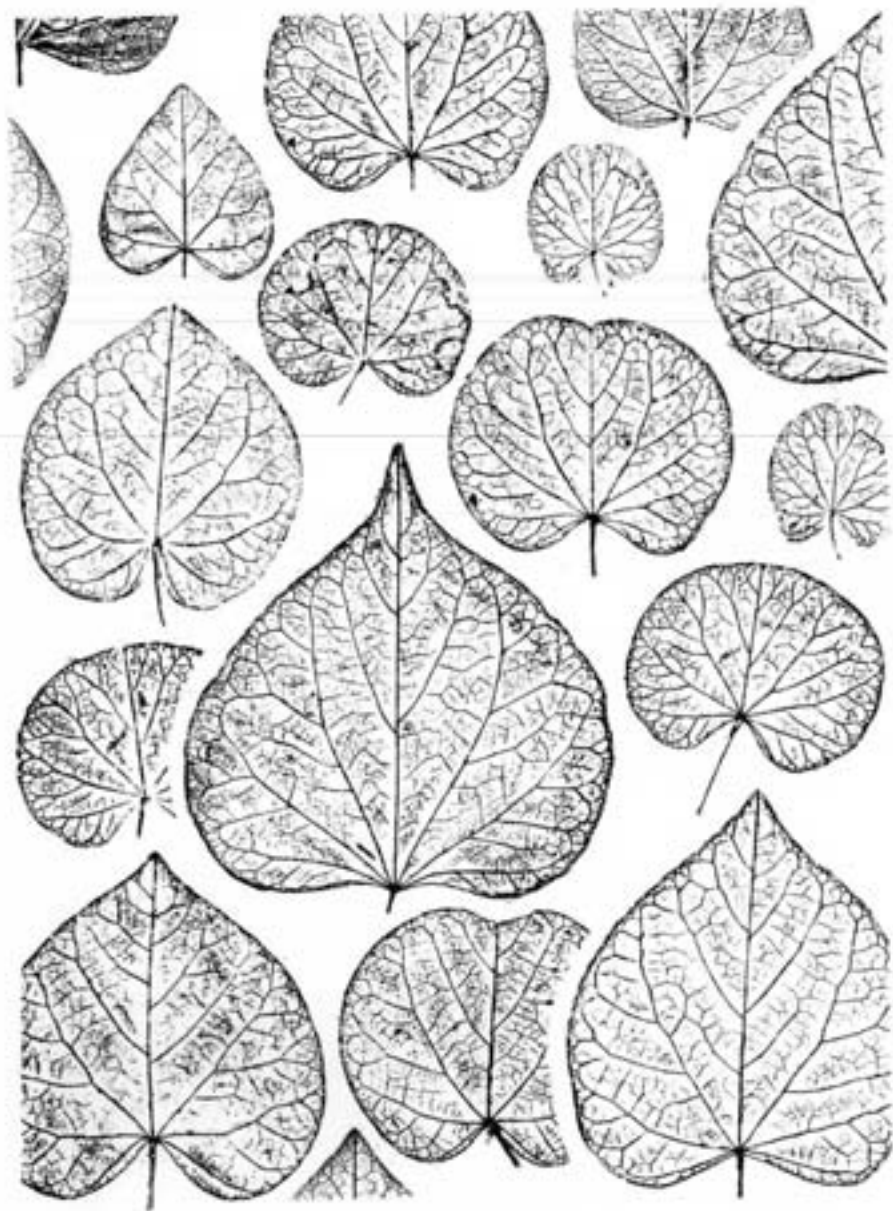


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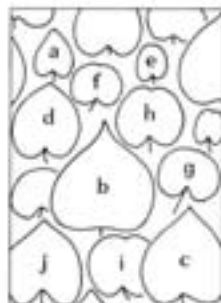


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Cover:
Rubbings of *Cercis* leaves by R. Lefberg.
a-c, *C. canadensis* var. *canadensis*; d, *C.*
canadensis var. *texensis*; e-g, *C. occidentalis*;
h, i, *C. Siliquastrum*; j, *C. chinensis*. All
 $\times 1/2$. (From herbarium specimens of
plants collected in the wild; each lettered
rubbing from a different collection.)

Cercis: The Redbuds

by KENNETH R. ROBERTSON

One of the few woody plants native to eastern North America that is widely planted as an ornamental is the eastern redbud, *Cercis canadensis*. This plant belongs to a genus of about eight species that is of interest to plant geographers because of its occurrence in four widely separated areas — the eastern United States southwestward to Mexico; western North America; southern and eastern Europe and western Asia; and eastern Asia. *Cercis* is a very distinctive genus in the *Caesalpinia* subfamily of the legume family (Leguminosae subfamily Caesalpinioideae). Because the apparently simple heart-shaped leaves are actually derived from the fusion of two leaflets of an evenly pinnately compound leaf, *Cercis* is thought to be related to *Bauhinia*, which includes the so-called orchid-trees commonly cultivated in tropical regions. The leaves of *Bauhinia* are usually two-lobed with an apical notch and are clearly made up of two partly fused leaflets.

The eastern redbud is more important in the garden than most other spring flowering trees because the flower buds, as well as the open flowers, are colorful, and the total ornamental season continues for two to three weeks. In winter a small bud is found just above each of the leaf scars that occur along the twigs of the previous year's growth; there are also clusters of winter buds on older branches and on the tree trunks (Figure 3). In early spring these winter buds enlarge (with the exception of those at the tips of the branches) and soon open to reveal clusters of flower buds. Each flower bud is composed of two parts: a bright magenta calyx tube and, protruding through the tube, five unopened, lavender-pink petals. A magenta stalk supports each flower bud. These flower buds do not open immediately, but their color and sheer number on otherwise bare stems make redbud plants very conspicuous at this time of the year.

Whoever coined the common name "redbud" must surely have been colorblind, but "redbud" is certainly more euphonious than "magentabud." In any case, the name "redbud" has been around for a long time. George Washington referred to the



Fig. 1. Young flowering tree of Cercis canadensis var. canadensis (eastern redbud). Photo: Arnold Arboretum.

planting of redbuds around Mt. Vernon, and later Thomas Jefferson described them at Monticello. Some people use the name “Judas-tree” for this plant, although that name rightly belongs to the European species *Cercis Siliquastrum*.

After a period of one to two weeks, the flower buds open into flowers that suggest those of a pea. The petals are a delicate, but still rather intense, shade of lavender-pink, which harmonizes well with the magenta calyx tubes. There are also forms in cultivation with pale pink to white flowers. With a little practice, one can tell from a considerable distance when a plant has open flowers by its overall pinkish rather than magenta color.

