

THE HISTOLOGICAL DIFFERENCE BETWEEN *PINUS TAEDA* AND *PINUS PALUSTRIS*.

BY KATHERINE GOLDEN BITTING.

Though the structure of the wood of a tree will show considerable variation due to environment and conditions of growth, the variation will be manifest in the amount of wood formed, and the size of the cells. The characteristics which distinguish the particular wood remain constant, no matter what the external conditions may be, so that it is always possible to distinguish the wood of any species by the use of the microscope. It is not always possible to distinguish woods macroscopically, even by expert lumber men. This is particularly true of Coniferous woods, which are composed of only one form of element, the tracheides.

The close macroscopical resemblance of many Conifers, coupled with the variety of local names possessed by nearly every species, has caused much confusion in the lumber business. At present when a certain lumber is specified in a contract, many times the only guarantee that the contract will be properly filled will be the resemblance to the lumber named, along with information as to the locality from which it was shipped, the latter being the more reliable, if it be known to furnish pure groups.

Two of the hardwood Conifers which are confounded are *Pinus taeda* and *Pinus palustris*, or as they are more commonly known, Loblolly and Longleaf pine. In addition to these Loblolly has twenty-two other common names, and Longleaf twenty-seven, three of which are common to both.

Pinus taeda is of wide distribution, due to its adaptability to grow in different soils, consequently it shows considerable variation in its annual growth in both height and diameter. The best lumber is obtained from trees grown in mixed forests on well drained and fertile soil. These trees give the greatest growth in height, and a slower growth in diameter, both varying with the age of the tree. The zones of the spring and summer wood in the annual ring are nearly equal in extent, the spring wood shading gradually into the summer wood. In the gross, the zones are fairly distinct, but under the microscope it is difficult to define their proximate limit, as seen in the transverse and radial sections. The tracheides in

cross-section are approximately square or oblong, those in the summer wood being much thickened, leaving an irregular-shaped opening. The thickness varies from .00454 mm. in the spring wood to .0106 mm. in the summer wood. The length and width of the tracheides also vary, those in the spring wood being 6.444 mm. in length by .05606 mm. in diameter, those in the summer wood being 6.735 mm. by .03333 mm., being very slightly longer but decreased considerably in diameter, the decrease in width being accompanied by a greatly increased thickness. These figures are taken from the early spring and the late summer tracheides.

The resin ducts occur singly in both the spring and summer zones.

The medullary rays are somewhat obscure, one row of cells in width and 2 to 17 cells in height, except those which contain resin ducts, which widen and have a greater height.

In the longitudinal sections, the walls show striations which are fairly prominent, but have very little bowing apart of the walls.

Pinus palustris requires a drained soil in which to grow, its seed years occur at longer intervals, and thus it has a more limited distribution than *P. taeda*. It also has a lesser height and diameter, but has a finer grain, and greater weight. The zones of the spring and summer wood are distinct from each other, showing in well-marked lines, the summer wood appearing oily and compact as against the lighter line of the spring wood. The summer zone varies from about one-third to one-half of the annual ring. The two zones are so distinct that unless the thickness of the walls be noted carefully, the only difference between the limits of the summer wood is that the first growth shows an irregular line, whereas, the end of the zone for the year's growth forms a clean-cut ring.

The tracheides in transverse section are approximately square or oblong, with approximately round or elliptic openings left in the summer wood. Those in the spring wood average 4.4555 mm. in length by .04356 mm. in diameter, and the walls .00643 mm. in thickness. The summer tracheides average 4.8533 mm. in length by .0409 mm. in diameter, and the walls .01363 mm. in thickness. There is only a slight difference between the tracheides of the spring and summer zones in length and diameter, but the thickness of the walls is more than doubled.

The resin ducts occur singly, near to, and in, the summer wood.

The medullary rays are conspicuous, being one row of cells, rarely more, in width. They vary from 2 to 28 cells in height, except those containing resin ducts, which are much larger.

The walls of the tracheides bow apart to such an extent as to appear like a string of beads in the longitudinal sections.

