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Cover: Inflorescences of Fothergilla major. Photo: P. Chevany.
The Witch Hazel Family
(Hamamelidaceae)

by Richard E. Weaver, Jr.

The Arnold Arboretum has claimed that there is a tree or shrub in bloom every month of the year on its grounds in Jamaica Plain, Mass. In many years this assertion is true, but only because of a single genus of plants, *Hamamelis*, the Witch Hazels. As December arrives, the last pale yellow flowers begin to fade on the Common Witch Hazel, *H. virginiana*, a native of the eastern United States. And with the New Year come the fragrant, bronzy flowers of the Vernal Witch Hazel, *H. vernalis*, closely followed by the bright and beautiful yellow blossoms of the Chinese species, *H. mollis*.

The Witch Hazels belong to the Hamamelidaceae, a family of plants which are mostly neglected by the American horticultural public. Admittedly, the family is insignificant horticulturally compared with some others, for example, the Rose Family, as a result of the diversity and sheer number of its genera and species, and the Magnolia Family, because of the universal appeal of some of its members. But a high percentage of the species in the Hamamelidaceae are first class ornamentals, possessing charm, beautiful and often fragrant flowers, unusual blooming times, and brilliant autumnal coloration. Most also are easy to grow if the soil is light and loamy, and they bloom reasonably well in partial shade. In addition, they are not bothered by any serious diseases or insect pests.

This article will present a brief discussion of all of the genera which are hardy in the northern half of the United States. Keys are provided for the identification of genera and species. The references listed are those which were consulted in the preparation of the article, and they are recommended for anyone desiring further information. Many of the species are rarely encountered in the American nursery trade, so sources are given if they exist. Nurseries are listed by name for each species and cultivar, with the addresses at the end of the article. Some, however, may not be current. For those willing to import plants from abroad, Hilliers' Nursery in Ampfield, Hampshire, England, lists all of the species treated here. I am most grateful to Mrs. Ida Burch, of the Arnold Arboretum staff, for preparing the list of the cultivars for the species treated here, for
Leaves of the Witch Hazel Family — 1/3 life-size. A, Parrotiopsis jacquemontiana; B, Parrotia persica; C, Corylopsis spicata; D, C. platypetala; E, C. pauciflora; F, C. veitchiana; G, C. glabrescens; H, Fothergilla gardenii; I, F. major; J, Hamamelis mollis; K, H. virginiana; L, H. japonica; M, H. vernalis; N, Lorypetalum chinense.
Leaves of the Witch Hazel Family — 1/2 life-size.  A, Liquidambar styraciflua; B, L. orientalis; C, Distylium racemosum; D, Sinowilsonia henryi; E, Disanthis cercidifolius; F, Sycopsis sinensis; G, Liquidambar formosana.
searching out the nursery sources for the species and cultivars, and for helping with the preparation of the leaf drawings.

As they go through this article, many readers will wonder how such seemingly diverse plants could be classified in the same plant family. The basic features which are common to the Hamamelidaceae are: woody plants with simple, alternate leaves which are often uneven at the base; stipules which are deciduous soon after the leaves expand; apparently simplified, but actually very complicated flowers, often without petals or sepals, but with the parts present inserted on the rim of a "floral cup"; a pistil with two separate styles; fruit that is a hard, almost woody capsule splitting with two or four usually slender projections at the apex, these representing the hardened remains of the styles; and seeds usually hard and shiny and usually two per capsule.

General family references:

KEY TO THE CULTIVATED GENERA OF THE WITCH HAZEL FAMILY

1a. Leaves palmately lobed Liquidambar.
1b. Leaves unlobed (2).
2a. Flowers with conspicuous petals (3).
2b. Flowers without petals or with inconspicuous ones (6).
3a. Leaves palmately veined, without teeth along the margins; flowers borne back-to-back in pairs Disanthus.
3b. Leaves pinnately veined, with teeth along the margins; flowers borne in pendulous racemes or in tight clusters of 3–6. (4).
4a. Flowers in pendulous racemes; petals as long as broad, or slightly longer than broad, leaves with sharp-pointed, usually triangular teeth Corylopsis.
4b. Flowers in tight clusters of 3–6; petals long and slender, much longer than broad; leaves with fine, almost hairlike teeth, or with rounded ones (5).
5a. Petals white; leaves evergreen, with fine, almost hairlike teeth Loropetalum.
5b. Petals yellow, orange, bronzy, or reddish; leaves with coarse, round teeth Hamamelis.
6a. Trees with flaky, exfoliating bark; leaves with coarse, rounded teeth Parrotia.
6b. Trees or shrubs with smooth or ridged bark (but not exfoliating); leaves without teeth along the margins or with sharp-pointed ones (7).
7a. Leaves evergreen, without teeth, or with a few inconspicuous, scattered ones above the middle (8).
7b. Leaves deciduous, with conspicuous teeth along the margin (9).
8a. Flowers in dense, nodding clusters, the clusters surrounded at the base by fuzzy, brownish bracts

*Sycopsis.*

8b. Flowers in upright racemes, without conspicuous bracts

*Distylium.*

9a. Flowers in dense, upright heads or spikes, with conspicuous filaments much longer than the anthers; fruit clusters upright (10).

9b. Flowers in pendulous catkin-like spikes or in racemes, the filaments not particularly conspicuous, and about the same length as anthers; fruit clusters pendulous (11).

10a. Inflorescences surrounded at the base by conspicuous white bracts, as in Dogwoods; filaments threadlike

*Parrotiopsis.*

10b. Inflorescences with white bracts at base; filaments thickened in upper portion

*Fothergilla.*

11a. Male and female flowers in the same inflorescence; flowers with inconspicuous petals; at least some of the teeth on the leaves triangular in shape

*Fortunearia.*

11b. Male and female flowers in different inflorescences; flowers completely apetalous; teeth on the margins of the leaves fine and bristle-like

*Sinowilsonia.*

**Corylopsis Sieb. & Zucc.**  *Winter Hazels*

References:


A genus of eight to twelve species native to the Himalayas, China and Japan, this is a group of fine ornamental plants. Their aspect in flower is completely different from that of any other hardy shrubs. The fragrant, soft yellow flowers are borne in pendent racemes from conspicuously zigzagged branches on the graceful, spreading plants. They are not splashy, and their fragrance is not strong, but they are distinctly charming and many of my colleagues here at the Arnold Arboretum place them among their favorite early-flowering shrubs.

The flowers generally appear in early April, before the leaves have expanded. The individual flowers are somewhat bell-shaped with five broad petals, and vary from $\frac{1}{4}$ to $\frac{1}{2}$ inch long. The racemes may be as much as 3 inches long. The foliage is attractive through the summer, although not distinguished in its autumn coloration; the individual leaves resemble those of the Hazels (*Corylus*), accounting for the generic name which means “a likeness to *Corylus.*”

The species treated here are all hardy at the Arnold Arboretum, although most are planted in one of our most sheltered spots, the Center Street Area. They would not be recommended for a climate any more harsh than ours. Even here the buds are occasionally winter-killed, and the flowers themselves are sometimes nipped by
spring frosts. Cultural requirements would be the same as for Witch Hazels — a good, rich soil and partial shade. They are most effective when planted in an informal situation, such as at the edge of woods or at the base of a large tree. The flowers will hold up well in water, and the form of the twigs and inflorescences are attractive in arrangements.

KEY TO THE SPECIES OF CORYLOPSIS

1a. Inflorescences (flower clusters) with 2–4 flowers; mature leaves usually less than 2 inches long  
C. pauciflora.

1b. Inflorescences with more than 5 flowers; mature leaves usually more than 2 inches long  
(2).

2a. Flowers greenish, small, individually ¼ inch long or less; flower-bearing winter buds slender, with a long tapering point; petioles (leaf stalks) usually with glandular hairs.  
C. platypetala.

2b. Flowers yellow, larger, individually ¾–½ inch long; flower-bearing winter buds egg-shaped, blunt; petioles sometimes hairy, but the hairs not gland-tipped  
(3).

3a. Leaf stalks and twigs with fine hairs  
(4).

3b. Leaf stalks and twigs glabrous (without hairs)  
(5).

4a. Inflorescences with less than 10 flowers  
C. spicata.

4b. Inflorescences with 11 or more flowers  
C. sinensis.

5a. Stalks and axis of inflorescences glabrous; anthers not protruding beyond the petals; capsules glabrous  
C. glabrescens.

5b. Stalks and axis of inflorescences pubescent; anthers protruding beyond the petals; capsule pubescent  
C. veitchiana.

Corylopsis spicata in flower, with Prunus cyclamina in the background. Photo: H. Howard.
Corylopsis glabrescens Fr. & Sav.

C. gotoana Makino
A native of the mountains of Honshu and Kyushu, Japan, this species was introduced into cultivation from seeds collected by J. G. Jack for the Arnold Arboretum in 1905. It is one of the hardest species, and at 4 to 6 feet, one of the lowest growing. The flowers are not as large as some of the other species, nor are they very fragrant. It is not commercially available in this country.

Corylopsis pauciflora Sieb. & Zucc.
Although native to Taiwan, Korea, and the island of Honshu, Japan, most plants in cultivation are probably of Japanese origin. This species is reputedly not as hardy as some of the others, but in my experience it appears to be about the most reliable for bloom here at the Arnold Arboretum. The pale yellow flowers are in the shortest clusters of any species in the genus, but they are also the largest among those of the hardy species, and they open more fully than most others. Since they also appear in profusion, this is perhaps the showiest species. The plant grows to about 10 feet tall here in New England. It is available from the following nurseries: Gossler Farms, Gulfstream, Hollandia, Malmo, and Tingle.

