

Knowing the Trees of Cambridge

A Map & Self-guided Tour

Introduction

Weeping Willow (Salix babylonica)



Look around! Along with people and buildings, the city is filled with all sorts of treesit's a true urban forest! The landscape surrounding the Cambridge Main Public Library, Joan Lorentz Park, the Rindge and Latin School and the bordering streets nurtures an unusual diversity of trees. This booklet includes a map and self-guided tour to help you make the acquaintance of these large silent tree companions.

Like the people of Cambridge, the trees growing here have come from many places. Some of the species are native to Massachusetts, while others originated in different regions of North America. Some came here from Europe and some made the long journey from Asia, North Africa, and the Middle East. The passion of explorers and plant collectors over hundreds of years has resulted in this international community of trees.

The tour starts with the huge weeping willow at the entrance to the park. On all 25 trees on the tour, you will find identification tags with the tree's common and Latin botanical names. To meet all 25 trees might take you an hour or more; for a shorter tour, try visiting the native trees one day and the non-natives another. Both are indicated on the map in the center of the booklet.



You can't miss the mature and graceful weeping willow at the park entrance. It seems to invite you to come close and experience the space beneath its sinuous branches. Notice the multiple intertwining trunks, a common trait in this plant. The willow's rippling leaves may bring to mind the movement of water and indeed, the tree thrives in wet places. Its extensive root system takes up an enormous amount of moisture: as many as 400 gallons of water per day can be brought up through the roots of a full grown willow like this one. Much of that water will be used to sustain the tree, but some will be transpired back into the atmosphere. Transpiration is the process where water is taken up through roots, transported through stems, and eventually released through the leaves. Salix babylonica is actually native to China, not Babylon as its Latin name suggests. Its bark contains salicin, a chemical which was used in the 1800s to develop aspirin. Willow bark has been used medicinally for millennia for body aches and fever.



European Hornbeam (Carpinus betulus)



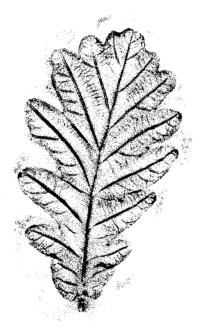
Here is a smaller tree with a subtle presence: the fine-textured, dense branching starts low and grows in an oval shape, creating an elegant and formal appearance year round. The bark is smooth and gray. If you touch the trunk it feels like strong muscles. The leaves have a corrugated texture with deep and regular veins. Look closely to see the double serrations along the leaf edge. In spring, the male and female catkins (so called because they resemble a cat's tail) emerge and dangle from the branches like yellow fringe, a lovely sight. When pollination occurs, the resulting fruit is a nutlet produced in the fall that hangs in a pendulous chain. This tree can be mistaken for a beech, but a sure way to know the difference is to see how the European hornbeam's buds curve tightly in towards the branch. Carpinus is a slowgrowing tree with particularly hard wood. It is very tolerant of urban stresses.

Dawn Redwood (Metasequoia glyptostroboides)



Notice the fibrous, reddish bark of this cone-bearing tree, its closely spaced, soft but needle-like leaves, and its dramatically tapering trunk. Unlike most conifers which are evergreen, this one sheds its leaves in the autumn. It requires ample space because it matures into a tall tree with a very wide base. The Latin name of this tree may be hard to pronounce but it tells an interesting story. In 1941 a Japanese scientist coined the name Metasequoia ("like redwoods") to describe the imprints of a tree found in five million-year-old fossil remains. The tree was thought to be long extinct. The very same year, in China, an unusual conifer was found by chance, which turned out to be a living Metasequoia! It took several years to unravel this mystery. Seed was eventually delivered to Harvard's Arnold Arboretum, and it germinated there easily. This tree is a descendant of those very seeds. Metasequoia is now considered a living fossil, dating back 136 million years, when dinosaurs roamed the earth.

