Hollow Block Building vs. Frame.

BY M. W. LAUER.

THE speculative builder who builds to sell has but one object in view, and that is to build at the lowest possible cost such a building as will favorably impress the prospective buyer long enough to induce him to buy it from the builder. There is no other material in this market from which the builder can obtain such a great variety of effect for an equal expenditure as he can from lumber. He can build in any style of architecture, from the primitive hunter's cabin to the most modern creation of the architect's mind. He can have a radius or angle or bay, a radius or angle tower, or any other embellishment he may choose, and can trim the building in keeping with his design, be it a castellated effect, with buttress walls or Irish renaissance, meaning a combination of all styles of architecture, à la Irish stew. He can have his lumber cut so that it will fit properly, and when he has finished, while he has only built a frame structure, we must admit that when built after a good plan it looks well. He sells it and immediately starts in to repeat the operation. He cares not if after a short time the owner discovers that his home is not what he thought it was; he cares not if the owner discovers that the lumber used was of an inferior quality, that one nail is doing the service of two, that paper sheathing was not put in at all, that the paint is crumbling off, and that, should a fire ever reach the studding it would spread all over the building and destroy it before he could summon assistance in putting it out. The builder cares not a straw if the owner, fortunate enough, perhaps, to escape a destructive fire, finds his home is just as surely being destroyed by the weather, and that he must continually spend money for repairs if he would keep his home in good condition, making the building more costly each year. However, the owner who finds that the cold winds of winter are readily conducted through the frame sides and from the basement up through the floors, necessitating the putting of his hand down deep in his pocket for dollars for which to buy fuel if he would keep himself comfortable during the winter months; the owner who finds on entering his basement some frosty winter morning that the season's supply of vegetables has been destroyed by frost, that the water supply pipes contain a first-class brand of ice instead of water (inviting plumber's services, a costly luxury in the city), in short, that Jack Frost has taken possession until Old Sol comes back and displaces him during the summer months; the owner who finds that he is living in a house where he must freeze in winter and swelter during the hot days of summer, whose health and happiness is affected in a measure by the kind of a house he lives in—does care for all these things. The verdict of those for whom we have built hollow block houses is, that the objections laid at the door of frame structures are entirely overcome by the use of hollow blocks, and that, although the first cost of a hollow block house is greater than that of frame, it is cheaper in the end, because "the best is always the cheapest."

The objections urged against a frame building, briefly stated, are these:

First. The very nature of frame construction affords ample opportunity for the substitution of inferior grades of lumber where only the best should be used. Green lumber is often used which warps and twists in the building when it becomes dry.

Second. The framing or roughing in is slapped together in a hurried manner, because after the siding is put on no one will know whether it has been done properly or not.

Third. A frame building is a good conductor of heat and cold, and as such transmits to the interior the heat of summer and the cold of winter.

Fourth. The combustible nature of a frame building, and ease with which a fire spreads (unless "nipped in the bud"), increases the cost of insurance.

Fifth. The necessity of repainting and repairing in order to preserve its life and retain its appearance.

Numerous other objections might be brought up, but those just mentioned will suffice. A hollow block building will overcome all of these objections for the following reasons:

First. The hollow blocks which the writer has seen, and those which he has used in the construction of buildings, have been burned to a degree of hardness making them impervious to moisture and unaffected by weather. It requires no expert to detect a poor block if laid in the wall. Building blocks, when properly laid, will remain so a lifetime.

Second. Building blocks can be well laid, and yet laid rapidly, so that there is little to be gained by unduly rushing or slighting the work. It is impossible in the construction of a hollow block building to successfully hide either defective material or cheap and poor workmanship. In order to obtain a good appearance it is not only essential to use good blocks, but to have them well and carefully laid. The writer has seen good blocks laid up in such a manner as to disgust a prospective builder and lead him to believe that it was the fault of the blocks that produced the abominable effect presented.

