The Temperate American Magnolias

by JOHN M. FOGG, Jr.

Few trees hardy in northern climes can surpass the Magnolias in the size and beauty of their flowers. While it is true that the American species, in which the blooms are produced with or following the unfolding of the leaves, are somewhat less spectacular than those from Asia, in most of which the flowers precede the appearance of the foliage, nevertheless our native forms possess a distinction and charm which entitle them to a place in any collection of trees. One of them, *Magnolia grandiflora*, is probably as widely cultivated as any ornamental tree in the Northern Hemisphere.

The Magnolia Family

The limits of the Magnoliaceae have varied over the years in conformity with the views of different authorities. According to earlier interpretations, the family contained about a dozen genera, including *Illicium*, *Schisandra*, *Tetracentron*, *Trochodendron*, *Kadsura*, and *Drimys*. The present tendency, following Hutchinson (1926), Dandy (1927), and others, is to restrict it to *Magnolia*, *Liriodendron*, *Manglietia*, *Michelia*, and *Talauma*. Of these only the first two occur in temperate North America.

It is worthy of note that many botanists regard the Magnoliaceae as one of the most primitive of all families of Angiosperms. In support of this view may be cited the woody habit, the simple leaves, the unspecialized character of the floral parts, and the numerous, free, spirally arranged stamens and carpels.

The discontinuous distribution of most modern representatives of the family is also an indication of antiquity, and parallels that of other groups of Dicotyledons which are likewise considered to be both primitive and ancient.

The Genus Magnolia

Magnolia was first described by the great Swedish botanist, Linnaeus, who named it in honor of Pierre Magnol, Director of the Botanical Garden at Montpellier.

In the first edition of Linnaeus's *Species Plantarum*, published in 1753, only a single species, namely, *M. virginiana*, is recognized, although the author, by the use of Greek letters, designates five varieties. In later works Linnaeus

This article was originally published in the Morris Arboretum Bulletin, *Vol. 12, No. 4, December, 1961. It is reprinted here with permission.*

described *M. acuminata*, *M. grandiflora*, and *M. tripetala*, all of them from North America.

At the present time the genus is generally regarded as embracing some seventy species. Of these nine are native to the Eastern United States, eight occur in Mexico and Central America, eight are indigenous to the West Indies, one is found in northern South America, and the remainder (about 45) are Oriental, growing in a triangular area which extends from Japan across China to the eastern Himalayas and south to Java. (Dandy, 1950)

All Magnolias are trees or in a few cases shrubs, *e.g.* the Chinese *M. liliiflora*. Most species are deciduous, but a few like *M. grandiflora* and *M. delavayi*, retain their foliage throughout the year. The leaves are alternate, simple, often large, and frequently interesting. Among the flowers, which are borne singly, are some of the largest and most spectacular of any group of trees found outside the tropics.

The perianth segments of Magnolias are usually in threes or multiples thereof. In those species in which the calyx is distinct from the corolla the number of sepals is generally three and the petals may number three, six, nine or even more. In other species, however, there is no clear difference in shape or color between sepals and petals and it is for this reason that the term "tepal" is frequently applied to the accessory organs of the flower.

The fruit is a cone-like structure formed of the numerous accrescent carpels. It is often large and showy, lending interest to the tree in late summer or autumn. The seeds which in most species are bright red are released when the carpels split open and usually remain attached by slender threads.

