

to remove the light surface, and to make the dark background appear without fatigue to the hand

In some backgrounds colors in monochrome are sometimes added, and these are treated just as you treat fresco, which is very easy after experience has taught the difference between the tint in its wet and dry state. Some of the finest and richest effects are reached by the addition of gilding to some part of the graffito, as ribbons, fruits, arms, &c. The gold, however, must be added when the graffito is perfectly dry.

Naturally there is much in graffito decoration that experience teaches, but it is not very difficult to execute, and it seems to be deserving of more attention in these days of progress, in virtue of its durability as well as of the excellent effects it lends itself to producing. There seems to be a good field open for teaching graffito decoration in the art schools, which have been so largely established in this country.

There are still other modes of decorating the exterior of edifices which were adopted by the fifteenth-century artist—namely, that of chiaroscuro in fresco, and fresco in colors. The first has, at a distance, all the appearance of graffito, and, although the design is not cut, it has similar color and effect.

Much was done in this style by Maturino Fiorentino and Polidoro da Caravaggio, both of whom arrived to the highest point in this art of decoration with their immortal work of chiaroscuro in fresco in Via della Maschera d' Oro in Rome. Many other examples could also be mentioned, but as this work is the most important among the others, it will suffice as an illustration of this beautiful art. The frieze representing historical scenes is the most important decoration, and in a certain sense it recalls to mind the sequence of pictures which compose the triumph of Cesare, by Mantegna, at Hampton Court. Speaking of fresco, what is meant is the real Italian fresco, and not tempera or incausto, which is occasionally confused with it. As an external decoration it may be considered to be truly ideal, and it is to be regretted that in England it appears to be absolutely out of fashion.

Outside fresco, when it is done with good and pure earth colors, upon suitable lime mixed with much sand and puzzolana of that sort which the Romans used on the Colosseum, becomes very solid, hard, lasting and washable, just like compact and durable stone.

It is really to be regretted that to-day the exterior of buildings is so much limited in the matter of decoration to frames, columns, or, in a few words, to architectural mouldings, whereas the old masters of nearly all ages introduced into their edifices all that contributed beauty. Why, it may be asked, render so poor the mother of all Arts—the one which more directly speaks to our souls, which is so impressive, which cheers and covers us?

A STATEMENT IN FAVOR OF HOLLOW BRICK WALLS.

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IN order to give a thorough knowledge of what is required, I quote the report made by the government officer of the Ordnance Department U. S. A., at Watertown Arsenal, of a test made of seven bricks from Providence, R.I., for the Norcross Brothers, of Worcester, Mass., Sept. 14, 1892.

| Test Numbers. | | Dimensions in Inches. | | | Sectional Area | First Crack. Lbs. | Ultimate Str. | |
|---------------|--|-----------------------|------|------|----------------|-------------------|---------------|--------------------|
| | | | | | | | Total lbs. | Lbs. Per Sq. Inch. |
| 8698 | No. 1. Long Island Brick Co..... | 2.30 | 3.50 | 8.15 | 28.52 | 58,000 | 128,100 | 4,492 |
| 8699 | No. 2. Danvers..... | 2.00 | 3.72 | 7.94 | 29.54 | 91,800 | 194,700 | 6,591 |
| 8670 | No. 3. N. E. Steam B. Co. Rough Pav..... | 2.20 | 3.80 | 7.78 | 29.56 | 132,000 | 372,800 | 12,612 |
| 8701 | No. 4. N. E. Steam B. Co. Smooth Pav..... | 2.20 | 3.51 | 7.78 | 27.31 | 177,000 | 383,900 | 14,057 |
| 8702 | No. 5. N. E. Steam B. Co. Sewer Brick..... | 2.25 | 3.90 | 8.00 | 34.20 | 114,000 | 282,600 | 3,263 |
| 8703 | No. 6. N. E. Steam B. Co. Light Hard..... | 2.40 | 4.16 | 8.33 | 34.65 | 67,000 | 159,000 | 4,592 |
| 8704 | No. 7. Nyatt Brick Co..... | 2.28 | 3.58 | 7.29 | 28.35 | 98,000 | 209,900 | 7,404 |

I consider the above tables of great value to the building community. We are indebted to the enterprising firm of Norcross Brothers, who caused the above tests to be made, for much valuable information. By their great desire to know the strength of materials, and by the many precautions they take, they have gained an enviable reputation as being most thorough builders.

