
Carleton Campus Ethnobotany in the Carleton College Cowling Arboretum

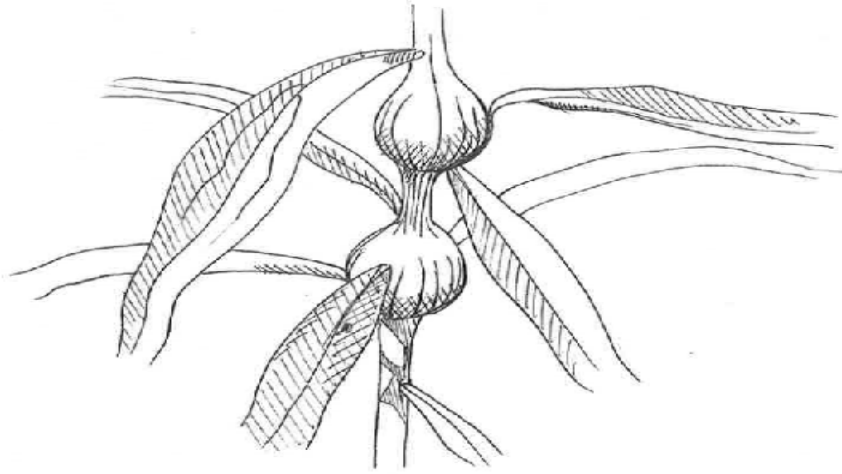
The following descriptions represent the culmination of our efforts to dig deep into the dense web of human connections surrounding the Cowling Arboretum. The Arboretum was first established in the 1920s under President Cowling and with the help of groundskeeper D. Blake Stewart (“Stewsie”) and botany professor Dr. Harvey Stork, and since then has taken a long and winding road to its current form. Throughout its history it has served as a diverse resource for students, faculty, and the local community; it is much more than an ecological restoration, as many will attest to. Stork’s original vision for a tree museum has evolved to embrace three key Arboretum goals: Conservation, Education, and Recreation. The Arb has become a vital part of Carleton with its diverse student body dedicated to fields of study ranging from biology to archeology to music, and personal pursuits ranging from cross-country skiing to holistic medicine to sculpture. It is only fitting that these 800 acres of land should become layered with such a rich range of memories, creative uses, discoveries, artistic endeavors, and understandings, and that the Arb should become so integrated into the life and culture of Carleton.

Through a series of on-campus interviews, we have begun to catalogue the myriad connections students and faculty have made to specific plants within the Arboretum, some obvious and some surprising. Our findings contribute to an appreciation of the Arb as a whole, as well as to each individual species in this list. We hope that you, as the reader, take your time learning about each plant, observing its physical presence, and allowing each piece of new information to shape and expand your understanding of the Arb’s significance.

For more information, access the Carleton Arboretum’s website at apps.carleton.edu/campus/arb.

Goldenrod

Solidago spp.



Goldenrod grows throughout the Arboretum and two of these species (*S. canadensis* and *S. gigantea*) are easily recognizable by the marble-sized galls prevalent on their woody stems. The galls form when gall flies deposit their eggs on the goldenrod stem, effectively parasitizing the plants and prompting them to grow hard round casings around the fly larvae. The galls provide sustenance and protection for the larvae as they mature. Protection from predators is not ensured though; there is also a small beetle that specializes in burrowing into the galls and eating the larvae inside.

Goldenrod has served as a regular subject of study for students in Winter Term offerings of introductory biology. As part of the lab component, students collect galls, extract the living larvae, homogenize them, and conduct a genetic analysis of the DNA. Because this recurring gall project has been a common experience for so many freshmen and sophomores cycling through Carleton, professors in other departments have found it to be a useful point of reference. In his English classes, for instance, Professor Peter Balaam often discusses goldenrod galls when trying to get his students to think poetically and imaginatively about the notion of homes, nests, and habitation in the Arboretum.

Bibliographic Note

The descriptions contained within this guide draw from our conversations with students who have experience foraging in the Arboretum, residents of Farm House, members of Carleton's cooking club (Firebellies), English professor Peter Balaam, sculpture professor Stephen Mohring, visiting studio art professor Rebecca Hutchinson, and Dacie Moses House Coordinator Julia Uleberg-Swanson. We also supplemented the more anecdotal information gleaned from these interviews with basic ecological information from native plant guides and databases such as those of the Minnesota Department of Natural Resources and the US Department of Agriculture. Thanks also to Brendan Grant 12' for his Cottonwood leaf and seed drawings.