Corylopsis platypetala Rehd. & Wils.
This species, a native of western China, was discovered by E. H. Wilson, who introduced it into cultivation. One of the plants from the original seeds is still growing at the Arnold Arboretum. The species is not vigorous here, although in England it grows to be 20 feet tall. It is the latest blooming of the hardy species, and also the least showy. The racemes are long, but the flowers are small and yellow-green. The species is not commercially available in this country, and is rare even in botanic gardens. Most of the plants grown as this species appear to be either C. sinensis or C. veitchiana.

A close relative, and another Wilson introduction, C. wilmottiae Rehd. & Wils., is apparently not grown in this country, and there seems to be much confusion about its identity in general. A cultivar (the only one in the genus) said to be of this species is offered by Hilliers’. It is called 'Spring Purple' because of the most attractive plum-purple color of the spring growth. As a parent in hybridization, this clone could give rise to some particularly attractive plants.

Corylopsis sinensis Hemsl.
Related to C. platypetala but more showy, this native of China was introduced by Wilson when he was collecting for Veitch and Son. It is somewhat tender here, and the only specimens at the Arnold Arboretum are still in the nursery. It is offered for sale by Dauber and Gossler Farms.
Corylopsis spicata Sieb. & Zucc.

A native of Japan, this is the oldest species in cultivation. It is distinctive because of its non-flaring petals and its projecting red anthers. It is an attractive species, but forms a rather large plant. The largest specimen at the Arnold Arboretum is nearly 60 years old, and is 10 feet tall with a spread of 18 feet. A hybrid between this species and C. pauciflora (the only one reported for the genus) is being grown at Winterthur and the Morris Arboretum. From photographs, it appears to be most handsome, and it points out the ornamental possibilities of hybrids between other species. Corylopsis spicata is available from Brimfield and Hollandia.

Corylopsis veitchiana Bean

Another Wilson introduction for Veitch and Son, this native of western China is a particularly desirable species. In bloom and habit it resembles Corylopsis spicata, but the flowers are more open and there are more of them per raceme. In good years it is an attractive plant indeed. It is available in this country only from Tingle Nursery.

Disanthus cercidifolius Maxim.

Reference:

Although it certainly has ornamental attributes, this plant is probably more interesting than beautiful. The curious, faintly ill-smelling flowers somewhat resemble those of the Witch Hazels, but they are more star-shaped, with five tapering, dark red-purple petals rather than four strap-shaped, yellow or reddish ones. They appear in the autumn as the leaves are falling, when few other shrubs are in bloom, but although individually attractive, they are seldom sufficiently profuse to provide much of a show.

The flowers are borne in a most unusual manner — in pairs, back-to-back, on a short stalk — thus obviously accounting for the derivation of the generic name from the Greek *dis*, meaning "twice," and *anthos*, meaning "flower." The specific name meaning "leaves of Cercis," the Redbud genus, alludes to a resemblance that has nothing to do with evolutionary relationships, Cercis belonging to the Legume Family. The leaves of the two are remarkably similar; but they are completely different from those of all of the other plants in the Witch Hazel Family. In fact, Disanthus, with *D. cercidifolius* the only species, is usually classified as a distinct subfamily of the Hamamelidaceae.

In the autumn the foliage of *Disanthus* turns a spectacular blend of reds, purples and oranges, even in the shaded position in which it seems to grow best. This along with its unusual flowers and elegant, spreading form would recommend it for more frequent cultivation.

The plant is native to the islands of Shikoku and Honshu, Japan, and is apparently quite rare in the wild. We have not been able to keep it for more than a few years at the Arnold Arboretum; it is apparently hardy only in Zone 6. The only material offered in this country is seed, available from Schumacher.

**Distylium racemosum** Sieb. & Zucc.

Reference:

*Distylium* is a genus of about eight species distributed through much of tropical and subtropical Asia, with extensions into the more temperate zones. This species, a native of Japan, Korea, and Taiwan, is the only one in cultivation in the West. It is more curious than ornamental. The evergreen leaves somewhat resemble those of our native Mountain Laurel (*Kalmia latifolia*), and the flowers are conspicuous only for their large red anthers. Although becoming a small tree in the wild, cultivated specimens form stiff shrubs seldom more than 6 feet tall. Rehder lists the plant as being hardy in Zone 7, and it does survive in Washington, D.C. In this country it appears to be cultivated primarily in California, but no commercial sources have been located.

**Fortunearia sinensis** Rehd. & Wils.

Another plant of little ornamental value and therefore rare in cultivation, *Fortunearia sinensis*, the only species, was discovered by Wilson in China and originally described by Rehder and Wilson at the Arnold Arboretum. It is named for Robert Fortune, another great student of the plants of China and Japan. Vegetatively this species resembles *Sinowilsonia henryi*, which will be discussed later. The flowers are in inconspicuous drooping racemes. Rehder gives its hardiness as Zone 5, but the original plants survived here for but a few years. It is probably no longer present in cultivation in this country.

**Fothergilla L.**

Reference:

The two known species of *Fothergilla*, occasionally called Witch Alders, are restricted in the wild to the southeastern United States.
They are quite similar in appearance except for stature, and they are among the more desirable ornamentals in the Witch Hazel Family. The flowers lack petals, the conspicuous parts being the twelve to thirty-two long, creamy-white, narrowly club-shaped staminal filaments. The individual flowers are tiny, but they are massed together into a dense, upright spike resembling a "bottle-brush." The bloom is often profuse in cultivated specimens, so a plant in full flower is quite showy. The flowers are strongly scented, but the odor is of a type that is somewhat unpleasant to some people, myself excepted. Autumn coloration is spectacular, varying from red and orange in some specimens to mostly yellow in others. Bloom and autumn coloration are good even in partial shade, and both species grow well on poor, dry soils.

**KEY TO THE SPECIES OF FOTHERGILLA**

1a. Flowers appearing with the leaves; leaves usually more than 2 inches broad, the margins toothed to near the base, spikes usually more than 1½ inches long; tall shrub, 3–10 feet tall at maturity

   F. major.

1b. Flowers appearing before the leaves; leaves less than 2 inches broad, the margins toothed only above the middle; spikes less than 1½ inches long; low shrub, 1½–3 feet tall at maturity

   F. gardeni.

*Fothergilla major* Lodd.

This, the more ornamental of the two species, is native to the southern Appalachians where it typically grows on dry, sunny ridges. In the wild it is generally a straggling, stoloniferous shrub, attaining a maximum size of 20 feet. In cultivation it forms a more compact plant. Two growth forms are prevalent; one more or less erect, the other spreading. These have been considered to be two distinct species, *Fothergilla major* being the upright type, in addition to having leaves which are glaucous beneath, and *F. monticola* Ashe being spreading with leaves which are green on both surfaces. Intensive studies of wild populations have convinced me that *F. monticola* is not a valid species or even a variety. The plants observed in the wild are mostly of spreading habit, with both green- and glaucous-leaved individuals growing side by side. Cultivated specimens are variable in other respects, including size of flowers and autumn coloration, but to date no clones have been selected and named as cultivars.

*Fothergilla major* blooms during the first half of May in New England, about the same time as the Redbuds, and the two planted together produce a most pleasing effect. The finest specimen at the Arnold Arboretum is planted just inside the Main Gate. This plant, 32 years old, is a shapely, rounded shrub 10 feet tall and about as broad. The species is perfectly hardy in Zone 5. It is available from
Above: Flowering branches of Fothergilla major. Photo: D. Wyman.

Right: Foliage and nearly mature capsules of Fothergilla major. Photo: H. Howard.
the following nurseries: Brimfield, Charles Fiore, Hollandia, Gulfstream, Panfield, Princeton, Weston.

_Fothergilla gardenii_ Murr.

*F. alnifolia* L.f.

*F. parviflora* Kearney

Native to the margins of swamps and pocosins on the Atlantic and Gulf Coastal Plains from Virginia to Alabama, _Fothergilla gardenii_ is far less frequently cultivated than its more spectacular relative. Although it is generally less graceful in habit and may not bloom so profusely, it possesses most of the ornamental qualities of *F. major*, except on a smaller scale. In cultivation it is seldom more than 3 feet tall. It is slightly less hardy than *F. major*, and the Arnold Arboretum has lost the species a number of times. The plants presently in our collections are still quite young; they are best observed on Bussey Hill near the Dove Tree.

As in _Fothergilla major_, glaucous-leaved forms of *F. gardenii* occur in the wild. One of these has been given the cultivar name 'Glaucophylla', but it is doubtfully in the trade at present. The species is available only from Hollandia (as *F. alnifolia*), and from Gerard K. Klyn.
Flowers of Hamamelis (twice life-size), showing the intermediate nature of H. × intermedia 'Arnold Promise' (upper right) compared with its parent species H. mollis (upper left) and H. japonica (cv. 'Flavo purpureascens' below). These drawings were prepared by Robin Lefberg and were made possible by a grant from the Stanley Smith Horticultural Trust.

Hamamelis L.  Witch Hazel

References:

The genus Hamamelis, the Witch Hazels, after which the family takes its name, consists of four or five species. Most of them are outstanding ornamentals still little appreciated by the American horticultural public. Even if they bloomed in the month of May, the
height of the flowering season for woody plants in New England, they would be well worth growing for their visually delicate, fragrant, spidery flowers. But the fact that the various species bloom from September through March makes them indispensable for northern gardeners who want a year-round display from their flowering shrubs.