Third. Practical tests have demonstrated that there is

no better non-conductor of heat and cold than dead air. The walls of a hollow block building contain dead air or non-circulating air, preventing the transmission of heat or cold through the same. The writer has a number of testimonials dwelling upon the fact that basements and houses built of hollow blocks are cool in summer and warm in winter.

Fourth. There is no necessity for a comparison as to the fireproof qualities of hollow building blocks and frame, as hollow building blocks are indestructible by fire. The rate of insurance is much less for a hollow block house than it is for frame, being rated the same as a brick or stone dwelling.

Fifth. A hollow building block, impervious to moisture, does not absorb and hold the dirt and dust from the air; dust does sometimes settle on the face of the blocks, but it is washed off by the first shower that comes along, making a building of this material look as fresh and new as though it had just received the finishing touches of a tuck-pointer.—Brick.

Normal Building Sand.

AN important feature in connection with the use of mortars and cements in masonry structure is the nature of the sand used in the mixture; yet in nearly all tests the cement is the main object under consideration, the sand being often rather neglected. It is this fact which gives especial interest and value to the tests, of so-called normal sands selected from various countries, recently conducted by Herr M. Gary at the Berlin Testing Laboratory. From the Mitt. aus den Kgl. Technischen Versuchsanstalten, in which the full report appeared, the following abstract of the work is given. It is well that attention has been directed to so fundamental an element in building construction.

Ten different varieties of sand were tested, and, in order that there might be no doubt as to the high quality and character of the samples, care was taken to have them selected by experts of acknowledged reputation in the various countries from which they were obtained.

Two varieties from Germany were tested, one being a crushed quartz from Freienwalde in Prussia, and the other the sand obtained from the Rhine by dredging. Single samples of standard sand were obtained from Austria, Switzerland, Russia, Norway, England, and the United States, and two samples from France, one of these being from Leucate, a natural sand brought down by the mountain streams of the Pyrenees, and the other a crushed quartz from Cherbourg.

The tests of the ten varieties of sand consisted in a chemical analysis, and a measurement of the loss of weight at red heat, as well as a determination of specific gravity, and size of grains, after which briquettes were made with Portland cement, and subjected to tension tests after seven, twenty-eight, and ninety days' hardening under water. Two sets of briquettes were made with each kind of sand, one set containing one part by weight of cement to three of sand, and the other one part of cement to five of sand. The former proportion represents the usual practice in nearly all countries; the latter was used to the extent to which the addition of a greater proportion of sand affects the strength. Very interesting microphotographs were made of the samples of sand, and the difference in the character of the grains was in some cases very marked.

It is impossible to go into the details of these interesting tests, which are fully tabulated and illustrated with diagrams in the original report, but some of the conclusions are here given.

Among other points it was found that the very sharp crushed quartz sand, which under the microscope showed an angular structure, gave a high tension test and a low compression test, while the natural sands, with rather rounded grains, gave proportionally better results in compression. Thus for the American sand, a crushed quartz from Massachusetts, the ratio between the tension and compression tests was 1 : 5.7, while for the English sand, which under the microscope showed round smooth grains, the ratio was 1 : 10.

The resistance to tension for the mixture of three of sand to one of cement was, for the English and American sands, respectively 424 pounds and 451 pounds per square inch, while for compression the figures were 4,300 pounds and 2,560 pounds. The American sand stood among the highest in the tension tests, being equaled only by that from Switzerland, but in the compression tests it was much lower than any other, the next higher being 3,500 pounds per square inch. On the other hand, the only sand which equaled the English sample in compression was that dredged from the Rhine, which also showed a similar rounded granular constitution. This feature is one which is worthy of further investigation, as, if it is possible to obtain high tension tests for a cement by the use of a sharp sand, while at the same time its resistance, when applied in practice with similar sand under compression, is diminished, these facts should be taken into consideration, or else, more properly, both tension and compression tests should be required.

Tests made with mixtures of sands of coarse and fine grains showed inferior results to those obtained with sands uniform in size of grain.

