

 Missouri Botanical Garden

Invites you to . . .

Know Our Trees



QK170
.M568
1990
c.1

Missouri Botanical Garden Library

QK170 .M568 1990

General
/Missouri Botanical Garden invites you to

568 1990 c.1



3 1753 00085 5897

Botanical Garden
you to know ...

INVITES

DATE DUE

6-4-93

2hr

On the cover: From an anonymous, untitled eighteenth-century pamphlet of etchings of trees, perhaps printed in England, from the collection of the Missouri Botanical Garden Library.

© Copyright 1990, Missouri Botanical Garden.



PRINTED ON RECYCLED PAPER

MISSOURI BOTANICAL
GARDEN LIBRARY

QK17
.M5
199
C.

GARDEN GATE

CONTENTS

Introduction	2
Map	24 - 25
Bald Cypress	4
Bitternut Hickory, Mockernut Hickory	5
Black Walnut	7
Chinese Spindletree	8
Corktree	10
Cucumbertree (Cucumber Magnolia)	11
Dawn Redwood	12
European Beech	14
Ginkgo	15
Hackberry	17
Horsechestnut	18
Japanese Pagodatree (Chinese Scholartree)	20
Kentucky Coffeetree	21
Osage-Orange	23
Pawpaw	26
Sassafras	27
Scotch Elm (Wych Elm), Chinese Elm	29
Shumard Oak	31
Soapberry	32
Sweetgum	33
Sycamore	35
Tree-of-Heaven	36
Tuliptree (Yellow-Poplar)	37
White Basswood	39
Yellowwood	40
Table: Just the Facts	42 - 47
Index	48

200

25 APR 90

INTRODUCTION

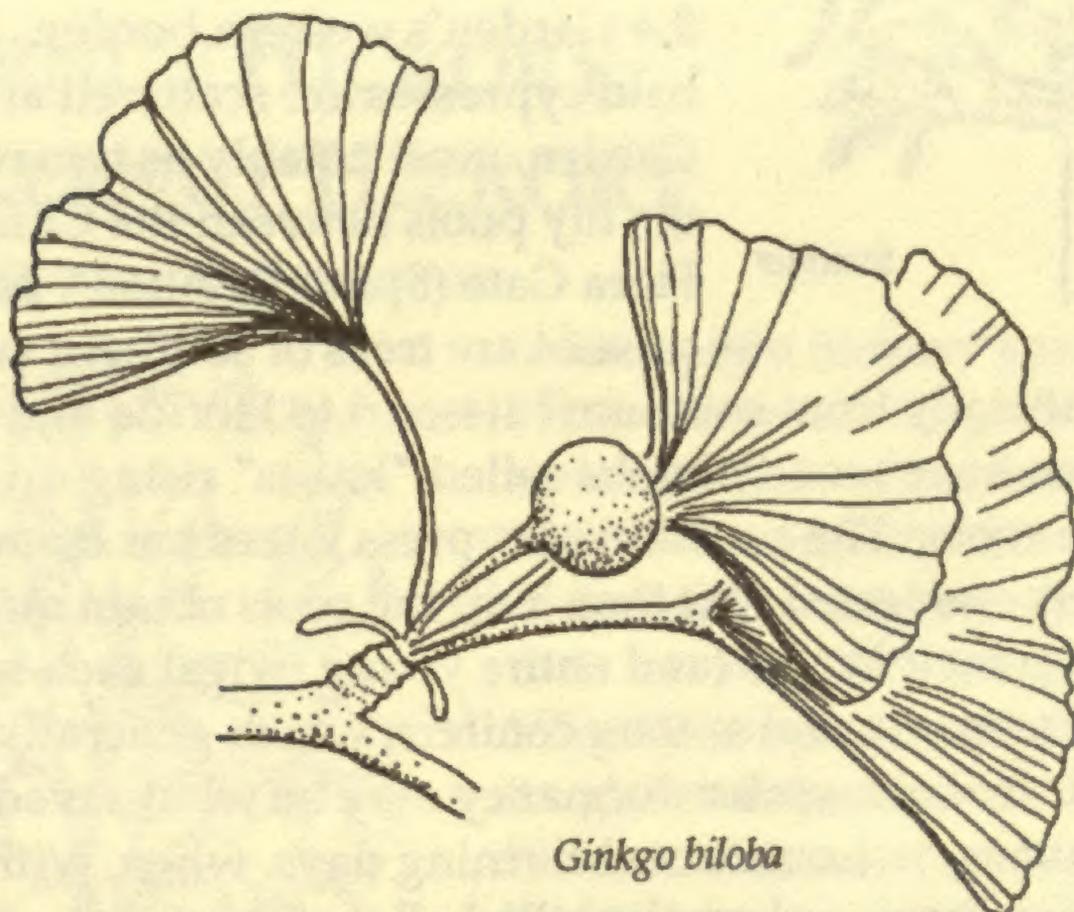
The trees at the Missouri Botanical Garden are enchanting throughout the year in their grandeur, colors, shapes, and histories. The floral display is most dazzling in the spring with cherries, flowering crabs, plums, and magnolias. The trees are coolly shady and enticing in the summer, and the fall colors rival the spring flowers for showiness. Even in winter, beauty shows forth in stark silhouettes, persistent fruits, and patterned barks. Our trees come from around the Northern Hemisphere; represented are wild species, hybrids, and old and new cultivated selections. They offer inspiration and examples for landscaping, lessons in recognizing native and exotic species, and surprises. As you get to know the Garden's trees, you will discover curious roles in human affairs, tricky pollination mechanisms, and sundry charming and fascinating stories ranging from microscopic details to global trends, and from ancient cultures to high technology. The aim of this guidebook is to capture some of these highlights for the most prominent trees of the Garden. It is meant to add joy to a walk around the grounds and to observing trees wherever you encounter them.

The site of the Garden was originally prairie, and when Henry Shaw founded it in 1859 the Garden was virtually devoid of trees. No trees presently standing are older than the Garden. A few charter members of the tree collection are still with us, and are pointed out in this guidebook. In the earliest years, the northwestern portion of the grounds was an arboretum, which through the action of storms (including the tornado of 1897), disease, air pollution, and age has almost vanished, although three large bald cypresses near the southwest corner of the visitor parking lot remind modern visitors of the original arboretum. Much of the opposite

end of the Garden was a "North American Tract", and most of the large trees in the Japanese Garden and thereabouts date back to that. Interest in locally native species has resurfaced in recent years as the Garden repopulates its trees in part from wild-collected seeds. Some young specimens from this initiative are beginning to appear around the grounds.

If you enjoy exploring the Garden's trees, you may also enjoy a trip to the Shaw Arboretum at Gray Summit, Missouri, which offers its own tree guidebook. And our immediate neighbor to the south, Tower Grove Park, has a splendid tree collection; many of the trees there are unusual and old.

This guidebook was researched and assembled by Arden Fisher, Joan Murphy, and George Rogers. Margaret Dykens prepared the illustrations. Susan Wooleyhan directed the layout and production, and is thanked for good cheer and valuable suggestions throughout the project. Sara Jenkins, Amy Scheuler, and Donna Rogers helped improve the manuscript.



Ginkgo biloba

This guide to the trees of the Missouri Botanical Garden has been made possible by financial support from Geraldine Epp Smith, a longtime friend of the Garden. We are deeply grateful for this gift, which benefits all who study and treasure the Garden's magnificent trees.

BALD CYPRESS

See Map: A, H

Taxodium distichum



The Garden was almost treeless when founded in 1859, and one of the earliest major tree-planting efforts, begun in 1861, was Henry Shaw's Arboretum. Not to be confused with the present Shaw Arboretum near Gray Summit, Missouri, the original arboretum occupied what is now the northwest corner of the Garden plus some land now outside of the walls. Over the years, that old arboretum dwindled as old age, disease, storms, air pollution, and changing policies eliminated its trees. Yet three reminders of the original arboretum are still with us: the grand trio of bald cypresses towering above the Maintenance Area gate onto Alfred Avenue at the Garden's western border. Additional bald cypresses are scattered around the Garden, most notably as two rows along the lily pools between the Climatron and Flora Gate (Spink Pavilion). Bald cypresses are trees of southern swamp-

lands, ranging naturally from southern Missouri to Florida and Texas. In the wild they often have woody knobs called "knees" rising up through the mud from the roots. The function of cypress knees has been debated—it is widely suspected that they help the roots obtain air.

That they drop their leaves (and entire young twigs) each winter makes bald cypresses unusual among conifers, which generally are evergreens. Their leafless winter dormancy may be what saved our large bald cypresses during St. Louis's coal-burning days, when, with one exception, pollution from coal smoke killed all the evergreen conifers on the grounds.

The Bald Cypress Family (Taxodiaceae) is small but contains well-known, big members: giant sequoias (*Sequoiadendron giganteum*) and redwoods (*Sequoia sempervirens*). Also in this family is the dawn redwood (a native of China and featured on page 12 in this guide). Bald cypress is easily confused with the very similar dawn redwood but has its

needles attached singly along its twigs, whereas the dawn redwood has needles in pairs; and the bald cypress has larger, more spherical cones.

Bald cypress wood resists rotting and thus is especially valuable for construction around water, such as for pilings and docks.

With some differences of interpretation, the genus *Taxodium* is made up of two or three species of the southern U.S. and Mexico. The fossil record shows that now-extinct *Taxodium* species once grew in Europe, Asia, and northern North America. Fossils of our "southern" species, *T. distichum*, have turned up as far north as British Columbia.

Taxodium comes from Greek for "yew-like", since the leaves look a little like yew leaves, and *distichum* is a Latin botanical term indicating leaves in two rows.



See Map: B, O, 29

BITTERNUT HICKORY, MOCKERNUT HICKORY

Carya cordiformis, *Carya tomentosa*



Winter

Summer

Carya cordiformis

About eight hickory species are native to Missouri, where they are frequent in upland and lowland woods. They rank high in beauty, diversity, and abundance in the eastern deciduous forest, lending their name to "oak-hickory" forests and "Old Hickory", Andrew Jackson, the tough 7th President of the U.S.

Bitternut hickory ranges across eastern North America from Quebec to Florida, usually occupying bottomlands and cool, shady slopes. It differs conspicuously from other hickories by having short wings or flanges on the husk of its nut.

The distinctive winter buds are long and narrow, with two sulfur-yellow, powdery, irregular scales face-to-face, a little like two hands clasped in

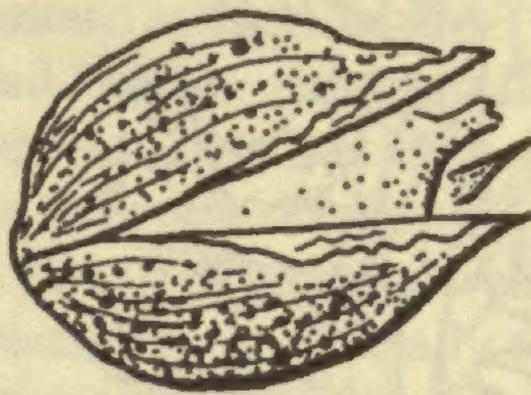
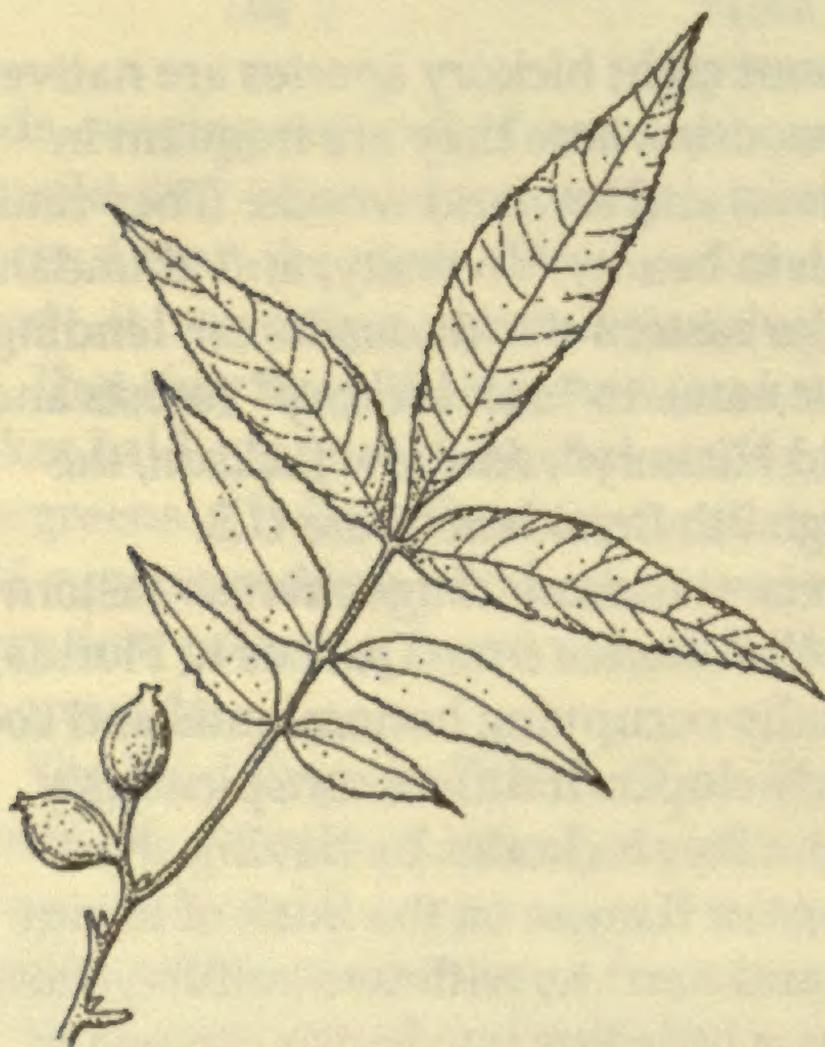
prayer. See one west of the Lehmann Rose Garden and one just south of the Zimmerman Scented Garden.

Mockernut hickory most often inhabits high, dry, acid sites but turns up also in lowland woods. Its distribution extends from New England south to Florida and west to Nebraska and Texas. Mockernut hickory is easily recognized by its fuzzy leaves and buds, and thick-shelled nuts. This species is in the English Woodland Garden.

Hickories tend to have very hard, stiff woods, useful for hammer handles and the hickory sticks once used for classroom discipline. Wood of mockernut hickory is particularly strong and was once valuable for furniture. Bitternut hickory wood is not as strong as that from other hickories.

Hickory nuts are usually good eating, although those of bitternut hickory live up to their name. Far more palatable is its close relative—the pecan (*Carya illinoensis*), a locally native lowland hickory (young trees are located west of the Lehmann Rose Garden and in the northern extension of the English Woodland Garden). Pecan is sometimes grafted onto hardier bitternut hickory understocks to allow pecan cultivation farther north than otherwise possible.

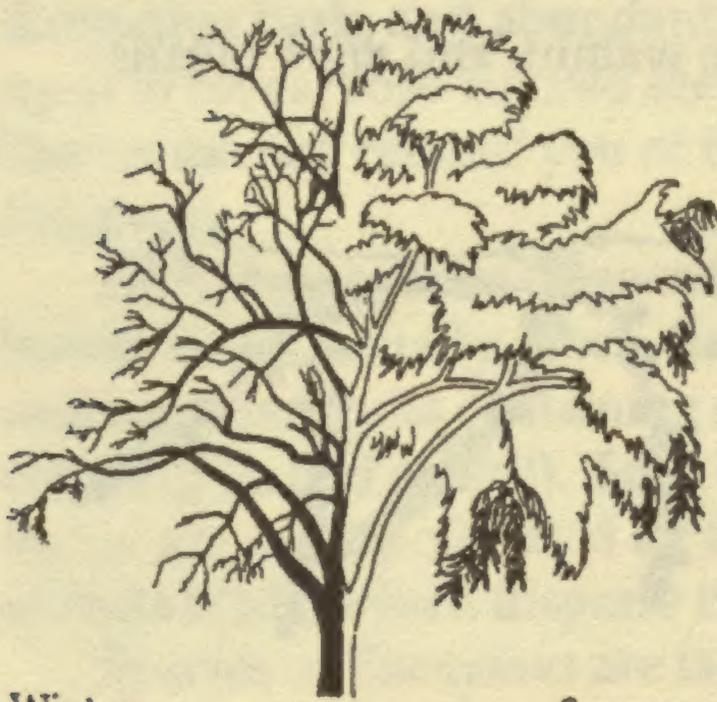
Carya comes from *Karua*, the Greek name for walnuts. *Cordiformis* is derived from Latin for “heart form” in reference to the heart shape of the nut from bitternut hickory. *Tomentosa* means “fuzzy”, which applies well to the mockernut hickory, and the English name for this species comes from the Dutch word *mooker* for “hammer”, which is required to open its hard nuts.