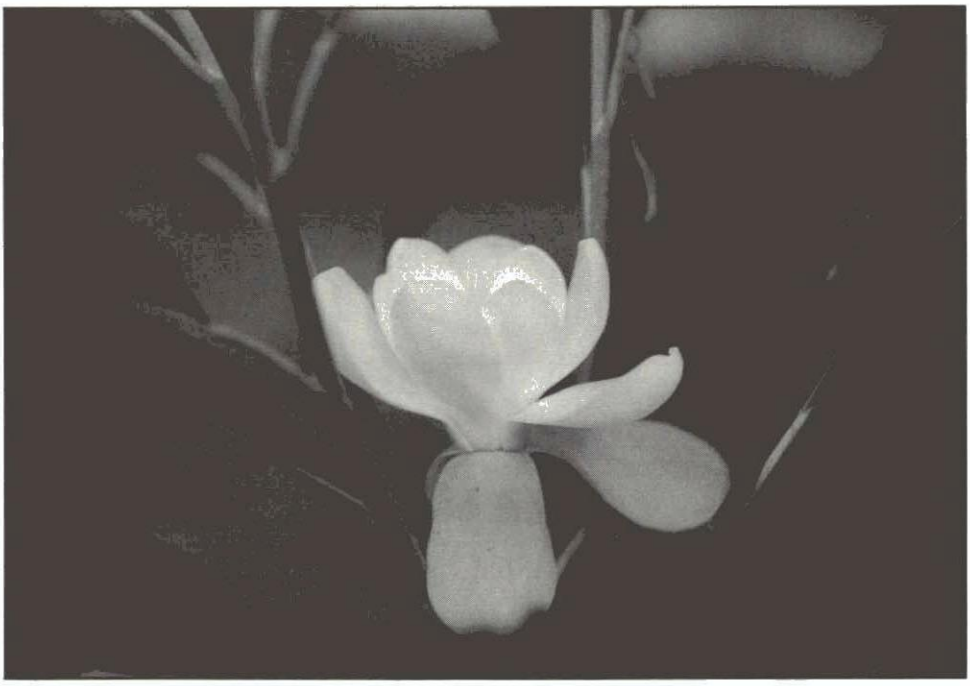
Classification

Of the several systems of classification which have been proposed for *Magnolia*, the one most widely accepted in this country is that of Rehder in his *Manual of Cultivated Trees and Shrubs*. According to this arrangement, the genus is divided into two subgenera: *Magnoliastrum* and *Gwillimia*.

In the first of these subgenera the flowers appear after the leaves, the fruiting body is symmetrical and somewhat cylindrical or globose, and the carpels are more or less distinctly beaked. The second subgenus is characterized by precocious flowers, unsymmetrical and somewhat twisted fruits and carpels which are not, or only rarely, beaked. Figure 34 clearly shows these two types of fruits as exemplified by *M. macrophylla* and *M.* x *soulangiana*. All nine of the temperate American species belong to the first of these groups, the subgenus *Magnoliastrum*.

Dandy (1950) also divides *Magnolia* into two subgenera, but places primary emphasis upon the manner of dehiscence of the anthers. In the subgenus *Magnolia*, as defined by him, the anthers open introrsely, *i.e.* toward the center of the flowers, while in subgenus *Pleurochasma*, they split laterally or sublaterally. Each subgenus is further divided into sections, a total of eleven being recognized. According to this arrangement two

Magnolia grandiflora *bloom bud.*



Magnolia virginiana *var.* australis

American species, *M. acuminata* and the closely related *M. cordata*, belong to the second subgenus, together with the precociously-flowering Asiatic *M. liliiflora*. Small, following Spach, places these two former species in the genus *Tulipastrum*, a division which Dandy reduces to the status of a section.

Cytologically the genus is extremely interesting. The haploid chromosome number is 19 and most species are diploid with a count of 38. However, *M. acuminata* is a tetraploid with 76, and *M. grandiflora* is a hexaploid with 114.

American Magnolias

The range of the genus *Magnolia* in temperate North America extends from central Florida to eastern Texas and Arkansas, north to New Jersey, western New York and southern Ontario. One species, *M. virginiana*, has a local outpost in eastern Massachusetts. All but one (*M. ashei*) were described prior to the early years of the nineteenth century and all nine of them have found their way into horticulture in this country. Bean records all but *M. ashei* as in cultivation in the British Isles.

The following artificial key, which is based solely on foliar characters, may help to differentiate those Magnolias which are indigenous to the eastern and southeastern United States.