English Oak (Quercus robur)

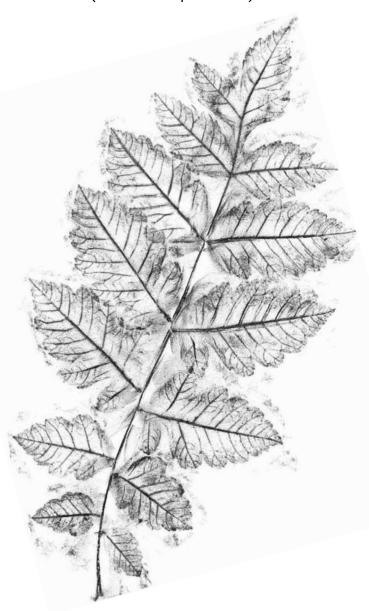


This English oak is an elegantly branched individual, with dark bark and a symmetrical shape. In spring, chartreuse cylindrical catkins elongate and bloom. These are followed by small dark green leaves. At the base of the leaves are two tiny lobes that look like ears. The acorns that appear in late summer are slender and crowned by a small cap. In autumn the leaves turn light brown and like most oaks, remain on the tree into winter. On breezy days, you can hear them gently rustling while other trees, that have already dropped their leaves, are silent. There are hundreds of types of oaks growing in the northern hemisphere, providing abundant food and shelter to birds, insects and mammals. Although the common name refers to England, this oak's native habitat includes most of Europe and parts of North Africa. Quercus is "oak" in Latin and robur means "strength." This type of oak provides hard wood for building furniture and ships, and kegs for flavoring wine.

Pin Oak (Quercus palustris)

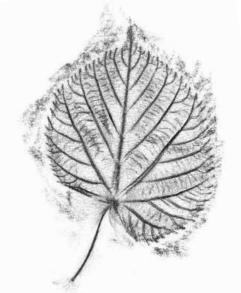
Here is another type of oak: look at the difference in the leafshape. In general, oaks fall into one of two groups: the white oak leaves have smooth rounded lobes (such as the English oak described above), while the red oaks have bristly pins on the leaf tips. Pin oak is in the red oak group. The leaf itself is so deeply incised that it looks as if much of it has been cut away in U-shaped curves. Pin oaks differ from other oaks in their habit -- the typical form a tree takes as it grows. They have a strong leader, a central trunk that does not fork and gets narrower as it ascends. At the crown, pin oak branches point up; in the middle, branches are horizontal; and the lower branches are broad and sweep toward the ground. You might not see this pattern in our street trees, though, because the lowest branches are often pruned away. Pin oak is a native of much of eastern North America and one of the most popular street trees in the U.S. Palustris means "marshloving," and indeed this oak can grow in land prone to flooding, but it is also happy in dry urban places. Easily transplanted, pin oaks grow quickly and resist pollution and disease. All these traits lead to their success in urban settings. Pin oak leaves turn red in fall. The small acorns are a favorite food of blue jays and woodpeckers.

Goldenrain Tree (Koelreuteria paniculata)



The goldenrain tree is named for its panicles of brilliant yellow flowers that rain down in a summer breeze. The leaves look lacy, and in the summer, the tree is ablaze with sprays of blooms. The flowers are followed by equally showy seed capsules resembling little paper lanterns that turn from green to pink or brown. The capsules contain the tree's hard black seeds that germinate readily. This particular tree has reached its mature height. The goldenrain tree originally came from China and other parts of Asia (Japan and Korea). There, long ago, they were planted at the graves of important officials. In the late 1700s, few Europeans were allowed to visit or trade with China; in a rare opportunity, a Jesuit missionary stationed in China sent seeds of the goldenrain tree back to Europe with a Russian caravan that traveled through every few years. It grew in a greenhouse in St. Petersburg for twenty years before it ever flowered. The goldenrain tree came to this country in 1809 when Thomas Jefferson received seeds from a friend in France. Unlike in Russia, it is remarkably well-adapted here, and is tolerant of harsh city conditions. In fact it's so easy to grow that it is becoming invasive in some parts of the country.

Basswood or American Linden (Tilia americana)



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Basswood is a large handsome tree with wonderfully fragrant summer flowers that encourage walkers to linger awhile in June or July. Sometimes known as the "bee tree," basswood's creamy yellow flowers contain nectar that is collected by bees to make a delicious honey. The bees compete with dozens of other insects for this nectar and pollen. As the common and Latin names imply, this tree is native to New England and the central U.S. One of the benefits of planting native trees is that they provide the proper sustenance for our indigenous wildlife. Before leaves appear, you may notice the red oval-shaped buds that swell visibly in the spring. The large, heart-shaped leaves of basswood are dark green on top with a paler green underside. The name "bass" comes from the word "bast" meaning strong, woody fiber. Native Americans used the inner layer of the bark to make twine and fine thread. The wood is soft and pliable, used for carving and for paper pulp.