Close examination of the open flowers shows that there are five petals of three different sorts (Figure 2). The upper “banner” petal is innermost and is enclosed in bud by the two lateral “wing” petals and the two “keel” petals. The transfer of pollen from one flower to another is usually done by various long- and short-tongued bees, which are guided to the center of the flower by lines (nectar guides) on the “banner” petal. The two “keel” petals, which enclose the stamens, form a landing platform for the insect visitors. When an insect lands on a flower, the “keel” petals are pushed downward and the stamens spring upward, depositing pollen on the insect’s abdomen. At this time the stigma is exposed so that it can receive the pollen already present on the abdomen. The insect meanwhile feeds on nectar produced by special tissue at the base of the stamens. This “papilionaceous” (pea-like) flower, which is unusual in this subfamily, is a good example of convergent evolution, for this flower functions like the flowers of another subfamily (the Faboideae) of the legume family. In flowers of that subfamily, the banner petal is outermost, the keel petals are innermost, and the wings and keel together function as a landing platform.

Not all flowers within a cluster (inflorescence) open at the same time, but the “life span” of the flowers that open first is long enough so that they have not withered by the time the younger flower buds open. Since all flower clusters on a tree mature nearly simultaneously, there is a period when most of the flowers on an individual tree are open at the same time and the branches appear to be covered with flowers (Figures 1, 3). At this stage, redbud trees are spectacular! However, the plants do not remain this way for very long, as the older flowers soon begin to fade and wither.

At about this time the winter buds at the tips of the branches enlarge and open, sending out the new growth of the year. Suddenly the plant becomes quite unsightly, with the remains of the flowers scattered along the branches and only immature

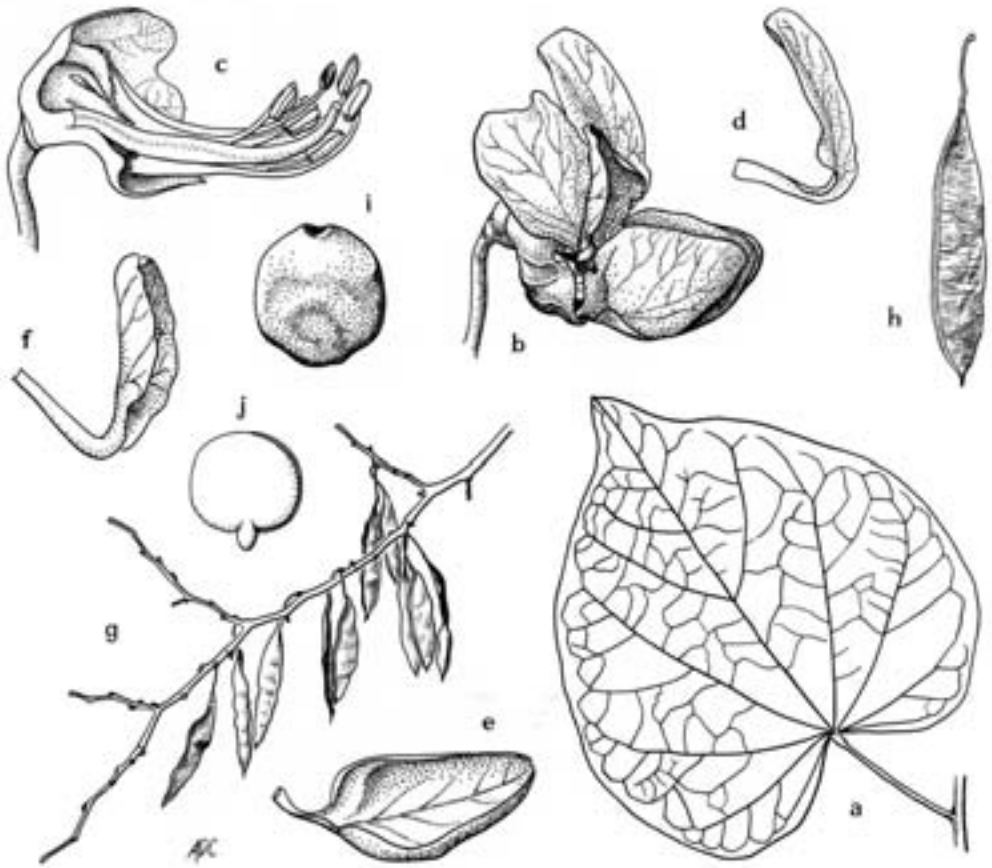


Fig. 2. *Cercis*. a-j, *C. canadensis* var. *canadensis*: a, leaf — note swollen pulvinus at tip of petiole, $\times 1/2$; b, flower, the uppermost (banner) petal innermost, $\times 3$; c, flower in partial longitudinal section, the petals removed, $\times 4$; d, wing petal, $\times 3$; e, keel petal, $\times 3$; f, banner petal, $\times 3$; g, branch with fruits after fall of leaves, $\times 1/4$; h, mature fruit, $\times 1/2$; i, seed, $\times 4$; j, embryo from soaked seed, $\times 3$. Drawn by Arnold D. Clapman for a Generic Flora of the Southeastern United States and reproduced here with the permission of Prof. Carroll E. Wood, Jr.

leaves at the tips. The young leaves, glossy and often reddish, grow rapidly, and in a few weeks the plants develop an attractive summer foliage. The mature leaves are arranged alternately in two rows along the branches of the current year. They are rather thin, dull green on both surfaces, usually three to six inches long and wide (with the largest leaves at the tips of the branches), and heart-shaped with abruptly tapering tips. Five to nine conspicuous veins radiate outward from the notch at the base of the leaf blade. Each leaf is borne on a petiole that is about as long as the blade itself. At each end of the petiole is a swollen area called the "pulvinus" (Figure 2). Changes in the volume of cells in the upper pulvinus bring about the sleep movements of the leaves — the leaf blades are usually held more or less horizontally, but at certain times, such as during the middle of a hot day, they droop. These sleep movements, while distinctly noticeable, are not as pronounced and regular in the redbud as in plants such as the hardy silk tree, *Albizia Julibrissin*, and the sensitive plant, *Mimosa pudica*.

The ovaries of one to several flowers in most flower clusters enlarge and develop into fruits that reach their full size by midsummer. The fruits are elongate, lustrous, deep pink or reddish legumes about $2\frac{1}{2}$ to 4 inches long and mostly $\frac{5}{8}$ inch wide (Figures 2, 3). They are strongly flattened laterally with tapering tips and bases and parallel margins, or the upper margin curves downward at the tips. A small wing is usually present along the upper margin. Each fruit contains four to ten compressed, reddish-brown, beanlike seeds. The generic name *Cercis* is derived from the Greek *kerkis*, weaver's shuttle, alluding to the shape of the fruit.