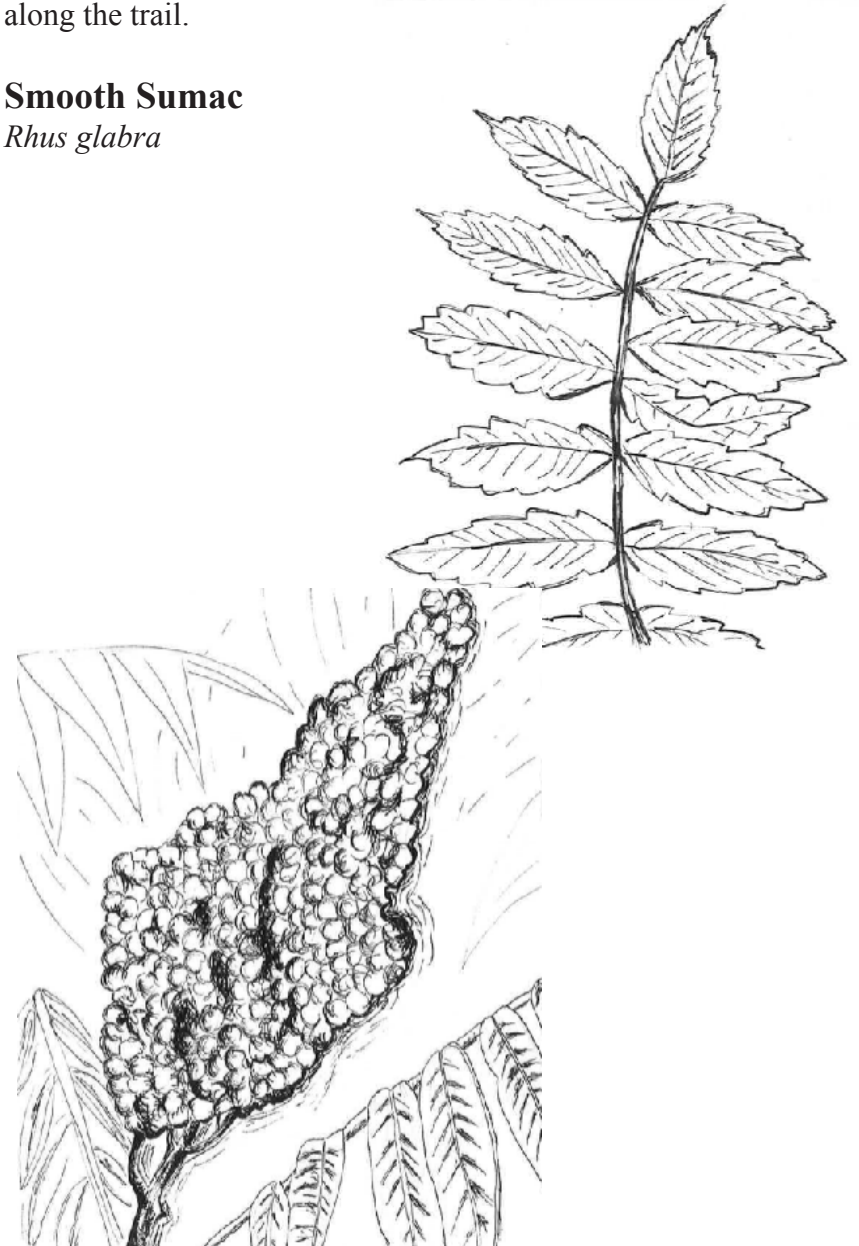
In 2007, Minneapolis artist and St. Olaf alum Jim Proctor directed the construction of an art installation in the Arb meant to raise community awareness about the ecological impacts of the invasive plant. The project, titled “The Buckthorn Menace,” enlisted students and volunteers from around Northfield to pull and collect buckthorn around Carleton and St. Olaf and then assemble the dense webbing roots into giant structures imitating another, much more familiar invasive weed: dandelion. The installation stood in the upper Arb (near Bell Field) for a full year, alluding to how buckthorn is an invasive that is just as prevalent as dandelions, though simultaneously much less visible in the public eye and much more detrimental. (Learn more at the Buckthorn Menace website at apps.carleton.edu/campus/gallery/buckthorn.)