The Silver Linden is a relative of basswood but is native to Southeastern Europe and Western Asia. Standing under the trees in spring or summer, the difference is unmistakable: the smaller heart-shaped leaves of this linden show their soft silvery-white undersides and contrast strongly with the dark green upper surface of the leaf. *Tomentosa* means "densely wooly," describing the leaf's texture. Like other lindens, the flowers are highly fragrant. Unfortunately, the pollen of the silver linden can be toxic for some bees. This particular tree is doing well in spite of the small space allotted to it in the concrete sidewalk—lindens are a good, tough urban tree.

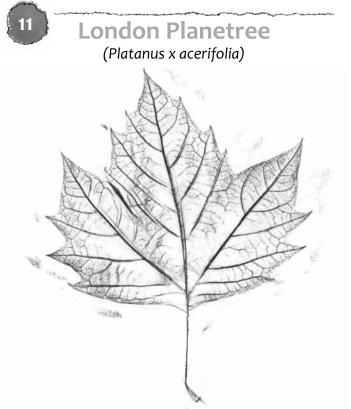




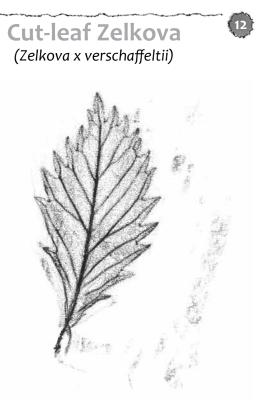
Sweetgum (Liquidambar styraciflua)

In the old-growth forest, tuliptrees have been measured at 200 feet--the size of a 15 story apartment building! But those trees were very old, while this specimen is still young and small. Liriodendron is an ancient genus dating back to the Cretaceous period, 65-145 million years ago. A mature tree has a huge trunk that is strikingly straight. The leaf is unique, somewhat squarish with shallow lobes. To some it resembles an abstract tulip. The flowers are also tulip-like, having 6 yellow-green petals, each with an unusual orange band at the base. If you look closely, you'll notice a conelike structure on the branches, green in summer and turning brown later on. These contain winged seeds that disperse in the wind. In winter part of the cone remains, providing an easy way to identify the tree after the golden fall leaves are gone. Look for some of the larger tuliptrees in this neighborhood to get a sense of their magnificence.

In spite of sweetgum's common and Latin names meaning "liquid amber, flowing with resin," this tree is not really known for its gum anymore. Instead, it is loved for the amazing array of colors seen in the shiny leaves in fall. They are perfect for collecting and pressing in books. Sweetgum leaves are most often shaped like a five-pointed star, although they sometimes have seven-pointed leaves. The spherical seed capsules are noticeable and cling on to the tree into the fall and winter. Some people complain that these "gumballs" are untidy, but for others they add interest to the tree. When they fall, you get a chance to admire their prickly strangeness. Just don't step on them in your bare feet! Though not present on this tree, sometimes you'll see corky wings growing along the branches. (Look on Vassar Street for some examples) A native forest tree from the southeastern U.S., the Sweetgum adapts to more northern climates such as our own, and is widely planted as a street tree.



The bark of the London planetree is a primary key to recognizing it: the distinctive mottling of creamy white, green and brown brings to mind an elegant camouflage pattern. The leaves resemble maple leaves, but they are velvety on the underside. The spherical seed-clusters, called buttonballs, dangle in pairs from long stems into the winter. This tree is still young, but you may have noticed many huge old London planetrees lining both sides of Memorial Drive. They were planted there in 1897 based on the design by Charles Eliot, a revered Bostonian landscape architect. Many of these trees also grow in London. The London planetree, a hybrid, came about by chance in an English garden in 1637. An English plant collector obtained American sycamore seeds from Virginia, and planted them near an Oriental planetree. These two related trees, which had previously been separated by thousands of miles, cross-pollinated and produced this magnificent and much-loved tree.



This tree catches the eye with its distinctive orange bark and its overall vase shape. It was generously planted here by an Ellery St. neighbor who was introduced to it in 1992 at the Brooklyn Botanic Gardens. Attracted by its graceful form, finely cut leaves, and unusual exfoliating bark, she wondered how the tree would fare as a street tree in Cambridge. After much research she found a nursery in Missouri growing this unusual tree, and ordered a small sapling. Now the tree is thriving in our urban forest. The parent tree, the Japanese Zelkova serrata, has been widely planted to replace the American elms devastated by Dutch elm disease in the 1960s. Zelkova x verschaffeltii is a hybrid first found in cultivation in 1885 in Belgium.