In early autumn, the inner leaves of the eastern redbud turn a clear yellow while the outer leaves remain green, thus creating a contrast of colors that is particularly vivid against a brilliant blue autumn sky. The outer leaves soon turn so that the whole tree is yellow for a brief period. Rapidly, however, the yellow changes to brown and the leaves drop. Thus, while attractive for a short time in autumn, the redbud is not as effective as some other native plants (such as the witch hazels or dogwoods) in contributing to fall color. The fruits remain on the trees after the leaves have fallen. By autumn, they have lost the reddish pigment and are dry, very light, and tan or brown in color. Dispersal of the seeds takes place primarily during the fall and winter as the wind periodically blows most of the fruits from the branches. Late in the season, after the



b



Fig. 3. *Cercis*. *a-e*, *C. canadensis* var. *canadensis*: *a*, tip of winter twig with vegetative bud above and floral buds below; *b*, close-up of winter twig with buds of 2 inflorescences (flower clusters); *c*, inflorescences with flower buds; *d*, stem with numerous inflorescences and open flowers; *e*, branch with mature fruits. *f*, flowering twig of *C. chinensis*. Photos: K. R. Robertson (from colored slides).

fruits have fallen or while they are still on the plants, the sutures on some of the fruits open, releasing the seeds; in the case of those fruits that do not open, seed release is effected by the decay of the fruit walls.

The eastern redbud is most often seen these days as a small tree or tall shrub. Mature specimens, however, can be moderate-sized trees with broad, rather flat-topped crowns, the largest being more than fifty feet tall, with a crown spread of over forty feet and a trunk diameter at breast height exceeding thirty inches. The natural range of the eastern redbud is from southern Connecticut and New York, south to central Florida, and west to Michigan, southern Wisconsin, Iowa, eastern Nebraska and Kansas, much of Oklahoma (except for the panhandle), and eastern Texas. In Canada, only one plant has been reported outside of cultivation — a tree that grew formerly on Pelee Island in Lake Erie, Essex County, Ontario. The eastern redbud is most abundant to the west of the Appalachian and Alleghany mountain ranges. It has a rather wide tolerance of environmental conditions, preferring strong sunlight and soils that have good drainage and are derived from limestone or acidic sandstone. In the northern and eastern part of its range, it is mostly found in open woodlands, limestone glades and openings, and thickets and along the borders of woods, rocky streams, and bluffs. Toward the south and west, it occurs in deep woods, ravines, bottomlands, and rich soil along streams.

Eastern redbud and flowering dogwood (*Cornus florida*) have similar geographical distributions and often occur together. Although the flowering season of the redbud is usually almost over when the dogwood begins to bloom, there are exceptional years when the trees flower simultaneously and produce a memorable show of spring color. I was raised in southwestern Missouri at the edge of the Ozark Mountains and vividly remember excursions into the countryside to admire the spectacle of the redbuds and dogwoods. Both of these species thrive in a border habitat, and, as a result of the many roads constructed in this century, they are probably more abundant now than ever before. In some places, redbud also flowers at about the same time as some of the shadbushes and wild plums (*Amelanchier* and *Prunus* species).

The type of redbud that has been discussed thus far corresponds technically to *Cercis canadensis* var. *canadensis*. It is native to the eastern United States and is distinguished from other North American redbuds by its tapering-acute leaves that at maturity are thin and dull green on both surfaces. Southwestward from the Arbuckle Mountains of Oklahoma, some or all of the wild redbuds are shrubs, instead of trees, with rather

thick, rich deep-green and waxy-shiny leaves that have blunt tips. Plants of this kind that lack hairs on the young branchlets and the petioles are known as the Texas redbud, *C. canadensis* var. *texensis* (or *C. reniformis*), which ranges from the Edwards Plateau to north-central Texas and the Arbuckle Mountains. Those plants with densely hairy branchlets and petioles are called the Mexican redbud, *C. canadensis* var. *mexicana*, and they occur from Crockett and Val Verde counties, Texas, to the Trans-Pecos and northeastern Mexico. Finally, the California or western redbud, *C. occidentalis*, distinguished from the eastern redbud by its larger flowers and fruits, occurs naturally from the Siskiyou Mountains of northern California southward through the Coast Ranges and the Sierra Nevada to San Diego County, California, eastward to southern Nevada, southwestern Utah, and northwestern Arizona (particularly along the canyons of the Colorado River). The Texas, Mexican, and California redbuds are commonly cultivated in the areas to which they are native. They are seldom grown in the eastern U.S., however, except as curiosities in botanical gardens.

Isely, in a very recent paper that appeared since the preceding discussion was written, while officially adopting the classification scheme established by Hopkins and modified by Turner, recognized six types of redbuds in the United States: (1) the eastern redbud, (2) the Texas redbud of east-central Texas and adjacent Oklahoma, (3) the Mexican redbud of Trans-Pecos Texas and south into Mexico, (4) the Intermountain redbud, *Cercis occidentalis* pro parte, of northern Arizona, adjacent Utah, and contiguous southeastern Nevada, (5) the San Diego redbud, *C. occidentalis* pro parte, of the Laguna Mountains of California, and (6) the Sierra redbud, *C. occidentalis* pro parte, that occurs on the inner Coastal Ranges and eastern slopes of the Sierra Nevada from Kern to Siskiyou counties, California. Two hypotheses were advanced by Isely to accommodate these phases in a taxonomic scheme. Following the first hypothesis, two species would be recognized, with *C. canadensis* including only the eastern redbud (*C. canadensis* var. *canadensis* of this paper) and *C. occidentalis* including all the forms with thick rounded leaves that occur from Texas to California. Isely's second hypothesis would treat all the redbuds of the United States (and probably Mexico) as a single species constituted of a number of regional varieties (approximately as outlined above).

In addition to the redbuds found in North America, several other species of *Cercis* are found in the Old World. The Judas-tree, *C. Siliquastrum*, is commonly seen throughout the Mediterranean region and southern Europe. According to legend, Judas Iscariot hanged himself from a branch of this plant, and



Fig. 4. Young flowering plant of Cercis chinensis. Photo: Arnold Arboretum.

its white flowers then turned red with either shame or blood (Figure 5). The Judas-tree is so widely cultivated and naturalized that it is difficult to ascertain its original geographical distribution; a good guess is that it is native only from Turkey eastward to Afghanistan. This species is quite variable both in nature and in cultivation, and many of the variants have been recognized as botanically different varieties or species. Just as the eastern redbud, *C. canadensis*, does not do well in cultivation in Europe, so the Judas-tree is not adaptable to gardens in eastern North America; each species is at its loveliest in the areas in which it grows spontaneously.

