orange, and yellow colors. Some trees display brilliant red autumnal color year after year. These should be sought, propagated, and distributed.

Red Maple trees are also especially attractive in late winter or early spring when the dense clusters of small, red or rarely yellow, sessile flowers open before the leaves. Trees may bear only pistillate or only staminate flowers, or both (Fig. 13).

The vegetative cells have either 78 or 104 chromosomes according to Duffield (6).

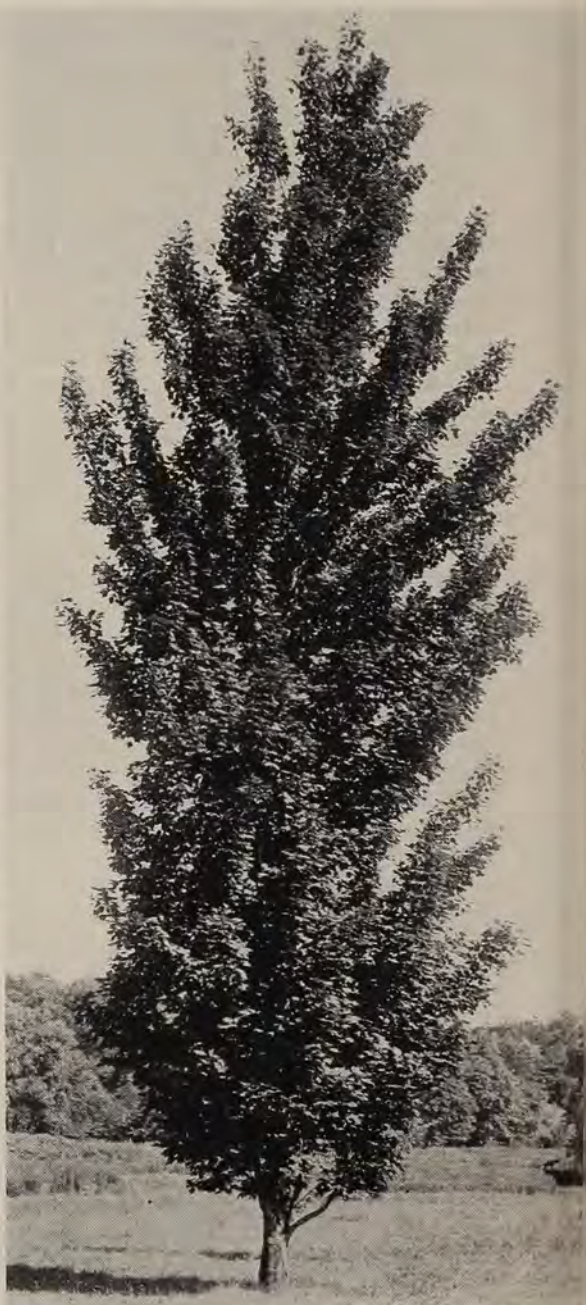
The bright red of the immature fruits contrasts pleasingly with the light green of the expanding leaves. At maturity in late spring or early summer the fruits are tan to brown. The wings of the fruits average $\frac{3}{4}$ -inch in length.

Seed should be collected as soon as it is ripe. There are about 25,000 cleaned seeds in a pound. Germination potential is 75 to 85 per cent. Red Maple is generally propagated from seeds, which will germinate and may be planted as soon as they are ripe. They may be kept under refrigeration at about 40°F. and planted in the autumn of the season of ripening or the following spring.

If only a few seedlings are desired, seeds may be planted in moist, shredded sphagnum in a flat or a pot. Seedlings growing in sphagnum rarely damp-off and may be held for many weeks or months if necessary before they are transplanted. In commercial practice seeds are sown out-of-doors in beds or rows.

Selections are propagated by budding or by grafting the selections onto seedlings of the species. Seed from special selections only rarely produce seedlings having the characteristics of the seed-source tree. Several special selections of red maple are available. Among these are columnar and globe-shaped types. *A. rubrum* f. *columnare* (Rehd.) Scherwin (Fig. 14) is densely upright; the cultivar Armstrong is narrowly columnar. Cultivar Bowhall also grows tall and straight.

A. rubrum f. *schlesingeri* Sarg. ex Scherwin develops autumnal colors about 3 weeks earlier than the species. Other



ARNOLD ARBORE

Figure 14

Red Maple, *Acer rubrum* f. *columnare*

cultivars are Gerling, Scanlon, and Tilford.

Red Maple, which is planted extensively for shade from the Atlantic coast to the eastern part of the Great Plains, can be transplanted relatively easily. Information given for transplanting Sugar Maple applies also to Red Maple.

Red Maple thrives best on a fertile, well-drained, moist soil, but will grow satisfactorily on a wide range of soil types including relatively dry sites. It will tolerate wetter sites than sugar maple. In nature it is often found in somewhat swampy places.

For those who desire a tree of fairly rapid growth, the Red Maple represents a compromise between the rapidly growing Silver Maple and the more slowly growing Sugar Maple. However, some storm damage to old trees may be expected in regions having ice, sleet, and heavy wind storms.

Red Maple commonly has a wide-spreading, somewhat shallow root system, which absorbs much water from the soil. Maintenance of a good lawn beneath a Red Maple is often difficult because it casts heavy shade and demands considerable water. Pruning of lower branches to raise the base of the crown will allow more light to reach the ground beneath the tree.

Roots of Red Maple will grow through small openings in sewer pipes. Once inside the pipe, the roots grow rapidly and interfere with flow of sewage.

Red Maple is sometimes tapped for syrup. The yield of sugar is said to be about half that of Sugar Maple. The wood is used for flooring, furniture, and miscellaneous purposes. It is not as strong as wood of Sugar Maple. Birds, squirrels, rabbits, deer, and other wild-life feed on red maple or use it for shelter. Bees collect pollen and nectar from the flowers.

Rocky Mountain Maple (*Acer glabrum* Torr.), also called Dwarf Maple, is native to western North America. It is a bush or small tree growing usually to not more than 25 feet in height but reaching a height of 40 feet and having a trunk diameter of 6 to 12 inches. Trees are often bush-like because of the numerous basal sprouts that develop and the upright branching habit. Bark of the trunk is thin, smooth, and dark reddish brown. Winter buds have red or occasionally yellow scales.

Leaves are deeply 3- to 5-lobed or 3-parted, 1 to 5 inches wide, dark green and shining on the upper surface, and pale green on the under side (Fig. 2-D). Petioles are bright red. Leaves become richly colored in autumn.

Flowers are about $\frac{1}{8}$ inch long and are borne on short stalks in loose corymbs on slender, drooping pedicels. Staminate and pistillate flowers are usually formed on separate plants.

Fruits are smooth with broad, nearly erect wings and are often rosy in summer.

There are 13,000 to 20,000 seeds in a pound. Seed may be sown in autumn after it ripens. One authority suggests storage at 41°F. for 90 days before planting.

Rocky Mountain Maple grows well on a relatively dry, well-drained site in the sun. It is not used much as a shade or ornamental tree, but in some western parks it contributes blazing color to the autumn picture. Deer commonly browse on it.

Silver Maple (*Acer saccharinum* L.), also called Soft Maple, White Maple, or River Maple, is a widely planted native tree reaching 120 feet in height under the best growing conditions. In cities it commonly grows to a height of 50 to 75 feet. It is native to northeastern United States and the eastern part of the northern and central Great Plains but has been planted in all States.

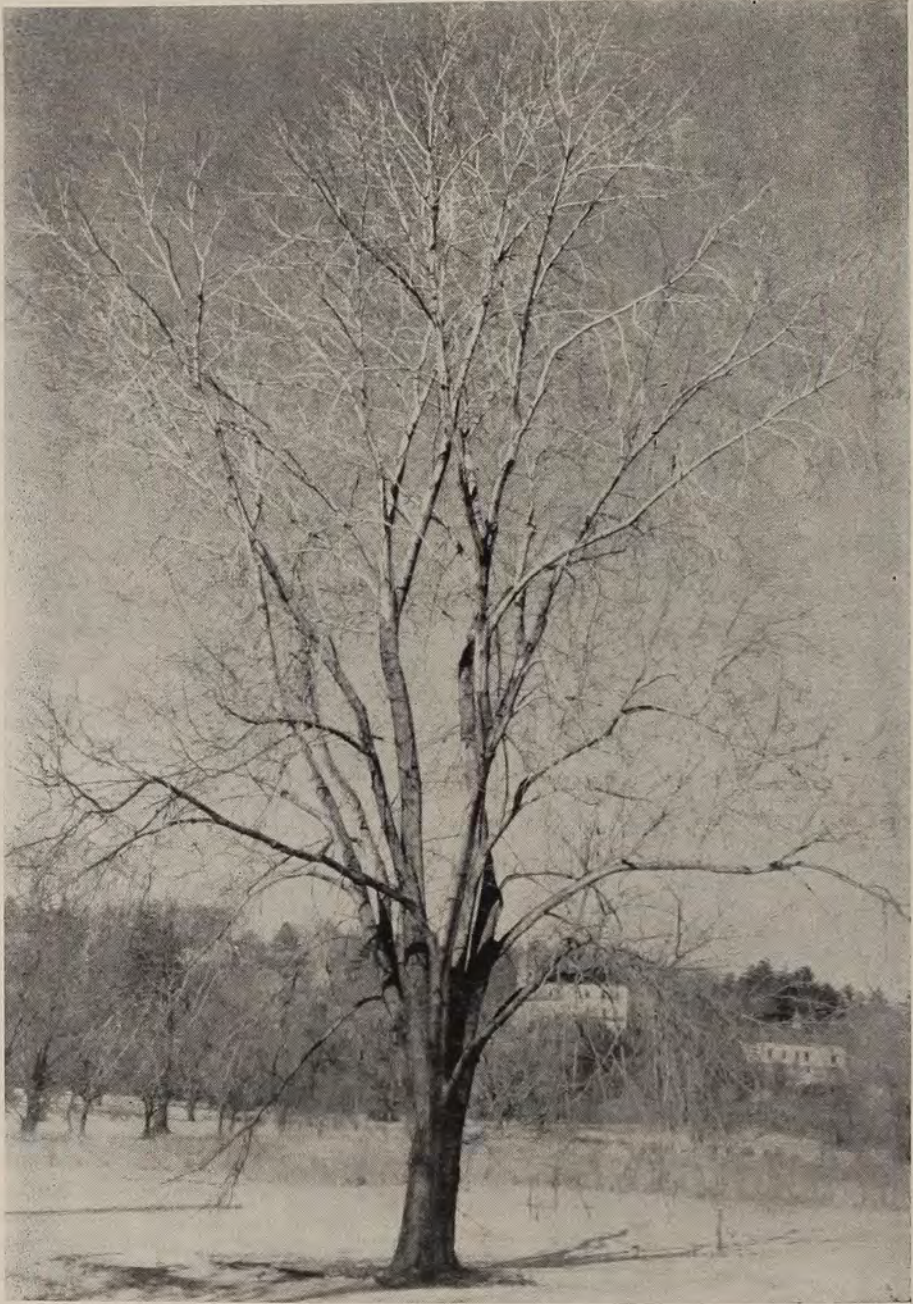
The crown is commonly wide-spreading with many long, slender branches (Fig. 15), but columnar types have been selected.

The 4- to 6-inch long leaves are deeply 5-lobed to 5-cleft, with each lobe deeply and doubly serrate. They are green on the upper surface and silvery white on the lower (Fig. 1-D). They turn yellow in autumn.

The bark on young trunks, limbs, and branches is smooth and gray. On older stems it is light brown, has a furrowed surface, and breaks into flakes which are commonly loose at the ends and fastened in the center. Twigs are green or chestnut brown and have a pungent odor when broken. Twigs of Red Maple (*A. rubrum*) do not have this odor.

The trunk is upright often dividing into two or more main ascending limbs, especially when the tree is not crowded. One Soft Maple with a trunk 22 feet in circumference is on record from Wisconsin.

The wood is light in color, relatively soft, brittle, subject to early decay, and



ARNOLD ARBORETUM

Figure 15

Branching habit of Silver Maple. Bark is light-gray and has a distinctive odor.

to breakage in severe wind, snow or ice storms.

Flower buds form during the summer on twigs of the current season's growth and open in late winter or early spring of the following year. Flowers have no petals, are greenish yellow, and are produced in short-stalked clusters. Staminate and pistillate flowers may be produced on the same or on different trees. The chromosome number of vegetative cells is 52, according to Taylor (16).

The young 2-winged fruits are red at first, but turn straw-colored or light brown when they ripen in early summer.

A tree bearing pistillate flowers will normally produce some seed each year and an especially abundant crop at irregular intervals. The seed will germinate as soon as it is ripe and usually will produce a seedling with several pairs of leaves by the end of the first growing season. Seed may be stored at about 40°F., but if the moisture content of the seed falls below 30 to 34 per cent it will not germinate. There are about 1,400 cleaned seeds to the pound.

Propagation is generally by seeds, but special selections are propagated by budding or grafting. Propagation by cuttings is uncertain.

The cultivar *Wieri* has pendulous branches and deeply cleft leaves with dissected lobes. *Kraussman* (10) describes 29 selections.

Silver Maple grows rapidly and will withstand city conditions. It grows best on a moist, rich soil but will grow on many soil types and in relatively unfavorable environments. Silver Maple is on the shade tree blacklist because of the tendency of old trees to break in storms, raise and break sidewalks with roots that form near the surface, and because its roots often clog sewer and drain pipes.

Silver Maple is subject to damage by fungi that cause verticillium wilt, wood decay, and leaf spots. In the Great Plains Silver Maple trees sometimes fail to develop normal green leaves but have instead pale-green or greenish-yellow leaves. Poor growth can be expected of trees with this chlorotic leaf condition.

Silver Maple can be tapped for syrup. The yield is said to be about half that of the Sugar Maple. Silver Maple is fed upon by deer, squirrels, rabbits, and other wildlife. Trunks and limbs hollowed by decay furnish shelter for wildlife.

Figure 16. Flower clusters (left) of Sugar Maple. Flowers of lower cluster are staminate. In the upper cluster some flowers are staminate and some are pistillate. Staminate flowers have sausage-shaped pollen sacs. Pistillate flowers have elongated, crooked stigmas. Staminate flower cluster (right) of the Striped Maple.

COURTESY OF W. H. HOEGE



Striped Maple (*Acer pennsylvanicum* L.) also called whistlewood and moosewood, is native in eastern North America and hardy in plant zone 3. Trees are usually less than 40 feet in height.