Douglas Fir (Pseudotsuga menziesii)



Don't be deceived by the common name: Douglas fir is not a fir and Douglas was not the first to discover it! David Douglas was a Scottish botanist and explorer who introduced the tree to cultivation in 1827. He had come across it a few years earlier while on a plant-hunting expedition in the Pacific Northwest. But the real credit goes to Archibald Menzies, his countryman and rival, who had already identified the tree on Vancouver Island in 1791. Menzies is remembered in the botanical name menziesii. Pseudo comes from the Greek for "false." In botany it refers to a plant that resembles another one--in this case Tsuga, hemlock. Like a hemlock, Pseudotsuga has flat needles with white bands beneath, so the needles alone are not useful for identification. Hanging on this evergreen and lying beneath it, you will see an abundance of cones. Look closely to find the pointy bracts—leaf or petallike structures-that stick out between the scales. This is one key to knowing the Douglas fir. This tree is happiest in a sunny spot and can grow very tall—over 300 feet in its native habitat-which makes it the largest conifer in the world aside from the redwoods in California. Its branches are the preferred nesting space for red voles and spotted owls; its needles and seeds feed many kinds of wildlife. Pseudotsuga menziesii has also recently been featured in remarkable research on mycorrhizal fungi, the living network within the soil that is beneficial to both microscopic fungi and the roots of trees. Scientific research has revealed how trees and fungi exchange nutrients in a symbiosis that strengthens the ecosystem of soil life and trees, both within the Douglas fir species and with other trees species: at some times of year the Douglas fir helps nourish the paper birch, and at others, the birch helps the fir.



Trees that are native to North America are in **bold:**

- 1. Weeping Willow
- 2. European Hornbeam
- 3. Dawn Redwood
- 4. English Oak
- 5. Pin Oak
- 7. Basswood 8. Silver Linden

6. Goldenrain Tree

- 9. Tuliptree
- 10. Sweetgum
- 11. London Planetree 12. Cut-leaf Zelkova
- 13. Douglas Fir
- 14. Yoshino Cherry
- 15. European
 - Horsechestnut

16. Kentucky Coffeetree

- 17. Sugar Maple
- 18. Norway Maple 19. Thornless Honeylocust 20. Redbud
- 21. Eastern White Pine 22. Swamp White Oak 23. Flowering Dogwood 24. Hophornbeam 25. Copper Beech



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There is a story behind the cherry trees that stand here near two empty mulched circles. Several years ago during the library construction project, seven cherry trees planted in the park around the corner were scheduled for removal. Thanks to active neighbors in partnership with the city, four of those trees were rescued and transplanted here. Two have survived. One key to identifying a cherry tree are the rows of horizontal lines on the bark. These are called lenticels, groups of cells that allow for direct gas exchange with the atmosphere. The leaves have very fine and pointy serrations. These cherries are ornamental, not grown for their fruit. They are loved for their brief flowering beauty in the spring that ends with a snowy carpet of petals around the tree. Originally from Japan where cherry blossoms are part of a long tradition, nearly 2000 Yoshino cherry trees were given as a gift to the people of the U.S. by the city of Tokyo in 1912. They are planted around the Tidal Basin in Washington, D.C. The U.S. government responded with a gift of our native flowering dogwood, which you'll see later on this tour.

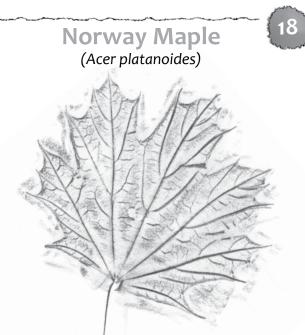
Have you ever picked up and admired the big shiny seeds of this tree? They look like polished wood and add something magical to the fall landscape. They resemble the edible chestnut, the fruit of the European or sweet chestnut (*Castanea sativa*). Livestock animals and deer eat horsechestnuts but they are not digestible by humans. Large white flowers, like tall candles, illuminate the tree when they bloom in the spring. The coarse leaves are shaped like an open hand with fingers spread out–in botanical terms, palmately compound. The very large sticky bud at the tips of branches provides a sure way to identify the tree when flowers and leaves have fallen. This tree is native to Greece and the Balkans, and was first cultivated in North America in 1741 by the great plantsman John Bartram, whose historic garden you can still visit in Philadelphia.