Many areas of the Arb are covered by dense buckthorn, especially close to campus where it was historically planted or has spread from intentionally planted areas in Northfield and nearby landscaped areas.

The Arb is actually home to six different species of goldenrod. Although in the winter the species are not easily distinguishable, when they bloom in the spring the differently shaped leaves and yellow flowers can offer some clues. Goldenrod enjoys full sun and is commonly found in the open prairies of the arb, particularly along the trail.

Smooth Sumac

Rhus glabra

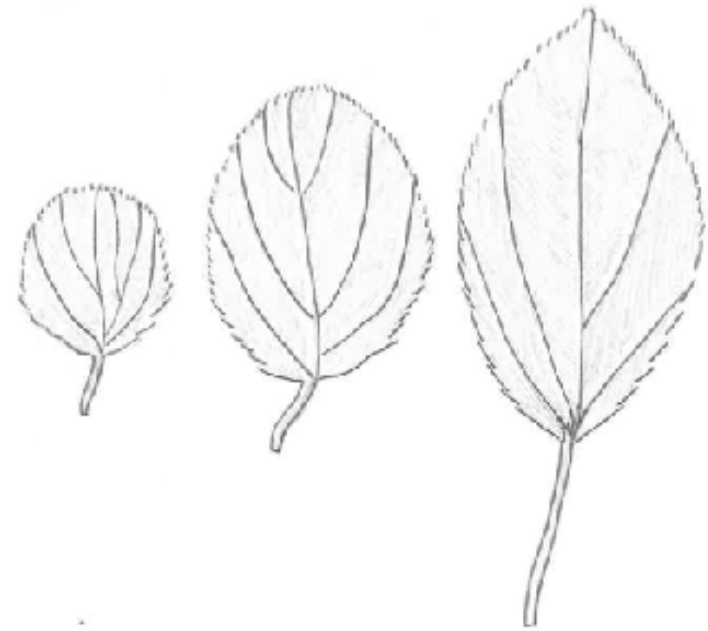


Smooth Sumac is one of the more common native shrubs in Minnesota, mostly found in open prairie and on roadsides. It is recognizable by its hairless twigs that are green the first year and turn reddish brown the second. It can also be recognized by its slightly flattened and hairy berry-like drupes which turn deep red and may persist through winter. These fruits, which appear after the sumac is three to four years old, are a nice seasonal indicator as they are one of the first things to turn brilliant red as the summer ends and fall begins. Sumac can spread aggressively and persists using clonal offsets from its rhizomes, which also enable it to recover from occasional wildfires. Sumac seeds sometimes have better germination after passing through the digestive system of wildlife or enduring through a fire.

The berries of this particular sumac species are not poisonous, and are in fact very high in Vitamin C due to the high concentration of ascorbic acid in the red covering of the seed clusters. When walking in the Arb, you might try grabbing some berries and sucking on them for a few seconds. Although the berries are somewhat fuzzy and tough, their citrusy, lemony taste can offer an enjoyable treat. Students conducting summer ecology research in the Arboretum have found their tanginess rejuvenating and refreshing while working in the heat. If you get them at just the right time of summer before the first rain, you can crush them into water to make a kind of pink lemonade (or more accurately, pink sumac-ade). Firebellies club, for example, made a scrumptious sumac lemonade for their “Love at First Bite,” set-up-your-roommate restaurant.

Sumac also provides an emergency food source during the winter for wildlife such as birds (that eat the sumac fruit) squirrels and rabbits (that eat the bark), and white-tail deer (that enjoy the fruit and stems). When flowering, sumac is often visited by many types of bees and flies, as well as occasional butterflies or beetles. Carpenter bees construct nests by tunneling into the inner bark of broken twigs. The larvae of some types of butterflies and moths feed on the foliage, wood, sap, and flowers of sumac.

In the Arb, smooth sumac enjoys partial shade and is commonly found on the forest-prairie border, particularly along trails.



Buckthorn is not native to Minnesota but has nonetheless established a powerful presence in the Arboretum. First brought to Minnesota from Europe in the Nineteenth Century, Buckthorn has become rampantly invasive throughout much of the United States and Canada, growing in dense, monospecific thickets that easily crowd out other understory plants and are self-perpetuating. Though classified as a shrub, buckthorn can grow to be up to 20 feet tall and 10 inches in basal diameter, producing small dark berries that are then eaten and dispersed by birds. The laxative effect induced by the berries makes animal seed dispersal more efficient and effective.