The bark is thin, rather smooth, greenish to reddish brown, and prominently marked with longitudinal white streaks that appear during the second season of growth. Old bark is darker, rougher, and less streaked. The striped bark is especially attractive in winter. Buds are red. Bark of *A. p. f. erythrocladum* (Spaeth) Rehd. retains its redness in winter.

Leaves are slightly cordate, 3-lobed, 5 to 7 inches long, and finely toothed. Young leaves have a brownish pubescence on the lower surface. They turn yellow in autumn.

The yellow flowers are borne in drooping racemes and open in May or June after the leaves are fully expanded. Staminate and pistillate flowers occur in separate clusters but on the same tree (Fig. 16 right).

The fruits, which are scarlet when ripe in September, are short-stalked and have wings spread widely at right angles.

There are about 15,000 seed to the pound. Seed may be sown outdoors in early autumn or stored at 41°F. for 90 to 120 days if it is to be planted the spring after it is collected.

In nature, striped maple grows best in cool, moist woods in a partly shaded situation. It does not respond to cultivation and is best when naturalized and left alone.

Sugar Maple (*Acer saccharum* Marsh.) is also called Rock Maple, Hard Maple, or Sugar Tree. Black Maple is sometimes considered a variety of Sugar Maple.

The native range of sugar maple extends from Nova Scotia and Newfoundland westward to eastern North Dakota, southward to Texas, and eastward to Florida. It is planted for shade in all States, extensively from New England to the eastern Great Plains, but it does not thrive where temperature is high and soil moisture low. It is recommended for low elevations in Montana, for western Washington and Oregon, and for northern California. *A. saccharum* is hardy in plant zone 3.

Uncrowded Sugar Maple trees usually

have a short compact trunk and a compact, more or less globular crown (Fig. 17). However, varieties with crowns of other shapes have been selected. Bark of young trees is silvery and smooth. As the tree matures the older 1/2- to 3/4-inch thick bark becomes darker, deeply grooved or ridged longitudinally, and tends to break into flakes, plates, or scales.

Sugar Maple trees may live for 100 years or more, reach 120 feet in height, have a branch spread of 60 to 80 feet and a trunk diameter of 3 to 4 feet under the most favorable conditions. However, when planted on streets in cities, trees with a height of 75 feet and a branch spread of 40 feet would be considered fully developed. The proportions of the height of the tree to the breadth of the crown of the conic, pyramidal, or columnar selections are of course different from those of the species.

Leaves of Sugar Maple are opposite. They vary greatly in size but generally are 3 to 5 1/2 inches wide (Fig. 1-E). They are dark green on the upper surface, lighter green on the lower surface, and thinner than the leaves of the Norway Maple or common Red Maple.

The small, yellowish, clustered flowers hanging on long hairy pedicels are produced from leafless lateral buds or leafy terminal buds at the time the leaves expand from the brown pointed buds in the spring (Fig. 16, left). Each cluster of flowers may contain staminate or pistillate flowers, or both. Both types of flowers are usually produced on a tree, but sometimes a tree may produce flowers that are all of one type. Taylor (16) reported that the chromosome number of vegetative cells is 26. The flowering period may last from a few days to about 2 weeks, depending upon weather. Cool weather prolongs the period. Bees collect pollen and nectar from the flowers.

The samaras ripen in autumn and whirl down on their 1- to 1 1/4-inch long wings. In winds they may cover considerable distances.

Sugar Maple may be propagated from seed. A good seed crop may be expected every 3 to 7 years. Usually only one of the pair of keys contains a seed. The light-brown, ripe fruits may be taken from the tree or collected after they fall. The fruits may be stored in a cool place over winter and planted the following



Fig. 17. This magnificent Sugar Maple at the Arnold Arboretum is typical of the species.

spring or may be planted in the autumn, in which case the seed normally germinates the following spring. Germination is hypogenous, that is the cotyledons remain beneath the surface of the ground. A rest period of 60 to 90 days at about 35 to 40°F. is necessary before seed will

germinate. The kitchen refrigerator provides satisfactory storage conditions for small quantities of seed. Seed should be stored dry. Wet seed may decay in storage. Seed stored for 90 days in moist sphagnum at 31°F. had begun to germinate. The germinated seed was planted



Figure 18

***Monumentale*, an upright selection of Sugar Maple.**

in shredded sphagnum and it produced normal plants. Seed refrigerated at 35 to 40°F. should be planted as soon as possible after storage for 60 to 90 days.

The average number of seed per pound is about 6,000 but the range is 3,000 to 9,000. An average germination of about 40 per cent may be expected. The seed will germinate in light having an intensity of 2 per cent of full sunlight. Seeds of selections usually do not produce seedlings having the charac-

teristics of the seed-source tree. Selections are propagated by grafting onto Sugar Maple seedlings.

If only a few seedlings are desired, seed may be planted about 1/8- to 1/4-inch deep in pulverized and moistened sphagnum moss in a wooden flat. In sphagnum the seedlings may be held for a year or more, or they may be transplanted to soil after the stems have become woody. In commercial practice, the seed is sown in beds out-of-doors in the autumn or spring.

No practical method of propagating Sugar Maple by cuttings has been developed, but rooting up to 65 per cent of greenwood cuttings taken from young trees in June and treated for 3 hours with indolbutyric acid at 50 parts per million has been reported.

Acer saccharum f. *monumentale* (Temple) Rehder, the Sentry Maple (Fig. 18), has a compact, upright form. *A. s. f. columnare* (Temple) Harkness is somewhat similar. The columnar types produce a dense top and generally grow more slowly than the species. Several cultivars have been named. Among these are Coleman, Flower, Newton, Sentry, Sandborn and Temples Upright. Harkness (9) discussed the nomenclature problems of selections of Sugar Maple.

Dormant Sugar Maple trees may be transplanted in either spring or autumn with a relatively high expectancy of survival. Trees in full leaf may also be transplanted successfully if adequate equipment is available and proper precautions are taken. Sugar Maple trees of any size may be transplanted. Small dormant trees may be moved with bare roots. When a large tree is moved, soil in which the roots grow should be moved with the tree, and with as little disturbance as possible. For such work special equipment is needed and the services of an arborist are advisable.

Sugar maple thrives in a rich, well-drained soil but will grow on a wide range of soils. Sugar Maple does not grow well in poorly drained or poorly aerated soil. When a young tree is planted one should make certain that the hole in which the tree is planted will not hold water during rainy periods. The rate of drainage can be determined by digging a test hole following a period of wet weather, filling the hole with water, and observing how much time is required for the water to drain out of the

hole. If water stands in the hole more than a day, some provision should be made to improve the drainage before the tree is planted. Trees are more susceptible to damage from excess water in the soil during the growing season than during the dormant season. Excess water reduces the oxygen content of the soil, and roots may suffocate.

Sugar Maple is classed among the more storm-resistant trees, however, in hurricanes and in sleet and ice storms, some trees may be damaged. Sugar Maple is more storm-fast than Silver or Red Maples. Bleeding canker may develop following severe storm damage. Sugar Maple is susceptible to damage by smoke and fumes and so is not suited for planting in areas where air pollution is a problem. It is seldom damaged by early

autumn or late spring frosts. It is recommended for lawns, parks, and streets that are wide enough to accommodate it.

Mycorrhizal fungi (endotrophs) grow in the roots of Sugar Maple but little is known about their effect on tree growth.

The Sugar Maple is the source of most commercial maple syrup and sugar. The wood is hard and close-grained, and takes a high polish. It is used for a wide variety of items where either strength or a smoothly finished surface are required. It supplies food for birds, deer, squirrels, rabbits, moose, and beaver.

Sugar Maple is the official tree of New York, Rhode Island, Vermont, West Virginia, and Wisconsin.

Stumps of Sugar Maple usually become punky and may be broken up easily 7 to 10 years after the death of the tree.



ARNOLD ARBORETUM

Figure 19. Magnificent specimen of the Sycamore Maple, *Acer pseudoplatanus*, near the Black Water River, Kells, Ireland.

Sycamore Maple, a vigorously-growing maple (*Acer pseudoplatanus* L.), is a native of Europe, and was brought to this country in early colonial times (Fig. 19). Mature trees may reach 90 feet in height and have a wide spreading crown which is less compact than that of Norway maple. Sycamore Maple is hardy in plant zone 5.

The thick, leathery leaves are 5-lobed with coarsely serrate margins, $3\frac{1}{2}$ to 7 inches across, deep green on the upper surface and lighter green on the lower surface (Fig. 1-F). Winter buds are green. Harkness (9) stated that, in Rochester, leaves commonly freeze on the tree before they fall in autumn.

The bark of the short trunk is gray



ARNOLD ARBORETUM

Figure 20. Tatarian Maple, *Acer tataricum*.

and breaks loose in thin, broad flakes or scales.

Each vegetative cell contains 52 chromosomes (Foster (8)).

The yellowish-green flowers are produced in pendulous racemes in late spring.

The fruits, which hang in clusters that may be as much as 5 inches long, ripen in autumn but hang on the tree through the winter. They may be collected and sown in the autumn or held in storage at 40°F. for 90 days before sowing. The average number of seeds per pound is 5,900. They will germinate between 40 and 50°F.

Propagation is by seed and by budding of varieties on seedlings of the species. (See Sugar Maple for further information on propagation.)

Several selections are cultivated. *A. p. f. erythrocarpum* (Carr.) Pax has bright red fruits. Leaves of *A. p. f. purpureum* (Lond.) Rehd. are purple on the lower surface; those of *A. p. f. worleei* Rosenth. and Schwerin are deep golden yellow when they are young. Leaves of the cultivar *spaethi* are burgundy wine red on the lower surface. The cultivar *globosum* has a rounded crown; *ascendens* and *erectum* have upright branches. Other cultivars are *Leopoldii* and Prinz Handjery.

Sycamore Maple trees of any size can be transplanted successfully. (See Sugar Maple.)

Sycamore Maple has been planted in the East, on the Pacific Coast, and in the Rocky Mountain region. It is not as hardy and in general is not as long-lived as Norway Maple. It is resistant to damage by salt spray and is useful in seacoast planting. Because of its tendency to develop roots near the surface, it sometimes cracks and raises sidewalks when planted close to them. In Europe the wood, which is used for furniture, is called harewood or silver greywood.

Tatarian Maple (*Acer tataricum* L.), a relatively small tree, almost as wide as tall and growing to a height of 20 to 30 feet, was brought here in 1759 from its native lands in southeastern Europe and Asia (Fig. 20). This useful small tree or tall shrub is hardy in plant zone 4.

The slightly glossy, 2 to 4 inch long, roundish oval or oblong or cordate leaves have doubly serrate margins. They color highly red and yellow in autumn.

Flowers are white and borne in long peduncled panicles. Young fruits are bright red in summer. Abundant seed

is produced. There is one record from Montana of trees that produced seed when they were about 7 years old.

Seed may be sown outdoors in autumn. Stratification or cold storage might also be a satisfactory method of holding the seed for spring sowing. Coggeshall (5) reported that 63 and 77 per cent of cuttings taken from old trees on August 16 and May 10, respectively, rooted in sand under a plastic tent.

The Tatarian Maple grows best in moist soil.

Vine Maple (*Acer circinatum* Pursh), native from British Columbia to California, grows to about 40 feet in height under favorable conditions in the West. The crown is widespreading, often with several basal branches resting on the ground. These branches may produce roots. Stems of Vine Maple commonly are much twisted and turned. The light green leaves are 2 to 7 inches across and have 7 to 9 serrated lobes, which become tinged with red in late summer. Autumn foliage is yellow to orange and scarlet. My co-worker, F. G. Meyer, says that in burned-over areas along the Pacific Coast Vine Maple provides a blazing splash of scarlet beginning in September. The attractive flowers are carried on drooping corymbs and have white to red or purple sepals. The fruits are rose colored.

The chromosome number of vegetative cells is 26, according to Foster (8).

There are about 5,000 seed per pound. Seed sown in autumn after it ripens will germinate the following spring.

Vine Maple, which may live in nature for 80 to 90 years, will grow in partly shaded situations. It does not thrive in the East but may be used in partly shaded locations. At Rochester, N. Y., it grows as a shrub on poor soil, according to Harkness (9).

In nature it furnishes food for wapiti, beaver, and muskrat.

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Rosa foetida

(Photographed from a plate in Curtis's Botanical Magazine, t. 363)

The Wild Yellow Roses and Related Species*

"The Yellow Rose (as divers do report) was by Art so coloured, and altered from his first estate, by grafting a wilde Rose upon a Broome-stalke; whereby (say they) it doth not only change his colour but his smell and force."—Gerard's Herball, 1597.

GRAHAM S. THOMAS

It so happens that most of the few yellow-flowered wild roses fit botanically into a convenient group, the Pimpinellifoliae, including one white-flowered species, and these few species are distributed only through the Old World from Eastern Europe to China. So far only two of them—*Rosa foetida*, the Austrian Brier, and *R. spinosissima*, the Burnet Rose—have been used to any extent by hybridizers, and possibly untold advances in yellow roses are at hand through some of the other species.

These roses form a rather diverse group from a garden point of view but botanically they are governed by a few characters common to them all. They are erect-growing shrubs, with straight or almost straight prickles; leaves small, with anything from five to nineteen leaflets; stipules narrow and joined to the petiole for about half their length; bracts absent; the sepals are vertical and stay on the hips which are rounded and orange, red or maroon.

It will be seen, therefore, that we have ordinary shrubs with small leaves to deal with; no great attraction in the hips, but only in the color of the flowers, and there is no doubt that the species in this group do add something very valuable not only to roses in general but to the whole of horticulture. For where would our early summer shrub display be without the dainty grace of *R. hugonis* or *R. cantabrigiensis*, or without the glory of 'Frühlingsgold'?—to say nothing of our modern roses which owe almost their entire yellow and flame coloring to *R. foetida* and its latent characters.

In the garden all these roses except *R. ecae* and also *R. foetida* and its varieties blend happily with everything else, their tones being cool and refreshing; the soft mauves of rhododendrons or the flaming colors of azaleas are all the better for a few pale yellow or white roses; likewise irises and peonies are enhanced by big bushes of pale yellow behind them.