Carya cordiformis

BLACK WALNUT

Juglans nigra



Winter

Summer

Like many of the Garden's trees, such as oaks, hickories, elms, birches, and others, walnuts are pollinated by wind. Unlike showy flowers that attract insect or bird pollinators, the wind-pollinated walnut flowers are small and inconspicuous. The male flowers are grouped into elongate clusters called catkins; and the female flowers (which grow into the familiar walnuts) are in clusters of 2-5 and look like tiny eggs, each with two big bunny ears on top. The "ears" are the stigmas, which work like antennae to capture airborne pollen grains as step one in the sexual cycle.

Walnuts are delicious, especially in such delicacies as maple walnut ice cream. But all pleasures have their costs—gathering walnuts incurs the risks of stained hands and clothing (the husks were once used for dyes), and the husks cause allergic reactions in some people. Worse, the walnut meats are exasperatingly difficult to remove. This is advantageous for the tree, since squirrels gather, nibble, and bury (plant from the tree's standpoint) walnuts often without destroying the meat, which is the embryo that grows into a new tree.

Pickled walnuts are eaten in England and were popular in colonial America. To make them, half-grown walnuts in their husks are boiled in brine, then wiped scrupulously clean and placed in jars filled with boiled, spiced vinegar.

Nuts of the closely related butternut (*Juglans cinerea*) yield abundant oil when split and boiled. The oil and nutmeats float to the surface, are skimmed off, and mashed into butternut butter.

A year-round distinction between butternuts and black walnuts, both of which are Missouri natives, can be seen in the scar left when a leaf drops off of a twig. In butternut, the scar has a flat top, while in black walnut, the scar top is notched. The nuts of the butternut are elongate (vs. globe-shaped on the black walnut) and are sticky.

Black walnut trees have become rare in the wild, not from disease, but because of their value as sources of fine, dark, beautifully grained wood prized for furniture, interior trim, veneer, and gunstocks. Because of the

value of this wood, walnut plantations have been established. Missouri is a favorable walnut-growing state, and historically has produced over 1/6 of all black walnut wood.

Walnuts reduce competition from surrounding vegetation by producing their own natural herbicides. This makes it difficult to grow grass or shrubs under these trees. You may notice this in the walnut grove northwest of the Lehmann Rose Garden.

Juglans is the classical Latin name for the walnut, and *nigra* means "black".

Juglans nigra, female flowers

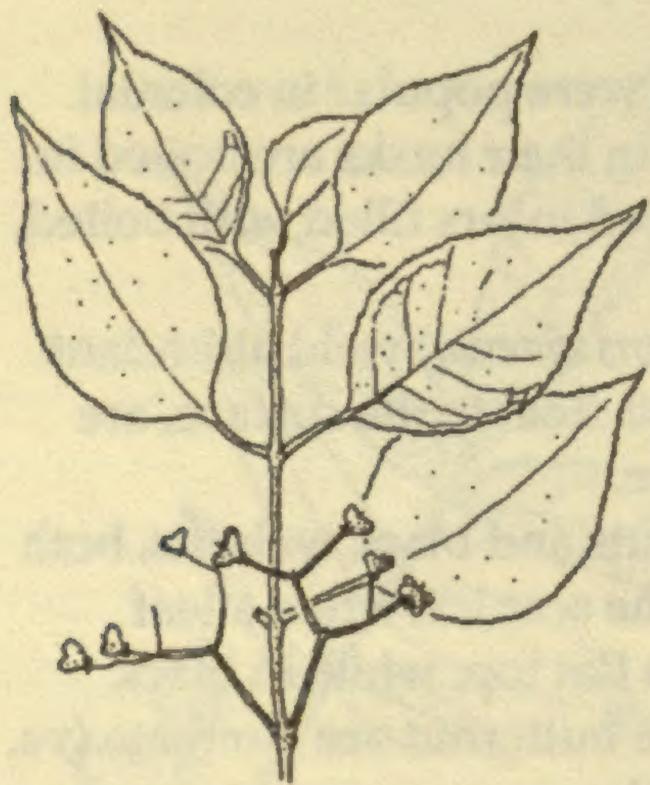


Juglans nigra, male catkins

CHINESE SPINDLETREE

See Map: E, 18, 19, 20

Euonymus bungeana



The horticulturally prominent genus *Euonymus*, with over 150 species, is native to Asia, Europe, Africa, Australia, and North America.

Familiar members of *Euonymus* include the burning bush (*E. alata*), which is used heavily in landscaping for its flaming orange-red or scarlet fall color; other shrubby species (*E. japonica*, *E. kiautschovica*, *E. europaea*); and a vining groundcover (*E. fortunei*). Native to Missouri are the shrubs wahoo (*E. atropurpurea*) and strawberry bush (*E. americana*), and the trailing vine known as running-strawberry-bush

(*E. obovata*). Most of the species mentioned above can be found at the Missouri Botanical Garden. Particularly dazzling in the autumn is the burning bush in the Japanese Garden and in the Knolls.

The preeminent *Euonymus* specimens at the Garden are the large *E. bungeana* trees just north of the Lehmann Rose Garden. They are bigger than the handbooks say this Chinese species ought to become and thus evidently date back far into the Garden's history. Another of similar size grows in the parking lot of the Commerce Bank in Kirkwood, a western suburb of St. Louis.

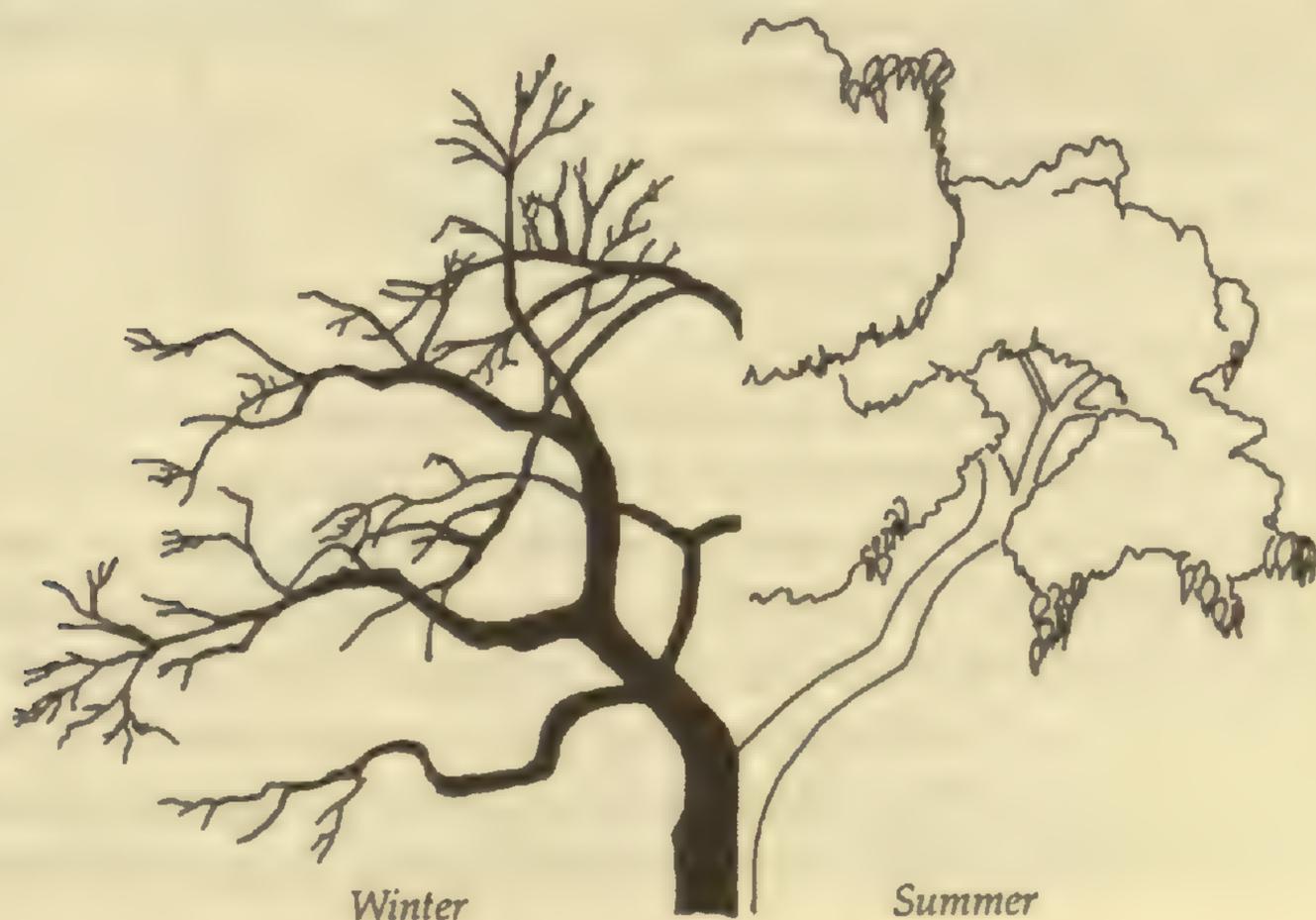
Horticulturally attractive aspects of *E. bungeana* are its gnarled shape, distinctive bark, and abundant fruits that change from yellow to pink and open to reveal rose-colored seeds, which retain their color into the winter. The fruits may remind you of the closely related bitter-sweet (species of *Celastrus*).

Euonymus species frequently have green, four-angled twigs; paired leaves; small, usually green, flat flowers often with four (or five) petals; and capsular fruits containing seeds with a bright orange and reddish covering (called an aril). Such small, greenish, flat flowers with exposed nectar are often pollinated by small flies. The bright aril on the seed attracts birds, which disperse the seeds through their digestive systems.

Species of *Euonymus* are laced with poisons; eating the fruits can induce digestive disorders and unconsciousness. The attractive bright coloration of the fruits and seeds makes them especially hazardous around children. Livestock browsing on the leaves have been poisoned.

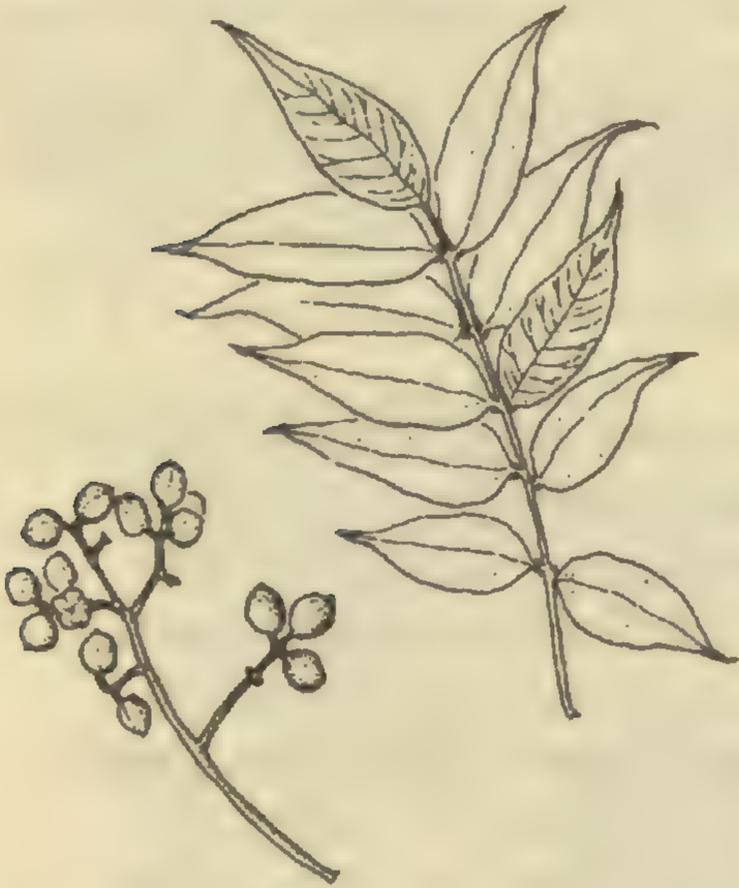
Like many poisonous plants, *Euonymus* species have been used in folk remedies for all sorts of ailments. Wood of *E. europaea* once served for making spindles for looms, hence the name "spindletree" for arborescent species. The dye used for the sacred forehead mark of the Hindus historically comes from the bark of *E. tingens*.

Euonymus is the ancient name for *Euonymus europaea*. *Bungeana* honors the botanist Aleksandr Andreevich von Bunge.



CORKTREE

Phellodendron amurense



Home to the corktree, the Amur River flows eastward from Mongolia as the eastern segment of the border between the Soviet Union and China. An exotic but accessible north temperate region, the Amur rewarded plant explorers in the last century with horticultural treasures. For instance, at the Missouri Botanical Garden you can also find the Amur cherry (*Prunus maackii*) and the Amur maackia (*Maackia amurensis*), both discovered in the Amur region by the plant explorer Maack. The discoverer of the corktree, in 1853, was Franz Josef

Rupprecht, who began life roaming with the Austrian Army in which his father was an officer during the Napoleonic Wars. Franz Josef trained as a physician but gave up that career at age 24 to explore for plants across what is now the Soviet Union. He became a prominent and influential Russian botanist.

The corktree is among the few cool-climate members of the large, mostly tropical, Citrus Family (Rutaceae), which includes oranges, lemons, and grapefruits. The resemblance of the corktree to these familiar fruits may seem unconvincing, but the fragrance of its crushed fruits helps make the connection. (But please do not break off fruits at the Garden for a sniff.) The trees are strictly male or female, so only half of them bear fruits, which contain a natural insecticide.

A small number of other members of the Citrus Family grow in Missouri. Native species are prickly-ash (*Zanthoxylum americanum*) and hoptree (*Ptelea trifoliata*). Introduced cultivated species are gas plant (*Dictamnus albus*), "hardy-orange" (*Poncirus trifoliata*), and rue (*Ruta graveolens*). Some of these are displayed at the Garden.

With inconspicuous flowers and small fruits, the main attractions of the corktree are its deep green, compound leaves and massive, "low", spreading main branches. Be sure to notice the shapes of the specimens northeast of the Climatron and next to the sculpture *Victory*.

The name "corktree" reflects the resemblance of the bark of this species to that of the true cork (*Quercus suber*), which is an oak. *Phello-**dendron* is Latin for "cork-tree", and *amurense* means "Amur-dweller".



*Phellodendron
amurense*

Winter

CUCUMBERTREE (CUCUMBER MAGNOLIA)

See Map: G

Magnolia acuminata



Winter

Summer

The cucumbertree is the sole magnolia native to (southern) Missouri, where it occurs mostly in stream bottoms, along ridges, and at the bottoms of bluffs. The species ranges from Ontario to Florida and Louisiana, attaining its greatest size (up to about 100 feet tall) and abundance in the southern Appalachians. This is the hardiest magnolia, of which there are some 80 species altogether in Asia and the Americas, primarily in warm places. About eight species are native to North America.

Stately landscaping trees best used in the open, cucumbertrees grow rapidly and become pyramidal. They are generally free of problems except for an intolerance of pollution. The specimen east of Tower Grove House demonstrates the attractiveness of a cucumbertree grown in the open.