The flowers of Witch Hazels are borne in tight, usually outward or downward facing clusters of three to six. The four petals, yellow, orange, bronzy, or reddish, are long and strap-shaped and unfold in a most unusual manner — similar to the uncoiling of fern fiddleheads. It seems almost incredible that such delicate structures can withstand temperatures near 0° F. without damage. But they do this quite well, coiling up on very cold days and uncoiling in milder weather. Equally incredible is the fact that the individual flowers remain fresh for 6 weeks or more. The four sepals are often colored a deep wine red on the inside, presenting a pleasing contrast to the paler petals. They persist after the petals have fallen and are then decorative in their own right. Autumn coloration of the foliage is an added ornamental feature, the color varying from bright yellow to shades of orange and red.

The name “Witch Hazel” is of uncertain origin. Almost certainly the last part is due to the resemblance of the leaves to those of Corylus, the true Hazels. But the “witch” probably has nothing to do with those unsavory characters who ride on brooms or were burned at the stake in Salem. It is probably derived from the word wych, meaning “to bend,” applied because of the tough, limber branches of the plants. Whether the “witching rods,” which doubtfully bend toward underground water, or “Witch Hazel,” their traditional source, came first is like the proverbial chicken and egg.

A preparation made from the leaves and bark of Hamamelis virginiana has long been a standard item in barber shops and bathrooms. Its astringent and antiseptic properties, however, are probably due to the alcohol in which it is extracted, but it does have a nice smell.

Witch Hazels prefer a deep rich soil, and partial shade. Given these conditions they generally live and bloom for many years. The following discussion of the species and cultivars of Hamamelis will be brief because of the existence of an excellent article on the subject by Roy Lancaster (cited above), Curator of the Hillier Gardens and Arboretum, Ampfield, England. These plants are much more popular in Europe than here, and many of the fine cultivars are not available in this country. In general, the cultivars here mentioned are those that are in the American nursery trade. All species and cultivars are hardy in Zone 5, with H. virginiana and probably H. vernalis also in Zone 4. Our collection here at the Arnold Arboretum is somewhat scattered, but the main concentrations are in the Center Street Area and around the moist depression occupied by Leitneria floridana, between the Buckeyes and the Tree Legumes.
KEY TO THE SPECIES OF HAMAMELIS

1a. Plants blooming from September through December

2. Margins of the leaves with teeth only in the upper two-thirds; leaves somewhat hairy beneath when unfolding, but soon becoming smooth

3. Petals crinkled; flowers faintly fragrant

4. Petals more than ½ inch long, crinkled; shrub or small tree with spreading branches

Hamamelis × intermedia Rehd.

This is not a species at all, but rather a hybrid between the Chinese Hamamelis mollis and the Japanese H. japonica. It was first described from seedlings raised at the Arnold Arboretum in 1929. Seeds had been collected the previous year from the specimens of H. mollis on the grounds. None of the resulting plants turned out to be true H. mollis, but rather were intermediate between this species and H. japonica, also present in the Arboretum collections. Several of these plants are still alive. Only one of them, the celebrated 'Arnold Promise', was propagated and registered as a cultivar.

The plants of Hamamelis × intermedia in our collection are large shrubs with several strongly ascending trunks. They begin to bloom in mid- to late February and remain in good condition until the middle of March. Several outstanding cultivars are described below.

'Arnold Promise' — In good years, the original plant of this cultivar is a joy to behold. It is planted to the side of the Administration Building, right outside the window by my desk, and it never fails to lift my spirits during the dark days of February. It is certainly the best Witch Hazel at the Arnold Arboretum. The flowers have stiffly drooping, bright yellow petals and sepals which are mahogany inside. Although produced in abundance, they are only faintly fragrant. The original plant, after 47 years, is 17 feet tall with a spread of 18 feet. The cultivar is available from the following nurseries: Carroll, Hess, Herman Losely, Panfield, Princeton, Weston.

'Jelena' — This cultivar was originally raised in Belgium. The flowers are large, and the petals yellow suffused with copper. Our plants are still small, but they are most attractive. According to Lancaster, the cultivars 'Copper Beauty' and 'Orange Beauty' are identical to this. It is available from Hollandia and West Oregon.
The original plant of Hamamelis 'Arnold Promise' beside the Administration Building at the Arnold Arboretum. As shown here, the flowers of this February-blooming plant are often covered with snow.
'Ruby Glow' — Again of Belgian origin, this has the reddest flowers of any Witch Hazel available. The petals are medium red with a tinge of copper. It is often erroneously listed as a cultivar of *Hamamelis japonica*. It is available from the following nurseries: Charles Fiore, Hess, Hollandia, Tingle, West Oregon.

*Hamamelis japonica* Sieb. & Zucc.

This native of Japan is generally a large shrub or small tree, but the cultivar 'Arborea' may reach a height of nearly 40 feet. The flowers appear in late February at the Arnold Arboretum; they are finished about the same time as those of the *Hamamelis × intermedia* cultivars and therefore do not lengthen the period of bloom for the genus. The flowers are large and spidery with narrow petals, those in the type of the species being bright yellow. Although some of the European cultivars are apparently quite beautiful, the plants offered in this country are inferior to the *H. × intermedia* cultivars. The species is offered by Charles Fiore, and the cultivar 'Rubra' (probably the same as 'Flavo-purpurascens') with yellow petals suffused with red at the base, is available from Tingle Nursery.

*Hamamelis mollis* Oliv.

A native of Central China, this species was first introduced by Charles Maries and was later also collected by E. H. Wilson. Several of our plants originate from Wilson's collections. Although in England plants of this species are often of ascending habit, the specimens at the Arnold Arboretum are widely spreading shrubs or small trees. The largest specimen, a sparse shrub with two main trunks, is 11 feet tall with a spread of 30 feet. The flowers appear here about the middle to the end of January, and individually are the handsomest in the genus, in my opinion. The sepals are mahogany inside and the petals are broad, bright yellow, and not crinkled. The flowers have a strong fragrance, so strong as to be almost overpowering when kept in a small room. Our specimens are never as floriferous as is 'Arnold Promise'.

Following are some of the cultivars which are available:

'Brevipetala' — The flowers of this plant have shorter petals than those of the species, but they are packed in dense clusters. It has the unfortunate attribute of holding its dead leaves into the winter, thus somewhat obscuring the flowers. The plant is available from: Brimfield, Weston, Tingle.

'Superba' — This is probably not a genuine cultivar, but rather a collection of selected clones of the species. It is available from Weston Nurseries.

Flowering branch of Hamamelis vernalis, the Vernal or Ozark Witch Hazel (twice life-size). Photo: P. Chvany.
'Pallida' — This is mentioned because it is supposedly one of the finest of all the Witch Hazels, as well as one of the most popular in Europe. The flowers are large, densely crowded, with bright yellow petals. It is not available in this country.

*Hamamelis vernalis* Sarg.

The Vernal or Ozark Witch Hazel is a native of the Ozark Mountains of Missouri, Arkansas and Oklahoma. It was originally described by Charles Sargent, the first Director of the Arnold Arboretum, and the type plant is still in our collections. This is the shrubbiest of the Witch Hazels, and also the one with the smallest flowers; unlike the others previously described, its autumn coloration is a clear yellow. The flowers, with short petals varying from pale orange to bronzy-red, are borne in great profusion and are strongly fragrant. They appear in January at the Arnold Arboretum, often during the first week of the month. Our mature specimens are immense; the 68-year-old plant by the parking lot of the Administration Building is a dense shrub 11 feet tall with a spread of 27 feet.

Alfred Rehder described a number of forms of this species, including *f. carnea*, with dark reddish petals, and *f. tomentella*, with leaves pale and pubescent beneath. The latter is available in the trade, as "tomentosa," from Tingle Nursery.

The species is rarely cultivated, but is a desirable plant. Its large size should not be a problem since it is easily restrained. It is available from the following nurseries: Brimfield, Cole, Charles Fiore, Greenbriar, Gulfstream, Lake Co., Princeton, Panfield, Tingle.

*Hamamelis virginiana* L.

This is the familiar Witch Hazel of eastern North America. It is a plant of the understory or the margin of forests from Canada to Georgia, and west to Nebraska. The pale yellow flowers open while the leaves are still green, and then are not conspicuous. As the leaves fall in October and November, the flowers become much more noticeable, and in good years this is a very attractive plant.

Plants in the wild are often sparse and straggling, but in cultivation form shapely large shrubs or small trees. At the Arnold Arboretum an old specimen, probably a spontaneous plant, is 20 feet tall with a spread of 34 feet. The largest of the numerous trunks is a foot in circumference.

A more southern plant with leaves that are more nearly lobed than toothed, and with flowers which appear in November, has been called a separate species, *Hamamelis macrophylla* Pursh. It is similar to *H. virginiana* in other respects, and is perhaps only a variety of that species.