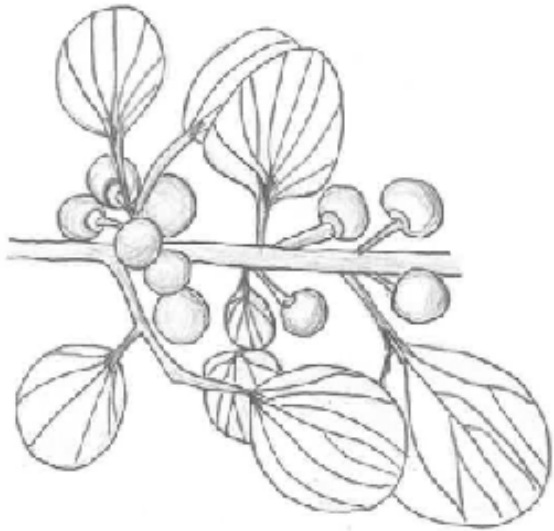
In the Arboretum, buckthorn has been the disproportionate focus of regular removal efforts, bringing together Carleton students as well as Northfield community members. Much of the student Arb crew’s time is spent cutting down and uprooting--“battling”--the shrub. Retired Arb Manager Myles Bakke has been spotted sporting a “Die Buckthorn Scum” T-shirt and once wrote that he considers buckthorn to be “the floral equivalent of the antichrist.” Complete removal of this species may be an eventual possibility but remains a very long-term goal at present.

Morel mushrooms have slender canopies with a honey-combed structure that, along with their hollow interiors, makes them easily identifiable. Like other mushrooms, morels have a mycorrhizal phase during which they exist underground as highways of thin fibers in symbiotic relationships with pine, spruce and other conifers. Their fruiting season then is extremely short, typically just two to three weeks.

Though they cannot be eaten raw due to the presence of a toxin, cooking Morels makes them safe to eat and brings out a strong and distinct savory flavor. They are one of the most valued mushrooms for cooking, and are one of a number of edible fungi that grow around the Arboretum. Here at Carleton, Farm House residents and members of the Mycology Club frequently cook with morels. The fruitbodies are considered quite nutritious, high in protein, rich in minerals, and low in calories. Morels can be found popping up around the Arboretum during the spring, typically around dead elms or other deciduous trees and disturbed woodland areas.

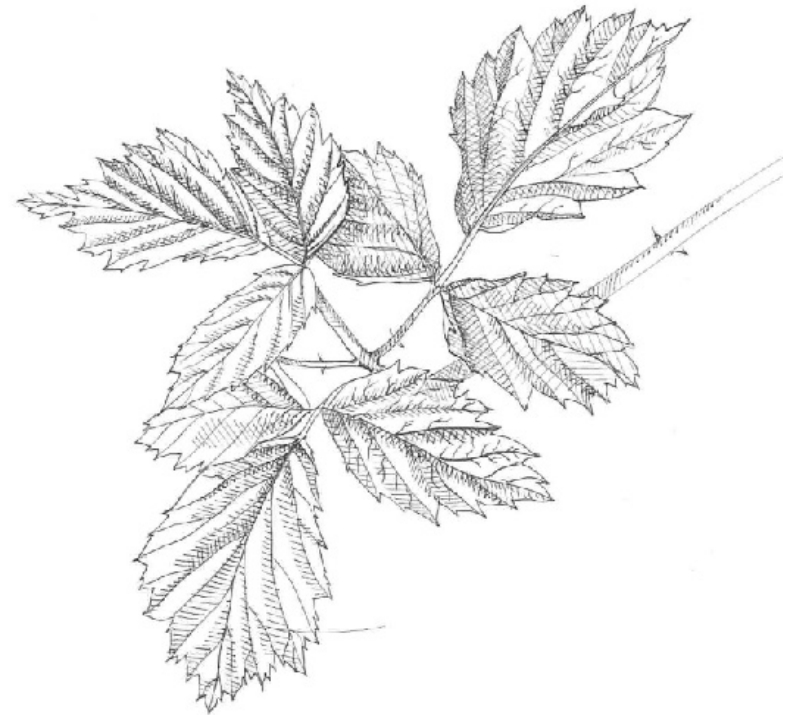
Common Buckthorn

Rhamnus cathartica



Black Raspberry

Solidago spp.