With greenish yellow, comparatively small flowers, the cucumbertree is not one of the showiest magnolias, but its flowers have interest beyond ornamental value. It is thought that magnolias are ancient among flowering plants, and that magnolia flowers show primitive characteristics, such

as separate, slightly leafy parts, which often occur in irregular numbers, and fairly unspecialized stamens and carpels (the clustered units at the center of the flower). Pollination is largely by beetles, which are considered to be among the most primitive pollinators.

The name "cucumbertree" comes from the immature fruits, which look like little cucumbers while green; they redden toward the end of the season and then dry out into a cluster of seed-bearing pouches (carpels), which open to allow a bright red seed to fall out and dangle on a thread. Thus displayed, the seeds are easily found and are probably dispersed through the digestive systems of birds. The young fruits were once placed in whiskey as a folk remedy for fevers and to enhance its flavor.

The name *Magnolia* honors the botanist Pierre Magnol, and *acuminata* indicates leaves with slender, tapering tips.



DAWN REDWOOD

See Map: H

Metasequoia glyptostroboides



The dawn redwood is one of the most intriguing botanical discoveries of the 20th century. Its existence was unknown to botany until 1941, when two key events took place. First, a Japanese paleobotanist, Shigeru Miki, realized that odd conifer fossils from around the Northern Hemisphere long misidentified as representing familiar living conifers were relicts of a previously unknown and presumably extinct tree. He named his new fossil discovery *Metasequoia*.

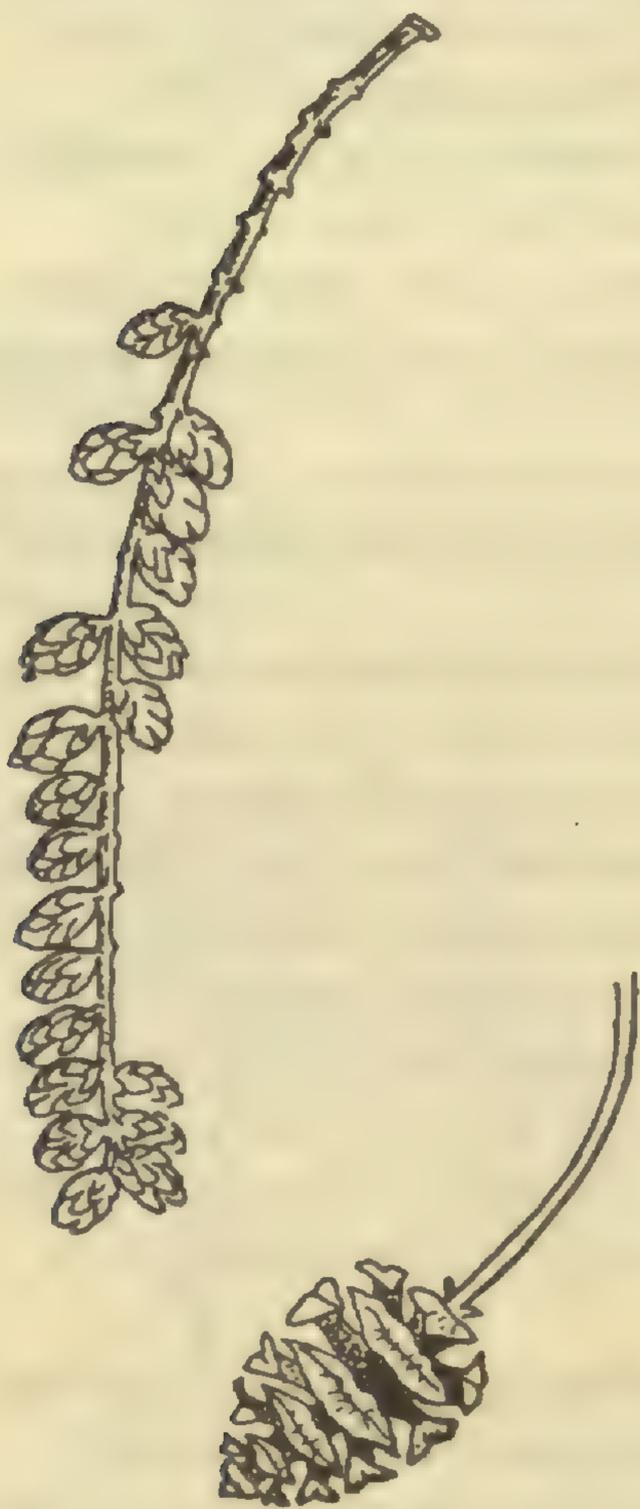
Likewise in 1941, a Chinese forester, T. Kan, noticed a curious conifer growing near the remote central Chinese mountain town of Modaoqi. This led to investigations that culminated in 1946 in the realization by botanist H. H. Hu that T. Kan's curious living conifer and Dr. Miki's fossil *Metasequoia*

were the same. In other words, the “extinct” fossil tree was living!

On December 26, 1947, the Missouri Botanical Garden received wild-collected seeds of the new discovery. These yielded several young metasequoias, which were planted in their present sites in front of the Lehmann Building in 1952. The first cones formed about eight years later.

Exploration in China since the discovery has turned up about 5,000 dawn redwoods with trunks a foot in diameter, including about 2,000 seed-producing individuals. All live near Mr. Kan’s original 1941 site. The human population is expanding there—to the point that human activities and domesticated animals have killed most of the young dawn redwoods. Despite this, the future looks promising since the Chinese government now protects the species.

The name *Metasequoia glyptostroboides* reflects the similarity of dawn redwood to its relatives *Sequoia* and *Glyptostrobus*.



Winter

Summer

EUROPEAN BEECH

Fagus sylvatica 'Atropunicea'



Winter

Summer

The Missouri native American beech (*Fagus grandifolia*) and the European beech (*Fagus sylvatica*) are both frequently encountered in eastern North America. The European beech differs from the American species by having much smaller teeth on the leaves, larger nuts, and fuzzy, flat-colored (vs. shiny and nearly hairless) winter buds. Far more common in cultivation, the European species comes in an array of ornamental cultivars, including purple-weeping ('Purpureo-pendula'), deep purple ('Riversii'), copper ('Atro-

punicea'), tricolor (with three-toned leaves; 'Roseo-marginata'), fastigiata (with dense, upright branches; 'Dawyckii'), cut-leaf ('Asplenifolia'), weeping ('Pendula'), and yellow/green ('Zlatia'). Many selections grace the grounds of the Garden (listed in the map key).

Despite the prominence of purplish European beeches in landscaping, only about four such individual trees are recorded in the wild. Probably all of the cultivated purple, copper, and tricolor beeches descend from a single wild tree in Germany.

Among the most noble wild and cultivated trees, beeches have light gray "elephant skin" bark, massive branches with the lower ones sometimes hanging to the ground, and majestic silhouettes with dense, spreading crowns. Depending on the cultivar, isolated beeches grow into broad, dominating splendor; or groups of beeches can be grown tightly clustered as screens and hedges that can be pruned to perfection. A European beech hedge in Perthshire, Scotland, dating back to 1745, is 580 yards long and 95 feet tall. Another Scottish hedge of *Fagus sylvatica* was planted in 1715, when the workers were suddenly called to battle. They set the trees in the ground on a slant for "temporary" storage but never came back, and the mature trees still lean.

Beech nuts are good to eat, if a little troublesome. In France and elsewhere, beech nut oil is a delicacy, and it once fueled lamps. Roasted beech nuts are still used as a coffee substitute. Pigs like the nuts too, and those with fine breeding find truffles, which are gourmet-esteemed edible fungi that grow underground on European beech roots. The pigs unwittingly help human truffle-hunters sniff out the prizes.

Beeches, chestnuts, and oaks are all members of the Oak Family (Fagaceae). Similarities in the leaves help reveal the kinship of these trees, but more revealing are the caps or coverings of the nuts: the cap on an acorn, the spiny sheath covering a chestnut, and the bristly cover on a beech nut. A glance shows differences while a close look reveals fundamental similarities.

Fagus is the ancient Latin name for the European beech. *Sylvatica* means "of the forest".



GINKGO

See Map: J

Ginkgo biloba

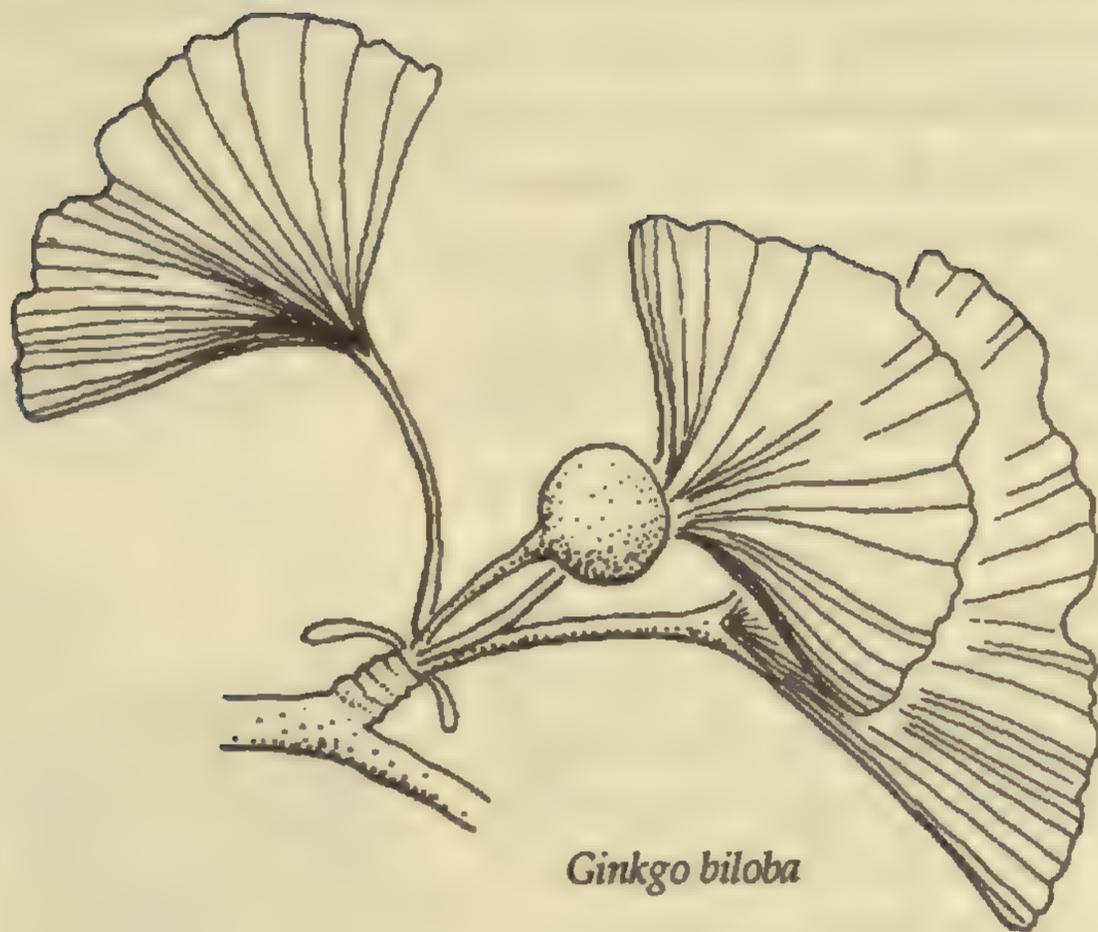


Winter

Summer

Although at first glance *Ginkgo biloba* appears to resemble other broadleaf trees, it is one of a kind. The species has unique fan-shaped leaves, and there are no flowers, fruits, or cones. The fruitlike globes on female ginkgoes are bare seeds. The species stands alone in these features because it represents an evolutionary line much older than and distinct from that of the flowering plants, the group to which almost all other broadleaf trees belong.

Ginkgoes and their extinct relatives originated perhaps 280 million years ago, approximately at the time of the earliest-known fossil insects and long ahead of the earliest-known mammals and birds. They flourished around the world before the oldest flowering plant fossils were deposited some



120 million years ago. Over vast periods of time, the once diverse ginkgo lineage dwindled to the single species *Ginkgo biloba*, now found wild only in eastern China, or perhaps persisting from ancient cultivation there.

The main difficulty in knowing whether old ginkgoes are wild or cultivated is that their cultivation in China and Japan is older than written records. Individual trees can live over 1,000 years. Some in Japan may date back almost to the introduction of the species from China by Buddhist monks in the 6th century. Most old ginkgoes are associated with Buddhist shrines and temples and can reach 120 feet in height and 10 feet in diameter. Roots called "chi-chi" in Japan descend peglike from the lowest branches on such ancient trees to take hold some distance from the trunk.

The ginkgoes at the Garden are relative youngsters. The founder of the Garden, Henry Shaw, recorded in 1861 buying a ginkgo 15-18 inches tall, which may be one of the large specimens currently growing on the grounds.

Even by Henry Shaw's time, ginkgoes had been familiar in North American landscaping for a century, for good reasons: beauty, novelty, biological and historical interest, and tolerance of unfavorable conditions. Another desirable characteristic is virtual freedom from pests, which ginkgoes may have outlived in evolutionary time. A word of caution: the seeds have a foul outer fleshy layer, which causes a rash when handled by some people. Thus only male (seedless) ginkgoes should be planted.

The inner kernel of the ginkgo seed is edible as a roasted nut. In fact, the name *Ginkgo* comes from Chinese *yin-kuo* for "silver nut". *Biloba* refers to the often two-lobed leaves. Ginkgoes occasionally are referred to as "maidenhair trees."

HACKBERRY

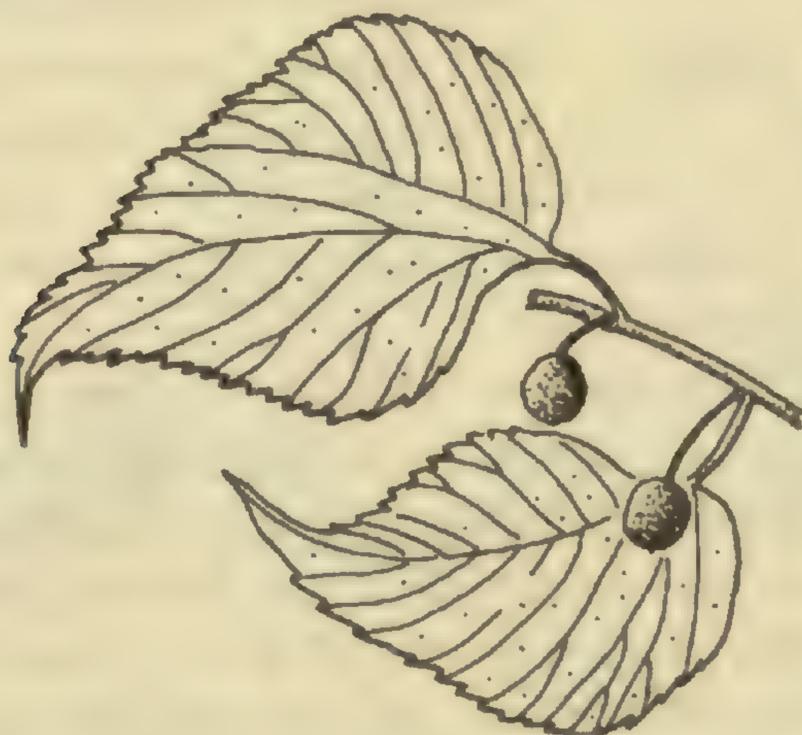
Celtis occidentalis



Native across most of eastern-central North America in upland and lowland sites, the hackberry occurs wild around St. Louis along with the similar and closely related sugarberry (*Celtis laevigata*—see one in the English Woodland Garden) and dwarf hackberry (*C. tenuifolia*). Hackberry differs from these relatives by having the leaves on the fruiting branches with more strongly saw-toothed margins; larger, usually dark-colored (vs. reddish) fruits that wrinkle more when dry; and the fruits on stalks longer than (vs. shorter than) the leaf stalks.

Dwarf hackberry is usually a shrub or small tree in glades or other open, rocky places. The sugarberry is usually a full-sized tree of bottomlands and is distinguished by slightly curved leaves and gray bark with round warts. (Hackberry likewise has gray bark but with elongate warts and irregular thin ridges.)