*Hamamelis virginiana* is readily available in the trade. It is listed by the following nurseries: Charles Fiore, Cole, Forest, Greenbriar, Gulfstream, Herman Losely, Lake Co., Mellingers, Princeton, Panfield, Tingle.
Liquidambar L.  Sweet Gum

References:

Many readers will be surprised to find that this genus is a member of the Witch Hazel Family. With their palmately lobed leaves and fruits in spherical, spiny, pendent aggregates, the plants bear very little obvious resemblance to the Common Witch Hazel. A number of botanists are also skeptical about the inclusion of Liquidambar within the family. They would prefer to classify it and its close Asiatic relative in a separate family, the Altingiaceae. But detailed examination of the flowers and fruits of the Sweet Gums reveals many features basically similar to those of the other plants treated in this article. And Sweet Gum leaves are basically the same as those of Disanthus, except that they are lobed. But enough of taxonomy.

The genus Liquidambar consists of three species, widely separated geographically. All are handsome trees with maple-like leaves (but those of Maples are opposite) on long, slender petioles. The flowers appear with the leaves and are not decorative. They are borne in dense, spherical clusters, the “males” consisting almost entirely of stamens, in clusters of clusters, like an upright bunch of grapes. The “females” are usually in a solitary, drooping cluster.

The generic name, derived from the Latin liquidus, meaning “fluid,” and the Arabic ambar, meaning “amber,” alludes to the aromatic but bitter tasting gum which the trees exude. This substance has long been used by man, primarily as an incense or in perfumes, but also as a hopeful cure for a long series of ills. Historically derived from the Turkish species, Liquidambar orientalis, but present in the other species as well, the gum does appear to have some value as an expectorant and in the treatment of bronchial disorders. The aromatic principle is present in most parts of the plants, and the leaves and twigs are fragrant when crushed.

KEY TO THE SPECIES OF LIQUIDAMBAR

1a. Mature leaves with 3 lobes; fruit aggregates with long bristles between the capsules, appearing and feeling bristly rather than spiny; winter buds densely silky-hairy .......... L. formosana.

1b. Mature leaves with 5-7 lobes; fruit aggregates without bristles, appearing and feeling spiny; winter buds not hairy, except on the margins of the scales (2).

2a. Main lobes of the leaves with smaller lobes near the apex; branchlets without corky ridges L. orientalis.

2b. Main lobes of the leaves without secondary lobes; branchlets usually with conspicuous corky ridges ... L. styraciflua.

Liquidambar formosana Hance

A native tree through much of central and southern China, as well as the island of Taiwan and parts of Southeast Asia, this species is rare in cultivation in the United States except in California. According to Rehder and Wilson in Plantae Wilsonianae, mature trees in the wild often form majestic specimens as much as 125 feet tall with straight trunks and a much-branched crown. The leaves turn red or chestnut-brown in the autumn, and remain on the tree into the winter.

A variety, monticola, of this species, discovered by Wilson and introduced by him, differs little from the species except that its young growth is glabrous. However, plants grown from this Wilson material are considerably harder than others of the species. They succeed very well as far north as Philadelphia, a very fine specimen being among the plantings of the Arthur Hoyt Scott Horticultural Foundation on the campus of Swarthmore College. Unfortunately, the plants from Wilson’s collection survived on the grounds of the Arnold Arboretum for less than 10 years; the few subsequent trials have also met with failure. Plants of L. formosana are offered by Boething Treeland and Central Nursery Co.

Liquidambar orientalis Mill.

Even rarer in cultivation than the preceding species is this native of the mountains of Turkey. It is slow-growing in cultivation, usually forming a low, bushy tree. Rehder characterizes it as being hardy in Zone 6, and no specimen has lived for more than 9 years at the Arnold Arboretum.

Liquidambar styraciflua L.

The Sweet Gum is a native tree in the Ohio and Mississippi River valleys and in the Atlantic Coast states as far north as Long Island and western Connecticut. It typically is a plant of wet lowland forests where it reaches its greatest size. The largest specimen on record, in Richland Co., S.C. (American Forests, Jan. 1971), is 125 feet tall, its trunk more than 6 feet in diameter. However, in much
A mature specimen of the American Sweet Gum, Liquidambar styraciflua. Photo: H. Howard.
Detail of Liquidambar styraciflua. From Sargent, C. S. The Silva of North America, vol. 5, plate 199. Included are: flowering twig (1) with male inflorescences (upright), female inflorescence (pendent); cross-section of former (3); cross-section of latter (6); individual female flowers (7,8); seeds (12); corky ridges on twigs (16).
of the Southeast, Sweet Gum is almost a weed tree, growing commonly along roadsides and in old fields. It is a handsome and desirable tree in cultivation. Most everything about it is attractive: its fragrant, glossy, star-shaped leaves; its spiny, globe-shaped fruit aggregates, remaining on the tree into the winter and a favorite component of "cone wreaths" and other winter decorations; its bark, silvery when young but dark and deeply furrowed with age; its twigs, with their curious, corky ridges; its form, symmetrical and pyramidal when young, but eventually with a tall, rounded crown; its ease of culture and its freedom from pests; and perhaps best, its autumnal coloration. This last feature varies from individual to individual — sometimes a deep burgundy, sometimes a brighter red, but perhaps most commonly, a crazy-quilt pattern of colors from primrose to purple.

The Sweet Gum is one of a number of familiar plants of our eastern forests, including White pine (Pinus strobus) and Partridgeberry (Mitchella repens), which also occur in disjunct populations in the mountains of Mexico and Guatemala. I had forgotten that fact when, early in my graduate student days, I made a 3-month trip to Central America for course work and plant collecting. By the end of that summer I was anxious to get home, but I needed to stop in Mexico to collect a plant that was important to my research. I was also most anxious to see the great snow-covered volcanoes that lie on the eastern edge of the Valley of Mexico. Luckily, I had a collection locality near the base of one of these mountains, Citlaltépetl or the Pico de Orizaba. I arose early, and from my hotel window in the town of Orizaba I could see the very peak of the mountain over the buildings of the town. I caught a bus that I thought would take me close to my collecting site and the mountain. This time the mountain had priority, because tropical mountains have an annoying habit of covering themselves with clouds early in the day, not to reveal themselves again. I searched out a clearing in the forest, and there before me was the magnificent mountain, framed by, of all things, a Sweet Gum tree. One of my fondest memories to date is that morning — the Sweet Gum and the mountain, my feelings a mixture of awe, exhilaration, strangeness, familiarity and homesickness. But enough of nostalgia.

The Mexican Sweet Gums were the first of their species known to Europeans. The chronicler of Cortez' rape of the Aztecs reportedly recognized the smell of "liquidamber" in the tobacco which Montezuma offered the Spaniards (see the book by D.C. Peattie cited above).

The gum which is the source of "liquidamber" is still harvested from trees in the South and used as an aromatic in soaps, perfumes, and tobacco. According to Peattie, the bark of the trees is peeled off when the leaves have fully expanded. The gum gathers slowly and is scraped off, eventually to be heated and canned.
The wood of the Sweet Gum has become very important in cabinet-making. The heartwood, called Red Gum or Gumwood, has an attractive grain and a pinkish or ruddy color. All of the wood takes a high polish.

All in all, this plant is one of North America's finest trees. Several cultivars have recently been named. Short descriptions of these, with their commercial sources, follow.

'Aurea' — leaves striped and mottled with flecks of gold — Lake County Nursery.

'Burgundy' — at least in California, the leaves turning a uniform burgundy color later than other clones, and persisting on the tree into the winter — Cole, Monrovia.

'Festival' — fast growing, with an upright crown; leaves coloring yellow with tinges of peach — Cole, Monrovia.

'Gum Ball' — slow growing and bush-like — Forest Nursery.

'Palo Alto' — leaves changing simultaneously to a rich orange-red; tree with a uniform pyramidal crown — Cole, Lights, Monrovia, Peters & Wilson.

'Pendula' — habit erect, but with pendent branches — source unknown.

'Rotundiloba' — lobes of leaves rounded rather than pointed; primarily a curiosity — source unknown.

'Variegata' — leaves broad, mottled with yellow — Hess, Scanlon.

Dr. Frank Santamour, of the U.S. National Arboretum, has produced hybrids between all three of the species. These have not been distributed, and their ornamental possibilities are not known.

Loropetalum chinense Oliv.

References:


This plant, which has been called the Chinese Fringe Shrub, is closely related to Hamamelis, and the flowers of the two are similar in shape, size, and arrangement. Those of Loropetalum, however, have white petals. The two genera are amply distinct in additional features, particularly the foliage. The leaves of Loropetalum chinense, the only species known, are usually less than 2 inches long; they have fine, almost hairlike teeth along the margins, and they are evergreen, at least south of Washington, D.C.

Forming a twiggy shrub with horizontal branches, and growing to about 8 feet tall in cultivation with fragrant flowers appearing
mostly in the late winter and early spring, but sporadically throughout the year, *Loropetalum chinense* would appear to be a most desirable plant for cultivation in the warmer parts of the United States. At present it appears to be grown mostly in California. None of the plants in cultivation is hardy north of Zone 7, or possibly Zone 6 with protection. The species is native to low elevations in the Khasia Hills of India, throughout much of southern China, and a single locality on the island of Honshu, Japan. It was introduced into cultivation by Charles Maries for the famous nursery of Veitch and Son in 1880 from a collection made in the vicinity of Chiukiang (Kiukiang) in the province of Chianghsi Sheng (Kiangsi), China (Wilson, E. H. 1913. *A Naturalist in Western China*, vol. 2, p. 3.). For years, all plants in cultivation were evidently grown from this material, and since the original collection site is less than 1000 feet elevation (at Latitude 30°N., approximately that of Jacksonville, Florida), they were tender even in most parts of England.

