hammer-head for driving spikes and wedges; the wooden handle he often uses as a lever to tighten knots and cords. Scaffolds should not be too heavily loaded, and the weight of materials should be distributed as much as possible. This applies especially to brick- layers’ scaffolds, for heavy concentrated loads, even if not sufficient to cause the scaffold to fail, tend to injure the brickwork.

In Scotland and the north of England much work is done from inside by means of platforms of boards placed upon the floor joists. When the work gets so advanced that it cannot De reached from the floor, trestles and platforms are used. For executing special external features, such as stone carving or plaster moulding, a scaffold will be thrown out on cantilevers projecting through openings in the wall and tied down inside the building. The materials are usually hoisted by derrick cranes.

“ Gantry ” is the term applied to a staging of squared timber used for the easy transmission of heavy material. The name has, however, come to be used generally for strong stagings of squared timber whether used for moving loads or not.

Taking the general meaning of the term, gantries may be divided into three classes: (1) Gantries supporting a traveller; (2) Travelling gantries, in which the whole stage moves along rails placed on the ground; (3) Elevated platforms which serve as a base upon which to erect pole scaffolding.

A gantry to support a traveller (fig. 1) consists of two sets of framing placed at a convenient distance apart, say 8 ft. or more, and standing independently of each other. These frames consist of standards or uprights standing upon a sleeper or sill resting in a continuous line upon the ground. The tops of the standards are levelled to receive the head or runner. Struts are taken from cleats fixed at a convenient point in the sides of the standards, and meet in pairs under the middle of the head; sometimes a straining-piece is introduced between them. Struts are also taken outwards from the uprights and bedded on foot-blocks or holted to small piles driven into the ground. The space between the two frames must be kept free from struts and ties of any description so as to leave a free passage for the material while being lifted and moved. The different members are connected by iron dogs and bolts; dogs are used wherever possible, as they form a strong connexion and do not spoil the

wood for other purposes as holt-holes do. They should be placed on both sides of the timbers to be connected. The size of the timbers varies according to the height of the structure and the weight intended to be carried. The standards may be from

6 to 12 in. squared in section, and the heads and sills are of similar size; the struts and braces are usually somewhat smaller. The traveller consists usually of two wood girders trussed with iron rods and mounted on flanged wheels so as to run along the

rails fixed to the head-piece. Along each girder also, a rail is provided upon which moves the hoisting gear; this is worked either by hand or steam power. The ends of the rails are turned up to form a stop for the

traveller or crab.

A travelling gantry (fig. 2) runs along rails placed on the ground, and consists of two strong trusses braced and bolted together and supporting the two trussed girders which take the crab- winch. The latter is mounted on wheels, and by simple gearing is caused to run along the rails fixed on the upper side of the girders. This is a most useful form of gantry, and requires a very small amount of timber for its construction. The travelling frame is, however, very heavy, and such an apparatus is usually fitted with a steam winch, the power from which, besides lifting the materials, can also be applied to move the traveller. Gantries built on this principle have been used successfully in building or repairing lofty and wide-spanned steel or other roofs. After the collapse of the steel “ bow- string ” roof of Charing Cross station (London) in December 1905, huge travelling gantries running along rails laid upon the station platforms were employed, and these provided an efficient and economical means of access to the damaged portions; as section by section the work was removed the gantries were shifted along to the next bay. These gantries were 60 ft. in height. One, used to strip and remove the coverings of the roof, was 32 ft. deep, weighed 200 tons and moved upon 24 steel flanged wheels ; the other, 40 ft. deep and with 32 wheels, weighed 250 tons and was used to take down the structural steel work of the roof. Four cranes were erected upon the staging to lower the material as it was removed. The amount of timber used in these gantries was 22,4oo cubic ft.

In the erection of the Williamsburg Bridge over the East river, New York, for which 19,000 tons of steel were used, “ framed timber falsework ” was built up of squared timber to a height of 100 ft. and 90 ft. wide at the top. The span was 355 ft The timber­ing was in three storeys or stages, and each “ bent ” had 8 vertical and 4 battering posts. The bents were 20 ft. apart and were connected