In concluding his report, Herr Gary recognizes the fact that the tests, being made with but one kind of cement, and with a limited number of samples of sand, can be considered as giving only general indications of the behavior of the materials. Many additional tests must be made before positive conclusions can be drawn. The results, however, certainly emphasize the importance of taking into account the nature of the sand in connection with tests and users of mortars and cements, and, if such tests are continued, they may lead to the establishment of an international standard.—Engineering Magazine.

Mahogany and Veneers.

THE large exports of electrical and other machinery to South America have been the means of fostering an import trade in mahogany wood that affects the furniture and cabinet business in all parts of the country. Most of the steamers that return from the South stop at Nicaragua and the United States of Colombia to load up with mahogany and cedar, two woods that are in constant demand in this country. Last year over 6,000,000 feet of mahogany logs was brought to this port, and the coming year the imports will probably run much higher.

Our increased trade with the South American countries must naturally stimulate these imports, for the rare hard woods of the tropical forest do not enter into competition with any native product. Their use is extending into many new fields and uses never before dreamed of. The perfection of the veneering machinery, by which very thin slices of the wood can be cut off at half the former prices, enables cabinet and furniture manufacturers to turn out loads of mahoganized articles. These furniture articles are what the trade calls "built-up" furniture. That is, they have a core of white pine or other cheap wood, and the surface is then veneered with thin layers of mahogany.

Before the veneering machinery was invented, all veneers were handsawed, and they cost considerable; but to-day 75 per cent. of the veneers is cut or sliced by huge knives. The sawed veneers are much better than the cut, and they last longer, but for the cheaper trade the cut answers all purposes. The slicer, as the veneer-cutting machine is called, is a costly machine, but it performs its work with wonderful effects. A large mahogany log is put into the powerful grip of the slicer, and as it moves against a rigid knife, which is 17 feet long, the veneer is cut off as evenly as a shaving is sliced from a block of wood by a plane. The whole log is thus sliced up into veneers one-thirtieth of an inch thick. Thus one log may yield several hundred veneers. Sawed veneers are more expensive, because not more than ten to fifteen can be cut from an inch of wood. The rest of the wood is lost in sawdust, while in the cut veneers there is no waste at all.

The relative cheapness of mahogany logs is also making revolutions in furniture manufacturing, says the New York Times. The sailing vessels and steamers engaged in the trade are more numerous than ever before, and each steamer may bring 700,000 feet of mahogany logs to New York, and the sailing vessels from 200,000 to 300,000 feet. The mahogany forests of South America are not being ruthlessly destroyed, as are many of our American woods. In Central America, where the forests are controlled by Americans, two trees are planted for every one cut. This wise policy insures a permanency of supply that practically makes the wood inexhaustible. The trees cut for this mahogany trade average twenty-five inches in diameter, with some running as large as forty inches. They vary in age from twenty-five to seventy-five years. In twenty-five years, it is estimated by those controlling the forests, a mahogany tree will attain a good commercial age, when it can be cut with profit to those planting it. As most of the logs are used for veneering purposes, their size does not count as much as it does with many of our native woods.

Natural Method of Testing Building Stone.

THE natural methods should always take precedence whenever they can be employed, because, says Baker, "First, the exact agencies concerned in the atmospheric attack upon stone, and, second, long periods of time far beyond the reach of artificial experiment."

One method is to visit the quarry, and observe whether the ledges that have been exposed to the weather are deeply corroded, or whether these old surfaces are still fresh. In applying this test, consideration must be given to the modifying effect of geological phenomena. It has been pointed out "that the length of time the ledges have been exposed, and the changes of actions to which they may have been subjected during long geological periods, are unknown; and since different quarries may not have been exposed to the same action, they do not always afford definite data for reliable comparative estimates of durability, except when different specimens occur in the same quarry."

North of the glacial limit, all the products of decomposition have been planed away and deposited as drift formation over the length and breadth of the land. The rocks are, therefore, in general, quite fresh in appearance, and possess only a slight depth of cap or worthless