

can be produced which will not only be fire and damp-proof, but also of indefinite life.

An illustration of methods used in the case of larger panels in walls is that of the coal car thawing shed built for the P. and R. Railroad at Port Reading, N.J. This building is an all-steel frame, covered with gunite, without and within; and in addition, the walls are provided with an inside coating wall, which procured two air spaces for insulation. The columns are spaced about six feet apart, connected only with tie-rods.

As a two-faced wall was called for, it was necessary to shoot one side without the use of a panel. It was, therefore, decided to shoot the outer wall from the inside and against a panel. The reinforcing mesh was attached directly to the channels, the movable panel furred away the proper distance and the material shot on. The middle wall was built up by hanging a tar-paper over the tie-rods, which were on the centre line of the channels. Over this a very light reinforcement was hung and one-half inch of gunite shot on. The inner wall was built up by first attaching a reinforced tar-paper directly to the columns, after which the reinforcing mesh was hung and then the gunite shot directly against the tar-paper. In this way the double insulation was assured.

In shooting roofs, expansion joints may or may not be used. Experience has shown that long roofs have been shot without expansion joints and with perfect success, care being taken to see that the edges and valleys are doubly reinforced. In other cases, however, expansion joints have been deemed necessary, in which case they can be made very successfully in the following manner:—

Stretch the reinforcing mesh in place over the rafters, taking care to see that this mesh is turned up vertically at the proposed joints. As roofs are usually shot from underneath, it will then be necessary to provide a square edge on the panel against which the shooting is done in order to cover this vertical wire. Prior to shooting the adjacent section, several layers of tar-paper or felt are placed against these vertical joints, thereby preserving a space between the two sections. This leaves a "standing joint," which is then covered with a cap of some type (either reinforced gunite or metal).

The panels against which the material is shot from below usually consists of light boards which can be easily removed. This lower coat is shot only to such thickness as necessary to insure stability, when the finish coat is added from above.

The following are some authoritative costs:—

West New York Farms Company, 15 buildings, 1,478 square yards covered:—

	Cents per sq. yd.
Labor	4.47
Tending cement-gun	3.70
Sundries	3.40
Repairs	2.60
Cement	13.77
Sand	7.81

Mason 35.75
8.50

Total 44.25

The following letter was received from the engineer in charge of the Whitby Hospital work and shows costs on that job:—

"Gunite on exterior walls is done in two coats and has a total thickness of $\frac{3}{4}$ inch. Nearly all this work is

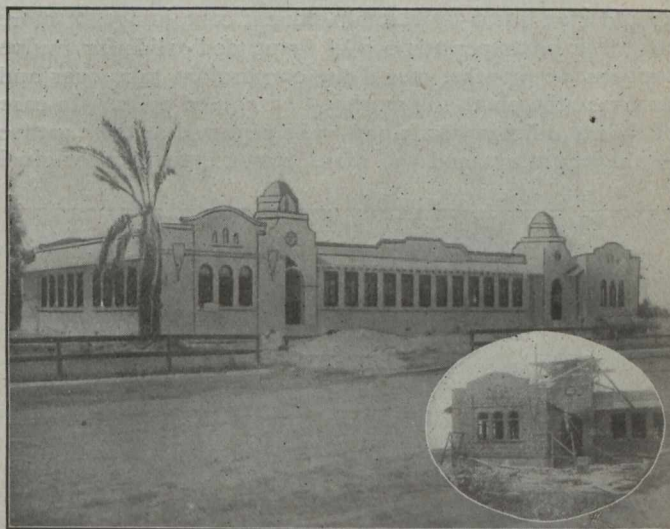
done from a swinging scaffolding, and our cost per yard covers the raising, lowering, etc., of same. Our average cost for all outside stucco done this season was 58 cents per square yard. The first coat costs on an average 49 cents and the splash or finish costs 9 cents.

"The wages we pay are as follows: Foreman, 55 cents; plasterers, 50 cents; nozzleman, 50 cents; unskilled labor, 30 cents.

"You will note that the price per square yard is arrived at after all openings have been deducted. We believe it is customary in the United States not to take openings into account at all, and, of course, this makes a considerable difference in the cost.

"If openings are not deducted, then our average cost per square yard for stucco is 43 cents.

"For interior plaster work our cost runs around



Gunite Shot Directly Onto Hollow Tile.

48 cents per square yard, with openings deducted; if openings are not deducted, the work can be done for about 40 cents. The material costs the same as for stucco and is applied by the same class of labor."

Recently a small-size cement-gun covered 160 square feet of wall an inch thick in thirteen minutes to illustrate the rapidity of operation of the machine.

Another illustration of how cheaply this new type of work can be done was shown recently when a building containing 800 square yards was completely covered in two days.

Bulletin No. 70 of the Bureau of Standards of the United States Government, issued January 31st, 1917, compares the mortar obtained by the cement-gun with hand-placed stuccos. A building erected in October, 1915, contains 57 panels, showing various stuccos over different substances. These panels were divided into groups. Group No. II. consists of five panels made up of cement mortar over wire lath. Of these five, the four hand-placed panels are rated in this report as "poor" and "very poor," while the gunite panel is rated as "excellent."

Report of Provincial Mines Branch shows the output of coal in Alberta this year to March 31st, to be one million five hundred and one thousand two hundred tons. The greater part of this was lignite from twenty-seven districts. Total production for 1916, four million six hundred and forty-eight thousand six hundred and four tons of coal, forty-one thousand nine hundred and fifty tons of coke, and one hundred and seven thousand nine hundred and fifty-nine tons of briquettes.