

measure off its length and fix its relative position. A wood peg or stake is driven in at each end, the centre of the pegs indicating the position of the quoins. The lines of all other walls are measured off from this front wall line.

The plans of most buildings must be approved by the local authority before building operations are commenced. A plan submitted for approval will include the *block plan* of the building on which is shown the site, drainage, relative position to adjacent streets, etc. If the site adjoins existing buildings or a highway, it is very important that the *frontage line* shall be accurately set out in order that it shall not encroach beyond the *building line*, the position of which is obtainable on application to the local authority.

If a building is rectangular, right angles are set off from the main line by using the "3 : 4 : 5" method, *i.e.*, a distance of 40-ft. is measured along the line from one end and a *pin* (or *arrow*, made of stout wire, about 9-in. long, ring-shaped at one end and pointed at the other) is inserted; a tape is held at each end of this length, the 30-ft. division on one of the tapes is held at the 50-ft. division on the other, both tapes are stretched taut and a pin is inserted at the intersection. The 30-ft. line thus set off is at right angles to the main line, as, in a right-angled triangle, the sum of the squares on the two sides containing the angle equals the square on the hypotenuse, *i.e.*, $40^2 + 30^2 = 50^2$. The large wood square shown at R, Fig. 27, is also used for setting out and checking right angles.

It is necessary to fix the height of one of the floors of the building, usually the ground floor level, to which all other heights are related. If possible, this should be a permanent level, such as the top of a plinth or step of a conveniently situated existing building; otherwise a peg is driven in a position on the site, preferably opposite a door opening where it is not likely to be disturbed, until its top coincides with the required level as determined by a dumpy level or other means. The height that the top of this peg is above the ground should be noted and booked in case the peg is surreptitiously or accidentally lowered and a subsequent check is required.

PROFILES are used to ensure the accurate setting out and construction of the walls. These are temporary guides, consisting of boards nailed to wood pegs which are driven into the ground. Details of profiles are shown in Fig. 27. A key plan of a building is shown by broken lines at A, and the various profiles are indicated at the corners and opposite to division walls. Enlargements of these profiles are shown in the plan G and the sketches B and C. A corner profile is made of three pegs, well driven in, to which two boards are nailed. One profile is placed at each corner (see A and G), with the boards parallel to and at 2 to 3-ft. from the outer trench lines. The top of the corner peg at least of each profile is often the level of the ground floor. A steel tape should be used when setting out these profiles, and the measurements checked. A useful check is obtained by taking diagonal measurements between opposite corners, and if the building is rectangular, these should, of course, be equal. Permanent dimensions are marked on each board indicating the width of the concrete bed, brick footings

(assuming that these are to be provided) and the thickness of the wall (see B and G). Saw-cuts, about $\frac{1}{2}$ -in. deep, are made down these marks in the upper edge of each board to receive the ends of the bricklayer's line. Each profile used for division walls consists of two pegs and a board, and the latter is similarly marked and cut (see C and G). The centre lines of the walls are sometimes marked.

The position and correct alignment of the trenches, footings and walls are obtained by plumbing down from lines which are stretched in turn between opposite profiles. Thus, assuming that the trenches have been lined out and excavated, and the concrete¹ has been placed in position, the bottom course of footings would be aligned in the following manner: One end of a line (see M and P at B and C) is passed down the saw-cut at the top of the appropriate mark and wrapped round the board, and after the line has been stretched taut the opposite end is fixed in a similar manner. The plumb-rule, sometimes stayed as shown (the stay being nailed to the rule), is held by one hand against the line near one end of the trench and, when vertical, a mark is made by the point of the trowel in a little mortar trowelled on the concrete bed. A brick is laid temporarily on this mortar with the outer face in line with the mark; the plumbing of this face is checked. Another brick is laid in a similar manner at the other end. A bricklayer's line, with pins, is fixed between and level with the top of these bricks. The bottom course of footings is then built, commencing at the corners, the position of each of which is found by plumbing down at the intersection of the two lines (see L at B). Similarly, the wall is set off correctly by plumbing down from lines N and Q shown at B and C.

Sometimes two profiles, like E shown at G, are used for the two walls forming a quoin instead of a corner profile. Profiles for division walls are often dispensed with, the right-angled intersections being then checked by the use of the large square H. Corner profiles for setting out squint quoins (see Fig. 11) have their boards parallel to the sides of the walls, and a division wall which forms a squint junction (see Fig. 10) is set out by placing the two profiles, one at each end, at right angles to its length.

Whilst profiles assist in the accurate setting out and construction of walls, their use is by no means general. In the absence of profiles the lines of the trenches are pegged out, two pegs being driven in at each end of a trench at a distance between their outer faces equal to its width; the line is stretched in alignment with these outer faces; these pegs, like the profiles are placed some 2-ft. outside the lines of trenches.

¹ *Levelling Concrete Bed*.—A peg is driven in the bottom and at each corner of the trenches until the top of each is at the required depth below the floor level: this depth is obtained by means of a 2-foot rule and the use of a spirit level and short straight edge applied on the corner peg of the nearest profile. If this depth is in accordance with the gauge of the brickwork decided upon, the floor level will course with the bed joint of the brickwork. Intermediate pegs are then driven in the bottom of the trenches at convenient intervals until their tops are at the same level as the corner pegs. This is assured if three boning rods (see p. 75) of the same height (about 4-ft.) are used, one on each of a pair of corner pegs and the third on the intermediate pegs in turn, and "sighting through" from one end. The concrete is carefully deposited and brought approximately to the level of the peg tops. A horizontal surface is obtained by using a striking-off board (see p. 60) on each pair of adjacent pegs in turn. These wood pegs must be removed before the concrete has set, and the holes filled with concrete. If allowed to remain the pegs may rot and be responsible for the onset of dry rot in floor, etc., timbers (see pp. 14-16, Vol. III).