This native plant is recognizable by its purplish arching stems which are covered in thorns and can grow up to 12 feet long. Black raspberry is common throughout much of southern Minnesota, frequently seen along roadsides and hiking trails. Unlike the fruit of blackberry plants with their cylindrical white center, the fruit of the black raspberry has a hollow center, just like red raspberries.

Many of Carleton's nature enthusiasts look for this plant when they are on walks in the Arb, eating the fruit whenever they see it, an activity called "black cap picking." The summer farm interns have been known to procrastinate from doing their work by indulging in the berry-goodness of black raspberries. These little forest treats also tend to turn students in Dan Hernandez's lab groups into berry-obsessed squirrels, scurrying around hunting for berries amidst hoards of mosquitos.

Peak ripeness for berries starts in late July, lasts through the later half of mid-summer, and is generally over in September. When ripe, the berries turn a deep blue-black with only the faintest hints of red. Until they reach this stage, however, they remain quite tart. There is always an element of surprise when black cap picking as it is unpredictable whether a berry will be tart, sweet, sickly sweet, or tangy from fermentation on the branch. The guess work in picking berries is all part of the fun. The nectar of the flowers attracts many types of bees, as well as the occasional butterfly or skipper. here are several insects that chew on the foliage or suck the sap, including the caterpillars of various moths, spider mites, flea beetles, and leafhoppers. Some caterpillars and grubs even bore through canes or roots. The fruit also provides important nourishment for many gamebirds and songbirds.

In the Arboretum, black raspberries can be found in partial shade in wooded areas and along forest edges, particularly near trails and roadsides.

to name a few in the Arboretum), grapevines have some of the highest fiber content and thus represent one of the toughest and most resilient plants to work with as a papermaker. The intensive labor required to break down grapevines makes them an unpopular choice in commercial paper production. For papermaking students at Carleton, however, using wild grapes and other native plants offers an opportunity to take advantage of local materials and consider not only the final product of their artwork but also the ties to local ecosystems.

Common Morels

Morchella esculenta



Wild grape grows as a woody perennial vine and can be found wrapping its curly tendrils around many trees and shrubs throughout the Arboretum. The forking tendrils coil themselves around anything they can get a hold of, allowing the vines to climb other plants and reach up to 50 feet in length. While new growth on vines can be quite thin and fragile, the woody stems may be multiple inches thick and covered in shaggy bark. If not limited by the shade of old-growth forest, wild grape vines can spread out into dense thickets and shade out or smother other plants (and even small trees), often becoming a problematic invasive. Also known as the riverbank grape, *Vitis riparia* grows extremely well in the elevated light of forest edges and in disturbed areas such as roadsides and trail edges.

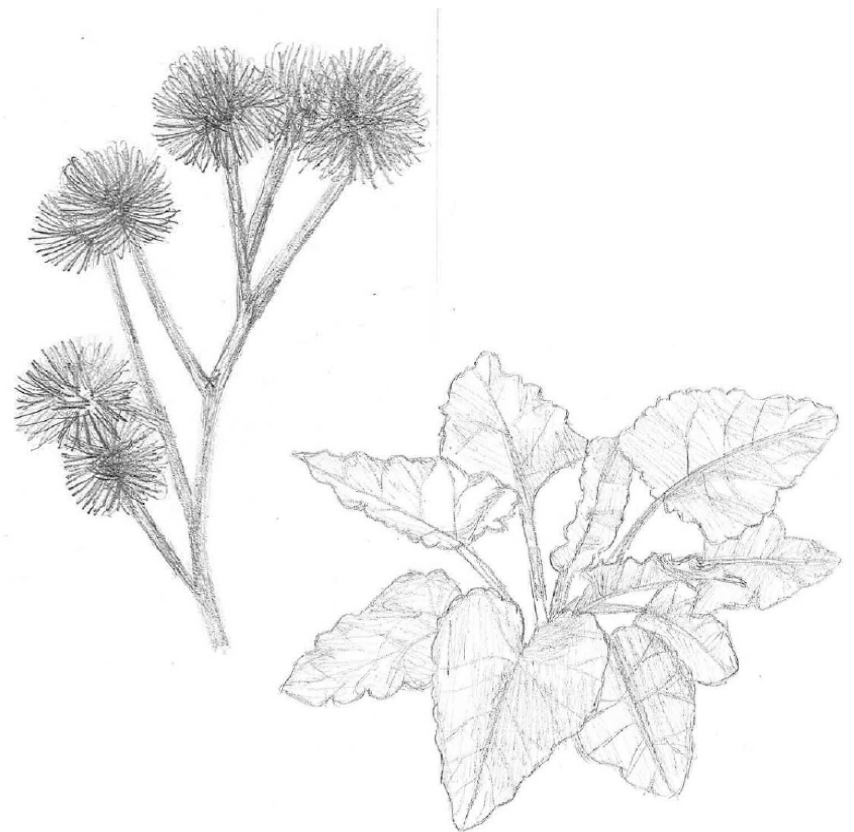
The sour-sweet fruit of wild grape are a major source of both food and shady cover for birds, insects, and a number of mammals including skunks, opossum, and raccoons. While they do not eat the grapes, white-tailed deer and cottontail rabbits will sometimes forage on the foliage and the tender stems of the vines.

