

of 1666; and if our arrangements for the extinction of fire had not made immense progress, this recent event might have rivalled that great calamity.

Our own lesson from this must be to improve by all means the construction and arrangement of buildings, even though we may be in advance of Building Acts. We cannot widen the streets, nor increase the unoccupied areas, nor reduce the necessary openings for light, nor dictate to the trader modes of conducting his business which would make his business impossible, nor can we do much in advance of public opinion to diminish the numbers of an audience or spread them over a larger area. The most that we can do is to diminish the chances of fire and to delay its progress, to prevent its passage from room to room and from house to house, to so arrange the construction that a fire may be more easily put out, and, as regards the safety of the inmates, to provide the best means of escape.

I am quite unable to understand the slow progress made in this country by the fire-resisting floor. In Paris fire-resisting floors were common five-and-thirty years ago. I was then carrying out such work here on a large scale, but the case was exceptional; the weight of the floors was great, the walls had to be thickened, and the cost was excessive. Cheap steel and light substitutes for concrete have changed all that.

In the Cripplegate fire, although many of the warehouses were modern, and some had already been burnt out once or oftener, there was not a single fire-resisting floor. There were wooden floors carried on iron girders, but we are familiar with the behaviour of wrought-iron girders under such conditions. They expand and contract so as to overthrow the walls, or they become soft so as to hang down like tapes. There are now available fire-resisting floors in great variety in which the iron is more or less protected from the fire. In using them care must, however, be taken that no leakage of gas can accumulate in any hollow spaces. I have seen a large and handsomely decorated house in which fire-resisting floors were used in conjunction with battened walls. Upon applying a light in the usual way to the suspected point of escape the mixture of gas and air accumulated in the hollows exploded, and the ceiling with the wall battening in two stories was stripped away, littering the floors and mixing with the broken window glass. In that case there were also severe personal injuries.

In the great re-housing schemes of the London County Council I have made every floor fire-resisting by the use of steel joists wide-spaced, and filled in solid with coke breeze concrete upon which the floor-boards are nailed, the plastered ceiling being done under the concrete direct. The cost is no more than that of a good wooden floor, while the total thickness is only seven inches, which saves two or three inches in the height of each storey. They are not complained of by the tenants in respect of noise, but in a house where this would be of great consequence a cork covering to the boards under the carpet would be a sufficient remedy.

If it is necessary to adopt wooden construction for floors, the ordinary pugging should at least be used. Joists of double the usual thickness placed two feet apart, and filled in solid with some form of concrete, would offer great resistance to fire. As to the material for pugging, coke breeze and cement concrete, mixed four parts to one, stands fire and water better than anything else. In Switzerland they use coarse plaster stuff, into which long wet shavings have been

stirred as hair is stirred into plaster for ceilings; and this, though an imperfect substitute for concrete, will resist a fierce fire for a considerable time, but more experience is required in the use of light solid materials.

I think we have now arrived at a time when architects should at least try to secure an incombustible roof. This is stipulated in the building leases of some very important London estates, and I am told that it raises no difficulty. If the space in the roof is wanted, pugging or concrete is sometimes put between wooden rafters. If a steep roof is necessary, sheets of asbestos put on the roof boarding in place of felt will afford some protection. In a building professing to any degree of fire-resistance, the roof should be protected by a ceiling of concrete put over the topmost storey. Ceiling on perforated or expanded metal will give some protection against a small fire.

As to partitions, lath and plaster should be quite abandoned, and brick-nogging also, for a half-brick wall in cement is as easily constructed. There are many kinds of thin partitions from which to choose. I commonly use coke breeze cement concrete two inches in thickness, which is light, tough, and strong enough for storeys of the ordinary height. Old lath-and-plaster partitions may be filled in with this material or with brickwork by removing the plaster from one side only. If the structure is otherwise fire-resisting, any wooden panelled partitions may be considered as fixtures and disregarded, particularly if in hard wood.

I mention these and similar details, not as being unknown, but as being too often neglected, even where the cost would not be a serious item. If fire-resisting materials were in more regular demand, workmen would become familiar with them and they would cost less. Exaggerated estimates of the cost of fire-resisting construction do much harm. Very important steps can certainly be taken in that direction with very little extra cost on ordinary construction.

The great danger of a staircase arises from the cupboard underneath its lower flight, which will probably be stored with combustible materials. If it is constructed of thin deal it will take fire easily. If more solid or made of hard wood it will resist a small fire for some time. If it is to be fire-resisting, concrete is safer than stone. But if everything about a staircase is incombustible it may be rendered useless by accumulated smoke arising from such a cupboard as I have mentioned, or from an adjoining room.

There are certain precautions necessary in construction whether the materials are fire-resisting or not. I have already suggested the danger of hollow floors and hollow partitions, but all hollow spaces that can contain gas or transmit flame or inflammable vapour, or will even allow a supply of air to pass towards a fire, are highly dangerous. The lining of walls with matchboarding is the most ordinary case of this kind. By means of it fire communicates instantly all over a shop, and up through the floor to the rooms above. The hollows formed in heavy plaster cornices and the hollow spaces behind skirtings transmit flame or inflammable air without any outward warning to adjoining or even distant rooms.

Mr. Blashill paper is very instructive and interesting, and we can commend it in its entirety to our subscribers.