

WOOD IDENTIFICATION FOR SURVEYORS

From F. Henry Sipe, *Compass Land Surveying*

The surveyor's need to identify the species of wood is less frequent than telling the kind of tree. But on occasion the species of a stump, log or root can be important. It would not be proper to decide that a certain stump was the corner unless it was the species called for (or was a very similar species).

The trees most commonly called for in West Virginia deeds are: oak, chestnut, hemlock, beech, hickory, maple, poplar, locust, gum, birch, dogwood, sassafras, cherry, cedar, lynn, pine, spruce, ash, cucumber, sycamore, sarvis, walnut, and elm. This group deserves the most study for wood identification.

For wood identification the surveyor should acquire four things: a good key scheme, a collection of wood samples, a very sharp knife, and a hand lens of 2 and 4 power. The USDA *Yearbook Trees* and the *Forestry Handbook* have good and identical keys.

The surveyor should make his own collection from logs, stumps, roots, sawmills, wood processing plants, etc. All should be carefully labeled as to species and, if on a survey, where found.

To examine a wood specimen, try to obtain a piece of heartwood, because (a) the keys are based on heartwood, and (b) the sapwood is often thin and rotted away. Then saw or cut so as to obtain an end (cross section) and two longitudinal (side) sections at right angles to each other (a radial section parallel to the tree radius, and tangential at right angle to the radius). To understand wood technology, a surveyor should learn some terms:

1. *Pores*. Rounded openings on end cuts, and fine grooves on side cuts. Pores may be so small that they are not visible to the naked eye, or they may be large enough to be easily seen.
2. *Ring-porous*. When large spring pores are visible to the naked eye and the small summer pores are not.
3. *Diffuse-porous*. No large pores; small ones may be a little larger on the spring growth.
4. *Rays*. Marks, lines or bands differing in color from surrounding wood and containing no visible pores. Rays visible on end and side cuts.
5. *Annual rings*. The wood grown in one year.

The following key is adapted from the key in USDA *Yearbook Trees*, with comments by the author. Only the more common species are listed. The key is based on heartwood (usually darker than sap-wood) unless otherwise stated. It is based on fresh-cut wood with average ring width, and *without a lens*. A lens, however, may clarify minute details.

HARDWOODS

I. Pores visible.

A. Ring-porous.

1. Summerwood on end cut has light and dark irregular V-radial designs or patches.
 - a. Many rays broad and conspicuous; wood heavy. *Oak*. Two wood groups—white and red; it is possible only to tell which group the wood belongs to.
 - a-1. Wood has reddish tinge; large pores usually open.
Red Oaks (red, black, scarlet, pin, Spanish).
 - a-2. Wood usually yellowish brownish without reddish tinge; large pores mostly closed (except chestnut oak). *White Oaks* (white, post, chestnut).
 - b. Rays not noticeable; color brownish; wood lighter than oak. *Chestnut*.
2. Summerwood has short or long wavy tangential lines.
 - a. Heartwood brown with red tinge.
 - a-1. Tangential bands long, conspicuous in summerwood:
Elm.
 - a-2. Bands short, inconspicuous and in outer summer-wood; springwood several pores wide. *White Ash*.
 - b. Heart yellowish to greenish brown; pores closed; rays indistinct; one of our heaviest woods. *Black Locust*.
 - c. Heart silvery brown, with spicy odor and taste; rays indistinct; wood heavy. *Sassafras*.
3. Summerwood radial or tangential patterns not visible without lens; heart reddish brown; sap over 1" wide; one of our heaviest woods. *Hickory*.

B. Diffuse-porous.

1. Single pores plainly visible on end and side, larger in spring-wood; rays smaller than largest pores; pores not in radial groups across rings.
 - a. Heart chocolate or purplish brown; wood heavy. *BlackWalnut*.
 - b. Heart light chestnut brown with springwood darker than summerwood. *White Walnut*.
2. Single pores barely visible in good light and smooth surface; pores fairly uniform size throughout, not crowded on end cut; heart red-brown; wood heavy. *Birch*.