Hackberries belong to the Elm Family (Ulmaceae) but differ from elms by having pea-sized, fleshy fruits with large pits rather than coin-sized, waferlike fruits. American Indians powdered hackberry pits for a seasoning, and the fleshy layer is sweet and pleasant. Homer described the fruit of the Mediterranean hackberry (*Celtis australis*) as "so delicious



as to make those who ate it forget their native country". (They are not *that* good.)

Hackberries often bear dense tangles of contorted twigs called "witch's brooms". These deformities, caused by mites and fungi working together, detract from the value of hackberries in landscaping. This defect aside, the species offers distinctive bark, handsome shape, fast growth, and tolerance of wind, drought, and poor soil. Asian hackberry (*Celtis bungeana*—see a young one behind the Climatron) resists witch's brooms and may become more common in horticulture.

The English name "hackberry" comes from the Scandinavian name *hagberry* for *Celtis*. *Celtis* is an ancient name for hackberries and other trees, and *occidentalis* means "western" in Latin.

See Map: L, 11-16, 34

HORSECHESTNUT

Aesculus hippocastanum



Winter

Summer

The horsechestnut is native to mountains in Greece and neighboring regions, and is most loved perhaps in Britain, where it is planted extensively. There, schoolboys harden the seeds with various secret treatments, drill them, tie them on a string, and conk them together in the game of conquerors (or conkers). The seed that breaks the opponent's is the conqueror.

The large, wood-grained, shiny seeds have also been powdered into soap, roasted into a hot beverage, fermented and distilled into an alcoholic

drink, and investigated as a commercial source of the chemical acetone. Don't try any of the drinking temptations mentioned above, for the seeds and other parts of the tree are toxic.

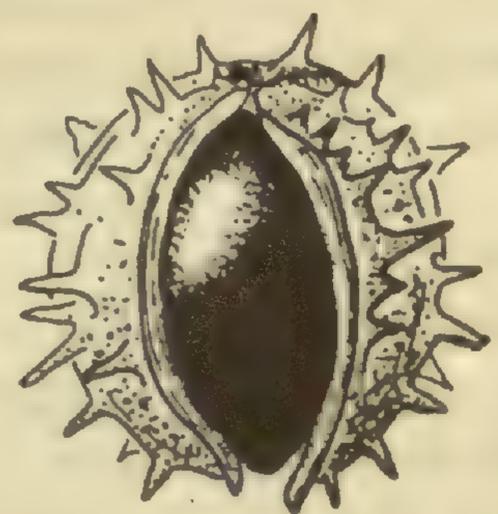
The flowers are held on upright "candles" during May. They are white with fragrant yellow spots that change to red, odorless spots, possibly as a signal to pollinators of changing nectar availability. Such color changes occur on other insect-pollinated flowers, such as the yellow-horn (*Xanthoceras sorbifolium*) just northeast of the Kaeser Maze.

You may notice the similarity of horsechestnut seeds and leaves to those of the Ohio buckeye (*Aesculus glabra*), which grows wild locally. An

easy distinction is that horsechestnuts have sticky, shiny buds and unfriendly, spiny fruits, whereas Ohio buckeyes have dry, dull-surfaced buds and warty fruits. A good example of an Ohio buckeye is in the English Woodland Garden, and, for comparison, a horsechestnut is not far away south of the Museum Building.

Among the additional members of the genus *Aesculus* in the Garden is bottlebrush buckeye (*Aesculus parviflora*), a dwarf, shrubby species native to Georgia and Alabama. Its showy, white, moth-pollinated flowers are dazzling in early summer. Oddly, the closest relatives of this species are not other eastern-North American buckeyes, but rather species from the West Coast and Asia. A large clump of *A. parviflora* forma *parviflora* is sliced in two by the walkway passing south from the Climatron area, and another (*A. parviflora* forma *serotina* (with drooping flower clusters)) is by the wall north of the Administration Building. The yellow buckeye (*Aesculus octandra*), near Henry Shaw's mausoleum, is a more eastern species that flourishes in the southern Appalachians. The red buckeye (*Aesculus pavia*—see one in the Woodland Garden) is a small, shrubby species native to Missouri and sometimes cultivated for its bright red flowers, which attract hummingbirds. The showy hybrid between the red buckeye and the horsechestnut is called *Aesculus Xcarnea* 'Briotii'; one brightens the area behind the Climatron. The large, double-flowered horsechestnut in the Jenkins Daylily Garden is the cultivar *A. hippocastanum* 'Baumannii' (also called 'Flore Pleno'), which was discovered around 1822 near Geneva, Switzerland.

Aesculus is an ancient name for a tree different from the ones considered here. Its application to horsechestnuts and buckeyes dates to the 1700s. Ancient Turks applied the seeds (or whole fruits) to treat horses for respiratory ailments and called them *At-Kastan*, which translates in English to "horsechestnut" and in Latin to *hippocastanum*, the second part of the species name. Horsechestnuts are not related to true chestnuts (genus *Castanea* in the Oak Family).



JAPANESE PAGODATREE (CHINESE SCHOLARTREE)

Sophora japonica



Winter

Summer

Despite its misleading name, *Sophora japonica* is native to Korea and northern China. Its cultivation outside the natural range, such as in Japan, is ancient and often associated with Buddhist temples.

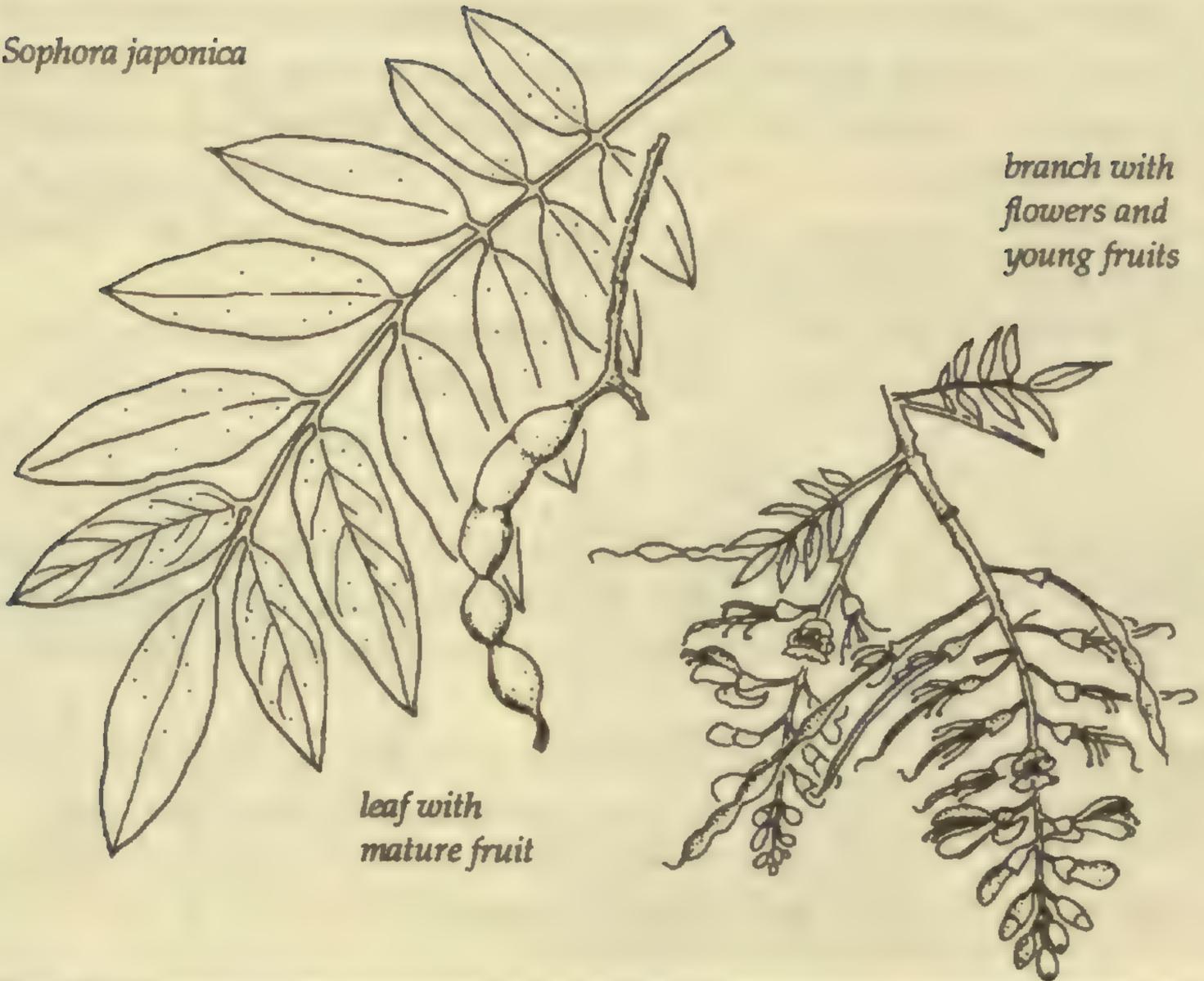
The fragrant, creamy-white, pealike flowers in great clusters cover the trees during July, August, and sometimes September, and then blanket the ground like a hot-weather snowfall. The flowers and sometimes other parts of the tree are sources of dyes, which were once exported to Europe from the Orient. You may notice "dyed" pavement under *Sophora* trees.

As with many other legumes (see Yellowwood, page 40, for more on legumes), the "business" parts of the flower (the stamens and pistil, which produce and receive pollen respectively), lie as a bundle in an upward-opening pouch a little like a hotdog in a bun. The weight of a visiting insect pushes the pouch (the bun) downward, exposing the stamens and pistil; these brush against the underside of the bug, picking up pollen carried from other flowers and applying new pollen for transport to the next flower in the visitor's itinerary.

Besides the splendid, late flowers, *Sophora japonica* offers dark green foliage, which looks desperately wilted at night and restiffens by day, and stays green into autumn. Novel, knobby, beanlike fruits and tolerance for city conditions are additional attractive points. But landscapers beware: the tree is poisonous. Among other toxins, *Sophora* contains substances that alter the blood. The wood is sufficiently nasty to sicken woodworkers, and fallen leaves poison water in wells.

Sophora japonica is a traditional planting at graves of Chinese high officials, which could be why the great 18th-century naturalist Linnaeus chose the name *Sophora*, with the explanation that it is "a genus sophorum, or of wise men". More likely, Linnaeus's reference acknowledges the wisdom needed to classify the tree and related species rather than the sagacity of Chinese leaders. *Japonica* reflects ancient cultivation of the species in Japan.

Sophora japonica



branch with
flowers and
young fruits

leaf with
mature fruit

See Map: N

KENTUCKY COFFEETREE

Gymnocladus dioica



Winter

Summer

The Kentucky coffeetree is a member of the Legume Family along with two other trees mentioned in this guidebook, Japanese pagodatree and yellowwood. For general comments on the Legume Family, see yellowwood.

The spectacular leaves are the largest of any Missouri tree. They are doubly compound: instead of leaflets on a stalk making up the leaf as in the more common singly compound leaves, this species has several such "leafy" stalks branching from a main stalk, altogether making up a large, attractive, multibranching frond.

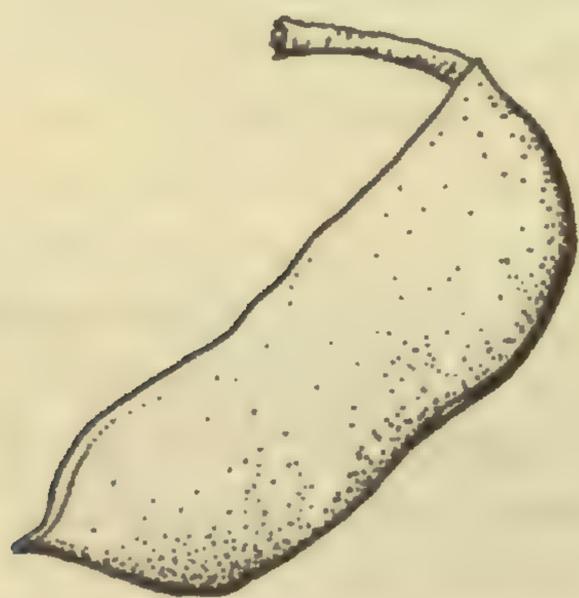
As befits a legume, the (female) trees have beanlike pods—in Kentucky coffeetree they are large, woody, and conspicuous against the winter sky. They are lined on the inside with greenish pulp having the appearance of axle grease. Embedded in this pulp are the very large seeds to which the species owes the name "Kentucky coffeetree". Early settlers prepared a hot beverage from the seeds, perhaps getting the idea

from American Indians, who enjoyed them roasted. The seeds are far from delicious, it is said, which is just as well since they contain poisons. The Indians put the seeds to healthier use as dice, which may account for the modern populations of Kentucky coffeetree at the historic sites of Indian villages in Wisconsin. They used the powdered root as "smelling salts" to revive unconscious patients.

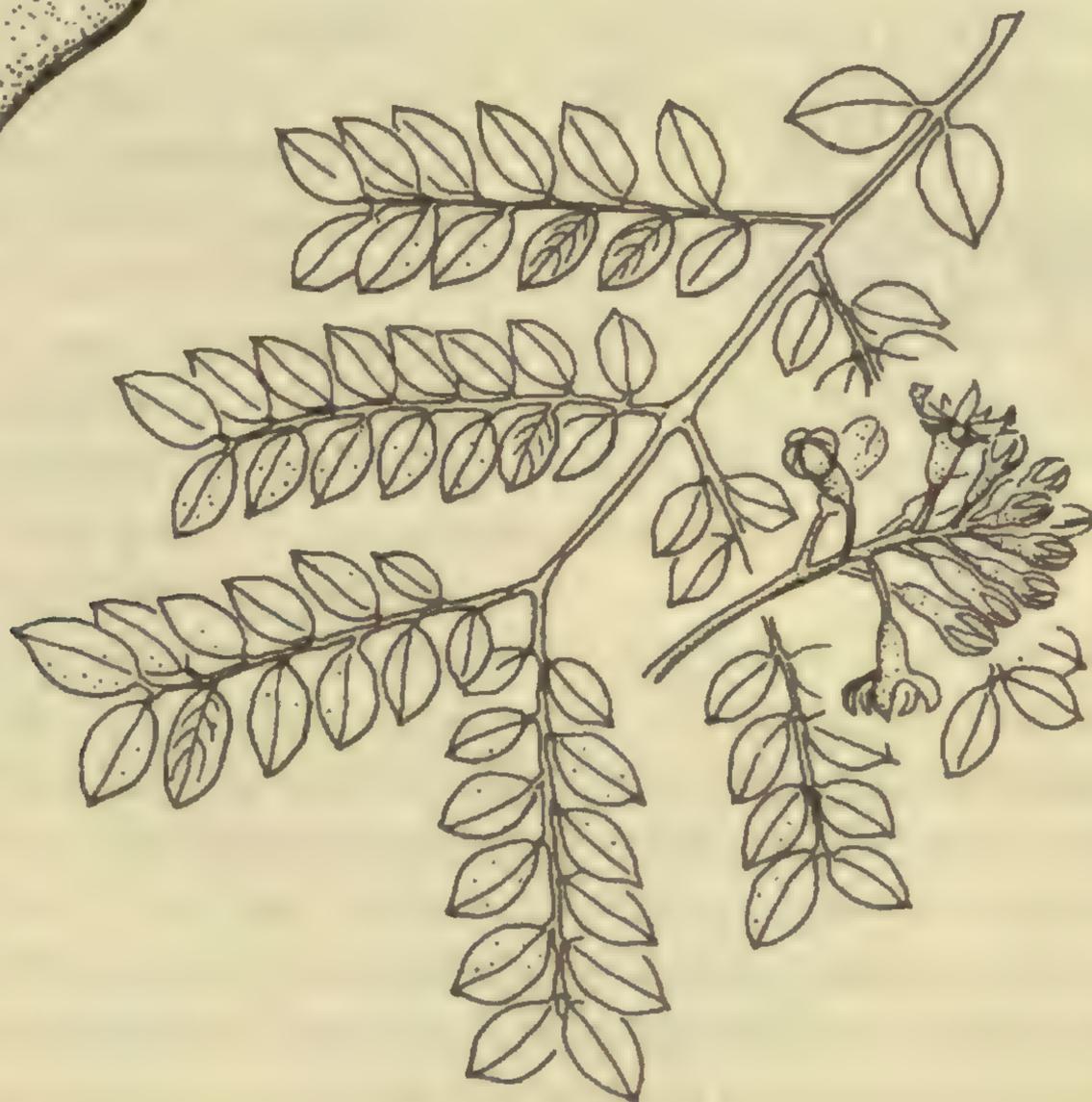
The Kentucky coffeetree ranges across southern Canada and the northern and central Midwest, including Missouri, and lives in bottomlands and at the bases of bluffs. It does not usually form extensive stands, but is spotty in distribution.