A very different approach is needed for *R. foetida* and its more startling varieties; I do not feel happy with them in any combination of roses apart from their own derivatives. Their yellow is so harsh and insistent that it needs the rich background of a copper beech hedge to add tone. The gorgeous warmth of the 'Austrian Copper' Brier is equally difficult to place with other roses, but it is such a glorious personage itself that I prefer it on its own. Against varied greenery, or copper leaves, it can be the focal point for the whole garden for its few brief weeks of flowering, then to sink into insignificance for the rest of the season. Even so I prefer to lead up to such brilliance as this with other brilliant plants, such as potentillas and geums, which diffuse the dazzling color in a kaleidoscopic mixture, and through their varied warmth and overlapping flowering periods, prolong the display so that the given spot can retain a barbaric splendor through the summer. I referred briefly to this coloring before, and would like to enlarge upon it here, as among species roses *R. foetida* and *R.f. bicolor* do need such careful placing in the garden, and need to be approached in colors of gathering strength. This method is indeed practised in several famous gardens today and excellent examples may be seen in the purple-and-orange garden at Crathes Castle, in the red-and-purple borders at Hidcote, in the red-and-yellow borders at Tintinhull, and beds of gorgeous color assortments at Sissinghurst Castle, Newby Hall, and Blickling Hall.

*An edited chapter-extract from Mr. Thomas' book *Shrub Roses of Today* to be published by Phoenix House in the spring of 1962. The new book will cover all species of shrub roses of garden value, except those included in the new edition of his *Old Shrub Roses*, together with their hybrids, with chapters on Hybrid Musks, Rugosas, Hybrid Peperuals and all miscellaneous shrub rose hybrids evolved during this century and before. The 14 Roses depicted from watercolors and eight from pencil drawings, together with numerous photographs, are all by the author. The published work will contain references to previously published illustrations and gardens where the roses discussed may be seen.

Let it not be thought, however, that roses provide necessarily the bulk of color in these blends. Probably the reverse would be true, but there is no doubt that the 'Austrian Copper' and some of its near relatives can add very greatly to such displays. I need only call attention to 'Reveil Dijonnais' and some of the flame-and-yellow Hybrid Teas and vivid Floribundas to conjure up some wonderful 'hot' color schemes.

This type of color work cannot depend upon normal greenery for its ultimate success. As I mentioned earlier the copper foliage of a beech, prunus, or berberis hedge is to my mind almost essential to give the grouping warmth and richness, and provides of course the inestimable asset of permanent color through the various flowering seasons.

Rosa ecae. Afghanistan. The strange name commemorates Mrs. Aitchison—E.C.A.—the wife of the botanist who named it. This rose is unique; slender upright growth with long reddish twigs set with reddish thorns and small, smooth dark green leaves. It is quite startling when in flower for the blooms are of intense deep buttercup-yellow. Five feet by four feet, or considerably more on good soil. Needs full sunshine and well-drained soil, and contrasts well with blue spring-flowering ceanothus.

Rosa foetida. Western Asia. The Austrian Brier. Although marked by an intensity of yellow bordering on the color of sulphur, a scent that one could hardly call attractive, and possessing a name which calls attention to its heavy color, this rose has a profound influence on our modern garden roses mainly through its famous variety, *R.f. persiana*. In the old books the species was known as *R. lutea* and was known and grown before 1600. The shining rich brown stems are set with straight gray prickles, and bear small leaves of intense parsley-green. The wide open flowers create a very startling effect. In my experience, despite the fact that it is a native of hot arid districts, it appears to thrive best in our cooler counties and in Scotland; this is also true of many other roses from the Middle East. Pruning seldom improves the results. Five feet by four feet.

Rosa foetida bicolor. *R. lutea punicea*. The famous 'Austrian Copper Brier' has

been known since before 1590. The reverse of the petals is much the same color as that of *R. foetida*, but shows through the thin texture some of the intense nasturtium-red of the face of the flower. Occasionally this dazzling rose reverts on an odd branch or two, to the vivid yellow of the species.

In the garden it grows best in the same conditions as *R. foetida*, and both of them, on account of their color, should be kept well away from the many roses which flower with them early in the season, and which have those soft tones of mauve-pink which are so prevalent in the genus.

Miss Willmott tells us it is known in France by the name of 'Rose Capucine' and used to be known as 'Rose Comtesse.' I wish we could find the double form which was apparently recorded in 1815 or thereabouts—although it could scarcely be an improvement on the single. In most of the portraits cited the artists have obviously been carried away with the unusual coloring of the flowers; we can imagine what a relief it must be to have a rose to paint of such brilliance when so many are mauve-pink.

Rosa foetida persiana. The Persian Yellow rose was introduced to this country by Sir Henry Willcock in 1838, and was welcomed by growers as the most brilliant and satisfactory of the double yellow roses for the garden. To us, with so many fine yellow roses around us, it is difficult to imagine a time when the only double roses of this color were the little Burnets and *R. hemisphaerica*. The latter seldom produced flowers worth looking at except in good weather, so we can appreciate with what enthusiasm the 'Persian Yellow' must have been greeted. In the *Gardeners' Chronicle* for 1843 plants were advertised at fifteen shillings each, a fabulous sum in those days for a new rose, and the equivalent to over nine dollars today. Eventually its pollen was made to produce fine yellow modern roses, such as had never been seen before. Five feet by four feet.

The famous nurseryman of Lyon, Pernet-Ducher, made a determined effort in 1883 and subsequent years, pollinating thousands of Hybrid Perpetuals with the 'Persian Yellow' and eventually succeeded in raising two seedlings, one of which subsequently gave rise to 'Soleil d'Or,'



Rosa sericea

(Photographed from a plate in Curtis's Botanical Magazine, t. 5200)

the first of the 'Pernet' race of roses. They have since been merged into the Hybrid Teas and, with the brilliant coloring of *R. foetida bicolor*, have also given us the two-tone effect which occurs in the 'Austrian Copper.'

Rosa hemisphaerica. Western Asia. *R. sulphurea*, *R. glaucophylla*. The 'Sulphur Rose.' Known and grown before 1625. A famous rose which is not really suited to our climate, but, prior to the introduction of the 'Persian Yellow,' it was the only large double yellow rose in cultivation. On account of its size of bloom it was often called the 'Yellow Provence Rose' although in growth and general appearance it bears no resemblance to the true 'Provence Rose,' *R. centifolia*.

Its synonym, *R. glaucophylla*, gives us the key to its foliage, which is of a distinctly grayish hue, and it has hooked prickles, distinguishing it again from *R. foetida*, even without flowers. It is of rather loose habit, and the twigs droop with the weight of the large globular blooms, filled with petals, of a brilliant sulphur yellow, and sweetly scented. Unfortunately, except in particularly warm dry weather, and in the right conditions, it seldom gives perfect blooms. They tend to 'ball' and decay without opening. It grows and flowers at Highdown. Mr. Gordon Rowley suggests that this rose was derived as a sport from a single-flowered species *R. rapinii*. As however, the double-flowered rose was named first, the name of this single-flowered species would be *R. hemisphaerica rapinii*. This species is a native of Asiatic Turkey to N.W. Persia. About four feet.

There is a very full account of these roses and an excellent plate in Miss Willmott's book *The Genus Rosa*. The double variety was depicted by Van Huysum and others in some of the great Dutch flower pictures of the seventeenth century, and its vivid color and occasionally superb blooms made it greatly prized. The quotation at the head of this article applies to this rose.

Rosa hugonis. Central China. With *R. moyesii* this is one of the two most famous roses which, being brought from the Far East at the turn of the century, revolutionized the horticultural appraisal of the wild roses. An established plant

is nearly thornless, but the bases of the young shoots are often crimson with bristly hairs and prickles. This exquisite species has tiny, smooth leaves, creating a fern-like effect on a shrub some seven feet high and wide. The flowers are charmingly disposed along the arching wiry twigs, and are of cool butter-yellow, with a hint of primrose; they seldom open fully, remaining in a cupped shape, crinkled and silky. Surpassed by some of its offspring. Thrives on chalky and other soils, but is at its best when on its own roots. The small maroon-colored hips are not conspicuous but the foliage often turns to purplish brown in the autumn.

Rosa omeiensis. See *R. sericea*.

Rosa primula. Turkestan to Northern China. The 'Incense Rose' is so called because of the rich aroma which emanates from the young foliage, which is dark green, smooth, narrow and of a somewhat glaucous tint. Some leaves have as many as fifteen leaflets. The plants are upright and a pretty sight when in flower, the tone of yellow being very pale and transparent like that of a primrose. It can make a fine effect when loaded with flowers; at Highdown, the famous chalky garden created by Sir Frederick Stern, it has reached some six feet by ten feet. Hips reddish, not conspicuous, but the young growth is reddish brown with red thorns.

Rosa sericea and *omeiensis*. Separated as they are only by minor botanical differences, it is best to class these two species together for our present purpose. They are the only roses which have four petals instead of the usual five. They make tall rather open shrubs up to some 9 feet high and wide; the stout young shoots are often densely bristly giving way to almost smooth wood which is irregularly set with wide, flattened, triangular prickles, most evident in the variety *R.s. pteracantha*. Numerous rich green leaflets give the plant the ferny appearance peculiar to several of these roses. In August and September in a good season, the bushes are brilliant with small pear-shaped glossy hips in bright scarlet; in *R.s. omeiensis* they have a thickened yellow stalk. In addition *R.s. omeiensis* has nearly glaucous leaflets up to seventeen, whereas those of *R.s. sericea* are silky-pubescent beneath, and not more than



Rosa sericea pteracantha

(Photographed from a plate in Curtis's Botanical Magazine, t. 8218)

eleven. In spite of all this Mr. Gordon Rowley considers, from Hurst's hybridizations and from recent observations on living material under his care at Bayfordbury, that these roses should be united under *R. sericea*.

They are attractive shrubs for the garden, giving the unsophisticated effect that is the prerogative of dainty wild species, and are really exquisite in flower. The petals are beautifully shaped and slightly veined, remaining in a wide, cup-formation for most of their short life. Their flowers are normally white.

Rosa sericea. Himalaya, introduced 1822.

Rosa omeiensis. Szechuan, West China, introduced 1901.

Rosa sericea chrysoarpa. A form with beautiful yellow hips.

Rosa sericea denudata. A thornless form.

Rosa sericea 'Heather Muir.' A superb form, named after the creator of the Kiftsgate garden, who purchased it many years previously as a seedling from E. A. Bunyard. A most beautiful large shrub with extra large white flowers produced over a long period (about three months), followed by orange-red hips on orange-red stalks. Nine feet tall and wide.

Rosa sericea polyphylla. *R. sericea inermis glandulosa*. A form with numerous leaflets, and not many prickles.

Rosa sericea 'Praecox.' Early flowering form.

Rosa sericea pteracantha. *R. omeiensis pteracantha*. A rose well known for its large flattened prickles. These are borne on stiff straight stems, being sometimes so numerous and wide that they make a vertical line of red among the small ferny leaves. Some prickles are an inch or more wide at the base. The flowers are white, and otherwise the plant is much like the species but less graceful. In the garden this variety should be placed so that the sun can shine through the prickles, giving a rich color-effect. In their second season the prickles become gray; thus, pruning to encourage constant new shoots is desirable. Introduced from Western China in 1890. Eight feet by eight feet.

Rosa xanthina. This, the double flowered form, has been cultivated for over a hundred years in Northern China and Korea, and has been known over here as *R. slingeri*. The growth is less free than its single parent and the flowers, though a good color and fairly double, are less beautiful and effective. Six feet by six feet. Unlike 'Canary Bird,' which is sometimes called *R. xanthina spontanea*, it has prickles.

Rosa xanthina spontanea. N. China and Korea. Although this was introduced in 1907 it has never become widely known, having been overshadowed by 'Canary Bird' (*q.v.*). It is vigorous, reaching in Mr. Hillier's garden eight to nine feet, with the usual light green foliage of the group, and large light yellow single flowers.

Hybrids of the Yellow Roses

'Canary Bird.' At one time distributed as *R. xanthina spontanea*, under the impression that it was the wild type of *R. xanthina*, it has since been considered a hybrid, perhaps *R. hugonis* × *xanthina* or *spinosissima*. I have found no record of its origin. The richly colored brown stems have a few prickles towards the base, and are noticeably warty, *i.e.*, covered with tiny excrescences. The leaves are of bright fresh green, luxuriant but small and fern-like; they are hairy beneath, and also in the folds above. The flowers open wide, and are of clear bright yellow, creating a really splendid effect on the arching young branches and small twigs. Unfortunately, it is subject to 'die back' like *R. hugonis*, but appears to be most at home in the drier parts of the country on well drained soils. Hips maroon or blackish, not conspicuous. Seven feet tall and seven wide.

Rosa headleyensis. This was raised at Boidier, the home of the late Sir Oscar Warburg, at Headley near Epsom about 1920. The seed parent was *R. hugonis*, presumably pollinated by *R. spinosissima altaica*. Dr. Bernard Smith at Pusey, Wiltshire, has the best plant I know, which is about nine feet high by 12 feet wide. This vigorous and healthy plant has the general ferny appearance of the parents as one would expect, with particularly handsome creamy-yellow single

flowers. Very fragrant. I consider this is the most ornamental of all the hybrids of *R. hugonis* that I have seen so far; its wide flowers, graceful growth, and clear soft coloring make it an important garden plant, and it is amazing that it has remained so long in obscurity.

Rosa pteragonis. Under this hybrid name are gathered all hybrids between the *R. sericea-omeiensis* group and *R. hugonis*.

Rosa pteragonis cantabrigiensis. 1931. Raised at Cambridge Botanic Garden by Dr. C. C. Hurst while working on the genetics of the genus. I regard this and *R. headleyensis* as the most satisfactory of the species-like yellow roses. *R. cantabrigiensis* makes an erect bush seven feet by six feet or more, densely covered in tiny hairy bristles on strong young growth, but without wing-like prickles; with the same ferny leaf-effect of its parents, but a shapely well-filled habit. The five-petalled flowers are very slightly paler than those of *R. hugonis*, but still a good clear yellow, and are far more shapely and open wider than those of that species. Extremely free flowering and a wonderful sight in full bloom; small orange-red hips in late summer. Fragrant. Not subject to die-back in my

experience, where it scores over *R. hugonis* and 'Canary Bird.'

Rosa pteragonis 'Earldomensis,' *R. pteragonis pteragonis*. *R. hugonis* × *sericea pteracantha*. Raised in Mr. Courtenay Page's garden, "Earldom," Haywards Heath, where the National Rose Society's trials were held for many years. Forms a bushy, thorny shrub with some of the reddish flattened prickles of the second parent. Small pretty foliage and bright yellow single flowers early in the season. Six to seven feet.

