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TECHNICAL NOTE

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COLOR TESTS FOR DIFFERENTIATING HEARTWOOD AND
SAPWOOD OF CERTAIN OAKS AND PINES

Two chemical color tests have been developed by which sapwood and heartwood of certain oaks and pines can be readily differentiated. Both consist of the application of a chemical solution with a small camel's-hair brush across the grain of the wood on any surface. Their only difference is in the chemical solution used, which is determined by the kind of wood to be tested. Both color the heartwood red and the sapwood yellowish.

Test for Oaks¹

The chemical solution used to distinguish heartwood from sapwood in oak is Taylor's concentrated Benzo Yellow pH indicator, a chemical used for making acidity tests. Its reaction to the more acid heartwood and to the less acid sapwood produces the characteristic color differentiation. A minute or longer may be required for the full development of color. Occasionally the red heartwood color occurs mainly in the wood rays, and in such cases a hand lens will aid in observing it.

The chemical has been found to give generally good results with Oregon white oak, white oak, chestnut oak, swamp chestnut oak, Northern red oak, black oak, scarlet oak, and roble (Quercus copeyensis). It apparently is about equally effective on green and on seasoned wood. Indefinite or erratic results may be obtained, however, when it is applied to wood treated with preservative chemicals, to wood exposed to long weathering, or to wood infected by stain or decay fungi, molds, or the organisms present in "sour" logs. Consequently, the test is not recommended for use under any of these conditions.

¹Developed by the Division of Forest Pathology, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Madison 5, Wisconsin.

Test for Pines

The boundary between heartwood and sapwood is frequently difficult to recognize with certainty in the pines. A chemical solution found to be effective in distinguishing one from the other in Southern yellow pine, lodgepole pine, and red pine, and which gives fairly good results with Western white pine, sugar pine, and ponderosa pine as well, can be made as follows:

Dissolve 5 grams of benzidine in 23 cubic centimeters of 25 percent hydrochloric acid and 970 cubic centimeters of water. (NOTE: concentrated c.p. hydrochloric acid contains about 38 percent of the acid; to make a 25 percent solution, pour out 25 cubic centimeters of chemically pure concentrated acid and add to it enough water to make 38 cubic centimeters of liquid.)

Next, prepare a 10 percent solution of sodium nitrite.

When ready to make tests on wood, mix the two prepared solutions in equal amounts. When the mixture is applied to the wood, color reaction takes place in a few moments, the sapwood appearing yellowish brown and the heartwood red.

The mixture, as tested so far, does not produce useful colorations on beech, oak, larch, the spruces, Douglas-fir, or the true firs.