The botanical name Gymnocladus comes from the Greek for "naked branch," because this tree is bare of leaves for 6 months or longer each year. If you watch, you'll notice it is one of the last trees to leaf out in the spring and one of the first to drop its leaves in the fall. Coffeetrees usually grow with a single stout trunk: the multi-trunk plant here is rare and still young, a spindly specimen. The bark is noticeably coarse and rough. When leaves finally appear, they are composed of many pairs of small leaflets, termed bi-pinnately compound. The leaf stems can be up to 3 feet long. The second part of the botanical name, dioicus, refers to the fact that the male and female flowers appear on separate plants. When in bloom, the female flowers are said to smell like roses. In the fall, the female trees produce a large leathery seed pod (up to 10" long) turning from green to a dark mahogany color. They hang on the tree until spring--it is wonderful to see a coffeetree with its seedpods against the winter sky! Adventurous pioneers reported using the large seeds as a poor coffee substitute.



This New England native is a very large and slow-growing tree. As you can observe here, the sugar maple needs rich soil and lots of space for its roots to grow well in the city. As it ages the smooth gray bark becomes rough and furrowed. The familiar leaf has five lobes, and the burnt orange, glowing yellow and reds are key to the beauty of New England's autumn. You'll often notice the tips of branches on the northern or western sides of the tree showing fall color long before the rest of the tree, as if signaling the coming change of season. At this time two-winged seeds called samaras twirl to the ground. The maple is covered with subtle yellowish-green flowers in spring. Native Americans taught European settlers how to tap the sweet sap that rises in the spring and boil it into syrup.



The trees growing side by side here are both maples but two different species. They may look similar, but they have very different stories. Norway maple is a fast growing tree able to live easily in the pollution, poor soil and drought that a city creates. It was first imported to the US in the late 18th century and guickly became a popular street tree. This tree produces a seemingly infinite number of seeds, many of which germinate. Soon they make their way to the forests and edge out native maples, and with them all the insects and other creatures that depend upon the native trees for life. With their heavy shade and huge water uptake, Norway maples displace native understory plants. Additionally, they leaf out very early in the spring, getting a head start on the growing season. This tree superficially resembles the sugar maple, but the leaves are broader, the samaras are flatter, and the bark of the tree is smoother than its cousin Acer saccharum. Another way to distinguish the two maples is by breaking a leaf's stem: you will see a milky sap. Today, Norway maple is a much maligned species because of its invasive habits and ubiquitous presence. In fact, its sale and propagation are banned in Massachusetts.

Thornless Honeylocust (Gleditsia triacanthos var. inermis)

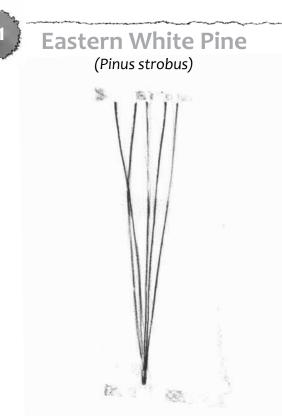


Tall and broadly spreading, the honeylocust casts a light shade in the heat of day. The leaves are pinnately compound, composed of many small leaflets, creating an airy crown. Like the Kentucky coffeetree, it is in the legume or bean family. A defining feature of this family is the seed pod with two seams: honeylocust pods are large, leathery, and twisting, while those of the coffeetree are flat. The "honey" is actually the sweet pulp of the pod, used as food by Native Americans. The variety usually grown today is inermis, meaning "unarmed," because the vicious thorns of the species are difficult to live with in the city. If you want to see an impressive example of a thorny honeylocust, there is one growing along Western Ave. not too far from the river. Approach with caution! Although it is native in the Midwestern US, the honeylocust is now a common tree throughout the country, heavily planted as a replacement for American elm.