Rosa pteragonis 'Hidcote Gold,' 1948. Apart from the fact that this plant has been growing for many years at Hidcote and was apparently raised there, I have no records of it. It is possibly a hybrid of *R. hugonis*, and the other parent is no doubt *R. omeiensis pteracantha*, as it bears conspicuous flattened prickles very like those of this species. It is a vigorous graceful bush with long wand-like branches and drooping twigs studded with good, clear yellow, single, five-petalled flowers and plenty of small foliage. An attractive shrub combining the five petals of a yellow rose with the striking armature of *R. sericea pteracantha*. Seven by seven feet.

A Book or Two

The Complete Book of Lilies

F. F. Rockwell, Esther C. Grayson, and Jan de Graaff. American Garden Guild and Doubleday and Company, Inc., 575 Madison Avenue, New York 22, New York, 1961. 352 pages. Illustrated. \$5.95. (Library)

This is, as the title suggests, a most complete book on lilies. Unfortunately completeness is not synonymous with quality, and quality is what this book lacks. By comparison with Mr. de Graaff's earlier book, of which he was sole author, this book is more pretentious in scope but less accurate in execution. Knowing Mr. de Graaff's felings on some of the topics discussed, I find it difficult to believe he contributed much more than his name to large parts of the book.

The book is divided into three main sections, the first of which seems largely the work of the Rockwells. While there is little actually wrong with the treatment of "Lilies in the Garden," the treatment is quite general and, despite Mr. Rockwell's assurances to the contrary, indicates little real personal knowledge of the genus. Perhaps the factual material came from Oregon and the filler from Massachusetts? An exception is the chapter on floral arrangement, which seems to my mind, unschooled in the intricacies of that subject, to be informative and useful.

The second part, "The Growing of Lilies," gives a very thorough account of the lily as a plant: its habits, structure and reproduction. Mrs. Virginia Howie's accurate and instructive line drawings do much to enhance the usefulness of this section. The chapter on "Lily Troubles: Diseases and Pests" is, at best mediocre. The speculation on cures for virus and the relationship of plant diseases to those of man are mere pseudoscientific flights of fantasy. It serves only as a change of pace from the usual dry treatment of diseases and symptoms. On the other hand, the chapters on propagation and plant breeding are excellent and instructive with the added bonus of a discussion on what the breeder should be. The usual treatment of methods and techniques is a necessary part and is well written and illustrated. One could only ask to have more ideas on the goals of breeding in the various hybrid groups. Chapter 15 comes as a disappointing shock. In dealing with the exhibition of lilies it shows little evidence of having been seen by Mr. de Graaff. Anyone familiar with his methods of cutting, packing, shipping, and exhibiting lilies will notice immediately that most of the recommendations are exactly opposite to his practice. Evidently the writer of this chapter had not attended any of Mr. de Graaff's several lectures on this subject. Lilies from Oregon have been shown in countries around the world, and have received awards after being shipped that distance.

The last part of the book, "The Lily World," is concerned with the enumeration and description of the species and hybrids. The descriptions are horticultural and fine for the gardener.

The hybrids, of course, are treated more thoroughly than the species, but then they are more popular and will continue to be so.

The appendix contains a large number of lists of lilies which should prove of great value to the gardener. Lilies are listed in many different ways under many different criteria. There is no question of the value of these to the novice lily enthusiast. These lists, the up-to-date teratment of the hybrids and the chapters on propagation and plant breeding are good reasons for owning this book. For the connoisseur this book will not replace *Lilies of the World*, but then, it wasn't meant to.

Why the authors went to all the trouble of writing a book and then illustrating it with the lack of variety found here, is beyond me. The plates are good, but why should the same lilies be used several times with negative reversed or with the plants rearranged? One group of Mid-Century Hybrids appears at least three times. The same lilies are used in black-and-white illustrations and color plates. Furthermore, it seems almost unfair to show, as examples of the correct use of lilies, potted plants, grown to perfection under glass and arranged amidst shrubbery so as to suggest that they grew there.

There are innumerable small errors such as the statement that E. H. Wilson discovered *Lilium davidii*, the use of the single *i* ending on *L. davidii* and *L. hansonii*, and the labeling of the Red Band Lily as the Gold Band Lily. These are of less consequence than the over-all mediocrity of the book, but nevertheless detract from its worth. It is the feeling of this reviewer that in such a book, intended to inform the public, the authors should exert a special effort to see that errors are at a minimum. But then, most avid gardeners are horticulturalists, while most horticultural writers are journalists, and the gardeners generally take the professional writers with a grain of salt and go on doing things in the manner they have found most successful. The writers have lost the confidence of the gardeners by producing a surfeit of books with a paucity of reliable, first-hand information. Unfortunately, this book does not stand out from the crowd.

RICHARD W. LIGHTY

The Mango. Botany, Cultivation and Utilization

Lal Behari Singh. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, New York, 1960. 438 pages. Illustrated. \$13.25. (Library)

This book is one of a series of *World Crop Books* on the botany, cultivation and utilization of the more important plant crops, under the general editorship of Professor N. Polunin. It is a well documented review of the world literature

(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.)

on the subject of mangoes combined with first hand reporting on Indian mango culture. There are chapters on the following subjects: History, origin, nomenclature, distribution; Botany and rootstock; Cytogenetics and breeding; Fruit bud differentiation and periodicity in cropping; Climate; Soil; Varieties; Propagation; Planting and Care; Irrigation, Nutrition; Diseases and their control; Insects, mites and other pests; Angiospermous parasites and epiphytes; Marketing; and Utilization.

The review on cytogenetics and breeding will be welcomed by research workers interested in the development of new varieties. In the chapter on Varieties the choicest Indian mangoes have been classified as to geographical origin, described and illustrated. Several varieties developed in Egypt, Florida, the Philippines, and Thailand are described. There is some reason to question which of the variety names pertain to true clones and which to types of similar clones. Comparative illustrations of the stones, with adhering fibers, would have been useful, as well as notes on disease or insect resistance of the various varieties. A list is included of the 23 Indian varieties the author rates topmost for flavor.

The subject of vegetative propagation is extensively dealt with and the various techniques are well illustrated by line drawings. It is not apparent which methods are most successfully employed in the various mango growing areas of the world. The use of plastic tape is mentioned but not sheets of plastics for protecting grafts or for shipping budwood.

The book is clearly and concisely written with the inclusion of few Indian colloquialisms. Measurements are either in metric or British terms. It should be well received by all who work with tropical and subtropical fruits.

H. F. W.

Mammillaria. Cultivation and Characteristics

Cyril Marsden. Cleaves-Hume Press, Limited, London, England. Distributed by St. Martin's Press, Inc., 175 Fifth Avenue, New York 10, New York. 1957. Illustrated. \$7.75. (Library)

The author's preface states that this is the second in a series of books pertaining to the cactus family. The first volume dealt generally with cactus culture and its problems. This book deals only with the genus *Mammillaria*.

The first section is divided into four areas of general information concerning the genus: background, classification of species, cultivation and propagation. The remainder of the book covers the identification and culture of the individual species. Very helpful cultural notes have been gathered from the experiences of many growers, both private and commercial.

Mr. Marsden's extensive research into the former names of each species will prove especially valuable. Any owner of a *mammillaria* with a name however archaic will be able, in most cases, to ascertain its proper identity from the inclusive index.

Unfortunately this book does not contain a standard key for identifying unnamed plants in a cactophile's collection.

PAUL W. SHAW

Campanulas and Bellflowers in Cultivation

H. Clifford Crook. St. Martin's Press, Inc., 175 Fifth Avenue, New York 10, New York. 1959. 90 pages. Illustrated. \$2.50. (Library)

H. Clifford Crook, who is probably the outstanding English authority on *Campanulas* and its related genera, in his preface states that he has restricted himself to "Species which are known to be in cultivation in England, even though in some cases considerable persistence and search may be needed to secure them."

Several years ago Mr. Crook published a well illustrated book on "*Campanulas*" in which he described and commented on every species that was known at that time. In England, this is considered a standard work on the genus. Anyone studying this subject, would be bound to consult his book. In his present book, he has made a selection of those plants that he believes, with proper attention to their requirements and idiosyncrasies, can be grown in England by the average gardener. He has devoted chapters to those plants suitable for the border, the rock garden, the wild garden, and the Alpine House. The last chapter in the book is devoted to a discussion of other genera of the *Campanulaceae* that are attractive and not too difficult to raise including *Adenophora*, *Cyananthus*, *Symphandra*, *Codonopsis*, *Edraianthus*, *Jasione*, and *Phyteumas*.

In the course of a lifetime, the writer has raised, or attempted to raise, nearly all of the *Campanulas* mentioned in Mr. Crook's book. No doubt most of them can be grown in this country, despite the fact that in certain sections, such as the Central States, where in summer the thermometer may frequently rise above 90 degrees, and the winter weather is so variable, it is possible that the mortality would be heavy. In the Pacific northwest, where the climate is more like that of the greater part of England, this handicap would be obviated. For example, in the neighborhood of Seattle, and on Vancouver Island, we have observed the delightful little *Campanula piperi* growing luxuriantly: here in the Ohio valley, on numerous occasions we have started this plant from seed; when the hot days of July and August arrived, the plant, despite careful nursing, invariably perished.

Of these species which Mr. Cook described, it might be of interest to the reader to have a list of some of those that at various times have thrived here, despite the handicaps of our climate. Among the taller species more suitable for the border or the wild garden, there are *C. lactiflora*, *persicifolia*, *latifolia*, *trachelium*, *glomerata*, *latiloba*, and of course, the Canterbury Bell: for the rock garden, the ironclad *poscharskyana*, *portenschlagiana* (syn. *muralis*), *carpatica*, *raddeana*, *collina*, *garganica*, *kemulariae*, and the Harebell, *C. rotundifolia* which is often the last plant to bloom in our rock garden: for the Alpine House, or possibly in a partly shaded cold frame, there are many delightful low growing plants that are not too difficult to raise, such as *C. betulaefolia*, *cochlearifolia* (syn. *muralis*), *fragilis*, *isophylla*, *pulla*. Then there are the monocarps, or biennials, such as *andrewsii*, *sartori*, and *formanekiana*.

ROBERT M. SENIOR

Are You Your Garden's Worst Pest?

Cynthia Westcott. Doubleday and Company, Inc., 575 Madison Avenue, New York 22, New York. 1961. 312 pages. Illustrated. \$4.50. (Library)

Dr. Westcott has again produced a most practical book for the home gardener. In "Are You Your Garden's Worst Pest?" she combines technical knowledge and common sense in a way that both the inexpert and expert gardener will find helpful.

Her latest book contains nearly a thousand recommendations for chemical control of diseases and pests attacking garden plants. In addition, Dr. Westcott discusses the need for diversifying garden plantings so that a disease or pest outbreak will not cause wholesale destruction. She also warns against the danger of planting alternate hosts, that is, different kinds of plants which some rusts need to complete their life cycle.

She discusses plant quarantine regulations in an understandable way, especially to the shipper who must often take special precautions to comply with them.

To the home gardener who does not keep an accurate time table for such things, Dr. Westcott tells when—and how—to prune trees and shrubs, especially roses. She discusses the common problems of planting, mulching, fertilizing and watering.

Dr. Westcott cautions against the average gardener's belief that every problem can be countered by use of a dust or spray. She precedes her chapter on spray recommendations with two others: "Is This Spray Necessary?" and "Spare Your Friends."

Dr. Westcott's appendix includes the common names of garden pesticides and precautions to be taken in their use; optimum soil acidity range for most garden plants; and State and Federal plant quarantine regulations.

P. R. M.

You Can Grow Orchids

Mary Noble. Mary Noble, 3003 Riverside Avenue, Jacksonville 5, Florida. 1960. (Revised, Second Edition.) 152 pages. Illustrated. (Paperbound.) \$1.98. (Library)

This second edition of a popular handbook on orchid growing is written particularly for those who have seen or heard about orchids but have not tried to grow them. The subject is enthusiastically presented. Much of the information is slightly more applicable to areas of mild climate, such as Florida, than to the North. The more common genera of orchids are described and illustrated. All factors affecting the growth and maintenance of orchid plants are discussed, including environmental requirements, potting materials and procedures, propagation, and the control of insects and diseases. Directions are given for preparing and using the orchid flowers in corsages and arrangements. A glossary of the more commonly heard orchid names and other terms is included. The book is enthusiastic, concise, well illustrated and inexpensive.

H. F. W.

Excerpts: Letters of Charles Sprague Sargent to Rochester Park Personnel

Distributed by Gilboy's House of Books, 197 Chestnut Street, Rochester 7, N. Y. Rochester Chapbooks, Publisher. June, 1961. 52 pages. \$2.00. (Library)

This is a paper bound volume of great style, beautiful format and printing. The Excerpts were chosen and annotated by Bernard Harkness of the Rochester Park Department.

The majority of the letters are addressed to Mr. John Dunbar, who began his career in the Rochester Park System in 1891 and made a name for himself and his work through a long and valued life. A few are addressed to Mr. Richard E. Horsery, whose work centered in and for the famous Highland Park.

The correspondence shows clearly the value that Professor Sargent found in the work of these men and their assistants, and the letters, delightfully informal, and brief, make reference to many of the distinguished botanists and plant collectors of the period, men of this country and abroad.

Prof. Sargent's interest in Crataegus is clear in the early days and his interest in what the members of the Park Department were doing in the way of plant collecting in this country is patent. While in no sense was the cooperation one-sided, the position of the Arnold Arboretum in Sargent's affections is clear.

B. Y. M.

Carefree Gardening

Jean Hersey. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1961. viii + 192 pages. Illustrated. \$4.95. (Library). AHS Members Price \$4.20.

A story of gardening in an easy manner along with enjoying the fields surrounding a Connecticut home and making them a part of the home landscape. The meadows around the house are allowed to grow and even some cultivated annuals and perennials are encouraged to naturalize in it. It is mowed only once a year in mid-August. Only a limited area near the house is maintained as a lawn. The surrounding area is planted in flowering shrubs and trees. Bulbs are used for spring flowering and ferns and other shade loving plants in the wooded area. Vegetables are grown with special attention to salad plants.

The author describes the way she maintains her home grounds with suggestions on the kinds of plants for different uses and her ways of growing them. A book to read and learn how one person gardens in a "carefree" manner.