As with many other lowland trees, the wood resists rotting, making it desirable for fence posts. Likewise a feature common in lowland trees, Kentucky coffeetrees sucker from the roots, sometimes at considerable distances from the parent trees.

Slow to leaf out in the spring and early with the autumn leaf-drop, the Kentucky coffeetree is well named *Gymnocladus*, meaning "naked-branches" in Latin. *Dioicus* comes from the botanical term describing species with separate male and female plants.

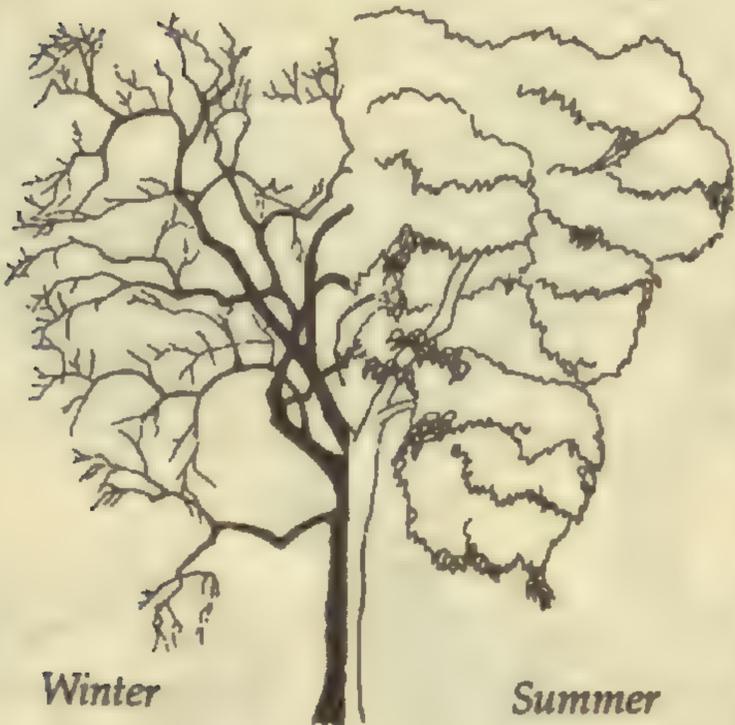


Gymnocladus dioicus



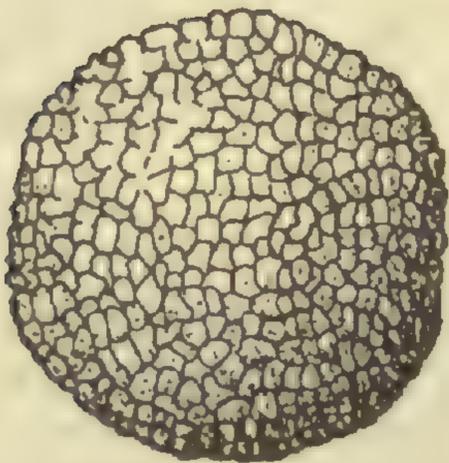
OSAGE-ORANGE

Maclura pomifera



In the earliest days of the Garden, a carriage road connected the northwest corner of the grounds to Tower Grove House. To this day a (diminished) row of osage-orange trees, mostly behind the Climatron, reveals the course of the old lane. Standing by that old row and looking toward Tower Grove House is a step back in time, and provides a new perspective on the Garden.

The name osage-orange is misleading since this species is related to figs and mulberries (in the Fig Family, the Moraceae) and not to oranges. Unlike a real

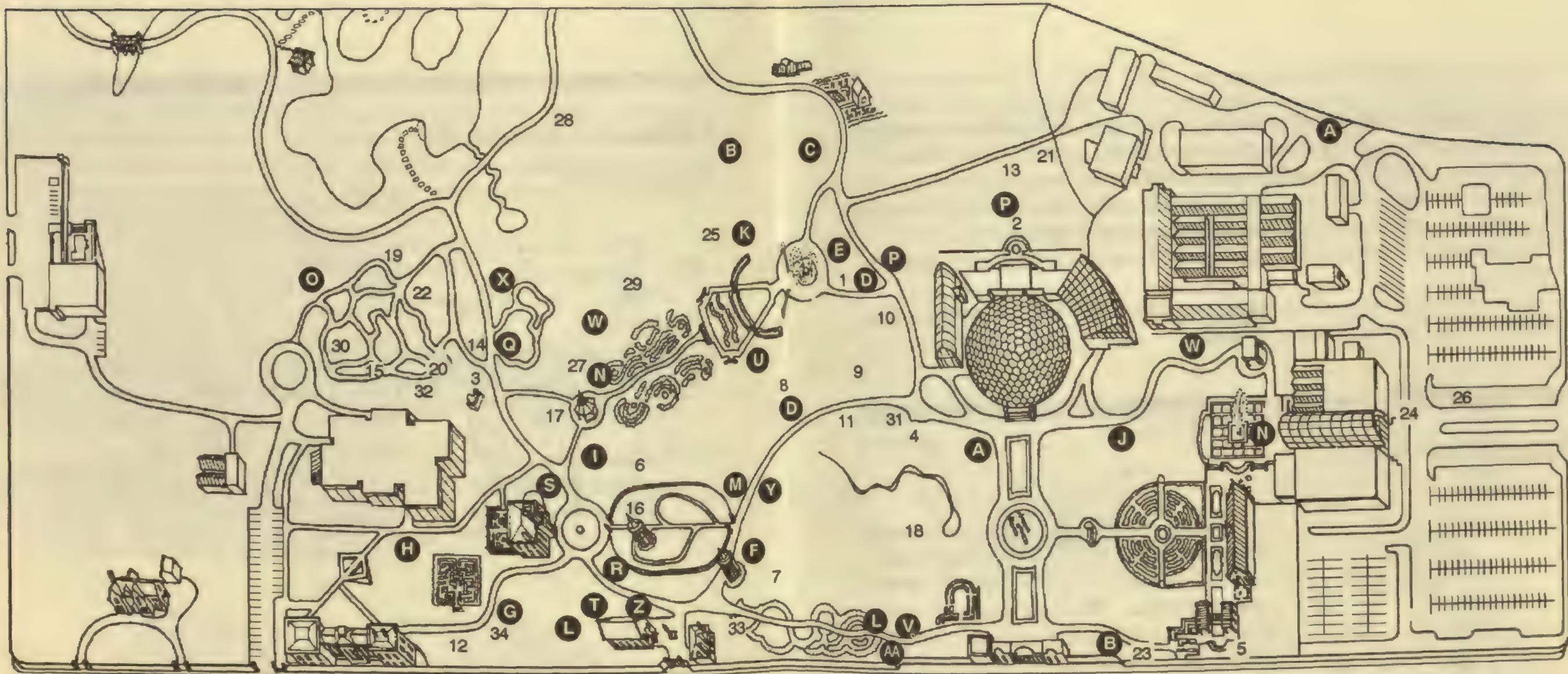


orange, which is a single fruit, an osage-orange is a cluster or hundreds of small, tightly packed fruits. Such cluster fruits are characteristic of the Fig Family (the tiny fruits are clustered *inside* of figs). Another characteristic of the Fig Family is the presence of milky sap, but be careful checking for this, because it causes a rash on some people.

The natural distribution for osage-orange is a little unclear, because American Indians may have planted the trees for their hard wood, and in more modern times osage-oranges have been used quite a lot as thick, thorny hedges. Its native home is probably in the south-central states, although the species is hardy in Michigan and New England.

The orange wood is so hard that pounding a nail into it can be

(continued on page 26)



Specimen Trees (See Index)

- | | |
|---|--|
| A. Bald cypress (<i>Taxodium distichum</i>) | M. Japanese pagodatree (<i>Sophora japonica</i>) |
| B. Bitternut hickory (<i>Carya cordiformis</i>) | N. Kentucky coffeetree (<i>Gymnocladus dioica</i>) |
| C. Black walnut (<i>Juglans nigra</i>) | O. Mockernut hickory (<i>Carya tomentosa</i>) |
| D. Chinese elm (<i>Ulmus parvifolia</i>) | P. Osage-orange (<i>Maclura pomifera</i>) |
| E. Chinese spindletree (<i>Euonymus bungeana</i>) | Q. Pawpaw (<i>Asimina triloba</i>) |
| F. Corktree (<i>Phellodendron amurense</i>) | R. Sassafras (<i>Sassafras albidum</i>) |
| G. Cucumbertree (<i>Magnolia acuminata</i>) | S. Scotch (Wych) elm (<i>Ulmus glabra</i>) |
| H. Dawn redwood (<i>Metasequoia glyptostroboides</i>) | T. Shumard oak (<i>Quercus shumardii</i>) |
| I. European beech (<i>Fagus sylvatica</i> 'Atropunicea') | U. Soapberry (<i>Sapindus drummondii</i>) |
| J. Ginkgo (<i>Ginkgo biloba</i>) | V. Sweetgum (<i>Liquidambar styraciflua</i>) |
| K. Hackberry (<i>Celtis occidentalis</i>) | W. Sycamore (<i>Platanus occidentalis</i>) |
| L. Horsechestnut (<i>Aesculus hippocastanum</i>) | X. Tree-of-heaven (<i>Ailanthus altissima</i>) |
| | Y. Tuliptree (<i>Liriodendron tulipifera</i>) |
| | Z. White basswood (<i>Tilia heterophylla</i>) |
| | AA. Yellowwood (<i>Cladrastis kentuckea</i>) |

Additional Trees and Shrubs (See Index)

- | | |
|--|---|
| 1. Amur cherry (<i>Prunus maackii</i>) | Euonymus |
| 2. Amur maackia (<i>Maackia amurensis</i>) | 18. Burning bush (<i>Euonymus alata</i>)
Note: many in Japanese Garden |
| 3. Beech, American (<i>Fagus grandifolia</i>) | 19. European spindletree (<i>Euonymus europaea</i>) |
| Beech, European, cultivars: | 20. Wahoo (<i>Euonymus atropurpurea</i>) |
| 4. 'Asplenifolia' (cut-leaf) | Hackberry |
| 5. 'Dawyckii' (fastigate) | 21. Asian hackberry (<i>Celtis bungeana</i>) |
| 6. 'Pendula' (weeping) | 22. Sugarberry (<i>Celtis laevigata</i>) |
| 7. 'Purpureo-pendula' (purple, weeping) | 23. Hardy-orange (<i>Poncirus trifoliata</i>) |
| 8. 'Riversii' (deep purple) | Linden |
| 9. 'Roseo-marginata' (tricolor) | 24. Crimean (<i>Tilia Xeuclora</i>) |
| 10. 'Zlatia' (yellow / green) | 25. Littleleaf (<i>Tilia cordata</i>) |
| Buckeye | 26. 'Redmond' (<i>Tilia</i> 'Redmond') |
| 11. Bottlebrush (<i>Aesculus parviflora</i> forma <i>parviflora</i>) | 27. London planetree (<i>Platanus Xacerifolia</i>) |
| 12. Bottlebrush (<i>Aesculus parviflora</i> forma <i>serotina</i>) | 28. Oriental planetree (<i>Platanus orientalis</i>) |
| 13. 'Briotii' (<i>Xcarnea</i>) | 29. Pecan (<i>Carya illinoensis</i>) |
| 14. Ohio (<i>Aesculus glabra</i>) | 30. Pondberry (<i>Lindera melissifolia</i>) |
| 15. Red (<i>Aesculus pavia</i>) | 31. Red oak (<i>Quercus rubra</i>) |
| 16. Yellow (<i>Aesculus octandra</i>) | 32. Spicebush (<i>Lindera benzoin</i>) |
| 17. English oak (<i>Quercus robur</i>) | 33. Witch hazel (<i>Hamamelis</i> species) |
| | 34. Yellowhorn (<i>Xanthoceras sorbifolium</i>) |

OSAGE-ORANGE (continued from page 23)

difficult, and it is exceptionally durable. American Indians made osage-orange bows, which offers one explanation for the origin of the name "Ozark", as set forth by the late Missouri Botanical Garden botanist Julian Steyermark. He believed that French settlers called the tree *Bois d'Arc* ("bow wood"), which evolved into Bodark and ultimately into Ozark. (There exists at least one alternative plausible explanation for the origin of "Ozark".)

Maclura honors the early American geologist William Maclure, and *pomifera* means "apple-bearing" in Latin.

See Map: Q

PAWPAW

Asimina triloba



The Custard-Apple Family (Annonaceae) contains some 2,300 species, all of them tropical except for the nine species of the genus *Asimina*. These are confined to the southeastern U.S. except for the pawpaw, which ranges from southern Canada to Florida and Texas. Thus this local native (see wild pawpaws at the Shaw Arboretum) is a lone far-flung satellite.

Pawpaws have a certain tropical aspect, with their large leaves; dangling, deep-purple flowers; and soft, sweet fruits a little reminiscent of bananas in appearance and flavor.

The fruits are edible when ripe straight from the tree or in ice creams and other desserts. Their palatability varies, and they fall into two broad categories—one type ripens early and is large with richly flavored yellow flesh; the other type is sometimes smaller, ripens later, and has white, milder flesh. Rich in nutritional value, including high levels of vitamins A and C, pawpaw fruits have received attention for commercial cultivation, but do not store or ship well. Additional drawbacks are that they nauseate some people, sometimes cause a rash when handled, and contain a depressant drug in the seeds.

The cup-shaped, purple flowers smell a little like fermenting grapes. In May try to observe the following mechanism that promotes their cross-pollination. When the flower first opens, the stigmas (pollen-receptive

tips on the seed-producing organs clustered at the floral center) are exposed. Since the inner petals cover the stamens (pollen-producing organs) at this time, the pollen deposited on the stigmas must come from a different flower. In time, the stigmas disappear and the stamens become exposed and release pollen to be carried by beetles and other creatures to different flowers in the pollen-receptive phase.

In winter, stroll by the pawpaws and examine the distinctive buds. They look like long, brownish red, curved cat's claws.

The Latin name *Asimina* comes from the Indian name *assimin* for the tree. *Triloba*, meaning "three-lobed", refers to the sepals and petals, which are in groups of three.