A. Leaves coriaceous, persistent or semi-persistent.
  B. Leaves 15-20 cm. long, brownish beneath, firm-coriaceous and always persistent.....*M. grandiflora*
  B. Leaves 10-15 cm long, whitish beneath, thin-coriaceous, semipersistent...*M. virginiana*
A. Leaves not coriaceous, deciduous
  C. Leaves auricled or heart-shaped at the base
    D. Leaves glaucous beneath; more or less evenly spaced along the branches.
      E. Leaf blades 5-8 dm. long, pubescent beneath. ..... *M. macrophylla*
      E. Leaf blades 4-6 dm. long, sparingly pubescent beneath. .....*M. ashei*
    D. Leaves pale green but not glaucous beneath, conspicuously clustered toward the tips of the branches.
      F. Leaves elongate-obovate, gradually pointed at the apex.....*M. fraseri*
      F. Leaves rhombic-obovate, abruptly acute at the apex..... *M. pyramidata*
  C. Leaves not auricled or heart-shaped at the base
    G. Leaf blades obovate to oblanceolate, 3-6 dm long. ..... M. tripetala
    G. Leaf blades elliptic to ovate or oval, 1-3 dm long.
      H. Leaf blades elliptic to ovate, acuminate at apex, 1.5-3 dm long. .....*M. acuminata*
      H. Leaf blades oval or orbicular-oval, rounded at apex, 1-1.5 dm long. .....*M. cordata*

M. grandiflora L. (*M. foetida* (L.) Sarg.). Bull Bay, Loblolly Magnolia. This is a tree of noble propor-

tions, capable of achieving a height of some 30 m. (about 100 ft.). The coriaceous, oblong or elliptic leaves are 15 to 25 dm. (6 to 10 in.) long, lustrous on the upper surface and usually brownish-pubescent beneath. The creamy, white, fragrant flowers are from 15 to 20 cm. (6 to 8 in.) across. Here at the Arboretum the first flowers usually appear during the last week of June and the tree continues to bloom during the entire month of July and even into the first week of August. Few trees hardy in our area enjoy such a protracted period of blooming.

The natural range of this species is from Central Florida to Texas and Arkansas, thence north to North Carolina. Fortunately for many of us, it is hardy as far north as Philadelphia and even New York, although north of Washington it seems to require a somewhat protected situation.

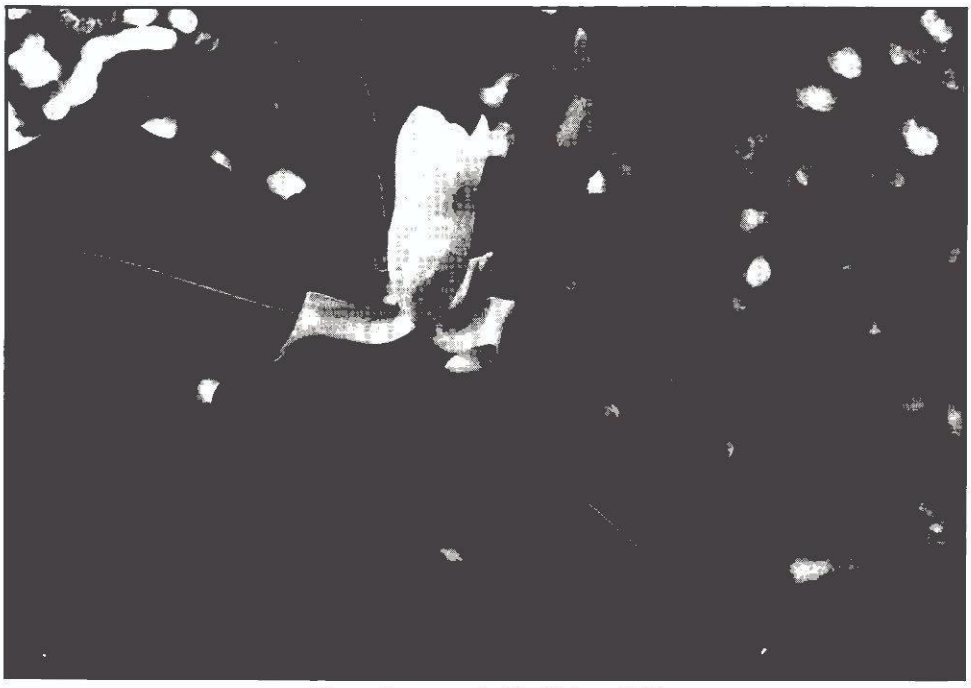
Since *M. grandiflora* is almost the only tree with evergreen leaves and handsome flowers which can be grown throughout warm to cool temperate regions, it has in a period of more than two centuries achieved a truly world-wide popularity. According to Dandy, it was introduced into Europe as early as 1732. Today it is found in practically every garden in the British Isles and western Europe, including, of course, the Mediterranean area. Some of the largest specimens I have ever seen in cultivation are in one of the world's oldest botanical gardens, namely, that of Padova, Italy. Equally fine ones are growing in the Botanical Garden at Pisa. In such remote countries as India and Japan our American Bull Bay is highly valued as an ornamental and in the latter country in particular it is widely planted along the shores of ponds and streams in gardens and public parks.