CONRAD B. LINK

Chemical and Natural Control of Pests

E. R. de Ong. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, New York. 1960. 244 pages. Illustrated. \$7.50. (Library)

This 244-page book is divided into two main sections. In the first section (55 pp.) natural control of insect pests and predators, insect diseases, and the use of pest resistant plants are discussed. The second section presents detailed information on pests (insects, plant diseases, weeds) of field crops, orchards and vineyards, vegetables, and ornamentals and lawns. Eighteen pages are devoted to the latter group.

A useful feature is an alphabetical list of pesticides, their chemical names, and their use. In the rapidly expanding field of pesticides new compounds are constantly appearing. de Ong brings the literature up to 1958. Dr. de Ong is a well known authority in the field of insect control work.

C. M.

Growing for Showing

Rudy J. Favretti. Doubleday and Company, Inc., 575 Madison Avenue, New York 22, New York. 1961. 147 pages. Illustrated. \$3.95. (Library). AHS Members Price \$3.55.

Mr. Favretti's book fulfills a long felt need—namely a "how-to-do-it" one for the amateur who would like to exhibit horticultural specimens in a flower show. The material covers culture, grooming, and conditioning. It has information concerning the soil, light, and temperature needed in order to produce good specimens. It goes into the training, pinching, and disbudding operations and gives valuable advice for protecting specimens from weather damage. Spraying is also dealt with, and useful hints on how to apply as well suggested cautions with pesticides.

In the part dealing with selection of plants not all show material is covered, but the information on potted plants and garden flowers is helpful and the portion devoted to vegetables and fruits contains interesting information. The reviewer feels that this book should be read and used by all garden club members planning horticultural classes, whether as exhibitors or in charge of staging. Judges, who have taken the National Council of State Garden Clubs courses in order to obtain an amateur accredited judge's status with the organization, will also find much to help them. For the average gardener entering a show it would be an admirable guide in aiding them in the selection of specimens for exhibits. Anyone interested in exhibiting in a flower show will find much to guide them in their selection of specimens of exhibition.

FRANCIS PATTESON-KNIGHT

Flower Arrangements in Color

Violet Stevenson. A Studio Book, The Viking Press, Incorporated, 625 Madison Avenue, New York 22, New York. 1961. 72 pages. Illustrated. \$2.98. (Library)

This book consists of twenty-four color plates of arrangements suitable for the four seasons, with explanatory text for each plate—and a sixteen-page introduction.

This reviewer examined all the color plates first, then read the introduction—and could not keep from wondering if the author had done the

same. Most of the text of the introduction is very good; the explanation is given that this book is really for people who are not interested in competitive work nor RIGID RULES, which can be inhibiting to some temperaments, but who want to know how to arrange flowers attractively. The author does give some excellent ideas on mechanics, especially on the use of chicken wire—good, if you are a chicken wire addict—and she has given some good pointers on conditioning various flowers, but when she comes to color, she again dwells on RIGID RULES.

The arrangements are colorful, maybe suitable for home use, although this reviewer feels that it would be better for beginners to be taught the PRINCIPLES OF DESIGN, so that they would not use a receding color in the center of an arrangement of warm colors, nor two large white "bulls eyes" in an otherwise all red design. The so-called rigid rule of using deep tones low is not a rule but the use of a principle affecting the stability of the design.

So-o-o read the introduction, enjoy the text with each illustration, but, please, do not use similar designs in competition.

G. P. W.

Miniature Roses

Roy Genders. Blandford Press, 16 West Central Street, London, W.C. 1, England. Distributed by St. Martin's Press, Inc., 175 Fifth Avenue, New York 10, New York. 1960. 104 pages. Illustrated. \$3.95. (Library)

Miniature roses are attracting much attention because of their size, habit of growth and adaptability. This book supplies cultural information and discusses ways in which miniature roses may be used.

It begins with the origin and introduction of these roses into Great Britain. Next, varieties are discussed with brief descriptions of each. In some cases, the origin or parents of a variety is given. Miniature roses are easy to propagate by cuttings or by budding. Even seed propagation is included, since this is the way new varieties are developed from hybridizing. Planting, soils, fertilizers, and pest controls are all included.

Several chapters suggest uses for these miniature plants as in special rose gardens, for troughs or tub gardens, in window boxes or as potted plants. Since this book is written for British conditions, the American gardener will have to make some adjustments in the culture suggested. This is not serious, however, since the basic information will be most helpful.

The book is well illustrated, including 10 in color.

CONRAD B. LINK

Gardening the Easy Way The Homeowner's Complete Guide to Gardening

Edwin F. Steffek. Holt, Rinehart and Winston, Inc., 383 Madison Avenue, New York 17, New York. x + 198 pages. Illustrated. \$3.95. (Library)

Gardening, The Easy Way is an intriguing title and is written for the very beginning gardener, one who has little information on plants and their culture. It begins with the house, as you find it after the builders leave, or as an old one you have just bought. The author tries to anticipate the problems and questions that will be met and to discuss them in a logical order. He begins with the tools you need and the soil. Next come trees, where he describes what makes a good tree, how to buy one, and when and how to plant it. He tells what some of the terms mean that confront the buyer such as caliper, balled, and burlapped. Lists of trees with a brief description of each is included for different areas of the country. In a similar manner shrubs, roses, annuals, perennials, vegetables and fruits are each considered.

Gardening practices are discussed such as pruning, fertilizing, watering, propagation all in a manner that is understandable to the beginner.

This is a good book for one who is very much an amateur. It will help them to get off to the right start with at least some answers to their questions.

CONRAD B. LINK

Nature's Year

The Seasons of Cape Cod

The Seasons of Cape Cod.

John Hay. Doubleday and Company, Inc., 575 Madison Avenue, New York 22, New York. 1961. 200 pages. Illustrated. \$4.50. (Library)

To those lovers of natural history who know that curving spit of sand that is Cape Cod this will be an appealing book. For this is a volume of nature essays about the Cape, one for each month of the year. As a Cape Codder the author has seen all this Cape's moods from the "restless days" of March until that time of year when ice appears on the innumerable freshwater ponds. Among other things he writes knowingly of a walk with an ovenbird, of chipmunks, of shipwreck, of tawny-beard grass, and indeed of a hundred other things. The reader will find a bonus in fine woodcuts by David Grose. Hay, a sort of modern Thoreau, ably presents the appeal that the Cape has to the naturalist—just one of the number of reasons why this famed physiographic feature has been selected as a new National Seashore Park.

W. H. H.

Variegated Foliage Plants

Paul Fischer. (Translated and edited by Corry Van Alphen.) St. Martin's Press, Inc., 175 Fifth Avenue, New York 10, New York. 1960. 136 pages. Illustrated. \$3.50. (Library)

In *Variegated Foliage Plants* the author describes variegated plants which he has grown in his greenhouses and which are suitable for indoor decoration. The plants included are those kinds which are normally grown in the greenhouse or as house plants. A few could be grown outdoors in the more southern states and at least one, *Hosta*, in the north. The plants described are those with vivid coloring or variegated foliage that occur naturally. He has not included plants having a variegation that is due to a virus or some known disease. In addition to naturally colored or variegated foliage plants, he includes colored or variegated varieties or cultivars of normally green plants. In some species

there may be more than one variegated form as in *Acalypha wilkesiana* or *Yucca aloifolia*. Cultural suggestions are given for each genera. Most of this would apply to conditions in the United States or with some slight adjustment. The book was originally written in German.

CONRAD B. LINK

Modern Trees

E. H. M. Cox and P. A. Cox. Thomas Nelson and Sons, 18 East 41st Street, New York 17, New York. 1961. x + 195 pages. Illustrated. 25 shillings. (Library)

This 195 page book will be of interest to those who want to know something about how selected American trees from other parts of the world grow in the British Isles when planted as ornamentals. The book is written with the gardener in mind. Color plates of *Magnolia* × *veitchii*, *Acer nikoense*, *Cercis siliquastrum*, and *Abies forrestii* are excellent. There are 23 text illustrations. Elementary basic information on cultivation and propagation is given. The authors state erroneously that seed of all maples may be stratified. Seed of *Acer rubrum* and *A. saccharinum* will germinate if sown as soon as it ripens. Descriptions of individual trees at specific locations are a valuable feature. The authors point out some requirements that must be met for a tree to withstand climatic conditions in different parts of the British Isles and the effects of climate on flowering and growth. Altogether the book is interesting and instructive. It is a book for the tree fancier.

C. M.

The Fern Guide

Northeastern and Midland United States and Adjacent Canada

Edgar T. Wherry. Doubleday and Company, Incorporated, 575 Madison Avenue, New York 22, New York. 1961. 320 pages. Illustrated. \$3.95. (Library). AHS Members Price \$3.55.

In 1942 Dr. Wherry published the *Guide to Eastern Ferns*, which for many years enjoyed a well-deserved popularity, but covered only the region from Pennsylvania and New Jersey to Virginia. The present volume covers the whole of the northeastern and midland states together with adjacent Canada. All of the approximately 135 species are illustrated by excellent line drawings.

The book has excellent keys to the ferns and fern allies, together with a usable glossary, a chapter on fern cytology, and one on fern spores. Helpful notes are given on growing ferns in the garden; also on collecting ferns.

For the serious fern amateur this book is just about indispensable.

PAUL RUSSELL

The Orchard and Fruit Garden

Edward Hyams and A. A. Jackson (editors). Longmans, Green and Company, Incorporated, 119 West 40th Street, New York 18, New York. 1961. xvi + 208 pages. Illustrated. 7 pounds (Library). AHS Members Price \$29.95.

This book is written for everyone interested in the fruit crops grown and marketed in Great Britain. It not only contains chapters on the

origin and history of the various Temperate climate fruit crops but treats on the bananas, citrus fruits, avocados and other imported tropical fruits that are encountered almost as frequently in English markets. There are chapters on the greenhouse culture of peaches, grapes, cucumbers and tomatoes. Particular attention is given to the Temperate climate tree fruits such as apples, pears, peaches, and plums and to the various small fruits. Each subject is covered by the individual best informed on the subject. As would be expected, the varieties described are those best adapted to the English climate. This rather limits the usefulness of the book as a text to the British Isles but as a reference to descriptions of fruit varieties, particularly the apples, it will be of broader interest. Short histories of fruit growing in America, Australia, and South Africa are included. The book is superbly illustrated in natural color photography, beautifully printed, well bound and encased in a heavy red jacket.

H. F. W.

Succulents in Cultivation

Vera Higgins. St. Martin's Press, Inc., 175 Fifth Avenue, New York 10, New York. 1960. 168 pages. Illustrated. \$4.95. (Library)

A book on the culture of succulent plants as indoor or greenhouse subjects. The author discusses the general cultural requirements as she has found them or as she follows them under conditions in England. Her terminology is British in some cases as "long tom" referring to a pot size. Potting, soils, watering, pest control and propagation are all briefly discussed in separate chapters.

The succulent plants found in 12 plant families are considered by genus. With each genus is mentioned one or more species together with a paragraph or two of cultural suggestions. The discussion is simple and helpful as to culture but the descriptions are not written to be used in the identification of a plant.

C. B. L.

The 1961 American Daffodil Yearbook

Carey E. Quinn, Editor. American Daffodil Society, 10 Othoridge Road, Lutherville, Maryland. 1961. 108 pages. Illustrated. (Library)

The specialist in daffodils will find in this yearbook several chapters of interest. To those interested in new varieties there are the reports or evaluations of new varieties as described in the Daffodil Symposium. The majority of the chapters or articles are concerned in one way or another with the breeding of daffodils. These include articles on the selection of seed and pollen parents, on insects and their attacks as related to seed production, on pollen, as well as a general review of Daffodil breeding in the United States mentioning the names of many persons interested in this and comments from them.

C. B. L.

Other Books Added to the Library

Introduction to Soil Microbiology

Martin Alexander. John Wiley and Sons, Inc., 440 Park Avenue, South, New York 16, New

York. 1961. x + 474 pages. Illustrated. \$9.50. (Library)

Your Garden Soil.

How to make the most of it

R. Milton Carleton. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1961. vi + 170 pages. \$3.95. (Library)

American Tomato Yearbook, 1961

John W. Carncross, Editor. American Tomato Yearbook, 8 Elm Street, Westfield, New Jersey. 44 pages. Illustrated. \$2.00. (Library)

Modern Fruit Science.

Orchard and Small Fruit Culture

Norman Franklin Childers. Horticultural Publications, Rutgers University, New Brunswick, New Jersey. 1961 (Second Edition). xvi + 896 pages. Illustrated. \$7.50. (Library)

Hanna's Handbook of Agricultural Chemicals

Lester W. Hanna. Lester W. Hanna, Route 1, Box 210, Forest Grove, Oregon. 1958 (Second Edition). 496 pages. Illustrated. \$5.95. (Library)

The Biology of Mycorrhiza

J. L. Harley. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, New York. 1959. 233 pages. Illustrated. \$8.75. (Library)

Horticultural Dictionary in Eight Languages*

J. Nijdam, Editor. Prepared under the auspices of the Ministry of Agriculture and Fisheries, The Netherlands. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, New York. 1961. 504 pages. \$7.50. (Library)

* (Dutch, English, French, German, Danish, Swedish, Spanish and Latin.)

Medical and Biological Research in Israel

Moshe Prywes, Editor. The Hebrew University of Jerusalem and Hadassah, The Women's Zionist Organization of America. Distributed by Grune and Stratton, Inc., New York, New York. 1960. xx + 562 pages. Illustrated. \$8.00. (Library)

Physiology of Plants

P. Font Quer. Harper and Brothers, 49 East 33rd Street, New York 16, New York. 1960. 128 pages. Illustrated. \$2.25. (Library)

Cell Heredity

Ruth Sager and Francis J. Ryan. John Wiley and Sons, Inc., 440 Park Avenue, South, New York 16, New York. 1961. xii + 412 pages. Illustrated. \$7.50. (Library)

Seeds.

The Yearbook of Agriculture, 1961

Alfred Stefferud, Editor. U. S. Department of Agriculture, Washington 25, D. C. Available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. 1961. xvi + 592 pages. Illustrated. \$2.00. (Library)

The New Perennials Preferred

Helen Van Pelt Wilson. M. Barrows and Company, 425 Park Avenue, South, New York 16, New York. 1961. 320 pages. Illustrated. \$4.95. (Library)



IVAN N. ANDERSON

Curcuma roscoeana

The Gardeners' Pocketbook

Curcuma roscoeana

One of the delights of moving into any new area, comes from indulging ones curiosity not only about the new plants one may find in the gardens there, but in pursuing the relatives of these same plants, which only the newcomer seems likely to do.

