

hardwood of *coarse texture* has large pores and/or broad rays (such as oak) and that of *fine texture* (such as beech) has small pores and/or narrow rays. Examples of intermediate grades are *moderately coarse texture* (Honduras mahogany) and *medium texture* (birch). Most softwoods are fine textured on account of their small cells, and some Russian redwood is especially so. Diffuse-porous hardwoods (such as beech) and softwoods with growth rings having slight contrasting spring and summer wood (such as white pine) are known as *even-textured* timber; ring-porous hardwoods (such as elm) and softwoods having strongly contrasting zones of spring and summer wood (such as Douglas fir) are of *uneven texture*. Sometimes softwoods are classified as "coarse grained" (or "coarse textured") or "fine grained" (or "fine textured") when their growth rings are wide and narrow respectively; such expressions are not correct, as the width of rings does not affect either grain or texture; they are best referred to as "wide" or "narrow-ringed" timbers.

3. *Figure* is the pattern on the surface of timber formed by the arrangement of the different tissues and influenced by the grain and colour. There is a big variation in the quality of the figure; thus, straight-grained timber has only a plain figure, whereas suitably converted timber will show beautiful markings when it is irregular, interlocked or wavy grained.

The nature of the figure is affected largely by the method of conversion, and when the appearance of the timber is an important consideration, as for panelling or furniture, the form of conversion adopted should expose the characteristic elements to the best advantage. Thus, oak is quarter-sawn in order to disclose relatively large sections of the conspicuous broad rays on the cut surface and which give the richly ornamental figure known as *silver grain*; pitch pine is flat or tangentially sawn to expose the distinct growth rings of light coloured spring wood and dark summer wood.

Conspicuous irregularities in the direction of the fibres usually give an attractive figure. The following are examples: Irregular grain due to small elevated patches on the growth rings produces *blister figure*, which is highly decorative and common to sapele and pitch pine; the irregular grain conforming to small depressions in the growth rings gives the characteristic *bird's-eye figure* of rock maple, and the handsome figure resulting from irregular grain at the *burrs* (swellings) (see A, Fig. 40) in walnut is called *burr figure*. Interlocked grain is responsible for the *stripe figure* or *ribbon figure* peculiar to African mahogany and Andaman Padauk when quarter-sawn and for the *mottled figure* characteristic of black bean, New Zealand kaurie, etc.; interlocked grain in Queensland maple, mahogany, sapele and other tropical timbers is sometimes irregular, and the striped figure is interrupted by longitudinal darker bands to form what is known as *roe figure*. Wavy or curly grain may produce markings in walnut, sycamore, Cuban mahogany, rock maple, Indian laurel, Australian blackwood, etc., known as *fiddle-back figure* (so called as such decorated wood is usually selected for the backs of violins); this is caused by alternate dense and lighter transverse bands crossing the grain.

Highly decorative figure results from converted timber obtained from just below a *crotch* (fork) (see A, Fig. 40) or at the *stump* (base) of a tree, the disturbed curly grain producing a figure in mahogany, rock maple, etc., known as *feather curl* (as it has the appearance of ostrich feathers); another modification as a result of contorted grain sometimes seen in oak is appropriately called *ram's horn figure*, the short waves forming a series of narrow transverse stripes.

Ripple marks are the transverse sections of rays seen on the cut surface of some timbers (including sweet chestnut, sycamore, East Indian satinwood and Honduras mahogany) and arranged regularly at intervals in straight lines across the width.

Variations in colour affect the figure and increase the decorative value of timber, *i.e.*, the rich colour of walnut streaked with dark bands.

Pith-flecks are discoloured brown streaks or spots occasionally seen in birch, Rhodesian teak, etc.

CONVERSION

The methods of converting ("breaking down") timber by (a) radial, rift or quarter sawing, (b) tangential, flat or plain sawing and (c) slab sawing are described on p. 57, Vol. I.

Machines are employed for felling trees on a large scale, although in this country most tree felling is done by hand. One type of machine used for this purpose is steam or electrically driven and resembles that shown at B, Fig. 2, with the reciprocating saw blade horizontal.

The sawing up of a log into baulks (squared timber exceeding 6-in. by 6-in.), planks (pieces from 2 to 6-in. thick and at least 11-in. wide), flitches (pieces not less than 4-in. by 12-in.), deals (pieces of softwood from 2 to 4-in. thick by 9 to under 11-in. wide), battens (from 2 to 4-in. thick by 5 to 8-in. wide), boards (under 2-in. thick by 4-in. and over in width) slices (thin wide pieces), etc., is performed by machinery. This machinery is power driven.

Whilst steam, gas and internal combustion engines are used for this purpose, the chief motive power is electricity. The power may be transmitted from its source either by shafting or, preferably, by a separate motor attached to each machine or group of machines. The shafting (steel rods) is suspended by hangers fixed to the roof or ceiling; rotary motion is imparted to the shafting by belting which passes over pulleys connected to the shafting and the engine or motor, and the motion of the shafting is transmitted by a belt to the machine. Shafting is gradually being dispensed with as machines with individual motors are installed; such are known as *motorized machines*.

Logs must first be cut into convenient lengths for handling. The *reciprocating cross-cut saw*, shown at B, Fig. 2, is suitable for this purpose. The mechanically operated 9-ft. long blade has a lower cutting edge, like the ordinary hand cross-cut saw, and during its reciprocating motion it cuts downwards with the inward stroke only. Logs up to 6-ft. diameter can be rapidly cross-cut by this machine.

There are several types of woodworking machines used for converting logs