Everybody who has observed *M. grandiflora* growing wither in the wild state or in cultivation is aware of its tremendous capacity for variation. This is reflected in the habit of the plant, the shape, size, color and pubescence of the leaves and the character of the flowers. Some of these variations were first recognized in native populations, such as Pursh's var. *elliptica* and var. *obovata*, which were based on leaf shape. These may be regarded as botanical varieties. Many more have been detected and described from plants in cultivation and are known as cultivars. Most of the early cultivars of *M. grandiflora* were identified in England and Europe. In recent years American growers have recognized an increasing number of individuals as worthy of description.

As noted in a previous issue of this Bulletin, I have accepted the assignment of registering all cultivar names in *Magnolia*. To date I have recorded over 30 such names in *M. grandiflora* alone. A discussion of these will appear in a future publication.

M. virginiana L. (*M. glauca* L.)
Swamp Magnolia, Sweet Bay

A small to medium-sized tree said to attain a height of 20 m (more than 60 ft.) but usually lower. The subcoriaceous, oval to broadly lanceolate leaves, which average 10 to 15 cm. (about 4-6 in.) in length, are dark green above and whitish beneath. When young the under leaf



Magnolia macrophylla *'Julian Hill'*

Magnolia acuminata *'Klassen'*

surfaces may be silky-pubescent, but as the season progresses they tend to become entirely smooth, although retaining their glaucous hue.

The white, fragrant, subglobose flowers which are about 5 to 7 cm. (2 to 2.5 in.) in diameter appear in this area toward the end of May and continue to open for the next three or four weeks. The bright red fruits and scarlet seeds produce a brilliant effect against the lustrous foliage in late August. The Swamp Magnolia extends from Florida and Mississippi north to Pennsylvania, New Jersey, and locally to eastern Massachusetts. A more southerly form, known as var. *australis* Sarg., is taller (up to 30 m.), and possesses more pubescent branches and foliage. There is a tendency in some quarters to apply this varietal name to any individual in which the leaves are persistent, but this characteristic was not embodied in Sargent's description. This evergreen form is more appropriately known as sempervirens, a name which has been in use since the early years of the nineteenth century.

M. virginiana is an extremely useful species. Although primarily a plant of low, wet woodlands, it flourishes in a wide variety of situations. It is attractive at all seasons of the year and well deserves the popularity which it has achieved in this country and abroad. It was the first Magnolia in cultivation in Europe, having been introduced in 1688, and has ever since been a universal favorite.