Although the "South" is said to be filled with "Hidden Lilies" all of them presumably *Curcuma petiolata*, the present writer is still stubbornly holding to the idea that the plants in the garden here are not that species but Heaven alone knows which. Other curcumas have been bought and while as yet that have produced only terrifically tropical looking foliage, one unknown almost of dwarf banana proportions, the most amazing species is the most tropical and according to Mr. Wyndham Hayward from whose splendid nursery, the root came, is the only species that tolerates a pot, and in this case, it is a "must."

The smallish root, should not be planted until one can be sure that the soil is warm. In a greenhouse in the North this would present no problem, but here with only a house that is just kept free of frost, it meant that the root was not potted until May. The soil must be rich, abundantly supplied with humus, and yet swift in drainage. This is the not impossible mixture so beloved in rock gardens.

Our single root was slow to start but sent up a good shoot, that developed leaves, eventually five in number, in two symmetrical ranks, as formal as one could desire or plan. From the center there came up, in August for this one plant, the inflorescence, to a height of sixteen inches, with the upper half furnished with the bracts typical in the genus. This species has bracts of amazingly firm substance, like curving lips, the whole making a much more architectural pattern than any other curcuma known here. The color is unlike that of the common species, whatever its name, being a clear orange, turning toward green as it approaches the stem, and

showing green in the inner portion. Each bract carries within it, several flowers that open one at a time, never together on this one plant. These are a paler color, almost lemon yellow. It seems that the plant observed showed the first flowers from the lower bracts first, others appearing up and down, but as the summer and early autumn progressed flowers or a flower might appear anywhere. Unfortunately no effort was made to determine the total number per bract and the inflorescence is still so handsome after more than two months, the writer is unwilling to tear it apart to discover the count. The Ridgway colors would be: for the bracts; Bittersweet Orange lightening as the color goes down toward the base of each bract where Neva Green takes over; for the flowers, Light Orange Yellow, with a central zone of Capucine Yellow. At this writing (Nov. 11, 1961) there is a flower about to open in the lowest bract, apparently the fourth and some signs of other flowers to come above.

Mr. Hayward's instructions were to allow the plant to come to rest when the foliage began to show signs of yellowing and to keep the root warm all winter. In the spring offsets may be found about the parent root, which serve as the basis of increase. How fortunate the writer may be in keeping the roots remains to be seen and only a later examination will show how many offsets there may be, which will need time and feeding to come to flowering size.—B. Y. MORRISON, *Pass Christian, Mississippi*.

Growing Plants in "Feather Rock"

After a year of growing plants in pumice or "feather rock" the first expectations have not been lessened. Several things have been learned, the main one being that water in most cases can be poured on freely with even quite intolerant plants and no harm is done. I have two pieces planted in western rock ferns,



FREDERICK W. COE

Cacti "Feather Rock" measuring about twelve by fourteen inches contains (clockwise, commencing with the top, left plant): Paramount hybrid Fluffy Ruffles, *Notocactus mammulosus*, *Echinocereus pectinatus*, *Echinocereus Fendleri*, *Notocactus* sp., Paramount hybrid Dainty Bess (in flower).

one group of plants native to Marin County here in California and consisting of two species each of *Cheilanthes* and *Pellaea*, as well as two "lace ferns" (*Aspidotis californica* and *Onychium densum*) and the California gold-fern (*Pityrogramma triangularis*) as well as *Selaginella wallacei*: a fern relative which grows locally under similar conditions to the rock ferns. All of these ferns have done well and continue to grow throughout most of the year when watered, rather than going dormant as they do in nature. The selaginella has proceeded to root into the bare surface of the pumice, sending wire-like roots into the rough, bubbly solid rock. These ferns definitely seem to need water, for I lost my first plants through the belief that they could be allowed to dry off and

become dormant, as they do locally during the period between June and October.

My second fern rock has *Cheilanthes covillei* from the Tehachapi Mountains, *Cheilanthes* or *Notholaena newberryi* and *Pellaea compacta* from Riverside County, all doing very well. These ferns, particularly the species from Riverside County, go dormant for most of the year in spite of watering. They start into growth in late winter and by mid-April have finished their growth for the year.

A more recent rock has been planted in eastern native ferns with maidenhair spleenwort (*Asplenium trichomanes*), brown-stemmed spleenwort (*A. platyneuron*), walking fern (*Camptosorus rhizophyllus*), rusty cliff fern (*Woodsia ilvensis*), and hairy lipfern (*Cheilanthes*



FREDERICK W. COE

A Fern "Feather Rock" planted with *Pellaea mucronata*, *Cheilanthes gracillima*, *Selaginella wallacei*, *Aspidotis californica*, *Onychium densum*, *Pellaea andromedi folia*, *Pityrogramma triangularis*. The erect plant in center, foreground is *Pinus monophylla*. This rock is about sixteen inches by nineteen.

lanosa). Each fern is planted in a separate pocket in the pumice and pieces of limestone have been incorporated in the pocket containing the walking fern. The surface of the pumice has been covered with a fine sifting of peat moss, fine sand and soil and tiny bits of live dry moss were sprinkled on this surface. After about six months the rock surface is completely covered with moss and the ferns all are growing quite happily. My hope is that the walking fern will "walk" on this surface, if all goes well.

Two very successful rocks have been planted in cacti, one containing hybrid and species cacti, the other planted only in species cacti, mostly *lobivias*. In contrast to the fern rocks, which have been kept in half shade, the cacti get sun or full sky light all day. Only if the air temperature gets in the high 90's do they need to be shaded or turned so that the plants do not get full sun. The latter is easy if the rock is irregular in shape and the plants are placed on a slanting surface. — FREDERICK W. COE, *Ross, California*.

A Titan Arum Flowers

In April of 1961 Longwood Gardens was able to display for the first time in its greenhouses a flowering specimen of *Amorphophallus titanum*, the titan arum of Sumatra, often billed incorrectly as "the largest flower in the world." [The largest true flower, measuring 18 inches across is produced by a Malayan parasitic herb, *Rafflesia arnoldi*.] The "flower" of the titan arum is, of course, actually an inflorescence, which is greatly surpassed in size by that of the talipot palm (*Corypha umbraculifera*). Since the blooming of this strange species of *Amorphophallus* under greenhouse conditions in temperate countries is a rare enough occasion, it warrants some brief notes for the record.

The first titan arum to flower in the western hemisphere bloomed in the greenhouses of the New York Botanical Garden in June, 1937. [See *The National Horticultural Magazine*, July 1937]. A description of it and its culture are very fully documented in a special issue of the



Journal of that Garden, published in August, 1937. The Longwood Gardens plant originated from one of three corms obtained during 1957 in the course of plant exchange with a correspondent in North Sumatra where material was collected from forests near Pematang Siantar.

According to the literature, the life cycle of *Amorphophallus titanum* is more or less a seven year one. The early years following germination of the seed are purely vegetative, a single large, much divided, compound leaf being produced annually (seasonally) and devoted to the storage of large supplies of food in the underground stem or corm. When this bulb-like structure increases sufficiently in size to assure successful flowering, an inflorescence bud is formed and its appearance and the ultimate production of flowers and seed mark the end of the plant's life, for the old corm normally dies. The seed produced, of course, serves to assure the continuation of the species in nature. Unfortunately, under cultivation no viable seed has ever been produced, and this is the primary reason why the titan arum is so rare in greenhouse collections.

Of the original three corms received by Longwood Gardens from Sumatra, two were lost due to rot caused by transit injuries. The third probably weighed from 25 to 30 pounds at the time it was originally planted and was about 16 inches in diameter. Apparently a young inflorescence bud had already been set for such soon appeared after the plant started into growth. Perhaps due to transport shock, it failed to develop properly and it was feared that the corm

might not survive. Fortunately, in July of 1958, a typical giant leaf was produced and this remained in good shape for twenty months, until March of 1960. The leaf attained a maximum height of 117 inches with a petiole length of 79.5 inches and a petiole circumference (at base) of 18.25 inches. In early June of 1960, when dried off, the corm had increased in weight to 53.25 pounds.

Following a six month rest period, the corm again started growth with the appearance of a young shoot on January 21, 1961. This eventually produced an inflorescence on April 13, 1961. The attractive spathe (mottled green outside and dark maroon inside) and yellowish spadix opened at about 6:30 p.m., announcing the event through the discharge of the powerful carrion stench so notable in this species. The inflorescence remained open throughout the night, but by 8 a.m. the following morning had started to close. It reopened slightly on a subsequent day, but did not remain fully open as long as specimens previously flowered. By May 7 the spadix had completely collapsed.

While in flower several pollinations were attempted with the result that two fruits developed to maturity. One of these was dissected and found to contain an embryo lacking endosperm. Seed from the other was planted but did not prove viable.

This plant was relatively puny compared to the specimen flowered in 1937 in New York. The latter, originating from a 113.5-pound corm, produced an inflorescence 101 inches high (measured from soil level to tip of spadix). Compared to this, the Longwood plant produced a specimen 50.75 inches high from a 53.25-pound corm. An unusual postscript to this note is that instead of rotting away, as it is supposed to do after flowering, the corm of the Longwood plant remained in good condition. In July, after a rest period of several months, it again started growth. As of this writing (September 25, 1961), a new leaf has been formed—practically the same size as the 1960 leaf. It looks, therefore, as though there would be a chance for this particular plant to produce another inflorescence sometime in the future.—W. H. HODGE, *Chevy Chase, Maryland*.

Amorphophallus titanum

Corm as received from Sumatra
in 1957, top, left.

Inflorescence at Longwood Gardens in
April, 1961, top, right.

Single compound leaf growing
at Longwood Gardens, 1960,
bottom, left.

Fruiting stalk in native forest
near Pematang Siantar, Northern
Sumatra (scale in decimeters),
bottom, right.



Gordonia lasianthus

Gordonia lasianthus Again

A short time ago there was a note on *Gordonia lasianthus* in the *AHS Gardeners Forum*. If my identification is accurate, this tree grows in the woods here, in association with pine, oak, hickory, sassafras, *Myrica cerifera*, *Ilex glabra*, and *Persea borbonia*. At a casual glance it looks a lot like *Persea*, but tends to be of a darker green. It is a handsome tree, deserving of wider use.

The bloom illustrated in a New Bern garden is on an eight foot tree moved in from a nursery near Norfolk two years ago and planted in full sun. The photograph was made in the last week of June, 1961. Blooming will continue until late in the fall. Blooming had not yet begun on the trees in the woods. The flowers on *Franklinia* planted last season and now just starting, are almost identical but smaller.

G. lasianthus has a reputation among local nurserymen of being difficult to move. It is difficult, but if properly nursery grown, or if root pruned well in advance, and then adequately cared for during the first season, there should be no unusual difficulty.—MORLEY WILLIAMS, *New Bern, North Carolina*.

Mahonia lomariaefolia and others

In the March issue of the *Journal of the Royal Horticultural Society*, H. G. Miller reports on Late-flowering Trees and Shrubs. He admits at the close of his lecture that he has reported on several plants that "viewers may regard as too early flowering to be classed among the late summer-blooming shrubs and so to conclude I will mention two which are at the winter end of my subject." In his plantings, this species and *M. acanthifolia* bloom in November.

In the editor's garden, *M. lomariaefolia* is still too young to think of bloom and as yet does not even show the typical character of growth and leaf that make it such an outstanding plant. In a nearby garden, however, two plants were seen, newly set from a source in Mobile, that were crowned with their splendid

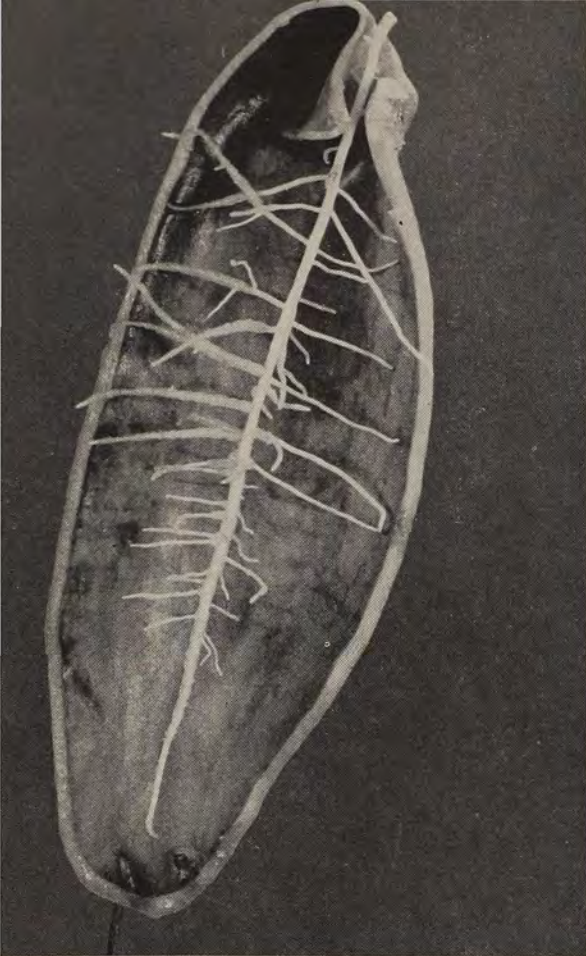
circle of blooms. The blooms were atop the equally striking circle of long leaves, with their slender leaflets, that are so different in style and character from those of the familiar Japanese *bealei*, a species that flowers here after Christmas, often in chilly seasons well into February. In contrast with the flowers of *bealei* these are a brilliant yellow, sweetly scented and long lasting, but in the two plants seen, not setting fruits as freely.

There seems to be some difference of opinion as to where the plant should be located from the point of view of its optimum development. In a letter, John L. Crech tells me that it has been long established in the Avery Island plantings of the McIlhennys and that in too dense shade it becomes straggling and leggy. Here, on the chance that it may be a little tender to cold, it will have to have some shade. The plants referred to above were definitely leggy and bare stemmed. This fault can be laid against any *Mahonia* not in health. This, in addition to the fact that it is not an impressive plant for some years after planting, may account for the fact that it is not often met in ordinary gardens. The amateur who is not willing to wait for development is impatient of the early lean years.

The question of hardiness is not completely known, or agreed upon, but *bealei* can be met in a variety of places through the eastern States, so wide in range that one can only imagine that the plant is more durable than is usually thought.