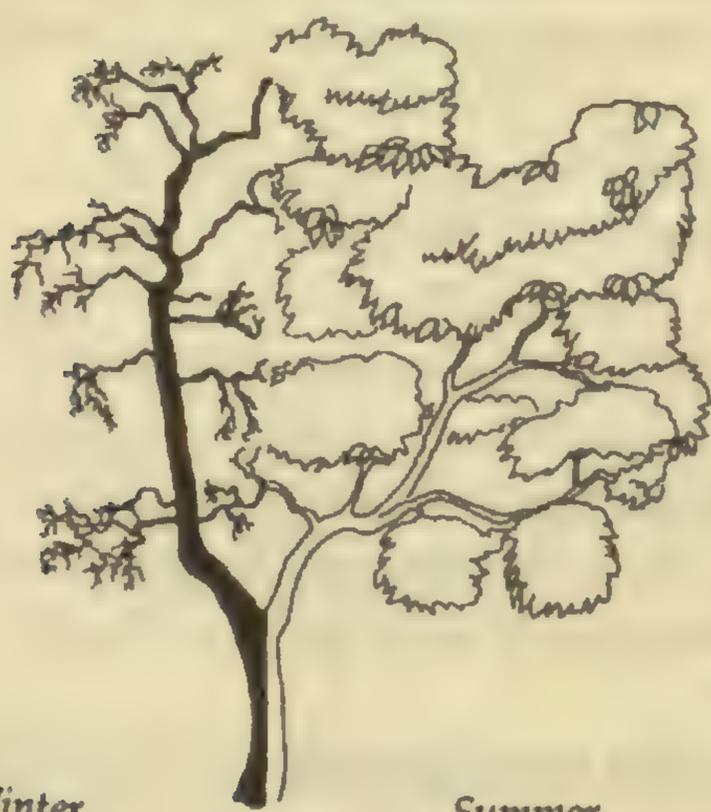
SASSAFRAS

See Map: R, 30, 32

Sassafras albidum

The sassafras grove, "Tower Grove", in the mausoleum grounds in front of Tower Grove House probably represents the only trees on the grounds that predate the Garden's founding on this former prairie site. None of the individual trees is that old, but the grove lives on resprouting from root suckers.

Sassafras belongs to the large, mostly tropical Cinnamon Family (Lauraceae) along with avocados and such fragrant, spicy relatives as camphor, cinnamon, and laurel. *Sassafras*, too, is pungent and has been used for sassafras tea and to



Winter

Summer

flavor root beer, candies, medicines, and tobacco. In the South, particularly Louisiana, dried and powdered pith from twigs and young leaves was the main ingredient in a thickener known as filé used in gumbos and soups. The fun of trying sassafras delicacies is spoiled, however, since they contain the cancer-causing compound safrole. Ironically, early settlers thought that sassafras tea *prevented* cancer and that preparations from the plant could cure the disease. For this and other attributed benefits sassafras swept European medicine as a fad shortly after the discovery of America.

Sassafras ranges across much of eastern North America, including Missouri, as one of the few northern members of the Cinnamon Family.



Other Missouri natives in this family are spicebush (*Lindera benzoin*) and the endangered species pondberry (*Lindera melissifolia*), both of which are in the English Woodland Garden.

Sassafras bark looks as though it is stained with tea; the leaves are often mitten-shaped and show off with yellowish to purplish or reddish fall colors; the winter twigs are bright green tipped with green buds; the tiny yellow flowers, which appear early in spring before the leaves, have stamens that open by four trap-door flaps (rather than the two slits found in most other flowering plants); and the almost black fruits (on female trees) are set in a red chalice on a red stalk. Such combinations of red and black appear often on fruits and seeds as attractants to birds who disperse the seeds through their digestive systems.

The name *Sassafras* comes from the ancient Spanish name for the tree. *Albidum* refers in Latin to the whitish undersides of the leaves.

SCOTCH ELM (WYCH ELM), CHINESE ELM

Ulmus glabra, *Ulmus parvifolia*



Ulmus glabra
Winter

Our magnificent old Scotch elm (*Ulmus glabra*), with its gnarled trunk and crooked spreading branches, dates back to the time of Henry Shaw, the founder of the Garden. His papers record the purchase of eight young Scotch elms in or about 1861 from a plant dealer in Edinburgh, Scotland. The large specimen just west of Tower Grove House may have been part of that purchase. Mother Nature has tried repeatedly to destroy this tough old tree. Two windstorms in 1927 damaged the tree so badly that it was thought to be ruined. Records from the following year report that a

Scotch elm, probably the tree in question, suffered severely in a May snowstorm.

Scotch elms are at home across Europe from eastern Asia to the British Isles, where they flourish especially in Ireland and Scotland.

A wheel hub found in Scotland that dated from the ancient Romans turned out to be elm wood, possibly this species. Wood from elms makes



Ulmus glabra
Summer



fine hubs thanks to its durability. It dents when other timbers split. Prehistoric peoples used it for making such weapons as swords, javelins, spears, and shields (for which resistance to splitting has obvious advantages). It also served to make chariots, as well as bows with which to shoot arrows from the chariots. From the tough inner bark a coarse cheesecloth was woven.

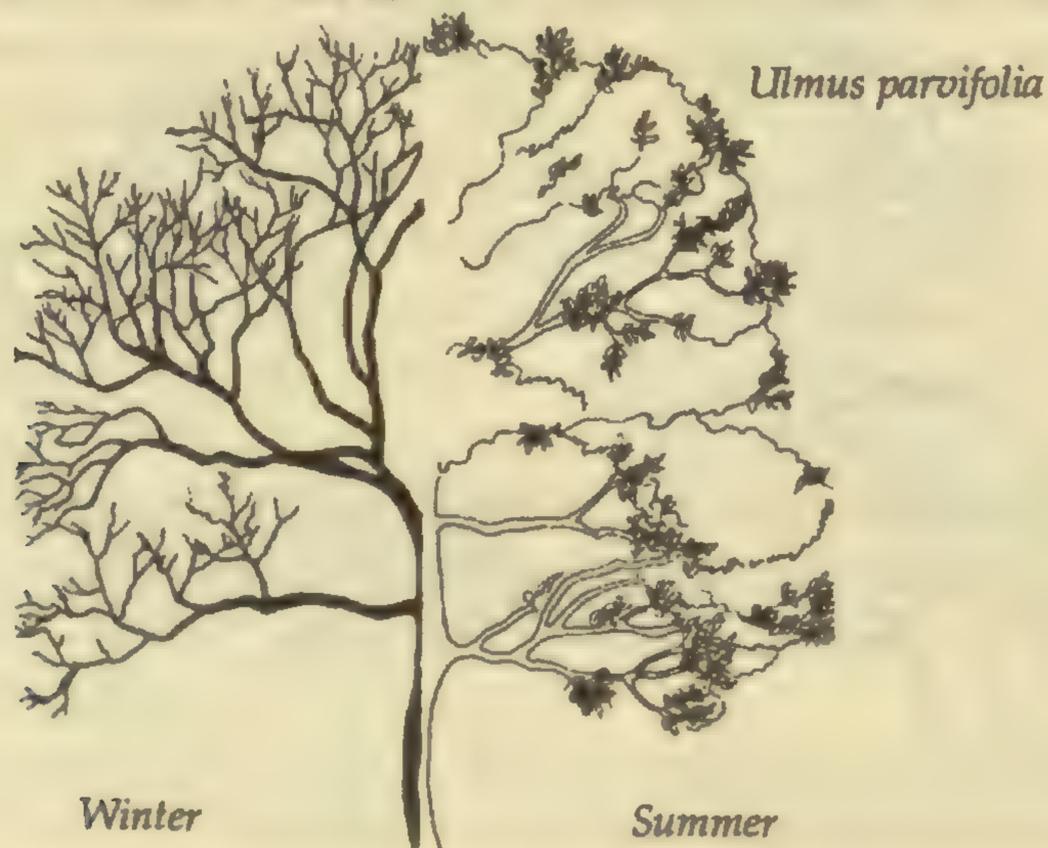
The stately Scotch elm can grow to 100 feet tall. The large, low branches (compare these with the arms on the angel to the right of the tree by Tower Grove House) and large leaves broadest above the middle are characteristic. Disadvantages of this species in landscaping are susceptibilities to the Dutch Elm Disease and to insect pests.

The common name *wych* is an ancient Anglo-Saxon word for a tree with flexible branches, and it appears in the common names of other trees and shrubs. *Wych* elm evolved into "witch elm", a big spooky tree, and the species worked its way into Halloween-type lore this way.

Likewise outstanding among the Garden's elms are the Chinese elms (*Ulmus parvifolia*). The striking feature of this native of China, Korea, and Japan is its mottled, multicolored bark. Other positive features are freedom from disease (including Dutch Elm Disease), toleration of pollution and varied soils, and rapid growth. On the negative side, Chinese elms tend to break apart when burdened with snow, ice, and strong winds.

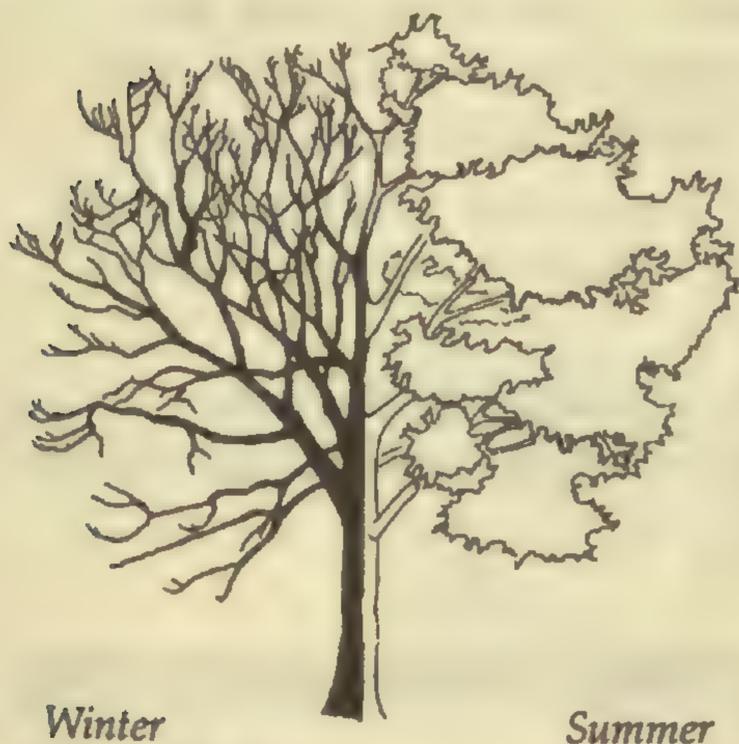
The horticulturally inferior and sometimes weedy species more appropriately called Siberian elm (*Ulmus pumila*) is often incorrectly called Chinese elm. While the two have similar small leaves, the Chinese elm forms its waferlike fruits in the autumn (vs. spring for Siberian elm) and has brown (vs. black) winter buds, fuzzier twigs, thicker leaves, and fancy mottled bark upon reaching a certain age.

Ulmus is the ancient Latin name for elms. *Glabra* means "hairless", and *parvifolia* means "little-leaved".



SHUMARD OAK

Quercus shumardii

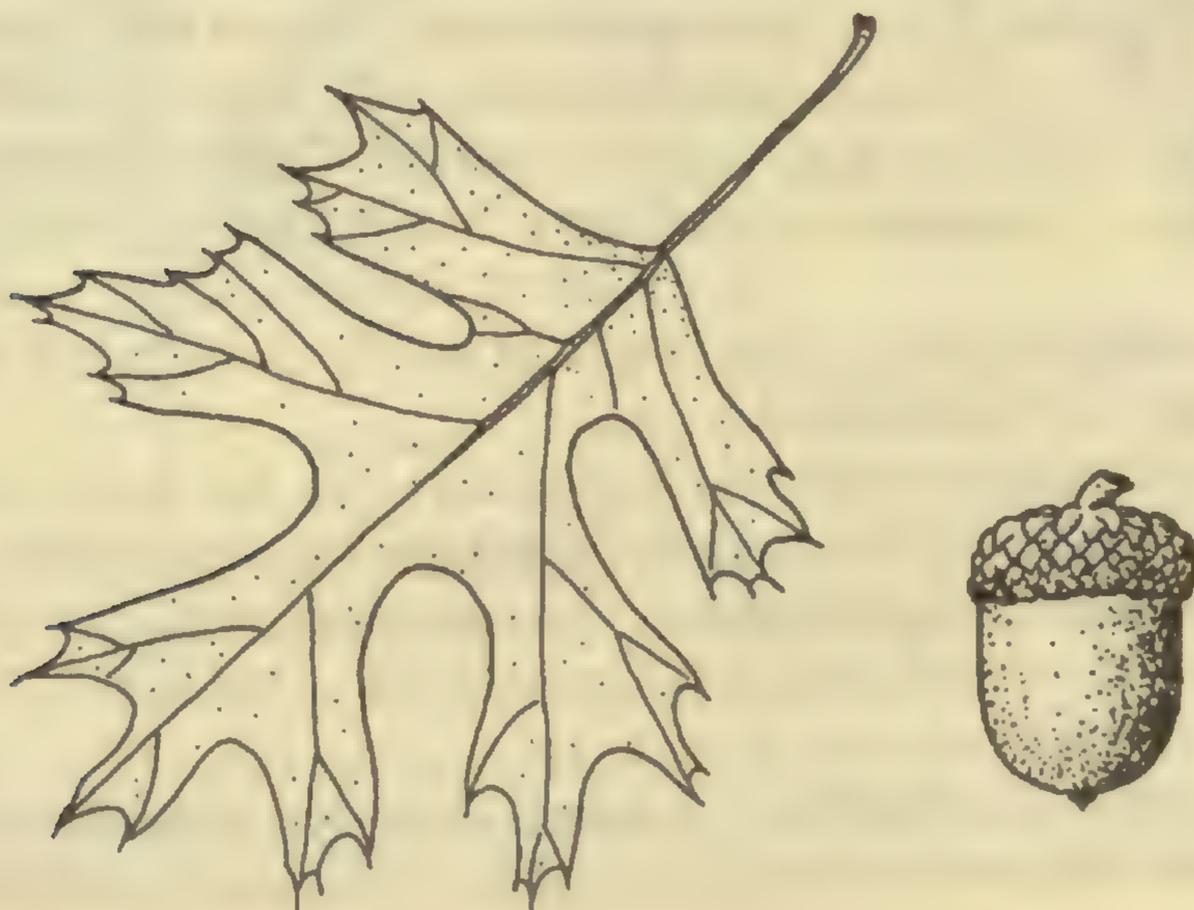


Of 600 species of oaks distributed primarily around the Northern Hemisphere, over 100 species are native to Mexico, about 80 to the U.S., and about 20 to Missouri, where they dominate forests, lawns, and the Missouri Botanical Garden.

Oaks have always been important for lumber, even in ancient times. One Roman name for oak, *robur*, means "strength" or "hardness", which are characteristics of oak wood, making it useful for construction, furniture, floors, and other purposes. An odd source of

oak wood is British moors, from which "bog oak" is hauled for fine carvings. These logs have been in the wet soil since Roman times. It is suspected that Roman legions cut the trees and dumped them in the moors for exercise and to deprive the local inhabitants of wood. Some oak species have particularly waterproof wood and thus have been useful for ancient aqueducts and more modern barrels, boats, and similar purposes. English oak (*Quercus robur*) was once the mainstay of the British navy. And oak wood still serves in vehicles of exploration, as heat shields in Chinese space reentry vehicles.

Shumard oak is native to the St. Louis area on high, dry sites. Else-



where it usually lives in lowlands, where it can reach a tremendous size. The Missouri state champion Shumard oak is in Big Oak Tree State Park in Mississippi County and is 118 feet tall with a trunk over five feet in diameter. The most spectacular Shumard oak at the Garden is along the walkway just south of the Museum Building.

Shumard oaks and red oaks (*Quercus rubra* —see these along the walkway leading south from the Climatron area) can be confused. Shumard oaks have more strongly flared side lobes on the leaves; grayish, more or less hairless winter buds (vs. darker buds fuzzy toward the tips); and dull-surfaced acorn scales free at the tips (rather than glossy scales pressed tightly together at the tips).

Quercus is an ancient, possibly originally Celtic, name for oaks. *Shumardii* means "of Shumard"; Benjamin Franklin Shumard was a Texas State Geologist.

See Map: U, 34

SOAPBERRY

Sapindus drummondii



The most remarkable aspect of the soapberry is its natural distribution, the only Missouri representative of the otherwise overwhelmingly tropical Soapberry Family (Sapindaceae). The species extends from southwestern Missouri to Mexico on limestone ledges and glades. Representing the Soapberry Family well, *Sapindus drummondii* has large compound leaves and numerous, small (poisonous?) flowers in showy, complex clusters. Other members of the Soapberry Family are the golden-rain tree (*Koelreuteria paniculata*), yellowhorn

(*Xanthoceras sorbifolium*—see one northeast of the Kaeser Maze at the Garden), and litchi (*Litchi chinensis*).