Five additional species of *Cercis* have been described from central and eastern China. One of these, *C. chinensis*, commonly called the Chinese redbud, is hardy in the Boston area (Figure 4). The flowers of this plant are larger and of a deeper color than those of the eastern redbud. In cultivation, the Chinese redbud is a moderate-sized shrub, but in the wild it can be a tree up to fifty feet tall with a trunk three to four feet in diameter. Another Chinese species, *C. racemosa*, is unique in the genus in that the flowers are borne in elongated racemes rather than in umbels. This species was collected in the wild and distributed to botanical gardens in 1907 by E. H. Wilson of the Arnold Arboretum, who said that of all the flowering trees he introduced into cultivation this was one of the very best and most beautiful. Unfortunately, *C. racemosa* is not hardy in Boston, but it would be worth trying on Cape Cod, Martha's Vineyard, and Nantucket Island. Apparently no commercial nursery in eastern North America currently offers *C. racemosa*. The other Chinese species of *Cercis* are poorly known to science and are evidently not in cultivation.

Our native eastern redbud and the Chinese redbud have much to recommend them for gardens in eastern North America. They are reliably hardy; they are highly ornamental in spring and summer; they flower consistently each year; they stay a nice compact size in a yard; and they are reasonably free of serious diseases, although canker can be a problem, particularly in areas where the summers are hot and humid. Commercially available cultivars of the eastern redbud include 'Alba' with white flowers; 'Flame', with double flowers and a more erect habit; 'Forest Pansy', with bright red new growth deepening to maroon as the season progresses; and several forms with light pink flowers, such as 'Pink Bud', 'Ruby Atkinson', and 'Withers Pink Charm'. The cultivar *Cercis* 'Oklahoma' is a variant of the Texas redbud with rich wine-red flowers and glossy foliage. Artificial hybrids have been obtained between *C. canadensis* and *C. chinensis* at the U.S. National Arboretum in Washing-

ton, D.C., where research involving breeding and selection of *Cercis* is being conducted.

Redbud plants should be transplanted at an early age since large specimens usually die when moved. Propagation is mostly from seed. Ripe seeds must be treated to break the hard waterproof seed coat. This may be done by filing or nicking the seed coat, by soaking the seeds in sulphuric acid for about an hour, or by covering the seeds with hot (180° F.) water and letting them sit overnight. The seeds should then be subjected to a moist cold treatment (40° F. for 3 months).

The following key is presented as an aid to the identification of cultivated redbuds. The use of this key requires knowledge of the flowers, fruits, and mature leaves. The species of *Cercis* are so similar that it is often necessary to observe a plant throughout a season before it can be identified. The overall shape of leaves and of leaf apices mentioned in couplet "2" of the key reflects the usual condition on a plant, rather than that of individual leaves. Flower length is measured from the base of the calyx tube to the tip of the "keel" petal.

KEY TO THE CULTIVATED REDBUDS

1. Flowers in umbels or shortly elongated fascicles. 2.
2. Leaves cordate or more or less triangular in overall outline, some or all with acuminate, acute, or narrowly rounded apices (at least tapering toward the tips); fruits mostly less than 16 mm. wide. 3.
3. Leaves without a definite translucent border; flowers 6–12 mm. long; petals light lavender-pink (white to dark pink in cultivars). 4.
4. Leaves dull green above and below, thin, not coriaceous, the apices usually abruptly acuminate. *C. canadensis* var. *canadensis*.
4. Leaves rich green, glossy, coriaceous, the apices narrowly rounded or acutish. 5.
5. Leaves glabrous beneath. *C. canadensis* var. *texensis*.
5. Leaves densely pubescent beneath. *C. canadensis* var. *mexicana*.
3. Leaves with a narrow translucent border; flowers 15–18 mm. long; petals purplish-pink. *C. chinensis*.
2. Leaves orbicular or reniform in overall outline, some or all with broadly rounded, often emarginate apices, not distinctly tapering toward the tips; fruits mostly 15 mm. or more wide. 6.
6. Leaves subcoriaceous to coriaceous; flowers 10–15 mm. long. *C. occidentalis*.
6. Leaves thin, not coriaceous; flowers 15–20 mm. long. *C. Siliquastrum*.
1. Flowers in elongate racemes. *C. racemosa*.

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This article is dedicated to my late mother, Mrs. Faye Robertson, who loved redbuds.

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Fig. 5. *Cercis Siliquastrum*, showing derivation of common name "Judas-tree." From Castor Durante, *Herbario Nuovo*. Venice. 1636. [Arnold Arboretum copy on deposit at the Houghton Library, Harvard University.]

The Cornelian Cherries

by RICHARD E. WEAVER, JR.

In late March at the Arnold Arboretum the signs of spring are few and subtle. True, the male Red-wing Blackbirds are calling in the meadow, and the meadow itself is beginning to turn green. And the Snowdrops in front of the Administration building have been blooming for some time, as have the Silver Maples along Meadow Road. But most of the trees and shrubs look about as they had during the drab days of winter. Only their swelling buds hint at their preparation for the season to come.

A few woody plants, however, are in full bloom during the last week of the month, at least if the weather has been seasonable. Silver Maples, *Daphne mezereum*, and *Rhododendron dauricum* provide a bit of color in the brown landscape, but the Cornelian Cherries put on the best show. At the Arnold Arboretum, the finest specimens are just behind the Cork Trees along Meadow Road and near the ponds close to the Forest Hills Gate. These members of the genus *Cornus*, the Dogwoods, are poorly known in comparison with some of their relatives, at least in America, but they are first class ornamentals. Forming large shrubs or small trees, they are literally covered with soft yellow flowers at a time when any color is much appreciated. They are also long-lived, relatively disease-free, and tolerant of poor soils; their fruits are attractive and edible, and the bark of one species is among the most attractive of any hardy woody plant.

The Cornelian Cherries, *Cornus mas* and *C. officinalis*, along with two other, little known species, form a distinctive group (*Cornus* subgenus *Cornus*) within a varied and highly ornamental genus. In these species, the flowers appear before the leaves. They are small and greenish or yellow and are borne on slender stalks in dense, rounded clusters or umbels. The clusters are surrounded at the base by a series of bracts similar to, but not nearly so conspicuous as, those in the Flowering Dogwood (*Cornus florida*) or the Kousa Dogwood (*C. kousa*). The fruits, also borne in clusters, are oblong drupes (fleshy fruits with a single, hard stone, as in Cherries), typically red



A fine specimen of Cornus officinalis in flower. This plant, growing at the Arnold Arboretum, is about 15 feet tall. Photo: D. Wyman.

in *C. mas* and *C. officinalis*, but black or blue-black in the other two species.

The best known of the Cornelian Cherries, and the one to which the name is most properly applied, *Cornus mas*, has been valued in Europe as a utilitarian plant since classical Greek and Roman times, and was mentioned in the writings of Homer and Virgil. The Latin name now given the plant is derived from the names applied to it in ancient times, and the common name also has been long established. Both are derived from its utilitarian attributes.