The species was generally grown as a tub plant set outside in the summer and wintered in a cool greenhouse where it would produce flowers from Christmas until March. Ernest Wilson wrote a short article for *Horticulture* (cited above) which outlined the procedure. Wilson also collected the plant in several localities in China, but it is not known whether or not he sent back seeds. At any rate, no plants of Wilson origin ever were displayed on the grounds here in Jamaica Plain.

More recently, plants have appeared in cultivation that are hardy as far north as Washington, D.C. and Baltimore. The original source of this material is not known, but most likely it is Japanese. At any rate, the Japanese plants would be hardier than any known from China or India, and they would show the most promise as the source of plants more amenable to wider culture in the United States.

*Loropetalum chinense* is available from: Hearn, Mitsch.

*Parrotia persica* C. A. Mey.

References:


This species, again alone in its genus, is one of the largest members of the Witch Hazel Family that can be cultivated in the northern United States. Although the species is moderately slow-growing and under certain conditions is almost shrubby in habit, the specimen at the Arnold Arboretum in the Center Street Area is a magnificent tree — perhaps one of the finest specimen plants on the grounds. Started as a cutting from the Harvard Botanical Garden in 1881, it is now 55 feet tall with eight trunks, the largest of which is 3 1/2 feet in circumference. The total spread is 55 feet. Although they
can be trained to grow with a single trunk, most cultivated specimens of this species in various parts of the world seem to have this multi-stemmed habit. However, Mr. Roy Lancaster reports that the trees that he observed in their native habitat, which is northern Iran and the Caucasus Mountains of the southern U.S.S.R., usually grow with a single trunk unbranched for a considerable distance.

The leaves of Parrotia persica are strongly reminiscent of those of Hamamelis with an uneven base and shallow but coarse, rounded teeth above the middle; sometimes the teeth are barely discernible, and the margin appears merely wavy. The autumn coloration of the foliage is one of the tree’s attractions; it develops the brilliant blend of reds, oranges and yellows so typical of many members of the family.

The flowers are not particularly conspicuous. They appear before the leaves, in late April to early May at the Arnold Arboretum, and are borne in small clusters enclosed by several dark brown, hairy bracts. Petals and sepals are absent, the most conspicuous feature being the numerous, red anthers. Although our specimen rarely blooms profusely, specimens in England have been described as being a haze of red when in full bloom.
The bark of the tree and the forms of its trunks are perhaps the most ornamental features of *Parrotia*. The trunks are slightly ridged and tightly covered with a bark that exfoliates in a mottled pattern of shades of grey. These attributes are particularly effective when the tree is allowed to develop several trunks.

The species was apparently introduced into cultivation in the West from several plants sent from Leningrad (then St. Petersburg) to Kew around 1840. It is rare in cultivation in this country, which is a great shame since a well-grown specimen is magnificent indeed. Perfectly hardy in many parts of the country, it has a rating of Zone 5, according to Rehder, although it certainly could be grown in parts of Zone 4.

Hilliers' in England lists a form of this species, 'Pendula', with drooping branches, slow growth, and a maximum height of 10 feet. This clone is unavailable in the United States, but the species is listed by the following nurseries: Brimfield, Daubers, Gossler Farms, Hollandia, Hess, Tingle.

Parrotiopsis *jacquemontiana* (Decne.) Rehd.

Reference:

Again a plant little known in cultivation in the United States, this rather handsome species is related to *Fothergilla*, and was originally described as a member of that genus. It also has been classified as a species of *Parrotia*, although its resemblance to *Parrotia persica* is slight indeed.

The flowers appear before the leaves, in late April or early May in New England. They resemble those of *Fothergilla* in that they are without petals, and they are borne in dense head-like clusters, appearing as tufts of stamens. But unlike *Fothergilla*, the clusters are surrounded at the base by a series of white bracts, and the assemblage, which may be as much as 2 inches across, is similar to the inflorescence of the Flowering Dogwood (*Cornus florida*). The plant is attractive in flower, but unlike many members of the Witch Hazel Family, the coloration of the autumn foliage is not spectacular.

*Parrotiopsis jacquemontiana* is the only species of its genus. Native to the Himalayas and adjacent ranges in India, particularly Kashmir, Pakistan, and Afghanistan, it is locally abundant between 2800 and 9000 feet elevation, forming dense stands. Natives of the area use the tough, flexible twigs in wickerwork and for making rope that is used in the construction of crude suspension bridges. In cultivation in this country it forms a shrub or slender tree to about 20 feet tall.
Portion of a dried specimen of Sinowilsonia henryi showing an inflorescence of female flowers.

The plant was discovered in 1838, and was introduced into cultivation at the Royal Botanic Gardens, Kew, in 1879. The Arnold Arboretum received its first plants from Kew in 1910. These survived for 35 years, the longest period of time that we have been able to keep the species alive. Therefore, although Rehder, in his *Manual of Cultivated Trees and Shrubs*, lists it as being hardy in Zone 5, *Parrotiopsis* would require a sheltered position to do well in central New England. There are several specimens thriving at the Arnold Arboretum at present; one by the cold storage unit of the Dana Greenhouses, and another on Bussey Hill, but they have not yet attained flowering size.

Although perhaps more popular in Europe, *Parrotiopsis* is primarily grown in botanic gardens and arboreta in the United States. It is not commercially available in this country.
Sinowilsonia henryi Hemsl.

Reference:

The Latin name of this plant commemorates two indefatigable plant explorers, E. H. Wilson and Augustine Henry. The former introduced it into cultivation for the Arnold Arboretum from material collected in western Hupeh, China, in 1907. Seeds from this collection were distributed to various botanic gardens, and apparently were the ultimate source of all the plants presently in cultivation. The specimens at the Arnold Arboretum survived for about 25 years. Unsuccessful attempts have been made to re-establish the species from seeds obtained from the fine specimen at the Planting Fields Arboretum on Long Island. This plant, more than 20 feet tall with a trunk a foot in diameter, is probably the best specimen in North America.

Although not unattractive, Sinowilsonia, again a genus with a single known species, is mostly grown for its botanical interest. The foliage, resembling that of a Linden, is somewhat coarse and does not color well in the fall. The staminate ("male") and pistillate ("female") flowers are borne in separate catkin-like clusters on an individual plant in May and are not conspicuous.
Sycopsis sinensis Oliver

Of the five or so species of *Sycopsis*, all of them native to the Himalayas and China, this is the only one in cultivation. It is an attractive evergreen shrub, growing to about 8 feet tall in cultivation. The leaves are dull-textured, oval, narrow and pointed, sometimes with a few inconspicuous teeth along the margin. The flowers are somewhat similar to those of *Parrotia persica*; that is, surrounded by brownish bracts and conspicuous only because of the large reddish anthers. Rehder lists this plant as being hardy in Zone 7, and it does well in Washington, D.C. Plants have never survived here for more than a few years.

Although there are many more attractive broad-leaved evergreens, *Sycopsis sinensis* is worthy of more frequent cultivation. It is extremely rare in this country, but is offered by Hollandia Gardens.

PROPAGATION

References:

Little has been published on the propagation of the members of the Witch Hazel Family. The seeds of *Liquidambar* germinate readily after cold stratification for several months, but those of *Fothergilla* are doubly dormant and must be subjected to warm stratification (optimally for twelve months) followed by cold stratification. It is to be expected that most other members of the family should be treated like *Fothergilla*. Since the seeds of both *Hamamelis* and *Fothergilla* are forcefully ejected from the capsules at maturity, the capsules should be collected just as they are beginning to turn brown.

Layering appears to be an effective means of propagating several genera, particularly if it is done in the spring. Plants of many, such as *Fothergilla* and *Corylopsis*, are readily increased by division. Softwood cuttings of *Fothergilla* root readily, and the other genera are probably similar in this respect, but they have trouble surviving their first winter after transplanting. Therefore, the cutting flats should be moved intact into a cold-storage unit, without disturbing the cuttings, to induce dormancy.

*Portion of a dried specimen of Sycopsis sinensis showing the conspicuous anthers and the dark brown bracts at the base of the inflorescence.*
ADDRESSES OF NURSERY SOURCES

Boething Treeland Farms
23475 Ventura Boulevard, Woodland Hills, California 91364
Retail

Brimfield Gardens Nursery
245 Brimfield Road, Wethersfield, Connecticut 06109
Retail

Carroll Gardens
East Main Street Ext., Westminster, Maryland 21157
Retail and Wholesale

Central Nursery Company
2675 Johnson Avenue, San Luis Obispo, California 93401
Wholesale

Cole Nursery Company, Inc.
30627 Orr Road, Circleville, Ohio 43113
Wholesale

Dauber's Nurseries
1705 North George Street, Box 1746, York, Pennsylvania 17405
Retail and Wholesale

Forest Nursery Company
Route 2, Box 118-A, McMinnville, Tennessee 37110
Wholesale

Gossler Farms Nursery
1200 Weaver Road, Springfield, Oregon 97477
Retail

Greenbrier Farms Ltd.
412 Thrasher Road, Chesapeake, Virginia 23320
Wholesale

Cull Stream Nursery, Inc.
Wachapreague, Virginia 23480
Wholesale

Hearn Nurseries
Arcadia, California 91006

Hess Nurseries, Inc.
P.O. Box 326, Route 553, Cedarville, New Jersey 08311
Wholesale

Hollandia Gardens
10725–39th Avenue N.E., Seattle, Washington 98125
Wholesale

Gerard K. Klyn, Inc.
6784 Hopkins Road, Mentor, Ohio 44060
Wholesale

Lake County Nursery Exchange, Inc.
Box 122, Route 84, Perry, Ohio 44081
Wholesale

