

## CHAPTER ONE

# BRICKWORK

*Syllabus.*—Brief description of the manufacture of bricks ; characteristics. Lime mortar, cement mortar and concrete. Sizes and shapes of bricks ; terms ; heading, stretching, English and Flemish bonds<sup>1</sup> ; 1, 1½ and 2-brick walls with stopped ends ; ½ to 1, 1 to 1 and 1 to 1½-brick junctions ; right-angled quoins to 1, 1½ and 2-brick walls ; piers ; rebated jambs with 2¼ and 4½-in. recesses to 1 and 1½-brick walls. Foundations for ½, 1, 1½ and 2-brick walls ; surface concrete ; horizontal damp-proof courses. Lintels ; axed and gauged flat, segmental and semicircular arches ; rough relieving arches ; terms. Copings ; window sills ; steps ; corbels and oversailing courses. Jointing and pointing.

### MATERIALS

**BRICKS.**—Bricks are made chiefly from clay and shale.<sup>2</sup> Clay, a plastic earth, is constituted largely of sand and alumina and may contain varying quantities of chalk, iron, manganese dioxide, etc. Shale is a laminated deposit of clay rock which is capable of being reduced to a plastic condition when broken up and ground to a fine state of division. Bricks are approximately 9-in. by 4½-in. by 3-in. (see p. 3).

**MANUFACTURE OF BRICKS.**—The processes of manufacture vary considerably according to the variety of clay used, machinery available, etc., and the following is a brief general description. Bricks are moulded either by machinery or by hand.

**MACHINE-MADE BRICKS.**—Most bricks are made by machinery. The various processes are : (1) preparation of the earth, (2) moulding, (3) drying and (4) burning.

(1) *Preparation.*—The clay or shale is excavated, and after large stones or other extraneous matter have been removed, it is conveyed to a pug mill and finely ground by heavy rotating and revolving wheels which force it through small perforations in the bottom of the mill.

(2) *Moulding.*—There are two kinds of machine-made bricks, *i.e.*, wire-cuts and pressed.

**WIRE-CUT BRICKS** are moulded as follows : The fine clay from the pug mill is forced through a mouthpiece (approximately 9-in. by 4½-in.) of a machine in a continuous band and conveyed by rollers to a frame which contains several fine vertical wires which are about 3-in. apart. A portion of this continuous band, equal in length to that of the frame, is pushed forward through the frame by means of a metal plate and the wires thus divide it into ten or more 9-in. by 4½-in. by 3-in. slabs of clay.

<sup>1</sup> Flemish bond is sometimes deferred until the second year of the Course.

<sup>2</sup> Sand-lime bricks (consisting of a mixture of lime and sand) and concrete bricks are also manufactured (see p. 17, Chapter One, Vol. II).

**PRESSED BRICKS.**—Of the many different types of machines for moulding bricks by pressure the simplest is worked by hand and the larger type is operated by steam power. The former consists of a metal box which is the size of a brick and into which is placed a clay slab which has been wire-cut as explained above ; a metal plate is caused to descend, and by exerting pressure upon the clay, consolidates it ; it is then removed. The larger type of machine consists of a rotating table which contains twelve or more boxes or dies each of which is the size of a brick ; as the table revolves each die in turn is brought under a hopper which contains the prepared clay or shale ; a plunger operating in the hopper descends and forces the clay into the die after which the raw brick (or slab of clay) is pushed out as the table rotates.

(3) *Drying and* (4) *Burning.*—Both of these operations are carried out in a modern kiln, one type of which contains several chambers, each accommodating 40,000 or more bricks. The wire-cut or pressed raw bricks are carefully stacked with a space between each and in alternate layers at right angles to each other. Heat, produced from gas or coal dust, is gradually applied until a maximum temperature is obtained (which is maintained for approximately two days), when the bricks are then allowed to cool. The loading, drying, burning, cooling and emptying of the kiln may occupy two weeks, and as it is a continuous process, a chamber of finished bricks is emptied daily.

**HAND-MADE BRICKS.**—Whilst most bricks are machine-made and used for general purposes (on account of their relative cheapness) there is an increasing demand for hand-made bricks for superior facing work. The preparation, drying and burning processes are similar to those already described, but the moulding is done by hand. The mould used for this purpose is of wood or metal and somewhat resembles the sides of a rectangular box and equal in size to the required bricks.<sup>1</sup> It is either wetted or sanded to prevent the clay from adhering to it and is placed on the moulder's bench. A portion of the

<sup>1</sup> Clay shrinks during the drying and burning processes by approximately one-tenth and allowance for this is made by using a mould which is larger than the finished brick.