In distinguishing the woods of the two trees the factors which are most prominent and also most readily obtained are in *Pinus taeda*, the junction of the spring and summer wood, in the year's zone, not distinct, the medullary rays somewhat obscure, and close together; in *Pinus palustris* spring and summer wood distinct from each other, the medullary rays conspicuous and farther apart, having a ratio of 4 to 11 to those in *Pinus taeda*. The other differences noted might be used in verification, but are not essential in the differentiation of the two woods.

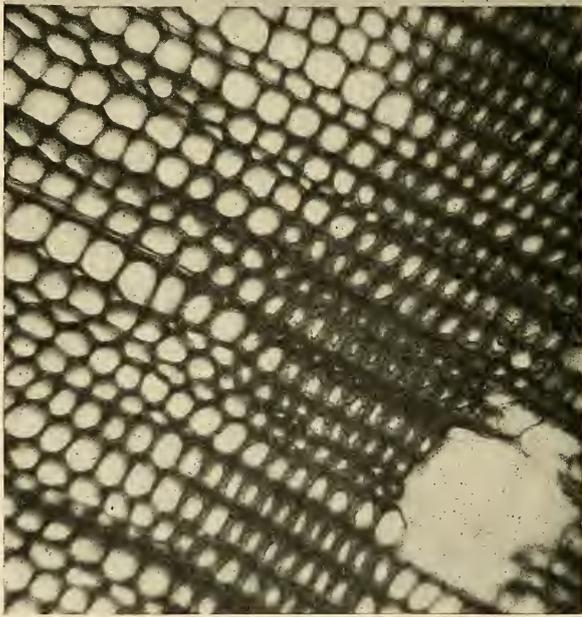


Fig. 1. *Pinus taeda*. Trans. sec. x 110.

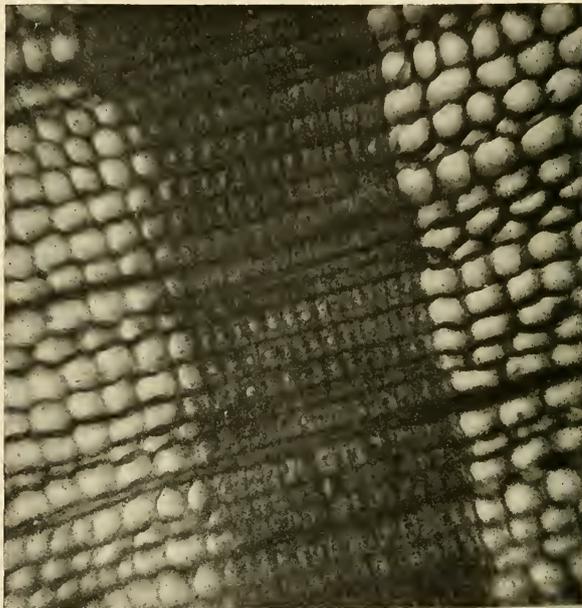


Fig. 4. *Pinus palustris*. Trans. sec. x 110.

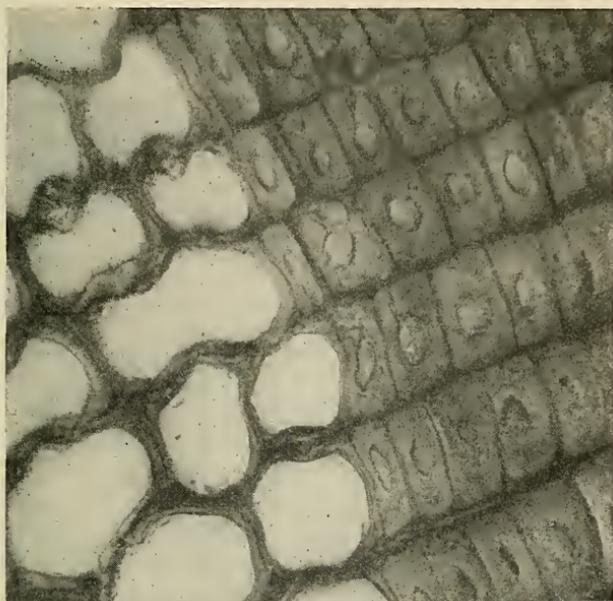


Fig. 5. *Pinus palustris*. Trans. sec. x 395.