(Cercis canadensis)

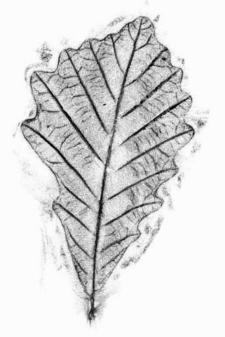
Redbud

Redbud blooms in mid-spring before its leaves appear. With its red-purple flowers emerging directly from the branch and sometimes from the trunk of the tree itself, it looks like a work of art. When in bloom, no tree is more exquisite. The leaves are heart-shaped. The seed is held in a small pea shaped pod—redbud is another tree in the legume family. In older plants, look for red-purple patches on the trunk, similar to the color of the flowers. A key to recognizing this plant in winter is the zigzag growth pattern of the twigs. The natural ecological niche of this eastern US native tree is woodland understory, thus it might prefer to be growing in partial shade.

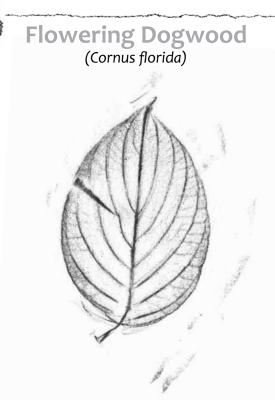


The long, slender, bluish-green needles in bundles of five offer a good way to identify eastern white pine. The underside of the white pine's needles is silvery-white—with a magnifying glass, you may be able to distinguish 2 or 3 white stripes. The tree you see here has been able to take advantage of the space and sunlight in this location allowing the branches to spread broadly. In the forest, white pine tends to become tall and narrow as it stretches for sunlight. Early in the 1500s, explorers were astounded by the countless enormous white pines in the New World forest. Later on, the largest and straightest would be claimed by England for use as masts for the British fleet, a provocation along with numerous others that eventually sparked the Revolution. Today, white pine is considered an early succession tree, easily growing in abandoned farm fields, a good indicator of the land's past use. It is so plentiful that it comprises 25% of the tree volume of Massachusetts.

Swamp White Oak (Quercus bicolor)



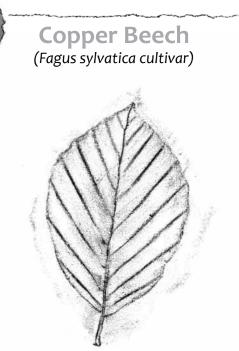
Not long ago, a large old swamp white oak was growing here near the ones you see that have been newly planted. A summer storm broke major branches of the old tree, and when inspected it was discovered to be unstable and dangerous to passersby. Sadly the tree was removed. Swamp white oak leaves are shallowly lobed and lustrous green above. They feel velvety on the undersides. The tree's bark is rough and furrowed. It will be at least 20 years before these young trees begin to produce acorns. Then, every few years, there will be an abundant crop of light brown acorns hanging in pairs on long woody stems, with a cap covering 1/3 of the nut. These are enjoyed by a variety of wildlife including ducks and squirrels. As its common name suggests, swamp white oak is associated with wet soils of the lowlands. Like the pin oak, it can thrive in both wet and dry soil. Usually found in central and eastern forests of the U.S, in its native habitat this oak can be long-lived, growing broader than it is tall.



Hophornbeam (Ostrya virginiana)

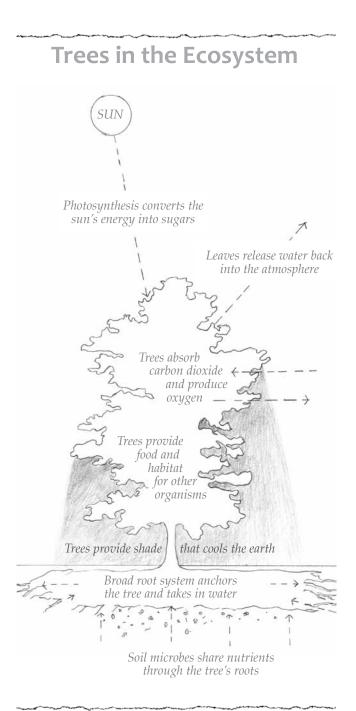
Like the redbud, our native flowering dogwood is happiest when it is sheltered in the woods by taller trees. The large white blooms that grace the tree for a few weeks in the spring are not really flowers at all: the true flowers are actually inconspicuous yellowish blossoms in the center of the 4 large white bracts that are commonly mistaken for petals. In a woodland setting, you can find dogwood blooming at the same time as redbud, just as the trees above them begin to leaf out in bright new green. In the fall the leaves turn rosecolored, and bright red fruits appear on the branches to the delight of birds. In winter, the dogwood's strong horizontal form stands out, often elegantly asymmetrical. The buds, shaped like an onion dome, sit up on the bare winter branches. During a long cold season, it is heartening to see these buds waiting for spring. Gifted with beauty throughout the year, the dogwood has become a popular ornamental in the city, even though it sometimes struggles here.