M. macrophylla Michx. Great-Leaved Magnolia, Large-Leaved Cucumber Tree.

Although this Magnolia conveys the impression of massive size it is seldom more than 16 m (about 50 ft.) tall and most individuals in our area are appreciably smaller. The sense of bigness derives in large measure from the huge leaves, which have the largest simple blade of any tree in temperate North America. Leaves 8 dm. (about 30 in.) in length are not unusual in the wild, although specimens cultivated in the north tend to be somewhat smaller, seldom exceeding 6 dm. (about 24 in.). The leaves are whitish and finely pubescent beneath, with a prominently auricled base.

The flowers of this species parallel the leaves in size and are the largest of any Magnolia hardy in our area, frequently achieving a diameter, when fully open, of 2 to 3 dm. (8 to 12 in.). The petals are six in number and the three inner ones are blotched with purple at the base. The fruit is an attractive rose-colored, globose, cone-like structure.

M. macrophylla was first described by the elder Michaux from North Carolina and is today known from that state to western Florida, west to Louisiana and north to Kentucky. It is, however, hardy as far north as eastern Massachusetts. Several fine specimens may be seen here at the Arboretum as well as elsewhere in the Philadelphia area. The species is worthy of a place in any garden which can afford it ample space in which to develop and be appreciated.

M. ashei Weatherby

This is a newcomer to the ranks of temperate American Magnolias, having been described by Mr. C. A.

Weatherby from western Florida in 1926. The species is closely related to *M. macrophylla*, which it resembles in its auriculate-based leaves, which are whitish on the under surface. However, the leaves of *M. ashei* are somewhat smaller and, when mature, are less pubescent on the lower surface. There appears to be some discrepancy concerning the size of the flowers. Weatherby and Small both state that they are larger than those of *M. macrophylla*; Coker and Totten say that they are much smaller. Most authorities agree that the fruiting body of *M. macrophylla* is globose whereas that of *M. ashei* is cylindrical. There are also differences in the size of the seeds.

Although this species is best known from western Florida, it grows well in our area and is hardy as far north as New York. Magnificent specimens are in cultivation in the gardens of the Henry Foundation at Gladwyne, Pennsylvania. Despite the fact that it is said to be a smaller tree than *M. macrophylla*, the plants at Gladwyne bid fair to rival that species in size.

Magnolia fraseri Walt. (*M. auriculata* Lam.) Ear-leaved Umbrella Tree.

This and the following species have leaves which are auriculate at the base and so closely clustered at the ends of the branches as to appear whorled or verticillate. *M. tripetala* also has its leaves aranged in this manner, but the leaf in that species tapers gradually toward the base.

M. fraseri is a slender tree up to 15 m. (about 50 ft.), which grows in swamps and bottomlands from Georgia and Alabama north to West Virginia and Virginia. The obovate-spatulate leaves are gradually pointed at the apex, pale green and glabrous beneath, and from 2 to 5 dm. (8 to 20 in.) long. The creamy white and very fragrant flowers are about 2 to 2.5 dm. (8 to 10 in.) across. In our area they open usually during the first week in May.