The wood of *Cornus mas* has been valued over the centuries for its hardiness, durability, and flexibility. Although put to more mundane use in recent times, such as for the manufac-

ture of wheel spokes, ladder rungs, and tool handles, it was favored by the Romans to make the shafts of javelins. The modern generic name *Cornus* is the name they used for the plant, its derivation being from the Latin *cornu*, meaning “horn,” because of the hardness of the wood.

The specific name *mas*, meaning “male” in Latin, was also applied to this plant by the Romans, presumably because (according to J. C. Loudon in *Arboretum et Fruticetum Britannicum*, vol. 2, page 1014. 1838) young plants bear only male flowers, and therefore do not set fruit. This would have been of some significance to the Romans, since they used the fruit as food. The common name, Cornelian Cherry, or shortened to “Cornel,” was given to the plant because its cherry-like fruits are about the color of the gemstone carnelian. Although seldom eaten today, they were formerly used for various purposes in Europe: to make confectionary, marmalades, and liqueurs; mixed with apples and pears to make cider; and pickled green to serve as a substitute for olives.

Key to the Species

1. Tree with a single trunk, or with a few main trunks close together, the bark on mature individuals exfoliating, exposing the pale inner bark and creating a mottled effect; leaves usually with 6–7 pairs of veins, and with conspicuous tufts of brown hairs in the axils of the veins on the undersurface; flower stalks and the base of the flowers sparsely covered with short, straight, straw-colored hairs (use a magnifying glass) *Cornus officinalis*.
1. Large shrub or bushy tree, usually with numerous stems from the base (or occasionally with only a few), the bark on mature individuals close, scaly, dark-colored; leaves usually with 4–5 pairs of veins, with often inconspicuous tufts of white hairs in the axils of the veins on the undersurface; flower stalks and the base of the flowers densely covered with short, slightly crinkled, white hairs (use a magnifying glass) *Cornus mas*.

The two related species are rare in cultivation, so they are not included in the above key. They are, however, briefly described below.

Top left: The flowers of Cornus mas, appearing before the leaves in early spring. Photo: R. Weaver.

right: The trunk of Cornus officinalis with its characteristic exfoliating bark. Photo: R. Weaver.

Bottom left: Trunks of Cornus mas showing the dark, scaly bark. Photo: P. Chvany.

right: Fruits and foliage of Cornus mas ‘Flava’, about 1/2 life-size. This cultivar is distinguished from the species by its yellow rather than red fruits. Photo: H. Howard.



Cornus mas L. Cornelian Cherry. Native from central and southern Europe into western Asia, and reliably bud-hardy into Zone 4, this is the most frequently cultivated of the species. In this country it generally forms a large, multi-stemmed shrub to 15 feet tall. The largest specimen at the Arnold Arboretum has grown about 12 feet tall and twice as broad in its 93 years. A specimen this size would hardly be suitable for the average sized American yard, but with careful pruning of sucker shoots, the plant can be trained into an attractive, several-stemmed small tree.

As mentioned earlier, the fruits are edible. But, although they may reach the size of a small olive, the stone is large and the flesh relatively scant. Also, fruit set is seldom heavy in this country.

A number of cultivars have been selected, most of them differing from the species in having variegated leaves or white or yellow fruit. A few are described briefly below, a condensation of a more complete list which appeared in *Arnoldia*, Vol. 21, pages 9-18, in 1961 (Registration Lists in Cultivar Names of *Cornus* by R. A. Howard).

Cornus mas 'Alba' — fruits white.

'Argenteo-marginata' — leaves with a broad, white edge.

'Aureo-elegantissima' — early leaves golden-edged, but becoming flushed with carmine at maturity.

'Flava' — fruits yellow.

The species is available from a number of nurseries in this country, but I have been unable to find sources for any of the cultivars.

Cornus officinalis Sieb. & Zucc. Korean Cornelian Cherry. This is certainly the finest of the hardy species. A native of central and southern Korea and perhaps the Chinese province of Chekiang where it grows into a tree 30 feet tall, it was introduced into cultivation in Europe about 1870. It is not quite as hardy as *C. mas*, being reliable only in Zone 5. The fruits, similar to those of *C. mas*, were thought to possess medicinal properties by Oriental peoples, and the plant has been widely cultivated by them for centuries. At least young individuals of this species are easily confused with *C. mas*, and if only flowers are



A large specimen of *Cornus mas* at the Arnold Arboretum showing the shrubby habit typical of the species. Plant was 86 years old when photographed; now 93, it has a height of 12 feet. Photo: H. Howard.

available, distinguishing between the two species is always difficult. The diagnostic characters separating the two are outlined in the key above. The most obvious differences, and the ones which make *C. officinalis* far superior horticulturally to *C. mas*, are in the bark and the habit of the plants. *Cornus officinalis* is almost always a vase-shaped small tree with a single trunk, or with a few main trunks close together. The finest specimen at the Arnold Arboretum is 62 years old and about 15 feet tall. The bark on mature specimens exfoliates in a pattern suggesting that of a Sycamore or a *Stewartia* (but not as attractive, I must admit, as the latter). More subtle differences, but also horticulturally significant, are that the flowers of *C. officinalis* are a slightly better yellow, they are borne in larger clusters, and they appear a few days earlier than those of *C. mas*.

A more complete account of this species is to be found in: Wilson, E. H. Rare and Noteworthy Plants. *The Garden* 88: 333. 1924. Although the Korean Cornelian Cherry is certainly a desirable plant, it is rarely offered for sale by nurserymen. It is, however, listed by LaFayette Home Nursery in Lafayette, Ill., and by Greenbrier Farms in Chesapeake, Va.

Cornus sessilis Torr. Miner's Dogwood. This species, a native of the mountains of California, is a shrub or small tree to 15 feet tall. The flowers are in few-flowered clusters and the fruits are blue-black. The plant is not showy in flower or fruit, and it apparently is seldom cultivated. It is tender in all but the warmest parts of the northeastern United States.

Cornus chinensis Wanger. This is a tree to 40 feet tall in the wild, with flowers in larger clusters than those of *C. mas* and *C. officinalis*. The leaves are also large with conspicuous veins, and have been compared with those of a *Hosta*. It is native to northern India, northern Burma, and western and central China, and is very rare in cultivation. The plants cultivated in England were grown from material collected by Kingdom Ward in northern Assam, and they are tender even in most parts of the British Isles. However, considering the natural range of the species, hardy clones might well be found if botanical exploration would be possible once more in China.