Light's Landscape Nurserymen
9153 East D Avenue, Richland, Michigan 49083
Retail and Limited Wholesale

Herman Losely & Son
3410 Shepard Road, Perry, Ohio 44081
Wholesale

Malmo Wholesale Nurseries
14900 Stone Avenue, Seattle, Washington 98133
Wholesale
Mellinger's, Inc.
   2310 West South Range, North Lima, Ohio  44452
   Retail
   Wholesale
Mitsch Nursery
   Route 2, Box 34, Aurora, Oregon  97002
   Wholesale
Monrovia Nursery Company
   P.O. Box Q, 18331 East Foothill Boulevard, Azusa, California  91702
   Wholesale
Panfield Nurseries, Inc.
   322 Southdown Road, Huntington, New York  11743
   Retail and Wholesale
Peters & Wilson Nursery
   East Millbrae Avenue & Rollins Road, Millbrae, California  94030
Princeton Nurseries
   P.O. Box 191, Princeton, New Jersey  08540
   Wholesale
Rosedale Nurseries
   Sawmill River Parkway, Hawthorne, New York  10532
   Retail
   7621 Lewis Road, Olmstead Falls, Ohio  44138
   Wholesale
F. W. Schumacher Co., Horticulturists
   Sandwich, Massachusetts  02563
Select Nurseries
   12831 East Central Avenue, Brea, California  92621
   Wholesale
The Tingle Nursery Company
   Pittsville, Maryland  21850
   Wholesale
West Oregon Nursery
   3550 N. W. Saltzman Road, Portland, Oregon  97229
Weston Nurseries
   East Main Street, Hopkinton, Massachusetts  01748
   Retail and Wholesale
The Nikita Botanic Garden, Yalta, USSR

by RICHARD A. HOWARD

Following the International Botanical Congress held in Leningrad in July 1975, Mrs. Howard and I participated in a post-Congress tour to the Crimea, with headquarters in Yalta. The trip was arranged, as is all travel in the Soviet Union, by Intourist, and we were accompanied by an Intourist guide and twin girl interpreters selected by the Academy of Sciences. The girls, English teachers by profession, had received special instructions in botanical and horticultural vocabulary in anticipation of the Congress, and were pleasant, efficient, interested in our fields, and excellent representatives of the Soviet people.

In Yalta our group was met by Nikita Botanic Garden staff members who accompanied us for four days on bus tours to the Botanic Garden; on an exciting mountain trip through conservation lands to the taiga vegetation; to historic houses and gardens, such as those at Livadia Palace where Roosevelt, Churchill and Stalin signed the Yalta agreement; and through many agricultural areas of cereal grains, tobacco and stone fruits. It was an excellent tour, and perhaps the best of those offered by the Congress.

Fortunately we had preplanned our trip to fly from the Crimea to Kiev, instead of returning to Moscow before leaving the Soviet Union. Thus we had two extra days in Yalta, during which time we returned to the Nikita Botanic Garden for additional personal conversations with the director and the staff, and for closer examination of the facilities and collections. We enjoyed the hospitality extended to us and would like to repay the kindness in Boston, although such an opportunity seems unlikely as the Nikita staff does not travel abroad.

The majority of the botanical gardens in the Soviet Union are state-supported and, in their operation, effect a combination of the roles of agricultural experiment stations and botanical gardens in the United States. The purpose of the Nikita Botanic Garden, for example, is to assist the economy of the country, and the direction of the garden was described for us as “agrobotanical.” However, of the gardens we saw, including those in Moscow, Leningrad and Kiev, it is the most attractive and best-maintained park for public use.
A primary goal of most gardens is to improve the quality of useful plants, and to distribute as plants or seeds the better selections they produce to appropriate collective farms. The gardens are also repositories for varietal collections to be held as reserves or gene pools, and the economic plant collections are comprehensive. In a new awareness they seek to preserve, as well, the designated endangered species of the area. Colorful flower displays are much enjoyed, especially by the Russian visitors, and portions of every botanical garden are devoted to eye-catching plantings that receive the ultimate in maintenance. Rose gardens were most attractive during the period of our visit. Not one wilted rose was seen; nor were mulches, since the available labor force hoes and weeds continuously.

Northern gardens are open long hours during the extended periods of summer light, and visitors were in the gardens early and late. Baskets for litter were beside the numerous benches and at every path crossing, even though for several reasons litter is not a problem in the Soviet Union.
Most botanical gardens have a natural area, but in many cases these are not open to the public. Greenhouses for display and for propagation are numerous, but surprisingly ancient structures. The Main Botanical Garden, USSR Academy of Sciences, Moscow, has elaborate plans for large geodesic domes with acres of land under glass, but the funding is not yet available for construction. Some indoor collections were meticulously maintained, while others were deplorable as examples of horticultural skills. Statues of Lenin occupy conspicuous positions in every garden, while lesser political or historical figures may be in attractive niches. Display slogans, so common in cities, are pleasantly absent from the gardens. Geographic plots, found often in older European gardens, are exhibits in some Soviet gardens and frequently emphasize the phytogeographic areas of the USSR.

Independent of the state-supported gardens are a few university-associated botanical gardens whose primary purpose is education. It is in these that the classical systematic beds are maintained as teaching aids.

A Soviet Council of Botanic Gardens is headed by the Main Botanical Garden, Moscow, and its director, Academician N. V. Tsitsin. The presidium of the Council meets two or three times a year to determine the general policy for each state-supported botanical garden, and has control of budget allocations to each area. There are also regional councils of botanical gardens to which the director may take his junior staff members for meetings.

The Nikita Botanic Garden was founded in 1811 by the Duke of Richelieu, a refugee from France during the rule of Napoleon, who became governor of the Crimea. He selected the site for the botanical garden and recommended the appointment of Christian Steven as the first director. His goal was to introduce all plants hardy to the area and, by distribution, stimulate the agriculture and forestry of the area. An assemblage of new fruit trees was achieved by 1817, and the Nikita Botanic Garden became the cradle of viticulture when the southern slopes of the Crimea proved excellent for the growing of grapes. Interestingly, the Nikita Botanic Garden won a special citation for an exhibit of wines at the Philadelphia Exposition of 1872, the year the Arnold Arboretum came into being. For timber trees, an expedition to North America introduced a large collection of conifers, and these introductions today are handsome specimen trees. A college of agriculture and horticulture was founded in 1869 by the garden staff. The publication program of the garden began in 1815, and is noted for its contribution of agricultural and horticultural notes, as well as for its Flora of the Crimea.

The Soviet Revolution, which began in Leningrad and centered its new government in Moscow, quickly had an effect in the Crimea. Under Communism the chief gardener became the new director, and
great changes were made in the administration and personnel relationships, although the direction of research was unchanged. The college of agriculture became independent of the garden. Research in the breeding and selection of ornamental herbs was introduced, and from this developed a major program on the culture of ethereal oil plants for perfumes. Satellite gardens were established where research was coordinated through the Nikita garden.

When the current director, Dr. M. A. Kochkin, was asked about the administrative organization of the Nikita Botanic Garden, he replied it was complicated and difficult to explain, and pointed to an intricate chart on the wall. The main garden at Yalta comprises 280 hectares, and a steppe and a maritime experimental area, respectively 480 and 200 hectares, total 960 hectares (2,372 acres); all are under his direction. He has two assistant directors who, in turn, supervise the work of 18 subdepartments; these include the
A guided tour in the Nikita Botanic Garden. The ground cover is a weed-free bed of Vinca minor.
areas of two seed laboratories, ornamental horticulture, floriculture, nut trees, industrial crops, entomology, phytological pathology, podology, climatology, scientific information, photography, printing, biochemistry, cytology, radiobiology, plant quarantine, library and herbarium. The labor staff is approximately 700 people. Student laborers at a given time average 100, and the research staff comprises 120, for a total of about 1,000 employees. Approximately two thirds of the staff are women, and a principle of equal pay for equal work is followed. All department heads are men, but the director admitted that the women do all the hard work; that we observed.

I asked the director a number of questions in our interview, and each was answered with the aid of the interpreters; but then each question was repeated to me for a comparison of our organization and experiences. Employees may or may not belong to the Communist party, but there is no union representing the employees. Each month every department head reports to the director on the progress in maintenance and research, on problems, and on the performance of employees. The outstanding workers may be recommended for a bonus, but this is supplementary income and an actual raise in pay is rare. A poor worker, or one with unexplained or unapproved absences, may be discharged. Attempts are made to place an employee in another position if he or she lacks a "green thumb" or proves inept in an assignment.

The professional staff may be graduates of a botanical institute and apply for open positions which are advertised in newspapers. College students may be assigned to summer work at the garden, and the Ministry of Higher Education decides what institutes need help and which students will be chosen. It was suggested to us that the students "obey the Ministry." When students graduate, the best are invited to accept employment.

Near Yalta is a vacation camp, called Artek, for outstanding elementary students throughout the Soviet Union. The Nikita staff visits the camp and explains the work of the garden; later groups of these children, immaculately uniformed, are given conducted tours of the garden. However, even while on vacation, the children have "working days," and these may be at the botanical garden.

