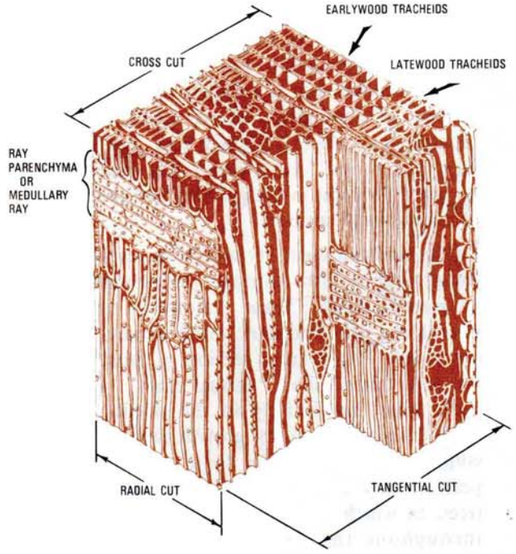

Fig. 13-6. Cell structure of softwood (highly magnified).

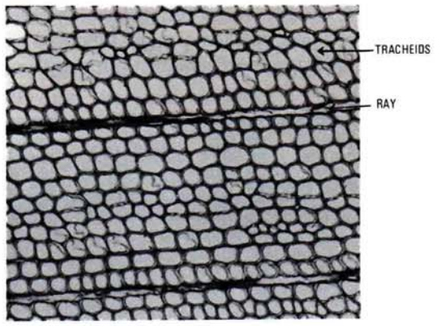

Fig. 13-7. Cross-section of softwood, showing tracheids and ray parenchyma (highly magnified).

Fig. 13-8. Typical pine forest, producing non-pored woods.

Structure of Wood

According to its botanical features, wood is classed as "hardwood" (pored wood) or "softwood" (non-pored wood). Hardwoods have leaves and softwoods usually have needle-like foliage, but hardwoods do not necessarily have harder wood than softwoods: balsa wood, which is the softest wood in the world, is a hardwood. As far as the woodworker is concerned, the main difference between softwood and hardwood, is in cell structure.

Softwoods or non-pored woods (Fig. 13-6) have a simpler and more uniform cell structure than hardwoods. This is due to the fact that the bulk of the wood is made up of long, thin cells called "tracheids", so thin that they are generally visible only under a microscope (Fig. 13-7). These cells perform two functions: they provide mechanical support and they also carry water and mineral salts from the roots to the leaves. Connection between the cells is by "pits", which are minute holes in adjacent cell walls. Rays, very small when compared to those in some hardwoods, radiating from the centre of the tree and at right angles to the tracheids, store food and carry food materials from the phloem inwards to the living cells in the wood. All non-pored woods come from coniferous and pine trees, e.g. Oregon, radiata pine, hoop pine, cypress pine (Fig. 13-8).

Hardwoods or pored woods (Fig. 13-9), are characterised by large, tube-like vessels, or pores. These consist of short stubby cells varying considerably in size and joined together to provide, when newly formed, a continuous means of conducting solutions from the roots to the leaves. The vessels frequently occur in groups and have pits in the side walls to allow the passage of solutions. The pores in some hardwoods such as pacific maple, are visible to the naked eye, whereas a magnifying glass is necessary to see those in coachwood. Smaller, thick-walled cells, termed "fibres", act simply as mechanical support for the tree, while the medullary rays have the same function as the rays in softwoods (Fig. 13-10). Some of the more important hardwoods are eucalypts, blackwood, maples, oaks, walnuts, ashes, beeches, willows, red cedar, mahoganies, basswood and hickory (Fig. 13-11).

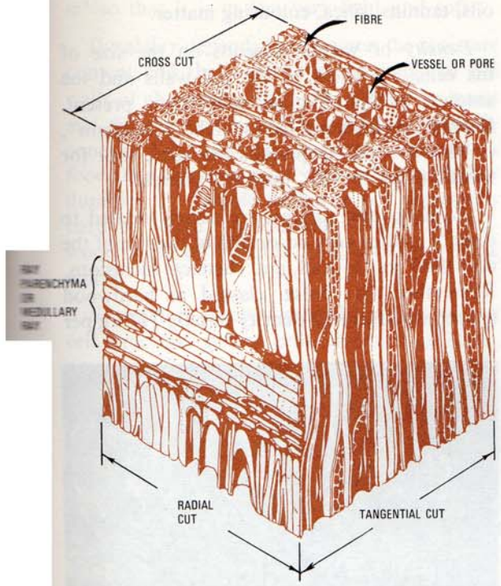

Fig. 13-9. Cell structure of hardwood (highly magnified).

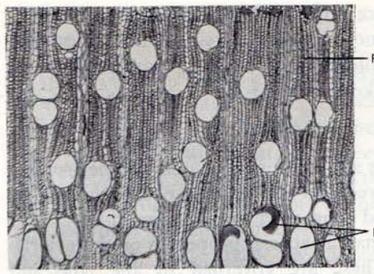

Fig. 13-10. Cross-section of hardwood, showing pores and fibres (highly magnified).

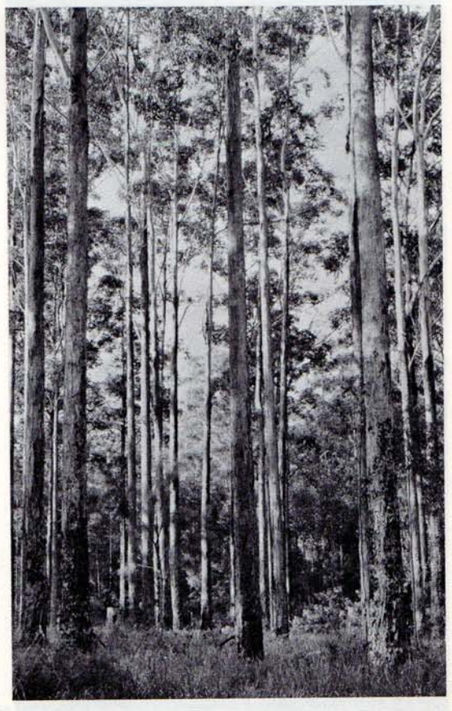

Fig. 13-11. Typical stand of hardwood, producing pored woods.