This tree has many common names that describe its characteristics: it is called "hophornbeam" in reference to the long papery seed cluster that looks strikingly like the flower of the hops plant, which is used to brew beer. It is also known as hornbeam or ironwood because of its extremely hard, dense wood – Ostrya is Greek for "bone-like." It bears strong resemblance to the hornbeam, (Carpinus #17) with its doubly serrated leaf edges. The bark is rough and shaggy. In spring, its catkins are grouped in threes. Hophornbeam is native to eastern North America, found naturally on rocky outcrops as well as moist sites. It is uncommon in the city, though its grace, domestic size, and disease resistance make it a worthy tree to invite into the protection of a home landscape.



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Even from a distance copper beech, with its smooth, pale gray bark, broad trunk, and dark, undulating leaves, creates a majestic impression. This is a variant of the typical greenleaved species. Beech is slow growing and requires ample space. It can grow to be well over 100 feet tall. Grass doesn't grow easily in the dense shade of this tree, so the mulched circle you see beneath it extends almost as far as the branches. One way to know the beech tree is by its buds: they are distinctively long, slender and pointed. Some years the tree produces fruits called beechnuts consisting of two nuts encased in a bristly husk. The nuts are relished by squirrels and birds in the fall. Beeches are somewhat sensitive to city conditions. Though there is a beech native to North America (*Fagus grandifolia*), this species with copper-colored leaves is European.



Conclusion

Now that you have learned the names and stories of these 25 trees, you will begin to recognize them all around Cambridge. On the map, the three trees marked "*" are ones you have already met on this tour--see if you know their names! As you walk along the city sidewalks, the trees become familiar friends. You will see them changing seasonally, weekly and sometimes even daily. Along with their loveliness, the trees give us shade, and offer food, shelter and medicine to humans and wildlife. They clean and cool the air. In a way, the trees breathe too, though in reverse: they take in carbon dioxide and exhale oxygen. The Cambridge urban forest removes thousands of tons of air pollutants each year. Our symbiotic relationship with trees is vital: we can't live without them. We hope this tour will inspire you to continue to get to know the trees. Why not give a tree tour in your own neighborhood? And perhaps you will find a spot to plant a new tree at your home, office, school or neighborhood park. We need the trees, and they need us!

Resources

Field Trips: More trees and more ways to learn about them can be found close by:

The Mt Auburn Cemetery (http://www.mountauburn.org)

The Arnold Arboretum (http://arboretum.harvard.edu/)

Please take advantage of the remarkable resources provided by these nearby destinations!

To get a tree planted in your neighborhood contact:

www.cambridgema.gov/theworks/ourservices/urbanforestry Phone: 617.349.6433. Email: cambridgetree@cambridgema.gov **References and Suggested Reading:**

Tree Guides:

The Urban Tree Book by Arthur Plotnik A readable introduction to many of the common trees you see on city streets.

Field Guide to Eastern Trees by George Petrides A classic for tree identification.

The Tree Identification Book by George Symonds A very well organized keyed guide to identification, with black and white photographs. Mostly native trees, with some exotics.

Trees of New England by Charles Fergus

An elegantly written, descriptive guide to native trees of this geographic area.

Dirr's Hardy Trees and Shrubs: An Illustrated Encyclopedia by Michael Dirr

A great book for tree ID with excellent photographs capturing the unique characteristics of each plant.

Plant History:

New England Natives by Sheila Connor Tells the story of the New England forests, Native Americans, and early colonists.

A Reunion of Trees by Stephen Spongberg Tells the story of the explorers and collectors that originally brought the exotic species we see all around us today.

Plant Classification:

The Naming of Names by Anna Pavord A historical account of how plants have been named, ordered and classified; with beautiful illustrations.

Soil Life:

Teaming with Microbes: The Organic Gardener's Guide to the Soil Food Web, by Jeff Lowenfels.

This well written guide describes the way the soil is a sustaining matrix for life, more than an inert substance.



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