If the splendid close suckering habits of *M. fortunei*, that will make a splendid thicketlike mass in time, could only be added to these other species, they certainly would add much to any planting of evergreen shrubs. As winter flowering is a great addition to any scheme, there is an added value. Berries, which are fine on *bealei*, covered with glaucous bloom until almost ripe, when they are usually picked off by the birds as they blacken, make a show during the early months, March and April here, that is almost as desirable as the period of blooming.

No special requirements of soil seem to be needed, other than good soil, deeply prepared, and in a site that is neither too dry nor wet from poor drainage.—B. Y. MORRISON, *Pass Christian, Mississippi*.



Hoya darwini* and *Dischidia rafflesiana

The genus *Hoya*, of which the "Wax plant," *Hoya carnososa*, is the most widely known representative, has sixty or seventy species which occur in the tropics and subtropics of Malaya, India, China, Indonesia, the Philippines, and Australia. *Hoya darwini* is of particular interest because some of its leaves are formed into hollow pouches in a similar manner as is known from the famous *Dischidia rafflesiana* which belongs to the same family, the ASCLEPIADACEAE or "Milkweeds."

When *Dischidia rafflesiana* was first discovered many speculations were made as to the functions of these pouches, and one of the assumptions, which prevailed for a long time, was that they served as insect traps. This is definitely not the case. In fact, the genus *Dischidia* itself shows rather clearly how these pouches came to be developed. Several other species of *Dischidia* living under similar conditions as *D. rafflesiana*—on the bare bark of trees (often dead trees), where they are exposed to periods of drought—have fleshy, shield-shaped leaves, which are tightly appressed to the bark of the host tree. Roots develop under these sheltering leaves. From this adaptation it was only a step to the formation of closed pouches.

Dischidia rafflesiana develops long, rambling shoots which, when they find a suitable spot for attachment, first develop a cluster of pouch leaves from which after a while new shoots appear. In a greenhouse this *Dischidia* is able to travel in this manner even along a bare steel bar, as long as it is within the reach of water spray, and under such conditions it never produces any free roots at all.

When one examines one of these pouches, which may be four or more inches long, one sees first of all that on its top is a funnel-shaped opening,

Dischidia rafflesiana, pouch-leaf cut open showing the root inside it, top, left.

Hoya darwini, one of the pouch-leaves removed and turned around to show the opening, top, right.

Dischidia rafflesiana, showing a group of pouch-leaves, bottom, left.

Dischidia rafflesiana, one pouch-leaf showing the opening, bottom, right.

Hoya darwini, in flower, is shown on the Front Cover.

through which water readily enters, and that a root, developed from the stem, also enters this opening. The accompanying illustration shows one such pouch cut open with the well sheltered root inside. It can be assumed that in nature ants probably carry humus into the pouch, and that rain water trickling down along the stem will provide a regular supply of nutrients.

The pouch-leaves of *Hoya darwini* are usually developed in pairs, or sometimes three together, but always only at wide intervals. They are somewhat heart-shaped in outline, up to 4 cm. wide on top and about the same in length. They have in the rear a somewhat recessed and rather large opening, 1.8 cm. in diameter. The curious part is that because of the position of the pouches, which with their rear sides are pressed tightly together, the recessed opening makes it almost impossible for water to enter. In cultivation in our greenhouses, these pouches are always completely dry inside, in spite of frequent spraying, and roots are never developed in them. Apparently, they serve no purpose whatsoever. The twining stem with its large leaves readily develops free roots. It is possible, of course, that under natural conditions the pouches may be functional.

We received our first plant of *Hoya darwini* from the Botanical Garden, Goettingen, Germany, under the name *Dischidia merrilli*, but, even before it flowered, a visiting botanist told me that he believed this to be *Hoya darwini* which he said was frequently misnamed *Dischidia merrilli* in cultivation. Actually, the two have little more in common than that both are native to the Philippine Islands. Their resemblance in general appearance is very superficial.

When our plant flowered, all doubts were removed. The flowers of the *Dischidias* are quite small and are urn-shaped, with only a very small opening, while the star-shaped corolla of any *Hoya* opens wide. The "wax plant," *Hoya carnososa*, which is a well-loved house plant, is typical for this feature. The flowers of *Hoya darwini* are about an inch in diameter and are very handsome. They are rose in color, deepening to purple in the center. *Hoya darwini* is a rampant climber and requires considerable space if it is not restrained.—HENRY TEUSCHER, Curator, Montreal Botanical Garden, Montreal, Canada.



G. HAMPLER, LONGWOOD GARDENS

A greenhouse-grown specimen of Vallota speciosa

Vallota speciosa

To those who know it, this amaryllid is one of the loveliest of "the Cape bulbs." In summer, usually August, mature plants produce several tall stalks each having four to nine red trumpet-shaped flowers each three to four inches across. *Vallota* is apparently little grown in this country. This is unfortunate for, unlike many bulbous plants, this species is evergreen. Thus it does not have to be put through an annual rest period

like the hippeastrums and therefore makes a fine year-round house plant. On the other hand, a number of years are required to produce show specimens. But if half a dozen bulbs are grown together in a large pot or tub, the display they will eventually make, perhaps after eight to ten years, is well worth the wait.

In Britain where it has had periods of popularity, *Vallota* is known as the Scarborough lily and the name has been carried to us as well. In a sense this is an unfortunate name appended, so the story

goes, because original bulbs were washed ashore from the wreck of a Dutch vessel at Scarborough on the English coast. It would seem that, when possible, plants should bear the popular names of their homelands, particularly when theirs is a land with a common tongue. South Africans call this plant the Knysna or George lily after its local haunts and certainly either of these is a more appropriate name.

A monotype (in other words, the sole species in its genus), *Vallota* is found in nature only along a one-hundred-mile stretch of lovely Indian Ocean coastline known familiarly to South Africans as the "Garden Coast." This area extends roughly from Mossel Bay to Humansdorp in the Cape Province, but the plant is especially well-known around the little resort towns of Knysna and George.

A decade ago I had the pleasure of observing flowering specimens of this species in the wild on its native coast. Unlike other more familiar South African bulbous species, it is associated with wooded or forested areas which occupy the valleys of numerous small streams which traverse the Outeniqua Mountains, a range paralleling the Indian Ocean. *Vallota* seems to prefer sunny sites with good soil in open glades or clearings in these broadleaved evergreen forests which exist because of the twenty-five inches of well-distributed annual rainfall. It is natural, then, that in cultivation this plant resents being dried off at any time.

Since *vallotas* can at most stand only a few degrees of frost, they are generally considered to be greenhouse bulbs. Even so, they are easy enough to grow on a sunny windowsill in the average home. In culture they are handled essentially the same as *Hippeastrums* except that *vallotas*, once established, dislike being disturbed and should never be dried off. —W. H. HODGE, *Chevy Chase, Maryland.*

These Plants Have Scents

As you drive north over the Golden Gate bridge from San Francisco on a warm day during the late spring, summer or fall you are greeted by a wonderful aromatic, almost sage-like, odor wafting down from the hillside above the highway. During late summer the source of this smell is more obvious because of

a dotting of bright yellow daisy flowers over an otherwise golden brown slope. This is the Hayfield Tarweed (*Hemizonia luzulaefolia* v. *lutescens*), an annual, whose leaves, stems, and even buds are covered by sticky golden droplets of scented resin.

This "weed" has a very long season of bloom as there are two forms, one spring blooming, the other summer and fall blooming. Even in late fall when the seasonal rains are expected daily and slopes are brown and dry, the tar weed continues to bloom and scent the slopes.

The fat bodied black blister beetle, which damages cultivated aster, seems to like the buds and flowers, for there are always swarms of them clustered around a good stand of the plants.

Although it is admittedly a "weed," if you are growing hay as a crop, the wonderful odor is to me one of the attractions of the golden hills.

Not so appetizing an odor, unless you are especially fond of a mephitic scent, is that of the skunk-weed (*Navarretia squarrosa*) which is fairly abundant in Marin county. This annual member of the Gilia Family with round heads of small pale lavender flowers set among thistle pointed bracts has finely cut foliage covered with glandular hairs secreting sticky skunk-scented resin. Fortunately this plant does not seem to grow in large pure stands, for only a breeze or a slight brush with the plant is needed to release the distinct smell. As the plant usually grows six to eight inches high and is not conspicuous, you may think that skunks are much more plentiful than they really are unless you recognize it.

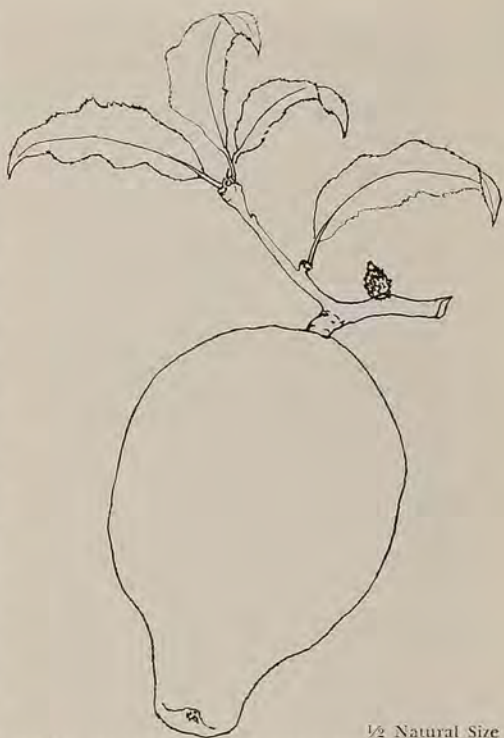
A member of the mint family with a much more pleasant smell is the yerba buena (*Satureja douglasii*), an evergreen creeper which grows along the borders of woodlands or in lightly shaded fields. This plant is common in the coastal hills and gives its name to the island in the middle of San Francisco Bay to which the Oakland-San Francisco bridge is anchored. The scent varies slightly from plant to plant and some are much more pleasant than others. At its best it is a minty odor with overtones of nutmeg or mace. Unlike either of the previous plants, yerba buena is odorless until crushed. This creeper has oval, crenulate half to an inch opposite leaves, and

small white or pale lavender flowers borne in the axils of the leaves in spring.

There is a tree native to California and Oregon and known by many names in these states. Locally it is the California Laurel or Bay, while in Oregon it is the myrtle or pepperwood. It (*Umbellularia californica*) varies in size and shape with exposure to wind and climate but no matter its shape, it scents the air with an aromatic bay tree odor. When the new foliage is still soft this smell is particularly strong on a breezy day and a grove of these trees will have almost a medicinal odor. The dried green leaves may be used cautiously as a flavoring in much the manner of "bay" leaves (*Laurus nobilis*). In spite of the strong aromatic flavor, which you might think would discourage any foraging animal, the wild deer will keep small plants trimmed to the point they resemble a badly clipped boxwood. On the hillside behind my home are plants four or five feet tall which are as dense as any hedge from this continual nibbling.

One other tree which is rarely seen, even here in California, is the Catalina ironwood (*Lyonothamnus floribundus*). This distant relative of the spirea stands alone in its genus and is only found on four islands off the Southern California coast. Two forms occur, one with simple almost peach-like leaves, on Santa Catalina Island. The other form has pinnate leaves with the leaflets again cut (var. *asplenifolius*) and resembling closely the eastern sweet-fern (*Comptonia peregrina* var. *asplenifolia*). This is found on all four islands and grades into the other form. Because of the unique foliage this is usually offered by nurseries.

In suitable mild climates where temperatures do not dip below twenty degrees Fahrenheit, growth is rapid and the Catalina ironwood grows to be a medium size tree in a few years. With the fern-like foliage, peeling dark red bark and large clusters of small white flowers in spring, it is quite a striking sight. Although all of these matters are mentioned in descriptions of the tree, I find no note made of the pleasant odor of the leaves. Near a tree on a warm day this scent is identical to the fir tree. Probably it has not been noticed or described for so few really warm days occur in its native islands and with a cold wind blowing the tree has no odor—FREDERICK W. COE, Ross, California.



½ Natural Size

PEN AND INK DRAWING BY CAROLINE DORMON

Chaenomeles cathayensis

Chinese Quince

Some years ago the late Miss Louise Butler (The Cottage, St. Francisville, Louisiana) gave me a very large quince, weighing more than a pound. It was golden yellow and deliciously fragrant. I planted the seeds, which germinated well. One of these plants bore a fruit in three years.

Meanwhile, I had read descriptions of *Chaenomeles sinensis*, and had tried in vain to find it in a nursery catalog. Ernest Wilson says, "It is a favorite of the priests and is commonly seen in temple grounds throughout the Orient." (*Plant Hunting*, Vol. II). One day I read that the Chinese keep fruits in the house all winter, for their perfume. This struck a spark in my mind—I had this much desired tree! My golden fruit reposed in a basket in my house, and kept perfectly until the late winter.

The pale pink flowers are large, but borne singly, therefore not nearly so showy as the shrubby species of *Chae-*

nomeles. But for an autumn display, it is unsurpassed. In late fall the leaves become glistening scarlet and crimson, and among them hang the great golden fruits. Both remain on the tree until almost Christmas.

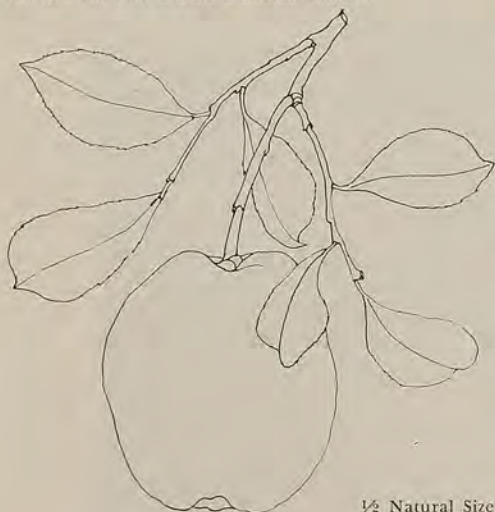
The small shapely tree seldom exceeds fifteen feet in height, and is suitable for even small grounds. It sheds its bark in large flakes, light brown on the inner surface.

This species is sometimes confused with a similar one, *C. cathayensis*, but the latter is not nearly so worthwhile. The odd fruits are pear-shaped, smaller, and not very fragrant. Neither are the leaves so brilliantly colored in autumn. The flowers are much like those of *C. sinensis*, not at all showy. The leaves are lanceolate, minutely and evenly serrate, while those of *C. sinensis* are ovate—occasionally obvate—and finely and irregularly serrate.

