PROFESSOR HOSKING ON THE LATE FAILURE AT THE EUSTON-SQUARE STATION.

When Mr. Hosking handed to the coroner his opinion in brief, on the cause of the failure at the Euston-square station, printed in our last,* the professor said that he had drawn up a general statement of the occurrence, with a fuller development of his views than he thought necessary to trouble the jury with, unless they called for it. The jury did not call for the statement, and therefore it was not read; but as this accident has naturally excited very considerable interest, the public will doubtless be glad to see Mr. Hosking's review of the occurrence in full, notwithstanding that it recapitulates matter which we placed before our readers last week.

We may notice *en passant* that it will be found to bear witness to the correctness of our own summary, and strengthens the opinion we expressed on the danger of trusting to columns so constructed,—which opinion, by the way, was in type before the adjourned meeting was held. We understand that, in order to prevent any fear on the part of the public, it is proposed to take down the south end of the vestibule, which presents similar columns to those which fell, although they are there backed up by a wall.

It appears from the evidence, that the fallen structure consisted of eight circular and slightly diminishing shafts, disposed as columns, in two parallel rows, with an architrave extending in breadth over both rows of columns, and in length over all the columns and the spaces between them, and between the columns and the side walls of the hall, of which the fallen structure formed the upper compartments of the north end; and a superstructure consisting of the upper portions of an entablature, a wall, or rather a series of piers and spaces arched over, and terminating as a continued wall; such upper parts of the entablature, and the wall above it, having been placed immediately over one of the two rows of columns below; that is to say, over the southern row, whilst York stone landings bridged over the space, between the several pairs of columns, of which the two parallel rows consisted, so as to make the columns of the northern row take part with those of the southern row in bearing the weight of the upper parts of the entablature and of the attic wall. It appears further, that the fallen structure stood upon a massive basement wall, which remains wholly undisturbed, except as to four pedestals which were raised upon it, and upon which the several pairs of columns of the fallen structure respectively stood, one before another upon the solid pedestals, transversely of the basement wall below, and which pedestals are more or less broken up and deranged, as to their upper courses over all, and throughout a great part of their height where they received the inner or southern row of columns. The basement wall is of brickwork in mortar, about 60 feet in length, or from side wall to side wall of the hall, of which it forms the north end, and in the lower compartment, 28 feet in height from the top of the footings to the level at which the insulated pedestals begin, and 7 feet, or thereabouts, in thickness, and the pedestals are also of brickwork in mortar, each about 3 feet 6 inches in length, from east to west, or in the direction of the length of the wall under them, of the full width or thickness of the wall immediately under them—that is to say, about 7 feet, and about 5 feet in height, from the top of the basement wall to the level at which they received the columns.

The columns are stated to have been built of bricks in cement, and to have been each 2 feet 2½ inches in diameter at the base, diminished in right lines about their vertical axes to 1 foot 10½ inches at the top, and 20 feet high, standing 1 foot 4 inches apart upon the tops of the pedestals—that is to say, transversely of the basement wall,—and 9 feet 4 inches apart, pair from pair, in the direction of the length of the basement wall, and of the superimposed entablature and attic wall; and the mode of structure of the columns was by disposing bricks edgewise in courses, and laid in every course radiating from the centre, the bricks being mostly cut to a wedge shape to adapt them to this mode of arrangement, and to bring the outer end of the bricks so laid nearer together than they could be brought if not so cut,—the heart of the cylinder being filled in with bricks cut to fill the void which the radiating bricks would necessarily fail to fill, as the diameter of the cylinder exceeded in every course twice the length of a brick. Over the heads of the columns, and upon the bridging stones which bound the several pairs together, springing blocks were formed of brickwork in cement, with skew-backs cut for the abutment of arches, which were turned in four half-bricks, and extended from pair to pair of the columns as an architrave, such arches being formed, also, of bricks in cement, and each arch spanning 10 feet, and rising about a foot, upon a core laid on stout wrought-iron bars, shackled together over the heads of the columns, and extending to the side walls of the hall, to tie in the arches throughout the whole extent of their range, and, in their turn, hung up to the arches, whereby the arches should carry the weight of the core, which rested upon their own ties, and compensate in some degree for the absence of any direct weight upon the backs of the arches above. The arches and the core they suspended thus formed the architrave of the entablature, and, extending transversely over both the rows of columns and over the space between them, a massive iron-tied brick-built beam connected the columned compartment with the side walls of the hall, and promised a rigid and durable structure capable of carrying any weight that could be placed upon it.

The upper part of the entablature was of brickwork and stone combined, as a means of projecting a cornice or preparation for a cornice on the side towards the hall, and above this preparation the attic wall was built of brickwork, in mortar 2 feet 8 inches thick, and 18 feet high, the wall being somewhat lightened by openings for windows over the void spaces between the columns lengthwise, or in the direction of the transverse section of the hall, but extending, like the beam of the entablature below, from side wall to side wall, and uniting itself with the side walls so as to yield support to, as well as to derive assistance from them.

