

BRICKS AND BRICKWORK.*

THE characteristics of a good brick are: 1. Regularity of shape, so that when built into a wall the pressure is equal over its surface. 2. Toughness as opposed to brittleness, *i. e.*, it ought not to snap when broken, but should require two or three hard blows. 3. Clearness of ring when gently knocked against another brick, and not a dull, heavy thud. 4. Homogeneity of surface and texture in the interior, and, above all, absence of small stones or pebbles or lumps of chalk; and 5. Nonporosity, *i. e.*, slowness in absorbing water. I am very much disposed to think the latter quality the most important, and one that is perhaps the least attended to. I mean, of course, with facing bricks. The rate at which a brick—or, for that matter, stone either—absorbs water is a more important element in its goodness than its total absorptive power, because when built in a wall the bricks are exposed only to intermittent wettings, and if in testing two samples of brick I were to find that one absorbed 15 per cent. of its volume of water in the course of an hour, while another absorbed 20 per cent., but took four hours to do it, I should prefer the latter. The crushing strength of a brick is an interesting subject of inquiry, but practically you will find it very rare indeed for bricks to be exposed in walls to anything approaching this crushing strain. Professor Unwin, at the Central Institution, Kensington, kindly tested some bricks for me a few months ago, and it was found that a Leicester brick was crushed with a load of 245 tons per square foot, a Coventry brick at 217 tons, and a London stock at 125 tons, while a blue Staffordshire brick only crushed under a load of 385 tons per square foot, and could not be broken by the machine. A two-brick wall carried up 102 feet high, which is, of course, much higher than would ever be done in practice, would exercise a pressure of five tons per square foot on the lowest course, and this will show you how small is the chance of a brick itself being crushed; but a brick and brickwork are two very different things, the intervention of the mortar joints introducing an entirely new element. Brick piers are very awkward things to experiment upon, and require very special machinery; but some practical experiments upon them have been made in the United States, and you may take it that three tons per square foot in mortar, and five tons in cement, are about the safe loads that should be placed on brickwork.

The reason why some bricks in a clamp or kiln are good and others bad—irrespective of their position—is very difficult to understand even by practical brickmakers, but the most eminent firms are quite willing to admit that they do get a number of bad bricks, and one gentleman told me that out of a very large number of burnings his experience would lead him to the conclusion that 30 per cent. on an average were of an inferior quality. One practical point is never to be guided in choice of a brick by color alone, as it may frequently happen that what looks like an excellent brick may really be as bad as they make them. Knock them together and see how they ring; a bad brick will never ring well, and then break the brick and see its interior. If you see pebbles, or find the interior soft and not of close texture, you may safely condemn the bricks.

Underburning is, I believe, a fruitful cause of inferiority in bricks, as they are then soft and friable; and from my own observation I should say that, if you notice a load of bricks coming on to a job, with a large number of broken ones among them, the chances are that the bulk of the bricks are bad ones, and they should be rejected. This is altogether apart from the risk to the work owing to the temptation to the men to use snap heaters. To revert for a moment to the question of porosity. I believe if in an ordinary wall you were to pour water on the face at a level of about 6 ft. from the ground, none of it would run down as far as the ground; the water would get absorbed before it reached so far; and this with very fair bricks. It may be of interest to you to know of an easy method of rendering a brick wall almost, if not quite, impervious to water. Wash the surface over with a solution of soft soap and water, about half a pound to a gallon, laid on with a soft brush; and, when that has dried in, apply a solution of alum and water, mixed in the same proportions, and the result will be that you have waterproofed the wall. I am indebted to Mr. Rowland Plumb for this recipe.

It goes without saying that however good your bricks may be, you will never get good brickwork unless good mortar is used, and anyone who is in the habit of inspecting old houses will have noticed that in nineteen cases out of twenty it is the mortar which has perished, and not the bricks. In fact, I believe a good brick is just as good after one hundred years' use as when it was new. I am sure the difficulty which public officers have with the speculating builder lies more frequently with the composition of this than with the bricks. The stuff which the 'highly respectable building-man' will try to pass off as sand is of a fearful and wonderful nature. Sometimes he will use sand, but of such a soft, sugary texture, with no sharpness about it, that it is impossible for it to make good mortar. This you can test for yourselves by trying it between your fingers. But I should strongly advise you to look with the greatest suspicion on a heap of brownish grey stuff, which the builder will tell you is road sweepings. I am not saying that in country districts where the roads are mended with granite, if the road-siftings lie in heaps for some months and are carefully washed, you may not obtain a very good building material, but as a rule there is much organic matter in road sweepings, and it is very easy to mix garden loam with it, which is, of course, utterly unsuitable for mortar. Another thing that men will often try to use for mortar, especially in a building which is to take the place of one recently pulled down, is the siftings of the old lime mortar and plaster which has come from the debris of the old houses. Sometimes you may spot this unmistakably by the smell, as I myself once did, a heap smelling very strongly of stale smoke from chimneys. As to lime, it is utterly impossible to discuss this question at the age-end of what I fear has been a terribly long infliction on you—it would take an evening to itself. I can only say I much wish it were more frequently the practice to build with cement-mortar. I am sure that cement and good sand mixed with 5 and 1 would make better work than ordinary lime and sand mixed 3 and 1, and the latter cost would not be very great. There is one thing that you should be on your guard against in country districts—never allow any brickwork to be built in chalk-lime mortar. It never sets in the interior of the joints. As to the joints, except in winter, I should always prefer to have the joints struck as the work goes up, rather than raking them out and pointing afterwards. There is always the risk of not raking the joints out far enough, and the chances are that the pointing will not adhere to the mortar in which the bricks are laid. Whether you have a struck joint or a pointed one, insist upon having it cut in at the top of the joint, and not at the bottom. The men will always do this if they are explicitly told to, but if not they will always cut it in at the bottom—why, I have never been able to understand—giving a lip on which the water collects. In hot weather you must be careful to dip the bricks in water before laying them, or they will absorb the water far too quickly, and prevent it setting properly.

In this country it can very rarely fall to our lot to be allowed to carry out a commission on those ideal conditions which Mr. Brydon so humorously alluded to in this room, when criticizing the students' work at the Institute, *viz.*, where cost is no object. Economy and utilitarianism are the conditions under which much of our work has to be carried out. We must often, therefore, be compelled to give up the use of stone and fall back on brick. But do not let us on that account despise our material. It is a good honest material, which lends itself to an inexpensive decorative treatment of a perfectly legitimate kind, and I can only hope that in this short paper—the deficiencies of which I am fully conscious of—I may have given you some reasons for not neglecting the study of the history of brick in the past, and I am confident that such a study will be productive of nothing but good in its results on the brick architecture which you will have to construct in the future.

THE Port Credit Pressed Brick and Terra Cotta Co. have removed their Toronto office from 52 Colborne street to No. 28 Victoria street.

The Ryan estate, Coldwater, Ont., is constructing a new residence. Mr. Croker, of Orillia, is the architect, and the work is being done by Mr. Eaton, of Orillia.

In the town of Barrie, Ont., W. A. Boys, Dr. Richardson and Geo. Overs are each erecting new residences. Their respective cost will be \$3,500, \$2,500 and \$1,500.

* Abstract of paper read by Mr. John Slater before the Architectural Association, London, England.