There is a short window to pick wild grapes as they are often sour until after a frost and then quickly turn sweet-tart. However their culinary uses are numerous. In addition to simply eating grapes right off the vine, students and staff have made them into jelly and wine. The fruit of wild grape plants is not to be confused with the fruit of moonseed which is similar, and poisonous. The leaves of moonseed are not toothed, like those of wild grape, and the fruit has a single seed inside, whereas wild grape has multiple seeds.

A lesser known use for the highly fibrous grapevines around the Arboretum is papermaking. Students in a Winter 2017 offering of a Studio Art class on sustainable papermaking used grapevines harvested from the Arboretum. To make paper, the vines are first boiled down in a caustic solution to remove everything but the most basic form of fiber in the plant: cellulose. What remains after hours of boiling is then beaten to a beige or brownish pulp at which point it can be not only made into paper, but also added to clay, or even used to paint with. While any fibrous plant or peeling bark can be converted to pulp (cattails, pine needles, and

Common Burdock

Arctium minus



Common burdock is an invasive weed from Europe which is now likely in every Minnesotan county, identifiable by its thistle-like flower heads and its rounded hairy leaves which grow up to two feet long and over a foot wide. Its massive taproot (a central, deep straight root) does not respond well to herbicide control, and the plant has a persistent seed bank, making it challenging to eradicate. Common burdock is not to be confused with rhubarb, which has similar shaped leaves but no hairy undersides. This bitter-tasting foliage is not generally eaten by mammalian herbivores unless nothing else is available, and may even be poisonous to rabbits.

The flowers of common burdock are pollinated primarily by long-tongued bees. The flowerheads, which are green and accented with pink or purple during the midsummer bloom, turn brown in the fall and form a burr. Humans and animals unwittingly

unwittingly disperse the seeds as the burrs cling tenaciously to fur and clothing. Burrs can be thrown on people for a laugh, meanwhile spreading the seed of this invasive plant far and wide in an ignorant act of mirth. Be careful though, handling the burrs extensively can cause skin aggravation!

Carleton students at Farm House have used common burdock for steam pit cooking, as burdock leaves are good for wrapping vegetables, fish, or meat to put in a fire pit. Students have also used the large leaves as plates. The root of the plant can also be harvested and consumed. Once a common burdock is a year old, the massive taproot can be chopped up, roasted, and steeped to make tea that is similar in flavor to coffee.

In the Arboretum, common burdock is often found in full or partial sun on woodland edges, roadsides, and other open areas.

Stinging Nettle

Urtica dioica

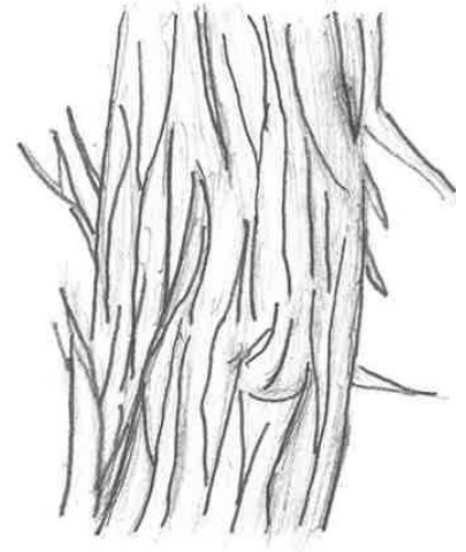


drill: wrap a string around a wooden spindle, then use another stick to spin the spindle and superheat it.