Neither *Cornus mas* nor *C. officinalis* seems to be fussy about soil conditions, nor are they bothered by any serious insect pests or diseases. According to Mr. Alfred Fordham, Propagator at the Arnold Arboretum, the seeds have a double dormancy. His experiments have shown that this may be overcome by a warm treatment for five months followed by cold stratification for three months at 40 degrees F. He also suggests that the seeds may be sown when mature in the fall, with germination to be expected in the spring of the second year hence. The intervening summer and subsequent winter supply the conditions necessary for germination. Both species are also easily propagated from softwood cuttings.

In Defense of the Rev. Dr. Reuben D. Nevius and the Plant Called *Neviusia*

by RICHARD A. HOWARD

In 1857 Prof. Asa Gray named *Neviusia* as a new genus of the Rose family, based on material supplied by the Rev. Dr. Reuben Denton Nevius. The plant later was grown in the Harvard Botanic Garden in Cambridge, Mass., and sent by Charles Sargent to Kew and to other European gardens; it had a limited native distribution along the Black Warrior River in Alabama near Tuscaloosa.

Although they lacked petals, the flowers were extremely showy in the spring, due to the display of bright, yellowish stamens. An enlarged calyx along with the presence of only a few 1-seeded carpels made the plant of great botanical interest and suggested a relationship with the Asiatic genera *Kerria* and *Rhodotypus* and an association with *Spiraea*.

For many years the tribute to Nevius was acknowledged by botanists, but in 1900 Charles Pollard wrote of a visit to the home of *Neviusia*. "During a recent collecting trip in the south a visit was made to Tuscaloosa for the purpose of seeing this and other rare plants of that region, and I was most fortunate in meeting Prof. W. S. Wyman, who was Dr. Nevius' companion on the trip during which the discovery was made. From his interesting account I learned that Dr. Gray erred in ascribing the discovery of the plant to Dr. Nevius; for it was first observed by Dr. Wyman, who had proceeded some distance ahead of his associate. These facts never have been made public, so far as I am aware, and it is unfortunate that the laws of botanical nomenclature forbid the substitution of *Wymania* for *Neviusia*."

This allegation of error on Gray's part and of a lack of candor on the part of Dr. Nevius have now been accepted in recent floras where the discovery of *Neviusia* is credited to both Wyman and Nevius. In an attempt to understand the true story, I read the correspondence of Dr. Nevius with Prof. Asa Gray. Regrettably, Gray's letters to Nevius on the subject are not available.

The Rev. Reuben Denton Nevius was born in Ovid, New York, in 1827 and received his D.D. from Union College in 1849. He served as rector of the Protestant Episcopal church in Tuscaloosa, Alabama, from 1855 to 1866. Subsequently he served in Mobile, Alabama, and in Portland, Oregon. He is reported to have been a general missionary in Oregon and Washington from 1873 until his death in 1913.

On May 11, 1858, Dr. Nevius wrote to Asa Gray, "I take the liberty of sending you a plant that I have been unable to determine. I cannot think it undetermined as it is not rare, though not common. I found the specimens which I send last year before I procured your valuable Manual and have not been able to procure a specimen for analysis since. Although I cannot think it unknown to you I will take this liberty to affix a description I have made."

Gray apparently replied suggesting the plant was new to science and offering some corrections for Nevius' description. On May 29, 1858, Nevius again wrote to Gray, "I hasten to tell you of my very agreeable surprise in finding that I had made a discovery and to thank you for the kind notice you have taken of the same. Had I not distrusted my own analysis of the plant attributing my failure in it to ignorance, I should have sent it a year ago. Since then I have learned something more by the study of your excellent books, Systematics and Structural Botany and the Manual, for which in my humble way a mere tyro I thank you in the name of the lovers of the herbal craft." He promised to observe whether the plant was evergreen or deciduous and continued, "Two years ago I began with Prof. Tuomey to make a register of the Flora of this neighborhood, but before we had taken our first ramble together he was lost to us and to the scientific world by death. Since then I have pursued the study alone, with many regrets for his loss both as a friend and a teacher."

Gray sent Nevius a copy of the Torrey & Gray *Flora of North America*, and on June 21, 1858, Nevius replied from the Christ Church Rectory, Tuscaloosa, "Immediately on receiving your kind note of the 8th. inst. (for which with your generous offer of assistance in my study and your valuable *Flora North America* I thank you most sincerely) I arranged an excursion to the locality of the new unknown and procured the specimens herewith enclosed. I sent them immediately as the carpels are not fully perfected and would wither in drying. . . . I send also a specimen of the wood. The shrub has the general habit of growth of the *Philadelphus* and resembles it very much except



Neviusia alabamensis. From: A. Gray. *Neviusia*, a new genus of *Rosaceae*. *Mem. Am. Acad. Arts Sci.* II. 6: pl. 30. 1858.

in foliage. In the thickets where many twigs grow from the same root . . . one twig is gracefully bent over another towards the sunny side of the cliff forming a dense mass of foliage almost impervious to the sunlight. The shrub is a very beauty and well worth cultivation. . . . I will still watch the ripening fruit and send it to you when perfected. If the plant proves to be a new genus it would be gratifying to me and to my friends and associates in this study, Prof. Wyman and Dr. Mallett of the University, to be permitted to name the genus in compliment to our old lamented friend Prof. Tuomey — Tuomeya. I have no doubt that the plant was known to him as he studied the flora of this neighborhood very thoroughly and that his sudden death cut short in this instance as in many others, a further investigation. Please inform me if this name will be agreeable to you. If it will I will leave to you if you please the site and form of publication and the pleasure (as it will be such I doubt not) of introducing it formally into the family of known plants and of making it known to science. . . . I beg you will do me the favor to write to me soon letting me know if this plant does establish a new genus and if you concur with me in the choice of a name, for really my interest in it and my desire to call it by its own name and to communicate my designed compliment to Mrs. Tuomey will hardly brook delay."

Gray received the material Nevius mentioned and on a packet containing fruit wrote the name *Tuomeya alabamensis*. On July 12th Nevius wrote again, "Your kind letter of June is before me and hasten to thank you for your promptness in writing as well as for cordial agreement with me in naming the new genus. Your disposition to do me the unmerited honor of giving it my name was pleasing to me but far less so than my ability to honor the name of a most excellent and deserving man — my friend — in such an enduring monument. One word as to the name. Shall it be written Tuomeya or Tuomara? I think the former with the accent thus Tuo-mey-a. The name you know is Tuomey — Toomay. The name is Irish as Prof. T. was himself from Ireland."

In this letter Dr. Nevius also refers to two other plants that had been the subject of correspondence between him and Prof. Gray. He obtained and sent material of *Croomia*, which Gray was able to grow in the Botanic Garden. Later Gray wrote a significant paper on the affinities of this unusual genus with *Roxburghia* of Asia. Nevius also wrote, "As to the Sedum, I really hope it is new that I may thus by your favor enter by



Branch of Neviusia alabamensis in full bloom. Photo: K. Robertson.

enrollment in a more modest way than you at first designed the honorable and gentle guild of botanists. I think, however, you have mistaken my name, as indeed all people do to whom I do not particularly say, it is Nevius not Nevins. My name you will see is already latinized. Perhaps so long ago as when written Naevius by Horace if so though I may not claim with modesty a descent so eminent. I may with reasonable pride see my name (through your works) incidentally mentioned like his upon a "Monument more lasting than brass."