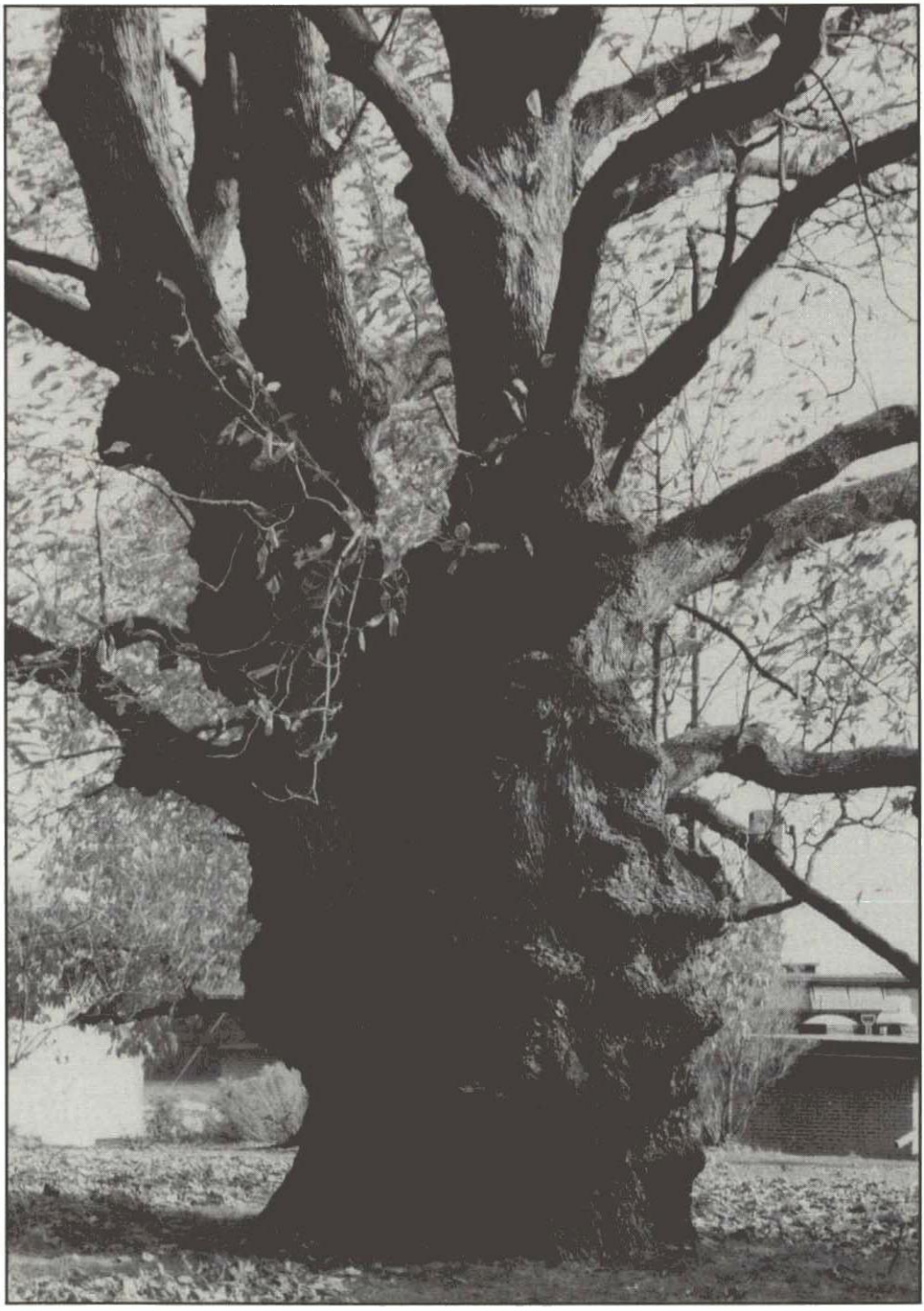
This species flourishes well in the Philadelphia region and is hardy as far north as Massachusetts.

M. pyramidata Bart. Bartram Magnolia

Closely related to the preceeding, this is a somewhat smaller tree, up to 10 m. (about 35 ft.) with a more restricted range. The leaves are rhombic-obovate and abruptly acute, rather than gradually pointed, at the apex. Moreover, the petioles are from 2 to 4 cm. (1 to 2 in.) long, whereas those of *M. fraseri* are appreciably longer. The flowers and fruit are also smaller than those of the foregoing species.

According to a map which Dr. Carroll E. Wood, Jr., of the Arnold Arboretum, has kindly furnished me, *M. pyramidata* occurs in southwestern Georgia, the panhandle of Florida, southern Alabama and southeastern Mississippi. A letter recently received from Dr. G.H. Ware of the Department of Botany, of the Northwestern State College of Louisiana, states that it also grows in Vernon Parish, Louisiana, as well as in southeastern Texas.