From exhaustive tests made during the building of the Allegheny County court house and tower, the tower being three hundred and twenty-five feet high, something over one hundred feet higher than Bunker Hill Monument, it was ascertained that the strength of brick built in walls or piers is very nearly one third of the crushing strength when crushed between smooth surfaces or imbedded in plaster; so that, in work where it is necessary to be near the margin of safety, it may be assumed that well-laid brickwork will carry in a wall one third the crushing strength of a single brick. In some parts of the above mentioned tower the brickwork carries twenty-four tons per square foot

We also have other authority, taken from a book published by

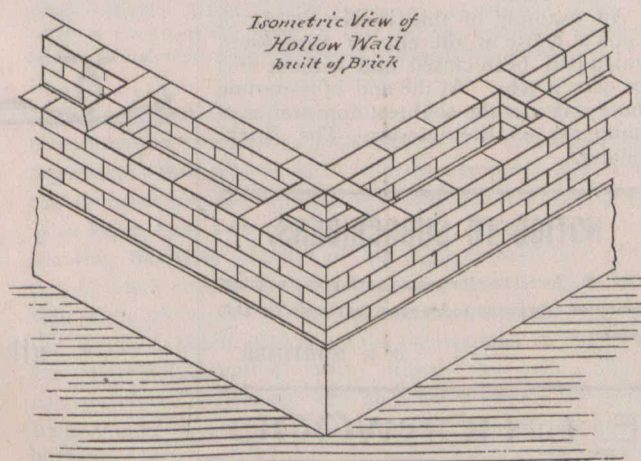
Frank E. Kidder, C. F., in 1892. On page 171 we find the following table:

| | STRENGTH OF MASONRY. | |
|-----------------------------|----------------------|--------------|
| | per square inch, | |
| Brick (common) Eastern, | | 10,000 |
| " (best pressed), | " " " | 12,000 |
| " (Trautwine), | " " " | 770 to 4,600 |
| Brickwork (ordinary), | " " " | 300 to 500 |
| " (good, in cement), | " " " | 450 1,000 |
| " (first-class, in cement), | " " " | 930 |

Take, for instance, from the above table, "Brickwork (good, in cement)," using the lowest figures, 450 pounds per square inch. Assuming the weight of brickwork to be 112 pounds per cubic foot, it would require a brick column one foot square and 580 feet high to crush the brick at the bottom.

Taking one brick 3 3/4 by 8 inches which gives us a surface of 30 square inches, and multiplying this by 450, we have the sustaining strength, 13,500 pounds.

Now if we should lay one brick upon another to a height of 100 feet, we would have 500 brick with a weight of 2,000 pounds, thus leaving us 11,500 pounds to carry the load.



In a 16-inch hollow wall 10 feet long laid with the solid bonded wyths of brick, 30 inches from centre we have 1,080 square inches of surfaces. Multiplying this by the lowest number of the seven Rhode Island bricks tested, 4,492, we have 4,851,368 pounds, or 2,425 1/2 tons, as our sustaining strength.

A hollow wall 10 feet long and 50 feet high contains 8,500 brick, with a weight of 34,000 pounds or 17 tons. Five hundred feet of flooring and roof at 25 pounds per square foot equals 6 1/4 tons; weight snow at 15 pounds per square foot equals 3/4 ton; required by Boston ordinance for loading of floor, at 75 pounds per square foot, equals 15 tons; total, 39 tons. On deducting the 39 tons from the 2,425 1/2 tons, we have 2,386 tons of additional strength. This is certainly enough to make it secure beyond all doubt.

If, instead of using the 16-inch hollow wall, we had used a 12-inch solid wall of the same height and length, it would have required 2,570 more brick, giving us 5 1/2 tons additional weight on our foundations.

In using a hollow wall we gain many advantages, aside from the less weight and number of brick.

First. The hollow wall stands on a sixteen-inch base, while the solid wall has a twelve-inch base, making the former much the stiffer wall.

Second. We have a much dryer building, and one that is cooler in summer and warmer in winter; and frost will not appear on the inside of the wall, as is frequently seen on solid walls.

Third. The vacuum in the wall may be used to ventilate the cellar, and also to receive a pipe to conduct off the water.

This was done in the residence of the late George Crompton, of Worcester, Mass., and has never needed repairs.

Fourth. A hollow wall will stand fire much better than a solid wall.

This is shown in the Ashburnham Academy, where the entire woodwork was burned away, leaving almost the entire hollow wall standing erect.

In my practice as an architect I have built a great many buildings in which I have used the hollow wall. Some of these were very large and tall buildings, as the Congress Hall of Saratoga, N. Y., which is in part seven stories high. I have used this wall in many dwellings, schoolhouses, stables and mills, all of which are standing as firm as the day when they were built.

All the above calculations are based upon good materials and good, thorough work. When these are obtained I claim that the hollow wall is much the best, and that buildings constructed with them are the most desirable to live in. I hope that the city authorities will soon change the ordinances so that we will not be compelled to put in more material than is necessary, to the injury of the building. I would rather pay for the extra brick and then leave them out, than to put them in; for the thicker the wall the longer it will retain the dampness.

A reliable architect made a statement before a city committee that he had seen a candle blown out through a solid brick wall