Visit the Garden's soapberry in the autumn to see the grapelike clusters of golden fruits glistening in the sunshine, but don't touch. They can irritate the skin and are poisonous. Even so, soapberries are used in landscaping, mostly in the Southwest. They tolerate high winds, city life, and poor, alkaline soils.

Sapindus is dubbed "soapberry" because the fruits contain soapy, lathering compounds known as saponins. In Mexico soapberries serve as

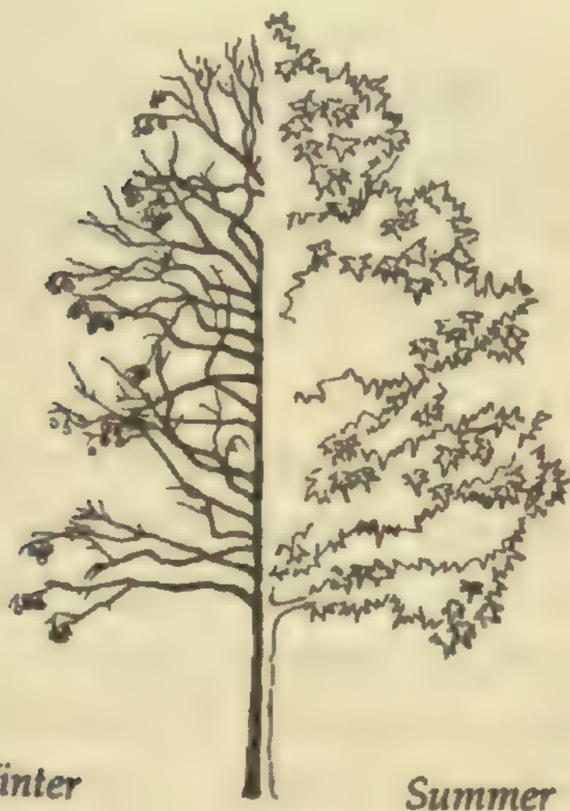
soap, with the added benefit of killing fish, which is handy for preparing a seafood lunch after a morning of laundering in the creek. The soapy fruits supply the Latin name *Sapindus*, from *sapo indicus* ("Indian soap"). *Drummondii* honors botanist Thomas Drummond.



SWEETGUM

See Map: V, 33

Liquidambar styraciflua



The sweetgum, a favorite lawn tree around St. Louis, offers ease of cultivation, unflinching tolerance of local conditions, fast growth, star-shaped leaves, pyramidal shape, and kaleidoscopic autumn yellows, oranges, reds, and purples, frequently on the same tree. There are also thousands of golf ball sized, bristly fruiting clusters, which add interest to the tree's silhouette but are a nasty mess to rake up.

Sweetgum is related to the commonly cultivated shrub witch hazel (*Hamamelis* species), both belonging to the Witch

Hazel Family (Hamamelidaceae). Examination of the fruits of both will help reveal their relationship (the sweetgum ball is a cluster of fruits). The comparison is most easily made in the Jenkins Daylily Garden, where a large sweetgum and two species of witch hazel are displayed.

Wild Missouri sweetgums are restricted to low, usually wet, woods in the southeastern corner of the state. The overall range is remarkable:

Connecticut discontinuously to Central America. Within this entire distribution, one of the largest trees watches over New Madrid County, Missouri, at the Hunter-Dawson Historic Site. It is 118 feet tall with a trunk almost six feet in diameter.

Sometimes called redgum due to red tones in the wood, this species is an important North American hardwood lumber tree. The wood is hard and polishes well, and its uses have included decorative trim as well as paving for roads.



Liquidambar styraciflua

Sweetgum is sometimes fragrant, and tests have shown city air under sweetgums to be lower in smog than surrounding air. The fragrance comes from the gum to which the tree owes its name. *Liquidambar* is a mix of Latin and Arabic for "liquid amber", and *styraciflua* means "liquid styrax", likening the sweet gum of our tree to that of the Old World *Styrax officinalis*, the source of the original fragrance storax (or styrax). Known as copalm balm (or sometimes misleadingly as styrax or storax), the gum from *Liquidambar styraciflua* was once shipped to Europe from New Orleans and Mexico for incense, perfumes, ointments, chewing gums, medicines, and flavorings.

SYCAMORE

Platanus occidentalis

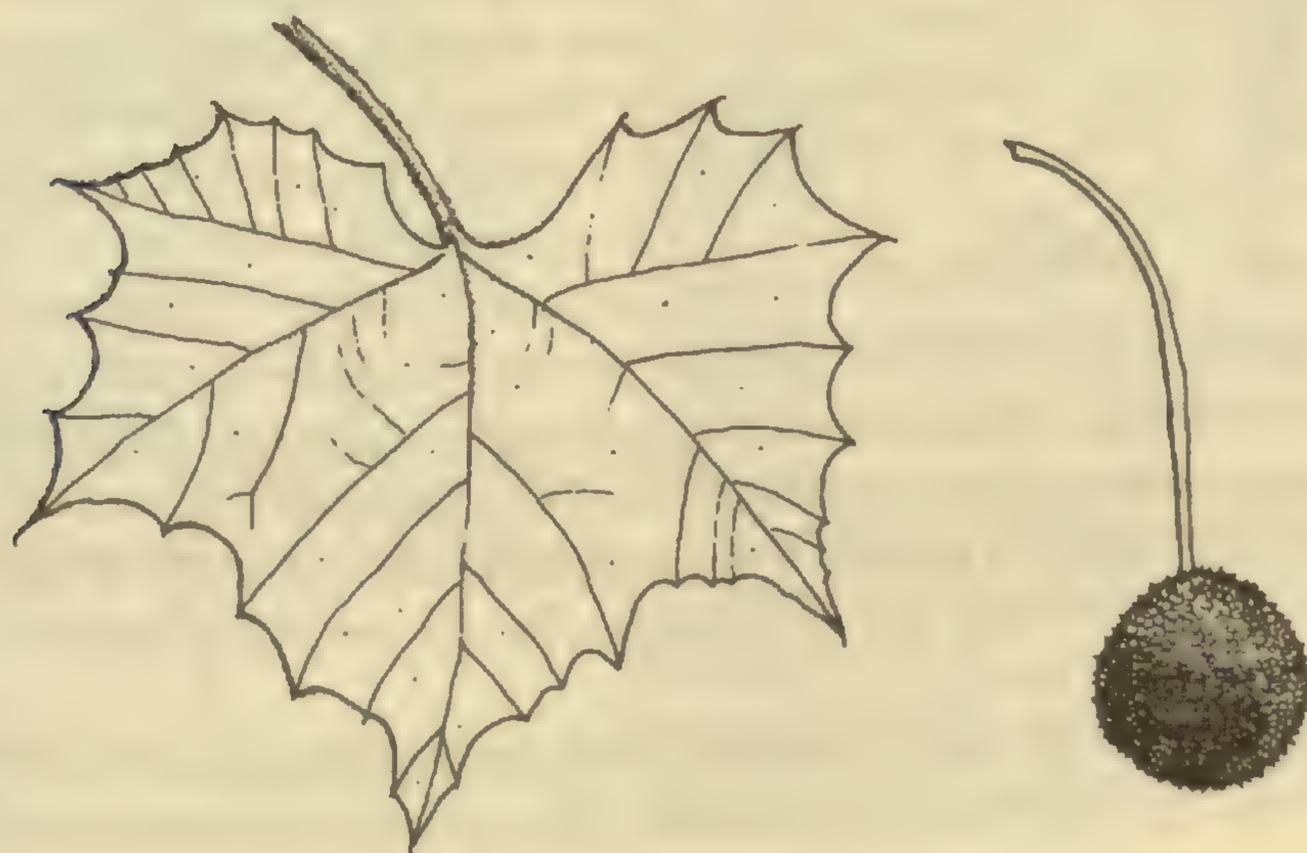


Sycamores achieve the greatest trunk diameters of North American hardwood trees—up to about 16 feet. The largest sycamore in Missouri is a mere eight feet in diameter, which was the size of the Tucker Sycamore in Florissant, Missouri. In the early 1800s Nathaniel Tucker cut this historic hollow tree off to 10 feet above the ground, cleaned it out, cut a door in it, put his books around the inside, and lived there as a practicing attorney. Mr. Tucker was a judge in the St. Louis Circuit Court and an organizer of the

First Presbyterian Church of St. Louis.

Sycamores have diverse uses: American Indians enjoyed the sap in syrups and other sweets. The wood, known as lacewood, resists splitting and thus makes good chopping blocks. Sycamores are favorite street trees, with their stately aspect, patterned bark, and tolerance of urban life. Their disadvantages for home planting are that massive limbs sometimes drop off; a fungal disease can blacken the foliage on wet days; and bark, jumbo leaves, twigs, and fuzzy fruits litter the lawn.

Examine those fuzzy fruits closely. Each sycamore ball is a cluster made up of hundreds of the fruits, each with a parachute of fine bristles to



carry it on the breeze. Sycamore fruits once were favorite foods of the now-extinct Carolina parakeet.

To make certain that trees appearing to be sycamores are the real thing, see if there is just one fruit ball dangling on each stalk. The sycamore has been crossed with the oriental planetree (*Platanus orientalis*), which has multiple balls per stalk, to yield the commonly planted London planetree (*Platanus Xacerifolia*). Not surprisingly, this hybrid has the intermediate number of two balls per stalk. A London planetree and an American sycamore can be viewed together near the southwest corner of the Lehmann Rose Garden, and an oriental planetree lives on the eastern side of the Japanese Garden. Check to see how the leaves of the two parental species and the hybrid compare.

Platanus is an ancient name for the genus. *Occidentalis* means "western", *orientalis* means "eastern", and *acerifolia* means "maple-leaved". The times sign in *Xacerifolia* indicates that the tree is a hybrid.

TREE-OF-HEAVEN

See Map: X

Ailanthus altissima



Winter

Summer

Tree-of-heaven was introduced in 1820 from China into New York City as a street tree and as a potential food for silkworms. In terms of tolerance for poor soil and urban pollution, it was a success—too much of a success perhaps. It became an urban weed springing up in pavement cracks, vacant lots, and gutters. The species is short-lived; its limbs decay and fall off; the pollen can be irritating; the roots clog drains and break pavement; the suckers are difficult to eradicate; the male flowers stink; and the tree houses undesirable caterpillars.

At its best, however, the tree-of-heaven can be attractive and is valued for its beauty in China. The enormous, arching compound leaves suggest a coarse tropical atmosphere, looking just a little like palm leaves on young trees. The fruits on female trees look like twisted sticks of chewing gum and redden in clusters late in the growing season. The "twigs" can be the size of walking canes.

Tree-of-heaven is the only frequently encountered representative of the odd Quassia Family (Simaroubaceae). This family, containing about

120 species, is mostly tropical and subtropical, and is closely related to the Citrus Family (see the corktree in this guidebook). Like citrus species, the leaves have a pungent fragrance when crushed (but please don't try this at the Garden).

The name *Ailanthus* is derived from *Ailantho*, an indigenous Asian name for a different species, and indicates a tree tall enough to reach the sky. From this possibly comes the common name "tree-of-heaven". *Altissima* is Latin for "very tall".

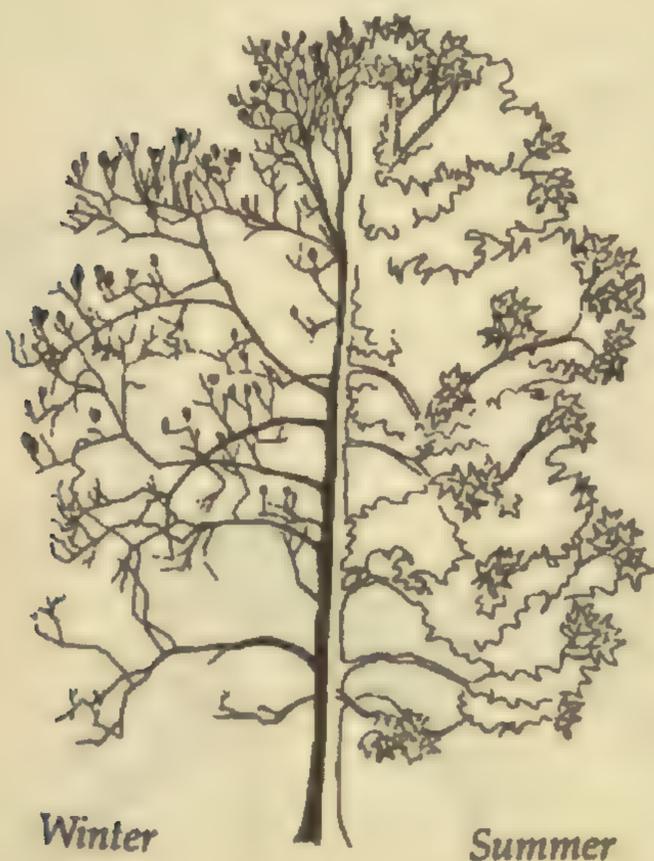
Scorned and relegated far from heaven to the back alley, the tree-of-heaven deserves affection as the only tree to shade some gritty urban neighborhoods. It was, in fact, featured in a famous film, "A Tree Grows in Brooklyn."



TULIPTREE (YELLOW-POPLAR)

See Map: Y

Liriodendron tulipifera



Tuliptrees can be enormous—200 feet tall with long, straight trunks 10 feet in diameter. Because of its size, rapid growth, and ease of woodworking, this is a valuable lumber tree, although the wood is not strong. The misleading common name yellow-poplar comes from the similarity of tuliptree wood to that from poplars, which are not closely related.

Tuliptrees range from Canada to Florida, reaching their western limit in Missouri, where wild tuliptrees are confined to rich woods at the southeastern corner of the state. The Garden's

best specimen is just east of the walkway leading from the Climatron area to Tower Grove House. A second species, *Liriodendron chinense*, occurs in central China.

Tuliptree flowers, which are mostly green and come out early in the summer, hide among the leaves. They are large, upright, tulip-shaped, marked with orange inside, pollinated primarily by beetles, and similar in many ways to flowers on magnolias. Magnolias and tuliptrees, in fact, are related, both belonging to the Magnolia Family (Magnoliaceae). You may spot additional similarities between tuliptrees and magnolias. For instance, both have large "aggregate" fruits made up of numerous clustered subunits. In the tuliptree, the fruits persist into the winter like candles on the limbs and gradually break apart into winged "helicopter" seed-dispersal units. Magnolia seeds are dispersed differently (see write-up on cucumbertree, page 11). Magnolias and tuliptrees alike have pungent, aromatic oils, which probably helped popularize tuliptree bark in tonics, stimulants, and folk remedies for the heart.

Most North American trees have tiny, highly modified leaves known as bud scales that protect their tender branch tips during the winter. Warm-climate trees, by contrast, having no need for such protection, generally lack bud scales. Tuliptrees and our locally cold-tolerant magnolias, being northern outliers of the essentially warm-climate Magnolia Family, have no bud scales. Instead, small, paired, green outgrowths (known as stipules) from the base of the leaf stalk (petiole) cover and protect the bud during the dormant season. In tuliptrees the large, green, flat stipules cover the bud conspicuously like the two halves of a duck's bill.

Liriodendron is Greek for "lily-tree". *Tulipifera* refers to the tuliplike flowers.



Liriodendron tulipifera

WHITE BASSWOOD

Tilia heterophylla



White basswood differs so slightly from its fellow Missouri native, the more widespread and better-known American basswood or American linden (*Tilia americana*), that the two are interpretable as belonging to the same species. The white basswood has a more southern distribution (Pennsylvania to Missouri and Florida as opposed to virtually the entire northeastern U.S. for the American basswood). Also, the white basswood has distinctively fuzzy leaf undersides.

Both species belong to the genus *Tilia*, which is made up of some 30 species in North America, Europe, and Asia. Among their notable features, tilias have a unique helicopter-type system of fruit dispersal. The pea-sized fruits are alone or clustered at the end of a long, thin stalk, which is attached to a tongue-shaped specialized leaf (a bract) quite unlike the other foliage. The fruit(s) + stalk + bract drop away from the tree and twirl to the ground.