The herbarium of the Nikita Botanic Garden is housed in a modern building, and the specimens are stored in wooden cases with attractive patterned veneer doors made of Juglans regia, the English walnut. The Englerian system is followed for families, but the genera are arranged alphabetically. Moth flakes are used as a fumigant, and specimens are affixed with cloth strips or sewed to
The herbarium was started in 1914 by Eugen Wulff. It was removed from the country by the German forces during World War II, but later recovered. Today it contains 107,000 specimens; about half of these are from the Crimea. Material is exchanged with other herbaria in Russia, and with organizations abroad. No staff member seems particularly interested in the taxonomy of cultivated plants.

The library is in the administration building and has one section for literature in the Cyrillic alphabet, and another section for foreign literature. Two catalogues are maintained, one in Cyrillic and one in the other languages. About 40 percent of the library represents foreign literature, which is obtained only by exchange or gift. The resident staff, we were told, could request books from publishers' lists, but the American literature familiar to me was not apparent. We were shown current issues of four journals, Botanical Review, Phytopathology, Genetics, and the Journal of Heredity, which were photocopies prepared in the Soviet Union.

The garden itself has several entrances, and a small admission fee is charged, although a group of children appeared to be admitted without charge. This group, and others we saw, were supervised in their tour. Although we could not understand the comments, the guides (employees of the garden), talked freely in reference to plants. Individual family groups also were enjoying the garden, but without guides.

The garden is on a steep hillside with excellent views of the Black Sea. The paths are exceptionally wide, and the concrete steps between levels are arresting to the eye and contrast to the well-designed, gently sloping paths. All plants appear to be well labeled with scientific and common names, and the Latin was welcome to this visitor. Descriptive labels, some very large and complicated, are numerous, and often include the geographic origin. A large, 35-foot specimen of Metasequoia, the dawn redwood, an Arnold Arboretum introduction to cultivation, attracted my attention, and I was told this was an original garden introduction from China in 1952. Although this specimen was sterile, the younger plants we saw were, we were told, grown from seed obtained when plants were kept pot-bound in the greenhouse.

Although the garden has had few American professional botanists as visitors, Mrs. Howard and I were cordially welcomed. We met with seven department heads in a Board Room, at a table set for us with place mats, china and silver, water goblets and wine glasses, bowls of fruit and flowers. Each staff member described his re-

Above: Perennial plant area of the Nikita Botanic Garden with central pool for aquatic plants.

Below: Broad paths meticulously maintained traverse the garden. The palms, yuccas, and succulents suggest the subtropical environment.
search briefly. At intervals they asked questions of us. The pomologist was proud of the variety of peaches, plums, apricots and almonds offered to us, and we had to sample each type. Fruits which were out of season came into the discussion at one point, and suddenly pint canning jars of preserved fruits were brought to the table to be opened and sampled. The wines of the area were evaluated, and the best offered for our enjoyment. Chocolates and sweet cookies were passed many times. I had to report that visitors do not receive such hospitality at the Arnold Arboretum.

(All photographs in this article are by the author.)
Colonial America was spawned in the forest and it was to the forest the early settlers turned for nearly all their necessities. Each successive group of English settlers to land upon North American soil must have gazed in wonder at the vast primeval wooded areas that stretched before it, their boundaries apparently limitless. It was a very different world from the one the immigrants had left behind, for the England of the late 16th and early 17th centuries was in the throes of a severe timber crisis. Wood was in short supply throughout Great Britain and large areas of forest were rapidly turning into countryside and fields.

Great Britain had shown little interest in the New World in the hundred years following Columbus' discovery. However, with their own forest reserves rapidly dwindling away in the late 1600's, there was sudden impetus to exploit America's untapped wilderness. In 1584, the English geographer, Richard Hakluyt, proposed a scheme for colonization. As he envisioned it, according to Charles Carroll, "men from the treeless English countryside would settle in the forests, set up sawmills, and produce boards for English craftsmen."

Once the operations were set up, craftsmen would begin making pipe staves, bows, "targets of Elme and tough wood, for use against the darts and arrows of Salvages [and] spades like those of Devonshire, and of other sorts, and shovels from time to time for common use." It was some time, however, before this vision became a reality. There were very few craftsmen among the first settlers and most communities fashioned dwellings and the necessary tools and utensils as best they could. For the most part they were crude but serviceable.

Pine, oak, walnut, butternut, and chestnut were among the preferred woods for colonial furniture making and sundry other purposes, but another wood, less known, served the colonists reliably and well and continues to be of value even today. I refer, of course, to the native American tulip tree, *Liriodendron tulipifera*.

The tulip tree has scarcely any equals in the world of trees. Once seen it is rarely forgotten. Few other specimens can approach it in magnificence, overall beauty or sheer size. Few other trees masquerade under such a variety of common names, either. To the American Indians it was always known as canoeewood, owing to its
Mature specimen of Liriodendron tulipifera showing stately habit.
extensive use in the manufacture of their dugout canoes. At various other times it has been called poplar, tulip poplar, Virginia poplar and saddle tree. Whitewood, canary whitewood, Canadian whitewood, yellow poplar and yellowwood all are monikers that refer to the color of the interior wood; depending upon the type of soil in which it is grown, the wood color varies considerably from yellow to a very pale white. No matter what its name, it has, from colonial times onward, proven to be a timber tree of great commercial and utilitarian value.

Several properties have combined to make the tulip tree adaptable for a number of commercial uses. As a wood, it does not easily warp or split and it has a close, fine, uniform grain that is much admired. It is light, elastic and easy to work and so has long been used for carved articles. Tulip wood takes both paint and varnish well and exhibits no odor. This latter property made it ideal for use by the colonists as a container for butter, cheese, lard and other foodstuffs that easily become tainted by external odors.

All manner of other containers also utilized this very adaptable wood. These ranged in size from tiny pillboxes to berry baskets to good-sized tobacco hogsheads. It was a favorite substitute for the more expensive cedar in cigar boxes. Also common throughout the colonies were Bible boxes. Treasured items in the colonial home, these items were often richly carved and ornamented, as befitted a repository for the family’s most cherished possession. Colonial boxes such as these are currently quite valuable and much in demand by antique collectors.

The building trade relied on the tulip tree as well. From shingles and clapboards to joists and beams, its wood was a valuable timber in the construction of colonial dwellings. Even the Southern homes, which were generally of brick and in the Georgian style, made use of it in their interiors. For carved moldings, borders and inlays it enjoyed great popularity.

In 1856 a machine that turned nests of trays was invented, and in 1899 a wooden bowl-turning machine appeared on the market. As a result, lathe-turned woodenware for the mass market suddenly became very popular. Tulip, maple, boxwood and lignum vitae were the primary woods employed in the production of such utensils as scoops, spoons, rolling pins, wooden measuring cups and a multitude of assorted kitchen items and small children’s toys.

Cherry, mahogany, maple and walnut were the most highly prized woods for fine furniture of high quality, but tulip was commonly used in the manufacture of everyday furniture. One often finds tulip wood used in the legless chests that were so much a part of the colonial home, particularly in Connecticut. Curiously enough, it was usually only the front panel that was made of tulip wood. The frame and other panels were generally made of pine or oak.
No doubt there are two reasons to explain this rather curious use of *Liriodendron* for a single panel only. First of all, it is easily carved and so was a good subject for the ornamentation that was commonly sculpted on the front panel. In addition, tulip wood receives paint well. Painted chests represented nearly the only color in an otherwise drab colonial life and were often very richly decorated. Oak and pine insured that the chests were strong and durable while the tulip wood allowed successful carving and painting; not surprisingly, one of the most popular designs employed on these tulip wood chests was a tulip flower motif.

In addition to the wood, the tree and root bark was of value as well. It has a bitter, pungent taste and when powdered was used
as a tonic or stimulant for chronic arthritis. Not infrequently, it was given to horses as a cure for worms.

Indigenous to North America, the tulip was one of the many new species to greet the Old World explorers upon their arrival in America. *Liriodendron tulipifera* is one of two species of *Liriodendron* in the Magnolia family and enjoys a range that extends from Massachusetts and central New York and Michigan south to northern Florida. Its western boundaries extend as far as Illinois, Mississippi and Arkansas. It reaches its greatest proportions, however, in the lower Ohio valley and in the southern Appalachian mountains.

Under optimum conditions, which include a deep, loose, well-drained soil that is primarily fertile loam, tulip trees have been known to reach heights of 200 feet. What makes these trees so striking is the almost ramrod straightness of the trunk and the fact that they are almost devoid of branches for the first 40 feet or so. Until the trunk exceeds 7 or 8 inches in diameter, it is smooth and even; as the tree grows older the bark becomes deeply furrowed and quite attractive.

Above all, the tulip tree is a highly individual tree. Its leaves have the singular distinction of not really resembling any other leaf in appearance. Once seen, tulip tree leaves are quite impossible to forget. They somewhat resemble the maple leaf, with a lobe on each side, but instead of coming to a point at the tip, they look as though they had been cut off abruptly.

Unfortunately, the unusually lovely and distinctive flowers grow too high to be seen well from ground level. It is the appearance of the flowers that actually gives the tree its most common name, for they closely resemble the garden tulip in form. The large greenish-yellow flowers are marked with orange and often are nearly 2 1/2 inches long.

The flowers persist quite some time and when they at last go by they are followed by pointed, conelike seed heads which stand upright and regal on the branches. In addition to the appearance of the unusual fruits, fall brings a vibrant touch of color to the tulip tree. It becomes suffused with a delicate yellow overall, making it one of the more visible autumn specimens.