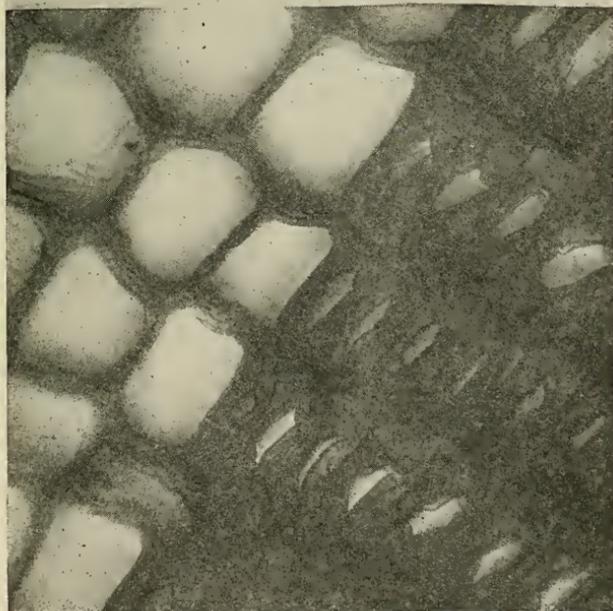


Fig. 2. *Pinus taeda*. Trans. sec. x 395.

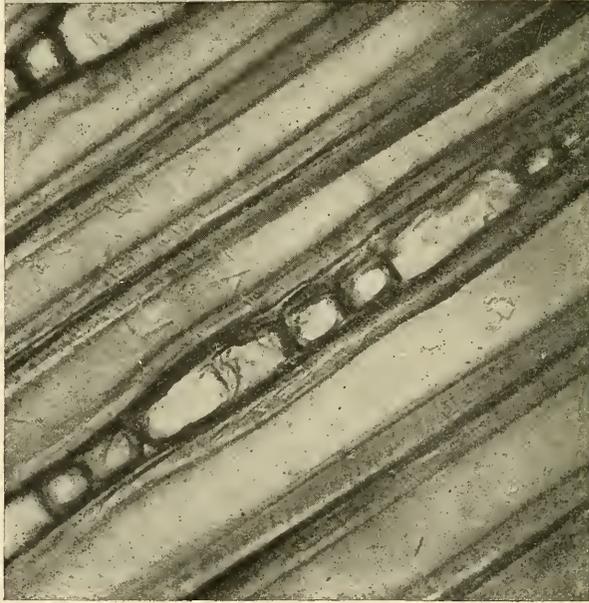


Fig. 3. *Pinus taeda*, Tang. sec. x 895.

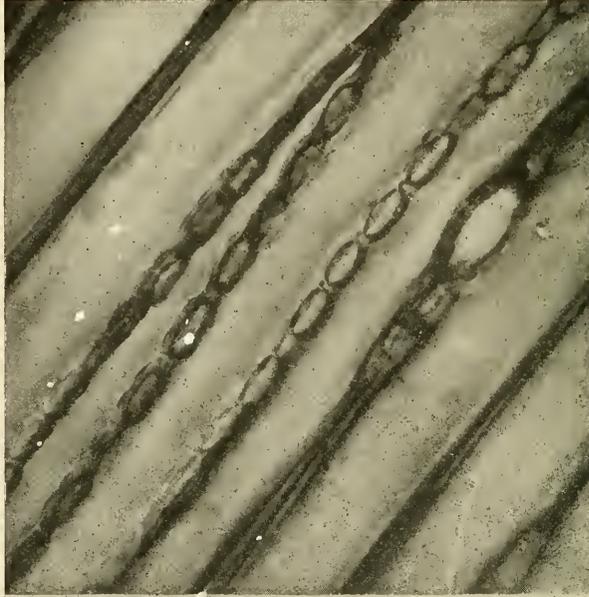


Fig. 6. *Pinus palustris*, Tang. sec. x 895.