

wood and which as hardwood? Compare the various kinds as to brittleness, toughness, weight, colour, texture, etc. Which warp most or split most on drying? Which kinds have the prettiest "grain"? Which would make prettiest floors and furniture? Try to find a piece of bird's-eye maple, what would it be good for? Is *bird's-eye* a different kind of maple from rock maple or red maple? How many kinds of maple do you know?

Possibly some boy has a plane, and could smooth pieces of each kind of wood for a school collection. Where a manual training department exists, such a collection would already exist.

Besides identifying the kinds of wood in the wood-pile, the child can readily estimate the age of a tree by counting the annual rings of growth. Did the tree grow equally rapidly each year? Are any other marks noticeable on the end of a log besides "rings"? Look at newly-sawed lumber, and see how these marks on the end of the log appear on the surface of the board. How do you explain the presence of large knots in some boards and not in others? Why do wide boards often have small knots near the centre, but none near the edge? Can you tell which boards came from the heart of a tree, and which from near the outside? Do heart-wood and sap-wood look alike in all trees?

Where branches have been cut off, see if the "heart" of the branch is in the centre. If not, why not? Is there any relation between the position of the "heart" and the angle at which the branch meets the main trunk?

The wood-pile furnishes other topics. March is maple sugar month. Have the students look for sap running from the end of a log. Does sap come down from the top of a tree or up from the roots? Do you find it on both ends of a log in the wood-pile? Did you ever find it exuding from the top of a stump in the woods? Then what is your conclusion as to the direction of sap-flow? Does sap flow from other trees besides maple?

What else of interest can we find in the wood-pile? Notice the *lenticels* in the bark of birch trees. What is their origin and use? [See December number.] How many kinds of birch do you find?

Compare the bark of the various trees as to thickness, roughness, cracks, etc. Notice the thick, reddish bark of hemlock. What is it used for? (Look up "tanning" in the dictionary.)

Look for lichens on the wood. Are they equally abundant on every side of the tree? Look on grow-

ing trees in the woods for this? Can you find any difference in the abundance or distribution of lichens in open woods and dense woods? Where are lichens most abundant on horizontal branches? Why? How many kinds of lichens can you find on the wood-pile? Do you find any mosses there? Is "Old Man's Beard" a moss or a lichen? Its Scientific name is *Usnea*.) Can you quote a reference to it in any poem? Possibly some of the children have seen their mothers use a certain lichen for making dye.

The birch and beech trees are almost sure to have a small dark-brown spreading growth clinging to the bark, and reminding one of frost-pictures on a window. This is a Liverwort (*Frullania*).

Does the wood-pile contain any hollow logs? How does a tree manage to live when its heart-wood is gone? Is heart-wood necessary to a tree's existence? What purpose does it serve? What purpose has it served in the past life of the tree?

Look for a tree that has been wounded at some time. Notice how the wound gradually heals.

The wood-pile could be profitably followed farther. When it is burned, ashes are left. Compare the weight and volume of the ashes with the weight and volume of the wood from which they came. What became of the rest of the wood? Where did the tree, while growing, get the material which becomes ashes? Where did the rest of the tree come from?

Collect some water that has leaked through a bucket of ashes. Evaporate it. What is left? (Find out how soft soap is made.) Are ashes good fertilizers? Is sawdust a good fertilizer? Does not sawdust contain all the materials that are in ashes? Then why is it not so good a fertilizer?

Would it not be well to try a few flowerpot experiments on ashes as a fertilizer? First, try equal volumes of hardwood and softwood ashes. Also try equal weights of these. Which is better, bulk for bulk? Which is better, pound for pound?

A tree, in growing, gets a small portion of its material from the ground. The rest comes from the air and from water. When it burns or decays, does it return to its source? If, for ages, trees grow and die on the same soil, do they enrich that soil or impoverish it?

Old Gentleman—"Getting on well at school my boy—got a good place in your class, eh?"

Jones, Minor—"Yes, sir, next the stove."—*The Tattler*.