This species appears perfectly hardy in the Philadelphia area where it flowers a few days later



Magnolia acuminata. *The champion tree in the United States, located at Waukon, Iowa.*

than *M. fraseri*. It deserves to be more widely grown than is apparently the case.

M. tripetala L. (*M. umbrella* Lam.) Umbrella Magnolia, Umbrella Tree

This Magnolia is a small tree, seldom more than 10 m. (about 35 ft.), of somewhat sporadic occurrence in rich woods from Georgia to Arkansas and north to West Virginia and Pennsylvania. Its seemingly whorled leaf clusters, large white flowers and handsome pink fruits make it a conspicuous plant in the wild and a favorite subject in cultivation.

The oblong-obovate leaves are from 3 to 6 dm (12 to 24 in.) long, whitish and pubescent (at least when young) beneath, and gradually tapered at the base.

The chalky-white flowers which are about 2 to 2.5 dm (8 to 10 in.) across, exude a rather unpleasant odor. With us they usually open between the middle and the end of May. The three large petal-like sepals (which give the plant its specific name) are reflexed and the six or nine petals are somewhat oblanceolate. The cylindrical fruiting bodies which are about 7 to 10 cm. (3 to 4 in.) long, begin to turn pink toward the middle of August and from then until frost are extremely ornamental.

M. tripetala is occasionally confused with the closely related Japanese *M. obovata* [*M. hypoleuca*]. In that species, however, the leaves are slightly rounded, rather than gradually tapering, at the base and the creamy white petals are spatulate.

The Umbrella Tree is a fast grower and with us exhibits something of a weedy tendency, becoming readily naturalized in moist shady situations, not only in the Arboretum but elsewhere throughout the area.

M. acuminata L. Cucumber Tree

This widely distributed species, which ranges as far north as western New York and southern Ontario, may attain a height of 30 m. (about 100 ft.). Its oblong-ovate leaves are 1.5 to 3 dm. (6 to 12 in.) long, light green and usually slightly pubescent beneath, and acute or short-acuminate at the apex. The campanulate to globose flower is 7 to 8 cm (about 3 in.) high. The three sepals are glaucous-green in color and the six petals are greenish-yellow.

The common name of this species derives from the shape and color of the young fruit which, with some exercise of the imagination, may be thought to resemble a small cucumber.

Although the flowers of this species are far from showy, the tree has great value in horticulture because of its fine proportions and good foliage. In autumn the golden yellow color of the leaves makes it one of the most showy of all the Magnolias.

Ashe and Sargent have described varieties of *M. acuminata*, based upon differences in size, shape, and color of the leaves. It is my own feeling that this species is no more variable than other members of the genus and distinctly less so than *M. grandiflora*.

M. cordata Michx.

Similar to the preceeding (of which it has by some been considered only a variety), but a smaller tree, seldom over 10 m. (35 ft.) with leaves which are shorter, broader, and more rounded at the apex. (Fig. 46). The leaves may also be somewhat cordate at the base, whereas those of *M. acuminata* are broadly rounded or acute.

The flower of this plant are slightly smaller than those of *M. acuminata* and the petals are a bright canary yellow. This species was originally discovered by the elder Michaux in the neighborhood of Augusta, Georgia, probably around 1790. It was introduced into cultivation in France soon after and all the trees growing in Europe are believed to be derived from the original introduction.

According to E. H. Wilson, this tree was lost sight of in the wild between the time of its discovery and 1926 when Mr. Louis A. Berckmans happened upon it in a dry wood some 18 miles north of Augusta.

Despite its restricted southern range, *M. cordata* is hardy as far north as the Arnold Arboretum. Since it is the only member of the genus, suitable to our climate, in which the flowers are a true yellow it merits a place in any collection of woody ornamentals.

Hybrids

Although no natural hybrids have been reported in *Magnolia*, garden crosses are well known. The most familiar of these is, of course, *M.* x *soulangiana*, an intersectional cross between two Asiatic species, *M. denudata* and *M. liliiflora*, which is believed to have occurred spontaneously in the garden of the Chevalier Soulange-Bodin near Paris in or about 1820.

