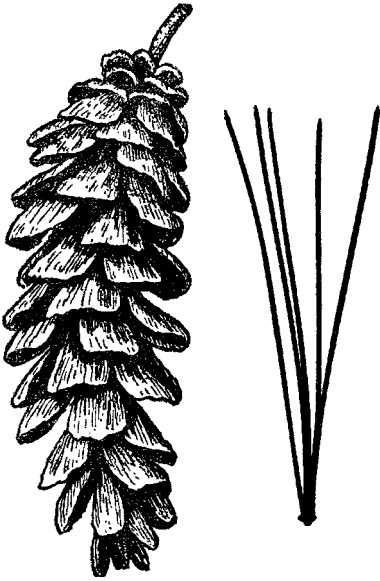
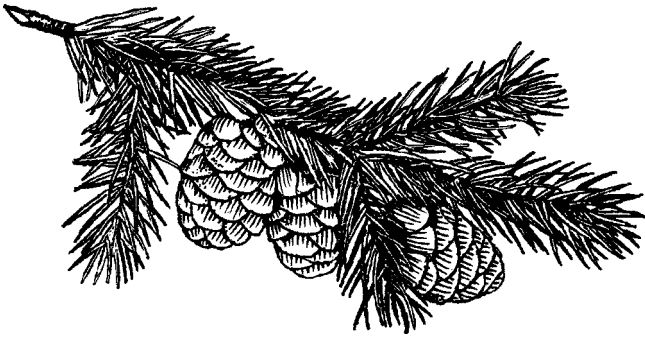


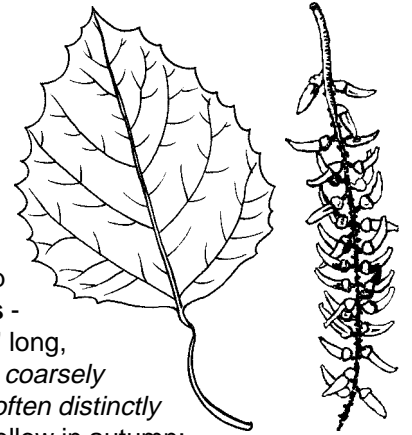
FORESTRY

BLACK SPRUCE - Small to medium tree, 25' - 30' (50') tall; slender pyramidal crown, often with dead lower branches; trunk up to 12" diameter. **Leaves** - needlelike, 1/4" - 5/8" long, blunt tips, blue-green. **Seed cones** - egg-shaped to nearly round, 1/2" - 1-1/4" long, purple (brown when ripe), irregularly toothed scale margins, open or closed scales.



BIGTOOTH ASPEN

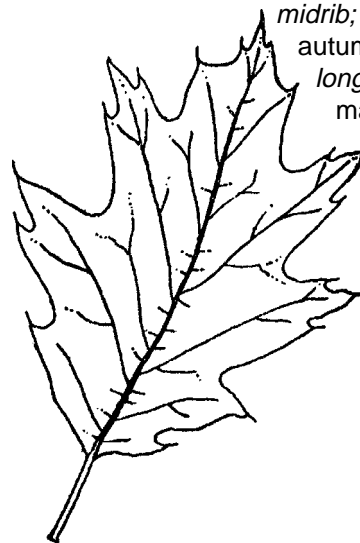
Medium to large tree, 40' - 60' (90') tall; open rounded crown; trunk up to 24" diameter. **Leaves** - alternate, simple, 2" - 6" long, 1" - 3" wide, firm, waxy, *coarsely toothed margins, teeth often distinctly curved*, yellow-green; yellow in autumn; leafstalk flattened. **Fruit** - capsule, splits into two parts; contains numerous seeds with cottony hairs; capsules grouped in 3" - 6" long catkins, mature in late spring.



EASTERN WHITE PINE - Large tree, 40' - 70' (100') tall; oval or irregular crown with horizontal branches spaced in annual whorls along the trunk (plumelike outline); trunk, buttressed when mature, up to 42" diameter. **Leaves** - needlelike, 2-1/2" - 5" long, 5 per bundle, soft, flexible, bluish-green. **Seed cones** - 4" - 8" long, flexible, resin-coated scale tips (white).



SUGAR MAPLE (Hard Maple) - Large tree, 40' - 70' (80') tall; broad, round or oval crown; trunk up to 36" diameter. **Leaves** - opposite, simple, 3-1/2" - 5-1/2" long, nearly as wide, palmately lobed; lobes: 5 (rarely 3), rounded crotches, smooth or wavy margins; light green; yellow, orange or deep red in autumn. **Fruit** - Samara, 3/4" - 1-1/4" long, U-shaped pairs with nearly parallel wings, mature in autumn.