Aside from its many commercial uses, *Liriodendron tulipifera* has long enjoyed popularity as an ornamental of great merit. Where it has the advantage of a lot of open space, it grows to be a handsome tree. Increasingly, it is being used in street plantings and as an impressive shade tree in parks, cemeteries and other public grounds.

Because of its grand proportions and majestic appearance, the tulip tree came to be known as the "tree of liberty" during the Revolutionary War period. Throughout the colonies, cities and towns planted the tulip as a symbol of their quest for independence. As the nation celebrates its 200th anniversary, the Arnold Arboretum
is marking the occasion by distributing small tulip trees to cities and towns throughout the state of Massachusetts. What better way to commemorate America's 200th birthday than by planting living reminders of its strength and growth? No tree is more indicative of this than the stately, elegant tulip tree.
Arnoldia Reviews


This comprehensive volume is the first major compilation of works relating to the history of agriculture to be published since 1930. As the author states in the introduction, "71% of the titles (in this book) have appeared since 1930, 41% since 1950, and 7.7% . . . since 1965." This book, then, represents a significant updating and offers much of value to the historical researcher.

In order to avoid frequent repetition of each work, a topical breakdown has been abandoned in favor of an alphabetical listing by principal author. An 81-page index listing entries by author, subject and title facilitates the search for a particular work. Brief annotations are provided for those works whose titles are not self-explanatory. All in all, a welcome reference book that ought to prove most useful to sociologists, historians and economists as well as agriculturists.

MARGO W. REYNOLDS


Two remarkably satisfying books for casual reading. Paperback and reasonably priced, the volumes are well illustrated with good color reproduction. Flowers of the World is a miscellany of photographs arranged in family groups, these alphabetically. Trees of the World has the contents arranged in groupings of conifers, palms, hardwoods, food trees, spice trees, beverage trees, drug trees, other useful trees, ornamentals and unusual trees. Descriptive material is brief but generally accurate. Either book will lift your spirits if you like plants.

RICHARD A. HOWARD


This book is a reprint of papers presented at a symposium held in Cambridge, Massachusetts, in 1968. It offers a rapid summary of what is known of plants and plant extracts active in human physiology, as seen from the points of view of anthropologists, phytochemists, biologists and others devoted to drug research. Men have always been experimenting with the effects, whether good or bad, of the plants that grow around us.
Many of the plants that have been consumed, or smoked, or poked into various orifices of the body have been shown to have no effect whatever, but it has slowly been established that others do certainly contain active principles that can change body metabolism.

The discovery and development of penicillin set off an explosion of search for other products of molds, algae, bacteriae and higher plants that might be of use to man in fighting diseases. Thousands of species have been studied but probably these comprise no more than five percent of the plants that still remain to be investigated.

The study of the old Calabar ordeal bean is a fascinating story. This legume grows near the mouth of the Niger river in Nigeria and for many generations of Nigerians it was a convenient method of execution. The victim was caused to swallow a suspension of five or six beans ground up in a little water. If he promptly vomited up the mix, he was deemed to be innocent of all charges. But usually it stayed down too long and he died quite promptly. Analysis of this bean has yielded physostigmine, a very potent alkaloid that is now used to relieve the symptoms of myasthenia gravis.

This book is not light reading. Much of it is highly technical and not easily followed except by specialists, but it is a book which should not be overlooked by any serious student of plants in relation to human physiology.


In the preface Dr. Herklots states, "In recent years several practical books have been written on the cultivation of vegetables in the tropics. Is there any justification for yet another?" He continues, "I think so, for in the books I have seen there is little about the tropics of South-East Asia where vegetables are so essential in the diet." Better justification is found in the Introduction. "My object is not to instruct the gardeners of Asia in the art of growing familiar Asiatic vegetables — they know more than I shall ever hope to learn. It is to collect and collate some of the knowledge available in the scientific literature, but not generally accessible to the gardener, in the hope that new ideas may emerge and other crops may be tried." Although the author fails to cite Ochse et al., Tropical and Subtropical Agriculture (1961) or Purseglove's Tropical Crops, Dicotyledons 1 and 2 (1968) he has compiled an interesting and useful volume for anyone interested in tropical vegetables, involved in a course in economic botany, or attempting to identify the vegetables in a Chinese market.

The first portion of this volume concerns the culture of tropical vegetables. There follow chapters on salads, spinaches and other greens; cabbages; beans and peas, cucurbits; bulbs, roots and tubers; and market vegetables. Both major and minor crops are discussed. The correlation of scientific names and local names in English and Chinese is particularly valuable.

The author has sampled the product or observed its preparation in most cases. For the botanist who has only read that Trapa, Lagenaria, Psophocarpus, Chrysanthemum and similar plants are “edible,” this volume has the answer to “how.” The illustrations are particularly useful in the identification of the many varieties of Brassica, beans and cucurbits.

Richard A. Howard

Local floras are a labor of love. Their usefulness is generally to local botanically interested individuals, to a college department of botany or local school for teaching purposes, or for details of local geographical distribution of plants. Essex County, north of Boston, represents the northeast corner of Massachusetts. This glaciated area, once heavily cultivated, has interesting pockets of vegetation ranging from coastal marshes to inland quaking bogs. Historic seaports and dumps and ballast areas have been intriguing collecting areas for novelties in the plant world. Nature reserves in Essex County are well-known to ornithologists. This flora, without keys or descriptions, concerns only the native or escaped vegetation and must be used in conjunction with Gray’s Manual of Botany, 8th. edition, on which the nomenclature is based. An appendix correlates the taxa listed with illustrations in the Weeds and Wildflowers of Eastern North America published also by the Peabody Museum of Salem.

Stuart Harris, professor of biology at Boston University, was asked to prepare this volume in 1951. For over 18 years he collected specimens now preserved in the New England Botanical Club. Unfortunately, he died before completing the manuscript; thus the introductory portions have been contributed by his friends. The volume is a fitting memorial and a tribute to his scholarship.

Richard A. Howard


The first book on ivy in 100 years, this small volume up-dates nomenclature and describes new cultivars, as well as old favorites. Over 60 indoor and outdoor ivies are included, with notes on general culture and specialized uses in landscaping and indoor topiary.

Unfortunately, the close-up photographs, many of which are not identified, do little to amplify the text which separates ivies into nine categories, primarily on the basis of appearance.

Ms. Pierot is the founder and president emeritus of the American Ivy Society; her modest book should produce many enthusiasts and boost membership considerably.

Jeanne S. Wadleigh


One will be envious of the British gardens and plants pictured in these spectacular volumes. The text, pictures, publication style and price are a credit to the authors and the publisher. As so often happens in these American editions, the species and varieties mentioned are not available locally or do not do well in the more diverse climates of the United States. By contrast some of our best, such as Cornus florida, does not grow well in the British Isles and so is not mentioned. Excellent cultural infor-
Traveller in a Vanished Landscape — The Life and Times of David Doug-
las, Botanical Explorer. William Morwood. New York: Clarkson N. Pot-
ter, Inc. 1973. 244 pages, illustrated. $7.95.

"In almost every category of plants to be found between Alaska and
the Mexican Border there is at least one species named for Douglas . . ."

Although Morwood does not overlook the measure of Douglas's con-
tribution (the book contains sketches of many of the plants Douglas
introduced into cultivation), he dwells more on the human aspects of
his career. In 1820 Prof. William J. Hooker of Glasgow University recom-
mended this young Scotsman, who stood out above his fellow trainees,
to the Horticultural Society of London. The Society was looking for a
talented and steadfast collector to send to the North American West,
the horticultural treasures of which had been reported by the recent
Lewis and Clark Expedition.

Talented Douglas was, and industrious beyond description, but stead-
fast he was not. This arresting tale takes an emotionally driven man
up and down the West Coast and Coastal Mountains of North America,
and finally to Hawaii where he died under extraordinary circumstances
in 1834 at the age of 35. It gives a vivid picture of the operation and
personalities of the Hudson's Bay Company under whose auspices Doug-
las travelled. It tells of the Indians, who called Douglas "grassman"; of
the Mexicans and Spanish in Monterey, where he was called "Don David
El Botanico"; of Dr Menzies, who had accompanied Vancouver 30 years
before, of Banks; of Nuttall, of Lindley; of Coulter, of McKenzie; and
of others who brightened the stage of those years. It is good biography
and great reading.

Introduction to Insect Pest Management. Robert L. Metcalf and William

A text for researchers and students of applied entomology, this book
delineates ecologically oriented pest control using a total systems ap-
proach that combines biological, natural and chemical control factors
to minimize effects on the environment and prevent economic damage.
Many of these principles are best applied to wide area pest management
such as one to several counties, states, or a region. Many are too com-
plicated for practical application in a small garden or the usual home
grounds.

The seventeen authors and contributors cover the concepts in the
broad field of pest control management from the basic idea of using all
favorable factors to aid in managing pest populations, the ecological
aspects and the economics thereof. The tactics from plant resistance,
parasitoids and predators, diseases, insecticides, attractants, repellents
and genetic control are discussed at length as are the strategies of
sampling and measuring, analysis and modeling. Examples discussed
in detail are cotton insect pests, forage crop insects, fruit tree pests and
insects of man and domesticated animals.

To many to whom these concepts are new, the vision of future pest
management that these authors advocate will seem unduly complicated;
but for readers with scientific training and interest, the book is well
worthwhile.

Robert G. Williams
Kolkwitzia amabalis, an Arnold Arboretum introduction. Photo: P. Chvany.