The true Chinese Quince, *Chaenomeles sinensis*, prefers a heavy rich soil, but will grow in almost any well-drained site. It is somewhat subject to fire-blight, and should not be planted near pears or native crabapples. It is said to be hardy to Philadelphia, but thrives best in the Deep South. Every Southern garden should grow this small tree, so spectacular in autumn.—CAROLINE DORMON, *Saline, Louisiana*.

Chaenomeles sinensis

PEN AND INK DRAWING BY CAROLINE DORMON



½ Natural Size

Two Native Azaleas

Although the interest of the editor's garden is centered chiefly on species in the Tsutsuji Section of the genus *Rhododendron*, the two species of azaleas common in the immediate area, *canescens* and *serrulatum*, have been in the plantings for years. Each year they increase in the beauty of their display and remind us that the evergreen azaleas we love best have little to offer in the way of perfume. Some years ago, one plant of *austrinum* from a stand near Van Cleve, Mississippi, was added and that now rises about seven feet tall, and annually is covered with its small yellow flowers, this plant with pink tinted tubes.

Until last summer, no plants of *prunifolium* had been gotten and when they were added, one plant each of *alabamense*, *aemulans* and *prinophylla* were ordered too, largely to satisfy my curiosity. *Aemulans* is reduced to a variety of *viscosum* by Rehder but flowered here as a very fine thing, better than any form of *viscosum* that I recall, and well before *serrulatum* even thought of blooming. Whether or not this plant is a particularly fine individual or not, one does not know, but it was a stunning addition to the planting.

Prinophylla is now reduced by Rehder to a synonym of *R. roseum*. The plant here is a fine thing, but this particular individual does not have the carnation-like scent that was so evident in the plant in my former garden, that came from the Nik Nar Nursery, in North Carolina, a scent that usually is noted for the species. Here again, we had a fine individual with large flowers and fine clear rose pink color, blooming after *canescens*, and before *aemulans*, which is a summer bloomer. It is well worth a place.

The two plants of *prunifolium* are markedly distinct in growth habits, obviously collected plants and properly pruned down, now furnished with new growths. One has started into vigorous growth, with promise of bud setting at this writing (mid-July), the other looks much like any plant of the general "mollis" category, unhappy, with poorish leaves and uncertain color in them, as if attacked by red spiders, which are not present. One can only wonder, if any care could be added to the routines of regular moisture, carefully peated site, and semi-shade, to induce this plant to rival its fellow. There are, as yet, no

signs of bud setting. The plants, of course, came from S. D. Coleman, Fort Gaines, Georgia.

The only thought that comes, is that often in this garden, a newly set plant, of apparently perfect condition on arrival, will remain almost stationary in growth, until the second year and then often will make a new top, from new growth so that the original plant disappears into the new mass. The editor would be glad to hear from others if this type of reaction is or has been noted elsewhere in the Deep South.—B. Y. MORRISON, *Pass Christian, Mississippi*.

Winter Heliotrope

I first read about winter heliotrope in *Garden Gossip* (April 1939) in the golden days when Elizabeth Rawlinson was its editor. "*Petasites fragrans*," Jane Boyd Nelly wrote in the correspondence column, "has grown for years and years in our old graden in Portsmouth (Va.) and we have loved it for its unusual fragrance and its ornate leaves. It is an evergreen, growing from six to twelve inches high, with leaves round, smooth and green on the upper side, fine, matted with hairs on the under side, the margins toothed. The flower heads are small, growing in a cluster and dingy white, turning to purple as they grow older and most fragrant. A partially shaded border seems best suited for growth."

I first saw winter heliotrope in Miss Isabel Busbee's garden in Raleigh, and soon transferred a root of it to mine, where it bloomed in January and promptly disappeared. Miss Isabel's died too. That was nearly twenty years ago, and I searched for it in vain until last fall, when I came upon a patch in Mrs. Drane's garden in Edenton (N.C.). She said she got it from Hayes, another old Edenton place, where it blooms in January.

This is all that I know about winter heliotrope in America, except that Mrs. Bratenahl once grew it at the Cottage Herb Garden at the Washington Cathedral, but English gardeners often speak of it, and always with dire warnings of the impossibility of ever getting rid of it, once it becomes established. Mr. Darnell says that the thick roots travel for yards underground, "throwing up growths

where they are least expected and probably not wanted." He advises growing it in a large pot sunk to its rim in the ground. Other winter gardeners suggest enjoying it at someone else's expense, and that some one not too close at hand.

In spite of all this, I have brought a root from Mrs. Drane's garden in mine and am enjoying the pattern of the large leaves, much like those of *Brunnera macrophylla*, while I wait for the vanilla-scented winter flowers. The wide leaves suggested to Dioscorides, what became the generic name, from the Greek for broad-brimmed hat.

The winter heliotrope is said to like clay banks, and I have certainly found it drought-resistant, but the foliage soon looks forlorn if it is allowed to get too dry. Coming from the Mediterranean countries, it is a somewhat tender plant, and I do not know how far north it grows. Mrs. Bratenahl may have kept it inside.—ELIZABETH LAWRENCE, *Charlotte, North Carolina*.

Juniperus conferta

Among the conifers of Japan that fit well in the American environment, *Juniperus conferta*, the Shore Juniper, is singularly promising. This species is the most nearly prostrate of the low-growing junipers and forms a true ground cover. Along the beaches of Japan, its horizontal branches develop in a radiating fashion, root down into the sand and then produce numerous vertical shoots that create a solid mat. The leaves are arranged in whorls of three, a quarter to a half inch long and needle-sharp. The foliage is bright green.

Juniperus conferta is distributed from Tanegashima, a small island south of Kyushu, Japan, to southern Sakhalin and although it is common on the flat sandy beaches, it occasionally is found inhabiting rocky sea-cliffs. From an adaptation point of view it should be suitable anywhere along the coasts of the United States, and although predominantly a sun-loving plant, the Shore Juniper will invade lightly wooded areas, in which case, it grows with leggy, upright branches. One of the common associations found along the beaches of southern Japan, especially on the Pacific side of Honshu, is *Juniperus conferta* and



JOHN L. CREECH

Juniperus conferta, a young plant on sand beach of Tanegashima, Japan

Juniperus conferta, the shore juniper, as it grows naturally along the beaches of Honshu, Japan

JOHN L. CREECH



Pinus thunbergii, the Japanese Black Pine. The juniper forms an evergreen, sand-holding cover while the pines develop a wind break behind the beaches. This combination should be effective also along our eastern seaboard from New Jersey southward. The black pine is especially tolerant to salt spray and grows well in sandy beach soil.

The Shore Juniper is used in plantings in the southern United States and, although introduced only in 1914, is available in a number of nurseries in the mid-Atlantic states.—JOHN L. CREECH, *Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.*

Odd Tree Noises

Since I moved to California many things about the plants have impressed me, but the subject of this note is something that might very well go unnoticed. Tree "noises" are usually limited to the squeaks of branches rubbing together, the sighing of the wind through evergreen needles, or the rustle or rattle of leaves. Ordinarily these are taken for granted on a windy day. To have trees make "noises" on hot, still days is another matter entirely.

The Monterey Pine (*Pinus radiata*) is widely planted in the San Francisco Bay region and a mature grove is found near the Letterman Army Hospital on the Presidio. One hot September day at noon I was walking through this grove and noticed a popping, crackling noise coming from high in these pines. After careful study with the help of binoculars, I found this was coming from cones which were opening their scales and shedding seeds. Once in awhile a few seeds would come spiralling down. This pine belongs to the closed cone group but apparently sun heat is enough to open them in some cases, while the Lodgepole Pine (*P. contorta* and var. *Murrayana*) and Bishop Pine (*P. muricata*) need intense heat from fires to fully open the cones and shed their seeds.

The second sound was heard one hot June day when the relative humidity was eight per cent and the temperature was in the mid-nineties. In Marin County there are scattered small groves of naturalized acacia trees coming, like the eucalyptus, from Australia. Usually these are *A. decurrens* in its variety *dealbata*, the

Silver Wattle, which are a mass of golden flowers in February or March and set a heavy crop of seed pods. These hang in reddish-brown clusters and by mid-June are ripe. On this day a light sound like popping corn could be heard and pods were seen to split open from the side, raining down a half dozen small black seeds as they curled about the unopened side. A slight breeze would detach these split pods and they, too, showered down.

Bark peeling from a tree would ordinarily not be thought of as a noisy process, but in a grove of the Pacific Madrones (*Arbutus menziesii*) in mid-July, again on a hot, dry day, there is a constant whisper of sound and a fine confetti of small pieces of bark float down from the trunk and all the branches exposed to direct sunlight. In deep shade at the base of these trees ordinarily checkered dark gray bark forms, but the rest of the trunk and limbs have beautiful, smooth cinnamon brown bark. After peeling in July and for several weeks thereafter, the limbs remain greenish brown, very gradually returning to the former shade. Only a tissue paper layer of bark peels, but this comes from the whole tree and forms a light carpet on the forest floor.

After seeing bark peel in this manner, I wondered if the sycamore (*Platanus*) trees are even noisier in their peeling. The large eucalyptus trees nearby with strips of bark twenty-five feet long hanging from the clean, white trunks also will be "listened" for on some hot, dry day.—FREDERICK W. COE, *Ross, California.*

Skunk Cabbages

The northern gardener with a woody brook, spring or continually wet spot on his place should consider the skunk cabbages as hardy garden oddities for spring-time show. The characteristic conical and often variously striped yellow, green or maroon spathes of our eastern skunk cabbage (*Symplocarpus foetidus*) are familiar to many as among the earliest (February-April) spring flowers in the northeastern states and adjacent Canada. The "skunky" odor of the flowers or bruised leaves may be objectionable to some, but is more than offset, it seems to me, by the plant's unusual interest.

Far more attractive horticulturally (and apparently equally hardy and odoriferous!) is the western yellow skunk cabbage (*Lysichiton americanum*) which is



W. H. HODGE

The Yellow or Western Skunk Cabbage flowering in early July at Chinook Pass (Elevation 5440 feet) near Mount Rainier, Washington

native to springy wooded sites in the so-called transition and Canadian zones in the mountains from northern California to Alaska. The illustration shows a wild plant blossoming in early July during snow-melt time at Chinook Pass (5,440 feet elevation), Mt. Rainier, Washington. The sunny cowslip-yellow spathes of this particular species are often the size of those of a Calla lily (*Zantedeschia*) and when in bloom are most attractive, especially when several specimens are allowed to clump. Less well-known is an

apparently distinct Eastern Asiatic species, *Lysichiton camtschatcense*, bearing white spathes equal in size to those of the Western American plant but with the flowers said to be odorless.

In all skunk cabbages the early spring-flowering structures precede the large cabbage-like leaves which persist for several months after flowering to give additional interest in the garden. The three species described are propagated usually by the thick rootstocks. In the case of the American species these may be ob-

tained either in the wild in late spring or early summer (be prepared for deep digging!), or from the occasional nurseryman who specializes in plants for wild-flower gardens.

Plants of *Symplocarpus* can be marked when in flower if a special color variation of the spathe is desired. Poor forms (with greenish-yellow rather than pure yellow spathes) of the yellow skunk cabbage (*Lysichiton*) also exist, making careful selection of wild plants worthwhile.—W. H. HODGE, *Chevy Chase, Maryland*.

Magnolia soulangiana var. *brozzoni*

In Millais' *Magnolias*, published in 1926, the plant named is discussed separately from many of the clones resulting from the original cross that produced what we know now as *Soulangiana*, since Millais regarded the clone *brozzoni* as one of the best.

It should be remembered that "soulangiana" is the result of a cross of *M. denudata* by *M. liliflora* and that there were among the seedlings of the population resulting, more than one plant that received a name. There seems to be some question as to how the plants came into cultivation through a nursery source, and in the book mentioned this is discussed, the author pointing out the theories and suggesting the doubtfulness of some. Whatever the complete story, the fact remains that a number of the most beautiful of the early flowering magnolias are the result of the cross.

Nearly all that we have been able to find are represented in the collection here, but *brozzoni* was added only in 1960, as a fairly large plant from a Pacific Coast nursery. The plant as received, was slender, and with widely divergent branching, suggesting that it might make a tree or shrub wider than tall, but the real excitement was the presence of three flower buds, suggesting an early blooming habit—early in age, not season.

Actually, the major value of the clone is the fact that it is one of the very last to bloom, with flowers lasting well into April here when all the others have long since past.

The blooms are not as large as the largest *soulangiana* but are not small, about ten inches across when widely open. The color is white, with a flush of

pinkish purple at the very base on the outside only. This is not strong enough to spoil the white effect of the bloom from a little distance. While it is not safe to predict from the newly planted specimen, this one seems to agree with Millais' statement that "the leaves develop with the flowers." Here there are leaves at blooming time, but not enough to interfere in any way.

Millais gives credit for its introduction to Barbier & Cie, of Orleans, France, about 1911, a statement that we have had no chance to verify—possibly a needless notion! He does not state that they originated it, or that it came from the original population and into their hands by purchase.

Whatever the story, behind all, the plant remains a lovely magnolia. Possibly for those persons who visit this garden and state categorically that they cannot grow early blooming Oriental magnolias on account of frosts that wreck the bloom, this is a solution of their troubles. Usually they admit that they do not know the beautiful hybrid *lennei*, which also is late flowering and well worth a place in any garden that has room for a plant that is spreading in habit rather than tree-like with one outstanding trunk.

Possibly it should be recorded that the winter-spring of 1960-61 was the kindest that has occurred here in ten years and that all the early magnolias had the chance to bloom without frosts, and such a display! The glorious Yulan, a tower of white, the variety bought as *denudata elongata*, not so tall yet, but splendid; Picture a *denudata seedling* (?) from Wada in Japan, which had its first normal flowers, and while close to those of *elongata*, is different enough so it will be cherished always; and *Veitchii* itself, now about twenty feet tall, covered from top to bottom with its blooms so different in style and with a clearer pink than shows in many. All these made up a fine sight, and some filled the air with their delectable perfumes.

Trials are being made again, with the species that have failed several times, *Sieboldi* and *Wilsoni*, and so far all goes well. The problem seems to be related to summer, but whether too long a period of heat, or too frequent rainfall has been their undoing, remains to be proven.—B. Y. MORRISON, *Pass Christian, Mississippi*.

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the PEONIES

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