

to that of its environment. The extent of shrinkage movement in timber may vary from about $\frac{1}{4}$ to $\frac{1}{2}$ -in. per ft. of original width if the moisture content is reduced from 20 to 10 per cent.

PRESERVATION.—In order to increase the durability of seasoned timber it is sometimes necessary to apply a preservative. Next to painting the most common preservative process is *creosoting*, which consists of placing the timber in steel cylinders in which hot creosote (an oil distilled from coal tar) is admitted and forced into the pores of the wood. A less effective method is to apply two or more coats of creosote to the surface of the timber.

CONVERSION.—A log of timber is divided or converted into various pieces to which the following terms are applied: Baulks, planks, deals, battens, boards, scantlings, quarterings, strips, etc. Baulk and planks have been referred to on the previous page.

Deals are sawn pieces of softwood which are from 2 to 4-in. thick by 9 to under 11-in. wide.

Battens are from 2 to 4-in. thick by 5 to 8-in. wide; *slating battens* are from $\frac{1}{2}$ to $1\frac{1}{2}$ -in. thick by 1 to $3\frac{1}{2}$ -in. wide.

Boards are under 2-in. thick by 4-in. or more in width.

Scantlings are from 2 to 4-in. thick by 2 to $4\frac{1}{2}$ -in. wide. The term is often applied to the dimensions of a piece of timber, thus "the joist is of 4-in. by 2-in. scantling."

Quarterings are square sections of from 2 to 6-in. side.

Strips are under 2-in. thick and less than 4-in. wide.

There are various ways of converting a log into planks, deals, boards, etc., i.e., (a) radial sawing, (b) tangential sawing and (c) slab sawing.

(a) *Radial, Rift or Quarter Sawing.*—Four forms are shown at A, Fig. 30. That at B is the best if the timber has well defined medullary rays, as in oak. The log is first sawn into four pieces (or is "quartered") and each quarter is cut into boards which, like the medullary rays, are radial. The rays appear irregularly on the surface to produce the *silver grain* (or *figure* or *flower*) which is so highly valued for high class joinery work. It is an expensive form of conversion, as much waste results. More economical methods are shown at

C and D, although the latter especially does not show up the figure to the same advantage. Comparatively thicker boards or planks are obtained by the method shown at E.

(b) *Tangential Sawing* is shown at F, Fig. 30. It is adopted when the timbers have ill-defined medullary rays and distinct annual rings, as in pitch pine, as the boards (having their faces tangential to the annual rings) show up to advantage when cut in this manner.

(c) *Slab Sawing* (see G, Fig. 30).—The inner pieces are rift sawn and the outer slabs approximate to tangential cuts. There is less waste by this method, and it is therefore the cheapest.

As already mentioned, timber shrinks as its moisture evaporates, and the heartwood shrinks less than the sapwood. Fig. H shows the distortion which occurs.

The maximum shrinkage occurs in the direction of the lines of the annual rings, it is much less in the radial direction (parallel to the medullary rays) and it is almost negligible in the direction of its length. The thickness of the plank J varies from a maximum at the centre (where there is little moisture in the heartwood) to a minimum at the circumference (owing to the larger amount of moisture in the sapwood and the shrinkage which takes place in the direction of the arrows). The piece of quartering, indicated by broken lines at K, is distorted as shown on account of the shrinkage in the direction of the rings being more extensive than that radially. Similarly the plank at L shows the shrinkage and warping which occurs. In each case the broken lines indicate the shape of each piece of timber before seasoning.

Thin boards, used as floor boards, should be rift sawn to give the best results (see O), but on account of the expense a cheaper method of conversion is often adopted and is shown at M, when the remaining sections, consisting of sapwood, are converted into scantlings as required, as at N. Although rift sawn boards shrink less and have better wearing qualities, such boards are often sawn tangentially on the score of economy. Tangentially sawn floor boards should be fixed with the heart side downwards (as at P), for if they are fixed with the heart side upwards, there is a tendency for portions to be kicked out as shown at Q.