Eastern cottonwood can be found in partial shade in the woods, on floodplains, and in lowland forest along the riverbank.

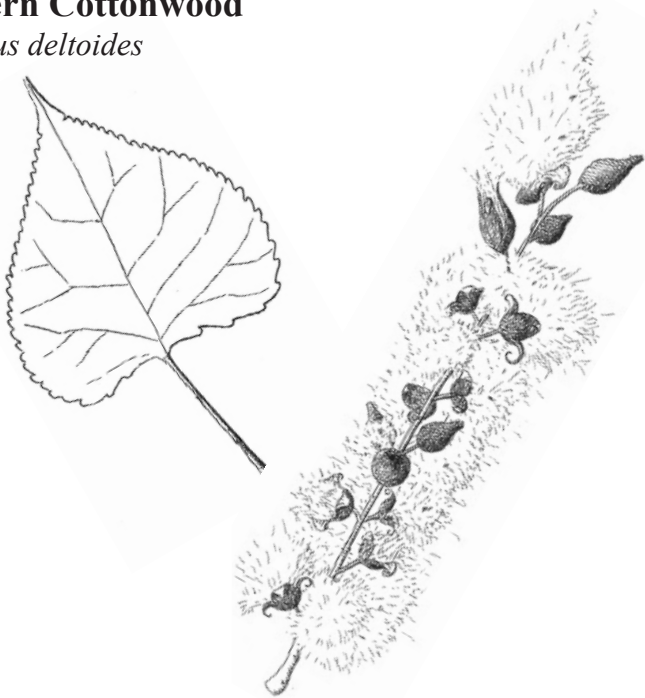
Wild Grape

Vitis riparia



Eastern Cottonwood

Populus deltoides



In the winter, the thick, deeply furrowed brownish-gray bark is the most recognizable feature of Eastern cottonwoods. This fast-growing tree is native to Minnesota and has a wide range throughout the country. Out of the native trees in the Arb, cottonwoods are the largest, growing up to 100 feet in height and seven feet in diameter at breast height. The tree has alternate, broad, triangular leaves and fruits that are green and shaped like eggs. When these fruit split they release large amounts of cotton-like seeds into the wind.

The highly fibrous inner bark of cottonwood has been used by Carleton students to make string and rope and to start fires. When you find a dead log, you can pull away the corky outer bark to reveal the dry stringy inner bark which you can then peel out in big strips. Rubbing these together will help to separate the fibers. If not being woven into string, the fibers can serve as a perfect little tinder bundle to start a fire. With extremely soft wood, Eastern cottonwood is also good for making a fire-starting device called a bow



Stinging Nettle is a native understory plant and is dominant and widespread throughout much of the country. It can grow up to six feet tall. As the plant takes well to disturbed areas, it is liable to become weedy or invasive in many areas.

Nettle blooms from June through August, each plant with a mix of separate male and female flowers, cream colored and clustered densely along the length of the stems. The leaves of the plant are heart-shaped and have toothed edges. The plant is perhaps most well-known for the stinging sensation it produces upon contact with bare skin; the bristly hairs covering its stalk are filled with formic acid, causing an instant burning and often inciting a mild rash which can last up to a few hours.