Gray later was to write in a published paper: "The *Sedum* — a small, white-flowered species, with short and nearly terete leaves, which may be named *Sedum nevii* — cannot be adequately characterized until better specimens shall be obtained." By present rules of botanical nomenclature Gray may have published an illegitimate provisional name. However, Dr. Nevius has been honored by others for his work on mosses and algae, for *Chenactis nevii*, *Mnium nevii* and *Racomitrum nevii* have been published honoring him. In October 1858 Nevius reported to Gray, "I have a few more seeds of Tuomeya which I will send enclosed."

On August 12, 1858, Asa Gray read a communication to the American Academy of Arts and Sciences in which *Neviusia* was proposed as a new genus of the Rosaceae. The communication was not published until April 25, 1859.

Shortly after reading the paper, Gray must have written to Nevius that another name must be chosen for the Alabama plant. His paper on *Neviusia* as published noted, "But the publication of the third part of the *Nereis Boreali-Americana* (since the present communication was made to the Academy) shows that the name of *Tuomeya* is preoccupied, Dr. Harvey having dedicated to Professor Tuomey's memory a curious fluviatile alga discovered by the latter in Alabama, as well as by the late Professor Bailey in Virginia." On November 16, 1858, Dr. Nevius lamented to Gray, "You may know how greatly I have been disappointed by being anticipated by Prof. Harvey in choice of a name for my new genus when I say that the discovery itself scarcely gave me more pleasure than the opportunity it afforded for honoring the name of my deceased friend. Prof. Harvey's compliment has given me great pleasure, yet I cannot help wishing that he had been a few months later in publishing his book.

"I do not see what can be done but to accept your kind proposition to give the genus the less honorable name Nevius except it would be proper to call it Toomara and trust to the usual note to designate the person. I can hardly hope, however, that you will think this proper. I will leave the whole matter entirely in your hands and by your will be godfather to the new genus."

What name Gray used for the genus when he read the paper cannot be clarified. It is clear he modified the printed version to use the name *Neviusia* rather than *Tuomeya*. On February 21, 1859, Nevius wrote to Gray, "I have just received with great pleasure a sheet containing your article upon the new genus *Neviusia* and a few days before a sheet came to me by your kindness containing your notice of Harvey's *Nevius*, etc. I am greatly obliged to you for both and I take pleasure in again expressing my obligation and my thanks for your favor and kindness shown in the matter of *Neviusia* both in bringing it out and in keeping me appraised of its progress. Your kind notice of my first intention in giving it a name and your pleasing tribute to Prof. Tuomey has been peculiarly gratifying to me. Your article is quite an imposing one and it surprises me by its fullness. I am glad to know that there is an importance in its discovery aside from the discovery itself in its bearing upon the affinities of other genera."

With this, the correspondence with Gray lags, judging from the letters retained in the historical files of the Gray Herbarium. On July 11, 1868, Dr. Nevius married Margaret Mercer Tuomey, the daughter of Prof. Tuomey. Dr. Nevius is recorded as a minister in Mobile, Alabama, from 1869 until 1871; on October 22, 1870, Mrs. Nevius died.

Alone then, he moved to Portland, Oregon, and from there wrote in March, 1873, "it is long since I have done anything in botany save with the mosses. But there are so many new plants here and so many interested persons continuously applying to me that I find my old love for the phanerogams returning upon me. And so I find myself turning to you in my difficulties as I used to do. By the way, how does the *Neviusia* thrive in Cambridge? Has it come to you from any other quarter than Tuscaloosa? Can you not have a few roots sent me by mail yet this spring?" Nevius was to write to Gray on November 18, 1883, congratulating him on his birthday, and in December his correspondence with Sereno Watson began. Gray died January 30, 1888.

In the spring of 1891, Nevius asked Watson to send roots of *Neviusia* to a friend in Tacoma, Washington, and in June of 1892 he wrote, "Thank you for securing for my friend a root of *Neviusia*. It will grow very well here. I think that . . . it is not so much climatic difficulties which affects it as a want of loose acid soil. In its native place . . . under a perpendicular rock (long cliff) I could pull up perfect roots by hand by simply pulling and shaking the loose virgin soil from its roots. It spreads from the roots and makes a long hedge-like thicket — which in season is white with bloom."

The role of Wyman as the first to find the original plant cannot be verified. It is clear that Dr. Nevius was not seeking honor for himself in the naming and that the final choice of a name was that of Gray when the suggestion of *Tuomeya* could not be implemented. The material sent to Gray was on the initiative of Dr. Nevius and his acknowledgment of "friends and associates in this study, Prof. Wyman and Dr. Mallett" is in the correspondence with Gray.

The seeds in a packet with the name *Tuomeya alabamensis* in Gray's handwriting and full herbarium specimens preserved in the Gray collections are those of 1858 and 1859 from Tuscaloosa, Alabama. The oldest herbarium specimen from a cultivated plant is labeled Hort. Cantab. Anno 1864, and later specimens are dated 1871 and 1879. Such plants must have been grown from the seed Nevius sent to Gray.

Charles Sargent was the director of the Botanic Garden in Cambridge from 1872-9 as well as director of the Arnold Arboretum. An Arnold Arboretum specimen numbered 430 in our inventory was made from cuttings in the Botanic Garden, Cambridge, in 1876. One cutting from this plant was also established in Holm Lea, Sargent's residence. Other plants from this propagation must have been distributed by Sargent.

J. D. Hooker illustrated *Neviusia alabamensis* and wrote of it in the Botanical Magazine in 1885. "*Neviusia* flowered at Kew in May 1883; the plant was nailed against a wall exposed to the east and presented a very beautiful appearance from the abundance of its snow white heathery blossoms. Considering the climate and position of its native country, I should doubt its being hardy. It has been received at Kew from several contributors, notably a living plant from Prof. Sargent of Cambridge, Massachusetts, United States in 1879 and another from M. Miles, Esq. in 1881."

George Nicholson had made a specimen of a flowering plant of *Neviusia* at Kew on May 31, 1880; a specimen from Zabel at Hannover, Germany, in 1894 bears the annotation of source as Simon Louis Fr. 1882. *Neviusia* has proved to be hardy in England, although L. P. Raffill noted in the Gardener's Chronicle that in sooty London of 1907 the plants failed to achieve a brilliance of flower when grown out-of-doors. An illustration is supplied of a greenhouse plant forced into early bloom which displayed spectacular white flowers worthy of a prize in any exhibition. In the northern hemisphere the flowering is in May or June, while in Sydney, Australia, the shrubs flower in September.