It further appears that the massive basement wall, which remains undisturbed, was founded and built within the months of August and September last, and that the pedestals upon them were built between the 21st and 30th of October following; that the columns were built between the 10th and 22nd of November, and that, after a rest of nearly three weeks, on the 11th December, the superimposed works were commenced, and followed on to the completion, or near completion, of the attic wall, when, on the 6th of January, the columns and everything depending upon them fell to the ground; some portions of the ruins, and among them the bridging-stones which had lain over the several pairs of the columns, falling to the north of the basement wall, or *from* the side of the impending attic wall, and some portions on the north side, or upon the floor of the hall, of which the structure had formed the north end. The evidence sets forth, moreover,—and the appearance of the work that remains, and of the corresponding work at the south end of the hall, justifies the evidence—that the materials used in the works which fell were of excellent quality, and that they had been executed by able and experienced workmen; the only departure from the usual practice in the execution of such works being in the disposition of the bricks in the composition of the columns. It appears also that the scaffold, which had been used to assist in executing the works which fell, extended along both faces of the work, and was formed in stages as the advance of the work required, and extended in height as the works advanced by adding pole to pole, and by forming stage above stage for the convenience of the workmen; the ends of the horizontal poles, or ledgers, which formed the bases of the several stages being tailed at each end into the side walls of the hall; whilst poles were laid across transversely of the scaffold and of the work, and tailed, in like manner, into a wall north of the passage or gallery, of which the double rows of columns would have formed the south side, and lashed to the poles and ledgers, to prevent the scaffold from rocking from north to south; and these cross-poles or transoms coming in contact, however, either directly or through a frame, with the shafts or columns as they passed from the inner or northern scaffold-poles to the wall north of the gallery, into which their ends were wedged. A still further height of scaffold being required to enable the masons to get up the materials of a cornice which was intended to cope the attic wall, labourers were engaged in raising it accordingly, whilst bricklayers and their labourers were still at work, laying some of the yet remaining courses of bricks to complete the attic wall; but there is no evidence to show that any more than the usual effect produced by men moving about upon the stages of a scaffold at their work, and in the equally familiar progress of heightening a scaffold, was perceived by any of the people who were so employed upon and about the scaffold at the time of, or immediately preceding, the accident.

It appeared also that the fall took place suddenly and without warning, no previous rocking of the work or of the scaffold having been noticed by any of the people upon or about it, the columns and their superstructure having dropped down together upon, and on both sides of, the basement wall, and not falling out on one or the other side much beyond the scaffold poles; those portions only of the scaffold which rested upon the falling structure, that is to say, the stages of which the putlogs, or cross-bearers, of the scaffold rested upon the wall, going down with it.

Having thus recited the circumstances as they appeared in evidence and from observation of what remains, and of the corresponding works in another part of the same building, I proceed to develope the causes which may have induced the failure of the work.

The power of brickwork to resist pressure depends upon the manner in which the bricks are laid as to their beds, and disposed with regard to one another, and to the direction in which the pressure is imposed upon them when combined in a structure. Bricks laid upon their broadest faces,—which faces are technically called their beds,—are less liable to be overturned and less liable to be forced into a yielding body below them than they are when laid upon their narrower sides, or edges; and bricks laid on their beds, or flat, will cover and bridge over a joint, and throw the bearing upon the bricks below more certainly and more effectually than if laid on their edges; and in the arrangement of bricks on their beds, flat, and so as to cover, and break joint, course above course, consists what is termed bond; and it is by means of bond that bricks can be piled upon bricks, and be extended both in length and in breadth, so as to form a compact mass capable of withstanding any pressure that will not crush the materials when applied at right angles to the beds of the bricks; the setting material, or mortar, in the joints between the beds being in layers thin with relation to the bricks, in proportion to its greater yieldingness, and being of such consistence, or having attained such a degree of induration, as to be capable of withstanding pressure to the same extent as the bricks themselves. But if bricks are not so laid and so disposed in any structure that every brick in any course above is supported by bricks below on both sides of every joint, the brick is liable to be broken across, or to be pressed down into the softer setting material, and thereby to induce the failure of the work of which it forms a part: and as bricks laid on their edges cannot bridge over a joint below so as to break joint with the same effect that bricks laid on their beds can, bricks on edge do not bond with the effect necessary to give the full strength of which brickwork is capable. Brickwork is, therefore, in common practice, built with bricks laid flat, and not on edge.

In building round bodies, however, as columns, with bricks, the proper disposition of the bricks to bond truly cannot be maintained, and consequently the strength of which brickwork is capable cannot be attained with bricks applied to produce such a form; and as bricks employed for such a purpose must be cut, and so be applied in fragments, the result

* See page 62 *ante*.