II. Pores not visible.

A. Rays broad, conspicuous; heart shades of light reddish brown.

1. Rays crowded on end, up to 3/16" long on side cuts, make pronounced crowded "flakes" when quartersawed; summerwood not darker or denser; interlocked grain; heavy. *Sycamore*.
2. Broad rays not crowded, up to 1/8" long on side cuts, producing scattered "flakes" when quartersawed; distinct, denser darker band of summerwood; straight grained and heavier than sycamore. *Beech*.

B. Rays not conspicuous but visible.

1. Heart deep rich red-brown; annual rings well defined; rays distinct. *Black Cherry*.
2. Heart light grayish brown with red tinge; rings clearly defined by thin darker reddish-brown layer; rays very distinct.
 - a. Wood heavy and hard to cut across grain; pith flecks rare. *Sugar Maple*.
 - b. Wood not so heavy and easier to cut across grain; pith flecks often abundant. *Red and Silver Maple*.
3. Heart light yellow-brown, with greenish tinge, sometimes purplish; sap wider than 1"; rings and rays distinct.
 - a. Wood moderately light. *Yellow Poplar*.
 - b. Wood moderately heavy. *Cucumber*.
4. Heart creamy brown; sap wide, not sharply defined from heart; rays fairly distinct; very light wood. *Basswood*.

C. Rays not distinctly visible

1. Rings not clearly divided into band of soft springwood and denser and darker band of summerwood; rings inconspicuous.
 - a. Heart distinctly darker than sap.
 - a-1. Heart reddish-brown; wood fairly heavy. *Birch*.
 - a-2. Heart grayish brown; wood crossgrained. *Black Gum*.

SOFTWOODS

2. Rings clearly divided into band of soft springwood and denser darker band of summerwood; rings more pronounced than 1.
 - a. Wood resinous as shown by exuding pitch, pitch streaks and pockets especially if heated, or by longitudinal resin duct lines from less than 1 inch to several inches long.
 - a-1. Heart darker than sap, reddish brown or orange brown; resin ducts abundant.
 - b-1. Summerwood not conspicuous and not much darker or harder than springwood. Wood light or moderately so. *White Pine*.
 - b-2. Summerwood conspicuously darker and harder than springwood; wood heavier than b-1. *Other Pines*.
 - a-2. Heart not much darker than sap; resin ducts scarce and inconspicuous; wood has no distinct odor. *Spruce*.
 - b. Wood not resinous.
 - b-1. Heart darker than sap, light brown to dark reddish-brown; aromatic odor and taste. *Cedar*.
 - b-2. Heart not much darker than sap when dry; all wood pale reddish brown. *Hemlock*.

Dogwood is not listed in the key. Rings are present; pores numerous, small to minute but distinct with lens, well distributed and rarely radially connected; rays heterogenous of two sizes; heart small and red brown to light chocolate; sap pinkish; wood hard and our second heaviest.

Sarvis is not listed in the key. Thick brownish sapwood; the brown or red brown heart is absent on small trees; brown pith flecks; wood hard and probably our heaviest; grain straight.

Durability of Wood

The surveyor may occasionally need to set a wood marker at a corner or for reference, although wood is inferior to stone or iron. The *heartwood* of certain species such as black locust may last for 30 years or more. The following list of the more durable species (heartwood) is in order of durability in contact with the ground, as stated in the *Wood Handbook*: cedar, chestnut, locust, mulberry, and black walnut. Cypress, catalpa, and osage orange are good if they can be obtained. *Sarvis* heartwood is said to be durable. Moderately durable are: white oak, sassafras, and white pine.

NOTE: The use of wood for survey corners would not meet today's minimum standards, and this paragraph is included here merely for the information it contains regarding relative durability of different species of wood.