Neviusia is reproduced readily from cuttings. Kenneth Robertson has made observations on the Rosaceae growing in the Arboretum and noted in the *Journal of the Arnold Arboretum* that "information on pollination mechanisms is lacking, but the plants are evidently partly self-compatible since the sole plant of the species in cultivation at the Arnold Arboretum produces some fruit." Our propagation records do not indicate that any propagator has tried to germinate the seeds of our plant. In fact, only one seed lot from another arboretum was tried and these seeds were infertile.

The original locale where *Neviusia* was collected has been destroyed by blasting operations, but populations still occur along both sides of the Black Warrior River in the vicinity. Originally it was thought to be restricted to Alabama, but sub-

sequently plants have been found in Arkansas and reported but unverified in Missouri. In any case all locations are on the periphery of the Mississippi embayment of the old Gulf Coastal Plain. *Neviusia* is considered by phytogeographers to be a relatively old relict species rather than a strict endemic of recent origin.

The spring of 1976 affords the opportunity of observing this interesting plant in our collections. What pollinates it? What attracts the pollinators? Do the flowers have an odor or nectar? Are fertile seeds produced? Do the seeds germinate in the same manner as the relatives *Kerria* and *Rhodotypus*?

Perhaps in the future sufficient young plants may be obtained to distribute again the material which Dr. Nevius sent to Prof. Asa Gray over a century ago.



Close-up of Neviusia flowers. Photo: K. Robertson.

Arnoldia Reviews

Wildflowers and Weeds. Booth Courtenay and James H. Zimmerman. New York: Van Nostrand Reinhold. 1972. 144 pages, illustrated. \$9.95.

This is a field guide intended for the lay person who is discouraged by technical keys and scientific terms. The authors have emphasized common names and have used habitat and a system of family group charts based on simple structural detail as the "tools" for identification. Each of the 650 plants selected for inclusion is briefly described and represented by a color photograph that could be used alone for identification purposes.

The area covered is the Great Lakes region of the United States and Canada; however, the plants included also will be found growing in similar habitats outside that area. The book should be useful for a large part of the Northern United States, and should appeal to everyone who likes to see his wildflowers depicted in color.

SHEILA MAGULLION

Container Gardening Outdoors. George Taloumis. New York: Simon and Schuster. 1972. 95 pp., illustrated. \$7.95.

This is an idea book; it shows where and how to use plants in containers, mostly out-of-doors and in warm climates. Gardening procedures and management occupy but a few pages, and virtually no cultural material is included.

The volume has particular application to the needs of designers of shopping malls and municipal parks as well as West Coast residences where money is no object. The rest of us might look at it in a library for fun and inspiration.

ELINORE B. TROWBRIDGE

The Complete Handbook of Pruning. Roger Grounds, editor. New York, Macmillan Co. 157 pages, illustrated. American edition 1975. \$12.95.

Originally published in England, this volume retains a few British characteristics in vocabulary, and in references to species grown or for hardiness ranges within the United States. A glossary explains the less familiar terms. The section on grapes, for example, is applicable in its entirety to England and not to the United States. The fundamentals of pruning procedures are described and illustrated with color plates and black and white diagrams and illustrations. The three sections of the book cover the pruning of ornamental plants; the pruning of fruit trees and bushes; hedges, including topiary; greenhouse plants; and the care of old trees. In several sections an alphabetical listing of the plants considered uses interchangeably scientific and common generic and specific names.

RICHARD A. HOWARD



P. mamei. From: *Philodendrons*.

Philodendrons. Jack Kramer. New York: Charles Scribner's Sons. 1974. 87 pp., illustrated. \$5.95.

This little book covers the selection, care, and propagation of philodendrons and related genera. The fifteen line drawings by Charles Hoeppner are the best part of the book; they are attractive, accurate, and correctly identified except for *Monstera deliciosa* (listed as *Philodendron pertusum*). Unfortunately the text does not live up to the illustrations; it is repetitive and sometimes misleading. For example, the delicate *Monstera Friedrichsthali* is described as "a treelike rampant climber," (p. 62), and dieffenbachias are said to have "large heart-shaped leaves resembling those of caladiums," (p. 68), which is untrue.

The chapters on the care of philodendrons contain useful summaries of the standard horticultural practices. However, the charts on diseases and their control (p. 28-30) recommend in several instances spraying with Malathion, a chemical toxic to humans which should not be used in the home. The description of propagation by air-layering (p. 57) is adequate, but the accompanying illustration by James Carew (p. 83) shows the gardener air-layering a petiole instead of a stem, a procedure certain of failure!

Much of the material presented in the first part of the book is repeated in the last chapter in a question and answer format. An index would have been more to the point, and the remaining pages could have been used to amplify the cryptic two-line descriptions of "forty favorite philodendrons," (Chapter 5).

The volume ends with a list of references. Notably absent is Monroe R. Birdsey's excellent work, *The Cultivated Aroids* (1951), which covers the same subject matter as *Philodendrons* and is still available from the publisher, Eric Lundberg, Ashton, Md. 20702, for a modest \$5.00.

MICHAEL MADISON

Wild Flowers of the Canary Islands. David and Zoë Bramwell. London: Stanley Thornes Ltd. 1974. 261 pp., illustrated. £5.00.

The Canary Islands are a paradise for plant lovers. The climate is ideal for growing a diverse group of garden plants from temperate to tropical types, but it is the native plants that are of particular interest. There are approximately 2000 of these; about one-fifth are found nowhere else on earth, and many are restricted to small areas on a single island. A large number are spectacular in a weird or a beautiful sense, particularly the *Echiums*, which are relatives of the familiar, weedy Viper's Bugloss. Succulents in several families are numerous.

This book is an indispensable aid for anyone interested in the native plants of the Canaries, whether he be a botanist or a more casual observer, as I can attest from firsthand experience. I took the book with me on a recent trip there, and I would have been lost without it.

A total of 205 species are illustrated by means of color photographs, and an additional 109 with reasonably good line drawings; nearly every genus is represented by at least one illustration. The last half of the book contains short descriptions and keys to the identification of a large percentage of the total flora. Although a glossary is provided, this section is most useful to the botanist or the serious amateur. Equally as useful as the identification aids is the excellent section on areas of botanical interest. A map of each of the seven major islands is given, and areas with concentrations of interesting plants are delineated. The plants listed in the accompanying text are usually among those illustrated later in the book. This section is particularly useful in preparing one's itinerary when time is limited.

RICHARD E. WEAVER, JR.

Galanthus nivalis — demure harbinger of spring brightens entrance of Administration Building. Photo: P. Chvany.





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