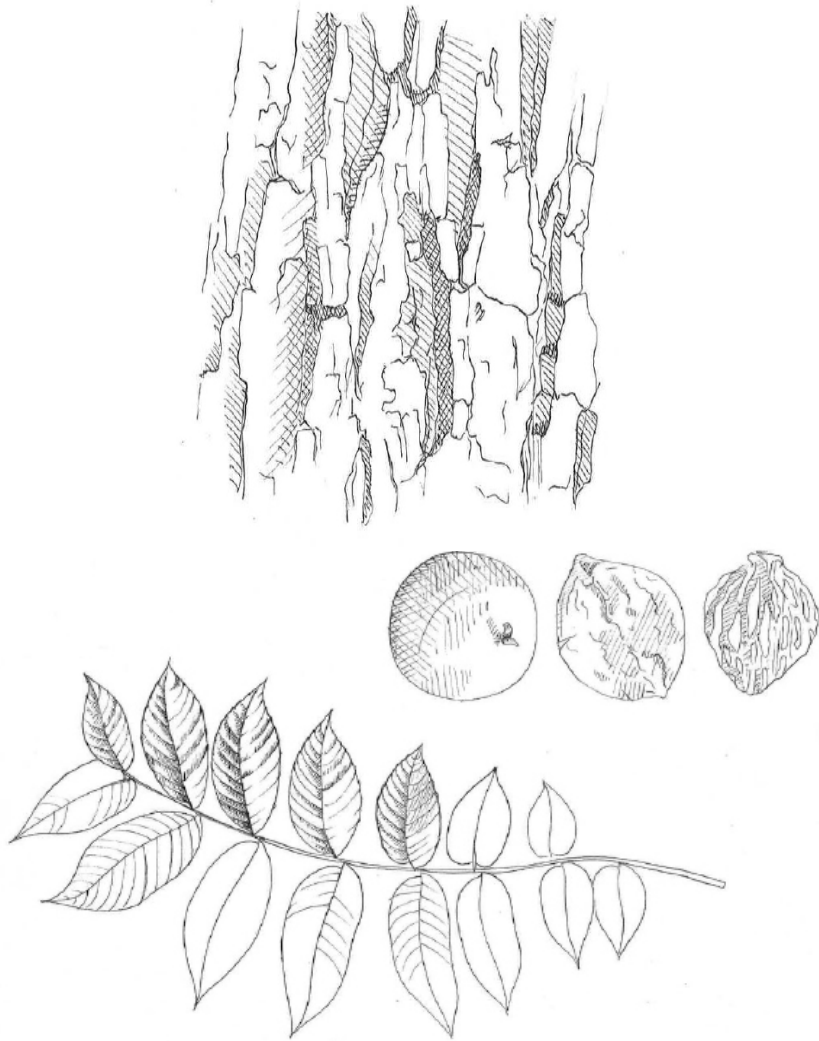
Surprisingly, stinging nettle, when handled correctly has a variety of medicinal and culinary uses. Farm House students often cook stinging nettle as a hearty vegetarian side dish high in protein. Once the stalk has been boiled long enough, the spines become limp and the stalk can be eaten as a filling vegetable with an “umami” quality to its taste, especially delicious when seasoned with soy sauce, ginger, and garlic. Farm House has also been known to bake nettle into bread (to the delight of some and the dismay of

Additionally, tea made from dried nettle leaves is known to be an excellent detoxifier and good for the liver.

In the Arboretum, stinging nettle may be found in a variety of habitats: shaded or sunny, wet fields, ditches, or open woods. It often grows along trail edges so be careful not to brush it as you pass by!

Black Walnut

Juglans nigra



Black walnut is a long-lived tree which typically take about 150 years to reach full size and can live up to 250 years. They have large compound leaves that emit an acrid smell when crushed, and crosshatch-patterned bark that changes to a knobby texture as it matures. The only walnut species native to this area, black walnut produces edible hard-shelled nuts that are a favorite food of red and gray squirrels and people with enough patience and strength to collect and crack the nuts. The nuts ripen between September and October at which point their yellow-green corrugated husks become a deep brown. Squirrels and other animals aid in the trees' seed dispersal when they bury nuts for winter storage; forgotten nuts will then sprout during the following spring or the spring after.

Black walnut is a staple hardwood in Professor Stephen Mohring's sculpture classes. It is admired for the deep, dark color it takes on when oiled and is a favorite for table making. Walnut is just one of many types of wood that sculpture students source from the Arboretum, however. Other trees that often make it into the faculty-operated and student-staffed sawmill of the sculpture studio include hardwoods such as cherry, maple, oak, elm, and ash, as well as occasional softwoods such as cedar and spruce. Sourcing lumber from the Arboretum, though labor intensive, makes good use of trees that are already being removed as part of restoration efforts. Just as importantly, it gives sculpture students a chance to engage more fully with the harvesting process, and to interact with their materials as local and living resources rather than simply purchased commodities. The growing collaboration between the sculpture studio and the Arboretum is part of a larger effort to supplement sculpture classes with more information about the biology, growth, and harvesting factors that come before trees are processed. For example, did you know that for maple and some other trees subjection to variable wind may affect the grain patterning of the wood?!

Black walnut populates the early successional upland forests of the Arboretum and is also a common sight closer to campus in partially shaded to sunny areas.