Known variously as basswoods, lindens, or limes (in Britain), tilias are highly useful, with most of the uses having been discovered multiple times in multiple places. The uniform and easily worked wood is valu-



able for carving and similar purposes. The inner bark yields strong and pliable fibers useful as twine. The flowers are sweet and attractive to bees—basswood honey is prized. And the flowers are used to make a pleasant tea, as well as to produce linden oil, which is an ingredient in perfumes. The fruits can be processed into a tasty chocolate substitute, and the leaves have been used to adulterate tobacco.

Probably the most important modern use of basswoods is for landscaping. The white basswood and American basswood grow into large, shade-tolerant specimen trees, often with gracefully arching branches. Smaller, with a distinctive pyramid shape, the European littleleaf (or heart-leaved) linden (*Tilia cordata*) is a favorite street tree. A hybrid derived in part from it, *Tilia Xeuropaea*, is the linden of the famous Berlin boulevard Unter den Linden. The lindens flanking the entranceway to the Garden include two selections: a cultivar of murky parentage, *Tilia* 'Redmond', and the hybrid Crimean linden *Tilia Xeuchlora*.

The name "basswood" comes from "bast-wood", the bast being the useful inner bark. *Tilia* is the ancient Latin name for lindens, and *heterophylla* means "diverse-leaved".

YELLOWWOOD

See Map: AA, M

Cladrastis kentuckea (formerly known as *Cladrastis lutea*)



The old yellowwood along the east wall of the Garden just south of the Flora Gate (Spink Pavilion) dates back to the early days of the Garden. This grand tree, now propped up on crutches, may not grace the Garden much longer. Until recently, it was the Missouri State Champion of its species; however, a slightly larger rival (depending on how you measure it) has turned up at a church in Independence, Missouri.

Yellowwoods prefer rich soil on limestone ridges and cliffs and along stream banks from North Carolina to Missouri. In Missouri it is rare and restricted to the

southern edge of the state. Yellowwood is similar in flower and other aspects to the Japanese pagodatree (also a legume and included in the guidebook on page 20) and was thus classified as a *Sophora* when discovered in 1811. Like sophoras, yellowwoods burst into bloom in alternate

years, in June, festooned richly with drooping clusters of fragrant, white, pealike flowers. Another similarity is that both woods contain a yellow dye. Its pealike flowers help reveal yellowwood as a member of one subgroup of the Legume Family (Fabaceae). That this tree is a legume is revealed further by the pinnately compound leaves (each leaf looking like a short branch with several small leaves along it) having "pulvini". A pulvinus is a small thickened joint at the base of each leaf and at the bases of its subdivisions.

Pulvini act like tiny muscles that let the leaves droop at night and stiffen by day. Virtually all legumes have pealike or beanlike, sometimes woody, pods. Watch for such pods around the Garden and around town, and you may thus recognize the following as legumes: sophoras, red-buds, honey locusts, black locusts, mimosas (genus *Albizia*, not *Mimosa*), Kentucky coffeetrees, and wisterias.

The name yellowwood comes from a yellow dye obtained from the wood and once thought to have commercial potential. *Cladrastis* comes from Greek for "brittle branches", and *kentuckea* refers to the place of discovery.



Cladrastis kentuckea
Winter



Cladrastis kentuckea
Summer

"Just the Facts"

DECIDUOUS TREES	MATURE HEIGHT	GROWTH		FLOWER	FRUIT	FALL COLOR	ADDITIONAL INFORMATION
		Shape	Rate				
BALD CYPRESS <i>Taxodium distichum</i>	70'	Pyramidal, with horizontal branching	Med.	None - has dangling clusters of pollen-making structures. Spring	None - has small round cone. Autumn	Yellowish to soft brown	Conifer that drops its needles and young twigs in Winter.
BITTERNUT HICKORY <i>Carya cordiformis</i>	50'-75'	Slender, with rounded crown	Fast	Inconspicuous, male flowers in catkins. April/May	Heart-shaped nut. Autumn	Gold	Best fuel for giving meat true "hickory smoked" flavor. Distinctive sulfur-yellow buds in Winter
BLACK WALNUT <i>Juglans nigra</i>	50'-150'	Round, spreading	Fast	Inconspicuous, male flowers in catkins. Spring	Spherical nut. Autumn	Bright yellow	Striking Winter silhouette with thick, heavy twigs.
CHINESE ELM <i>Ulmus parvifolia</i>	40'-70'	Broad, rounded	Fast	Inconspicuous. Aug/Sept	Clusters of small, flat, wafer-like fruits. Sept/Oct	Yellowish & reddish purple	Colorful, mottled bark.
CHINESE SPINDLETREE <i>Euonymus bungeana</i>	30'	Rounded, with pendulous branching	Slow	Inconspicuous, yellowish green. May/June	Yellow to pink with rose-colored seeds (resembles related bittersweet). Autumn	Yellow	Uncommon in U.S. horticulture. Poisonous.
CORKTREE <i>Phellodendron amurense</i>	30'-45'	Broad, spreading	Med. to Fast	Inconspicuous yellow-green clusters. May/June	Clusters of small black pea-sized fruits on female trees only. Ripen Oct, persist through Winter	Yellow	Attractive, ridged corky bark.
CUCUMBERTREE <i>Magnolia acuminata</i>	50'-80'	Upright, oval	Med. to Fast	Large and vaguely cup-shaped but inconspicuous, yellow-green. May/June	Shaped like small cucumber, reddens late in season.	Ashy brown	Exceedingly hardy for a magnolia. Less showy than other magnolias.
DAWN REDWOOD <i>Metasequoia glyptostroboides</i>	70'-120'	Pyramidal, with short horizontal branching	Fast	None - has dangling clusters of pollen-making structures. Spring	None - has small cone. Autumn	Brown, orange/red brown	Living fossil, compare with bald cypress.
EUROPEAN BEECH <i>Fagus sylvatica</i>	50'-60'	Densely pyramidal	Slow to Med.	Inconspicuous. April/May	Small nut in bristly husk. Autumn	Deep reds & golden bronze	Low branches from massive trunk, colorful cultivars.

"Just the Facts"

DECIDUOUS TREES	MATURE HEIGHT	GROWTH		FLOWER	FRUIT	FALL COLOR	ADDITIONAL INFORMATION
		Shape	Rate				
GINKGO <i>Ginkgo biloba</i>	120'	Oval, wide spreading	Slow	None - has pollen sacs on forked stalks. Spring	None - produces bare, grapelike, offensive seeds on female trees only. Autumn	Bright yellow	Living fossil.
HACKBERRY <i>Celtis occidentalis</i>	60'-100'	Upright, spreading	Med. to Fast	Inconspicuous. April/May	Pea-sized, black or purplish. Sept/Oct	Green-yellow	Bark gray with warts and ridges.
HORSECHESTNUT <i>Aesculus hippocastanum</i>	50'-75'	Tall, oval, densely branched	Med.	In showy, erect clusters; white with yellow & red markings. Early May	Leathery & spiny round capsule, 1 - 3 seeds. Sept/Oct	Poor yellow to brown	Seeds large, with shiny brown surface. Poisonous.
JAPANESE PAGODATREE <i>Sophora japonica</i>	50'-75'	Rounded, spreading	Med. to Fast	In large, showy clusters; creamy white, pealike. July/Aug	Beanlike knobby pods on tree. Oct through Spring	Stays green through Fall	Poisonous. Casts a light shade.
KENTUCKY COFFEETREE <i>Gymnocladus dioica</i>	60'-75'	Rounded, with irregular branching	Med.	Greenish white, not showy; in branched clusters. May/June	Red/brown leathery pods - 5-10" on female trees only. Oct	Variably yellow	Enormous doubly compound leaves, which tend to drop early. Seeds poisonous.
MOCKERNUT HICKORY <i>Carya tomentosa</i>	60'	Rounded	Med.	Inconspicuous, male flowers in catkins. Spring	Large, hard nut. Autumn	Yellow	Large, fuzzy, winter buds; leaves and twigs fuzzy.
OSAGE-ORANGE <i>Maclura pomifera</i>	20'-60'	Rounded, with irregular crown	Slow	Inconspicuous. May/June	Green, size of small grapefruit (fruit cluster), on female trees only. Sept/Oct	Orange/greenish yellow	Fruit clusters said to repel insects. Milky juice can irritate skin.
PAW PAW <i>Asimina triloba</i>	15'-20'	Dense, rounded, pyramid	Med.	Cup-shaped, 1"-2", lurid purple. May	2"-5", shaped a little like small bananas, soft & pulpy. Oct	Yellow, greenish yellow	Flowers appear before leaves.
SASSAFRAS <i>Sassafras albidum</i>	30'-60'	Oval, with irregular branching	Med.	Bright yellow, small. April	Bluish black on scarlet stalk, on female trees. Autumn	Yellow, orange, scarlet, purple	Flowers appear before leaves; forms extensive clones from roots.

"Just the Facts"

DECIDUOUS TREES	MATURE HEIGHT	GROWTH		FLOWER	FRUIT	FALL COLOR	ADDITIONAL INFORMATION
		Shape	Rate				
SCOTCH ELM <i>Ulmus glabra</i>	80'-100'	Massive open	Med.	Inconspicuous, green. Spring	Clusters of flat wafer-like fruits. Spring	Green to yellow to brown	Becomes very large. Leaves large and coarse for an elm.
SHUMARD OAK <i>Quercus shumardii</i>	120'	Spherical to oval	Med.	Inconspicuous, male flowers in catkins. Spring	Acorns. Autumn	Red	Superb shade tree.
SOAPBERRY <i>Sapindus drummondii</i>	25'-50'	Broad oval, with divergent branching	Med.	Dense, conical cluster of tiny greenish flowers. May/June	Grapelike cluster of translucent golden (becoming black) fruits. Autumn	Deep yellow-gold	Fruit stays on through Winter into Spring, possibly poisonous.
SWEETGUM <i>Liquidambar styraciflua</i>	60'-75'	Dense, oval	Med. to Fast	Not showy. April/May	Clustered in spiky, woody balls. Autumn	All colors, very showy - green, red, orange, yellow, purple	Fruit clusters persist through Winter. Can be nuisance in lawn.
SYCAMORE <i>Platanus occidentalis</i>	75'-150'	Massive, spreading, with irregular branching	Fast	Not Showy. April	Clustered in bumpy, fuzzy balls. Autumn	Tan to brown, poor color	Eye-catching patchy and peeling bark. Litters excessively.
TREE-OF-HEAVEN <i>Ailanthus altissima</i>	40'-60'	Upright, spreading	Fast	Inconspicuous, yellow-green 8"-16" clusters. Mid-June	Large clusters of "twisted sticks of gum"; change from green to red or brown; on female trees only. Autumn	Green, then brown	Male flowers of vile odor; female odorless. Aggressive sucker growth, weedy.
TULIPTREE <i>Liriodendron tulipifera</i>	70'-150'	Upright, oval	Fast	Beautiful greenish yellow, tulip-shaped flower marked with orange. May/June	Cone-like cluster of winged, wind-dispersed subunits. Autumn	Yellow, golden-yellow	Flowers borne high in tree, sometimes hard to see.
WHITE BASSWOOD <i>Tilia heterophylla</i>	60'-80'	Upright, oval, spreading	Med.	1/4" light yellow, loose, drooping clusters. June/July	White-yellow, round nut-like, pea-sized. Late Summer	Dull green-yellow	Attracts bees, makes finest honey. Called "Beetree Linden". Not a good patio tree.
YELLOWWOOD <i>Cladrastis kentuckea</i>	30'-50'	Round, low, spreading	Med.	White, pealike, in fragrant clusters 8"-14" long. May/June	2"-4" flat, brown pea-like pods. Summer/Autumn	Yellow to golden-yellow, not spectacular	Does not bloom consistently.

INDEX

Aesculus

- glabra*, 18-19
- hippocastanum*
(including 'Baumannii'), 18-19
- octandra*, 19
- parviflora* forma *parviflora*, 19
- parviflora* forma *serotina*, 19
- pavia*, 19
- Xcarnea* 'Briotii', 19

Ailanthus altissima, 36-37

Amur cherry, 10

Amur maackia, 10

Asian hackberry, 18

Asimina triloba, 26-27

Bald cypress, 4-5

Basswood, white, 39-40

Beech, American, 14

Beech, European, cultivars:

- 'Asplenifolia', cut-leaf, 14
- 'Atropunicea', copper, 14
- 'Dawyckii', fastigate, 14
- 'Pendula', weeping, 14
- 'Purpureo-pendula', purple weeping, 14
- 'Riversii', deep purple, 14
- 'Roseo-marginata', tricolor, 14
- 'Zlatia', yellow / green, 14

Black walnut, 7-8

Buckeye

bottlebrush, 19

Ohio, 18-19

red, 19

yellow, 19

Burning bush, 8

Butternut, 7

Carya

cordiformis, 5-6

illinoensis, 6

tomentosa, 5-6

Celtis

bungeana, 18

laevigata, 17

occidentalis, 17-18

Cherry, Amur, 10

Chinese elm, 29-30

Chinese scholartree, 20-21

Cladrastis kentuckea, (*C. lutea*), 40-41

Corktree, 10-11

Cucumbertree, 11-12

Dawn redwood, 12-13

Elm

Chinese, 29-30

Scotch (Wych), 29-30

English oak, 31

European spindletree, 8-9

Euonymus

alata, 8

atropurpurea, 8

bungeana, 8-9

europaea, 9

Fagus

grandifolia, 14

sylvatica 'Atropunicea'. For cultivars see
Beech in this index, 14

Fig Family, 23

Ginkgo biloba, 15-16

Gymnocladus dioicus, 21-22

Hackberry

Asian, 18

sugarberry, 17

Hamamelis species, 33

Hardy-orange, 10

Hickory

bitternut, 5-6

mockernut, 5-6

Horsechestnut, 18-19

hippocastanum

(including 'Baumannii'), 18-19

Xcarnea 'Briotii', 19

Japanese pagodatree, 20-21

Juglans nigra, 7-8

Kentucky coffeetree, 21-22

Legume Family, 20, 21, 40

Linden

Crimean, 40

European, 40

littleleaf, 40

'Redmond', 40

Lindera

benzoin, 28

melissifolia, 28

Liquidambar styraciflua, 33-34

Liriodendron tulipifera, 37-38

London planetree, 36

Maackia, Amur, 10

Maackia amurensis, 10

Maclura pomifera, 23, 26
Magnolia, cucumber, 11-12
Magnolia acuminata, 11-12
Metasequoia glyptostroboides, 12-13
Mockernut hickory, 5-6

Oak

English, 31
red, 32
Shumard, 31-32

Osage-orange, 23, 26

Pagodatree, Japanese, 20-21

Pawpaw, 26-27

Pecan, 6

Phellodendron amurense, 10-11

Planetree

London, 36
oriental, 36

Platanus

occidentalis, 35-36
orientalis, 36
Xacerifolia, 36

Poncirus trifoliata, 10

Pondberry, 28

Prunus maackii, 10

Quercus

robur, 31
rubra, 32
shumardii, 31-32

Red oak, 32

Sapindus drummondii, 32-33

Sassafras albidum, 27-28

Scholartree, Chinese, 20-21

Soapberry, 32-33

Sophora japonica, 20-21

Spicebush, 28

Spindletree

Chinese, 8-9
European, 8-9

Sugarberry, 17

Sweetgum, 33-34

Sycamore, 35-36

Taxodium distichum, 4-5

Tilia

cordata, 40
heterophylla, 39-40
'Redmond', 40
Xeuchlora, 40

Tree-of-heaven, 36-37

Tuliptree, 37-38

Ulmus

glabra, 29-30
parvifolia, 30

Wahoo, 8

Walnut, black, 7-8

Witch hazel, 33

Xanthoceras sorbifolium, 18, 32

Yellowhorn, 18, 32

Yellow-poplar, 37-38

Yellowwood, 40-41