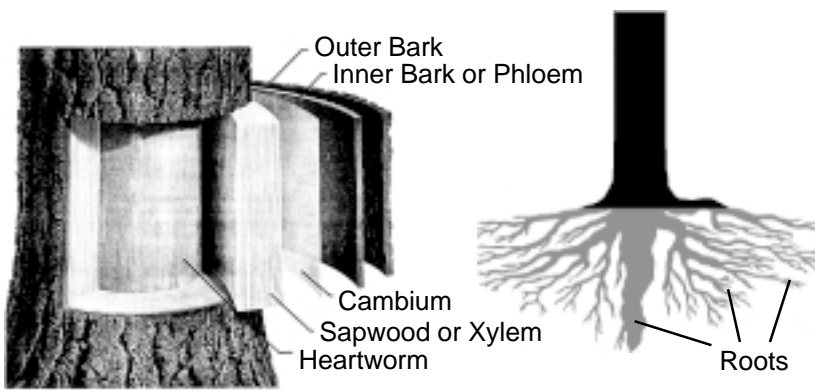


NORTHERN RED OAK - Large tree, 60' - 70' tall; broad, rounded crown with spreading branches; trunk up to 36" diameter. **Leaves** - alternate, simple, 4" - 9" long, 3" - 6" wide, pinnately lobed; lobes, 7 - 11, bristle-tipped, wavy crotches cut halfway to midrib; dull green; brown or dark red in autumn. **Fruit** - acorn; 5/8" - 1-1/8" long, saucerlike cup (very shallow), mature in autumn.

RED PINE (Norway Pine) - Large tree, 40' - 60' (100') tall; symmetric, rounded crown with stout, horizontal branches spaced in annual whorls along the trunk; trunk, buttressed when mature, up to 36" diameter. **Leaves** - needlelike, 4" - 6" long, 2 per bundle, break cleanly when bent, dark green. **Seed cone** - 1-1/2" - 2-1/4" long, scale tips *narmed*, pairs usually stick out at right angles from branch.



FORESTRY



PARTS OF A TREE

A. Annual rings

Reveal age of tree by showing new growth (xylem) added each year.

B. Cambium

Layer of cells which divide and grow to produce a new layer of bark and wood between the old bark and wood each year.

C. Outer bark

Protects tree from weather, insects, disease, fire, and animals.

D. Inner bark (Phloem)

Food made in leaves moves down through these cells to branches, trunk, and roots for growth and storage.

E. Sapwood (Xylem)

Sap rises through these cells from root to crown (the uppermost branched, leafy part of a tree). Food for seed production and for new tree growth is also stored here.

F. Heartwood

Old, non-functional xylem. These transport cells have become plugged. The sapwood and heartwood are the source of lumber and fiber.

G. Roots

Provide support for tree by penetrating the soil, absorbing water and minerals from the soil.

Interesting Root Facts:

- * The major tree roots grow horizontally, just below the surface. Smaller roots can even grow up towards the surface.
- * Roots often spread twice as far as branches, if the space is available.

H. Leaves/Needles

Make food for tree by combining carbon dioxide from air and water from soil in the presence of sunlight.

The Forest Industry

Forestry is not often considered a part of agriculture. However, the United States Forest Service is an agency in the United States Department of Agriculture. The forestry industry is very important to our nation's economy as well as Michigan's. The magnitude of Michigan's timber industry is reflected by the fact that half the state's land is forested. Lumber, furniture, pulp and paper products contribute billions of dollars to the state's economy annually. The most common trees include Aspen, Spruce, Balsam Fir, Birch, Ash, Maple, Northern White Cedar, Tamarack, Pine, Oak and Elm.

Forest Management

Forest management is more than just harvesting trees. It involves sensitivity towards other natural resources. Great care is taken to follow state and national regulations and guidelines in order to protect the environment. Some of these practices include ways to prevent runoff of soil and water into lakes and streams and minimize erosion. Pulp and paper companies have responded vigorously to national concern about solid waste disposal. Forty to fifty percent of all paper and paperboard consumed in the United States is recycled each year. Through careful management, timber volume is more than twice that which existed in

1936. Each year in Michigan, far more trees are planted and grown by natural regeneration than are harvested.

Major Product Categories Include:

- Pulp and paper
- Lumber
- Logs, wood bolts
- Specialty products
- Fuelwood
- Christmas trees and wreaths
- By-products
- Posts, poles, pilings
- Railroad ties
- Millwork/cabinetry
- Panel/strandboard

Agroforestry

Agroforestry provides an alternative agricultural opportunity for many Michigan farmers. It is the purposeful growing of trees and/or shrubs and other agricultural commodities in interactive combinations for a variety of objectives. Benefits are increased crop production, diversified rural economies, improved water quality, erosion and sediment control and wildlife habitat. Active agroforestry research has been going on for the last two decades, however most has been on the interaction of crops and trees as it relates to crop and biomass production for mulching or animal purposes.

As practiced in the U.S. today, agroforestry can be categorized into five systems:

1. Windbreaks - Trees and shrubs planted in a row or rows to reduce wind speed and soil erosion, saving valuable soil to enhance production of crops while providing habitat for wildlife.
2. Alleycropping or intercropping - Planting rows of trees at wide spacings and cropping the alleyways.
3. Silvopasture - Intensive management of forages grown with trees for pasture purposes.
4. Riparian Buffers - Combinations of permanent vegetation planted and/or managed on the stream bank to improve aquatic habitat and trap non-point-source pollutants.
5. Forest Farming - Natural forests which are managed for the cultivation of special forest products such as mushrooms and ginseng.

The most widely used agroforestry system in Michigan is windbreaks. The other systems are not currently used very much, but opportunities exist for them in certain conditions and locations.