According to Dandy (1950), there is no example of hybridization between the two subgenera, but there are several hybrids between different sections of the same subgenus.

Among the American species the most venerable cross is the one now called *M.* x *thompsoniana*, which is a hybrid between *M. tripetala* and *M. virginiana*. This cross, which appeared in Mr. Thompson's garden in Mile End, London, in 1808, has also been referred to as *M. major* or *M. glauca major*.

The leaves of this hybrid have the glossy upper surface of *M. virginiana*, but are appreciably larger than those of that species. The flowers, on the other hand, are larger than those of *M. virginiana* although smaller than those of *M. tripetala*.

M. x *thompsoniana* must be regarded as only semi-hardy in the Philadelphia area. Our material has been subject to severe winter injury during the last decade and a half.

We obtained scions of this cross from the Barnes Arboretum, Merion, Pennsylvania, in 1945. Shortly afterward the Barnes material was winter-killed and we were pleased to be able to supply them with rooted cuttings. In the winter of 1958-59 our material was severely damaged and we thought that once again we would be forced to seek help from Merion. One plant, however, has made a good recovery and even flowered during the summer of 1961.

Still another intersectional cross,

or rather series of crosses, namely *M. grandiflora* x *M. virginiana*, is reported by Rehder to have originated in 1930. Although *M. virginiana* is a fairly stable species, *M. grandiflora*, as already indicated, is extremely variable. However all of the progeny known to us have the coriaceous, evergreen leaves of *M. grandiflora*.

In recent years this cross has been repeated at a number of institutions, notably the National Arboretum in Washington, and we are growing a representative series of these at the Morris Arboretum. So far none has flowered.

Magnolias at the Arboretum

All nine species and two hybrids of temperate American Magnolias are in cultivation at the Morris Arboretum. A few, like *M. macrophylla, M. grandiflora, M. virginiana, M. tripetala*, and *M. acuminata*, have been here for many years and are well developed, mature individuals. Most of the others have been recently acquired and have yet to give a full account of themselves.

Two separate and very diverse sites have been selected for the growing of our magnolias. One is a low, flat, protected area along Hillcrest Avenue at the foot of the Azalea Meadow. The other is an open, north-facing hill slope along Meadowbrook Avenue south of the service entrance.

It is interesting to note that Magnolias seem to survive equally well in both situations, but that the unprotected north slope has one advantage over the more selected area: namely, the plants in the former site are somewhat retarded in their early spring development with the result that they frequently escape the deleterious effects of a sudden cold snap which would otherwise have blackened the young buds.

We are still learning much about the adjustment of these interesting plants to our local conditions and intend to try them out in a variety of other habitats. ❧

Bibliography

Bean, W.J. *Trees and Shrubs hardy in the British Isles*. Ed. 7. 1951.

Coker, W.C. and H. R. Totten. *Trees of the Southeastern States*. 1934.

Dandy, J.E. The genera of the Magnoliaceae. *Kew Bull*. 1927.

_____ A survey of the genus Magnolia together with Manglietia and Michelia. *Royal Hort. Soc. Conf. Rep*. 1950.

Fernald, M.L. *Gray's Manual of Botany*. Ed. 8. 1950.

Hutchinson, J. *The Families of Flowering Plants. I. Dicotyledons*. 1926.

Rehder, A. and E.H. Wilson. A Key to Magnolias. *Plantae Wilsonianae*. 1913.

Rehder, A. *Manual of Cultivated Trees and Shrubs*. Ed. 2. 1940.

Sargent, C.S. *The Silva of North America*. Vol. 1., 1891.

Small, J.K. *Manual of the Southeastern Flora*. 1933.

Weatherby, C.A. A new Magnolia from west Florida. *Rhodora* 28:35. 1926.

Wilson, E.H. *Aristocrats of the Trees*. 1930.