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Waterproofing Concrete.

The variety of uses to which concrete is now put and the frequency with which it is desirable to have it waterproof, give great importance to a series of experiments conducted by Mr. Richard Heyward Gaines, a chemist of the New York Board of Water Supply. Mr. Gaines describes two processes and says that they may be used singly or together. He thus provides three ways of accomplishing the desired result. One is substituting for the mixing water in the preparation of the concrete a solution of a certain class of chemicals designated as "electrolytes." The most economical and serviceable salt for the purpose is sulphate of aluminium. The second expedient is replacing from five to ten percent. of the cement with an equal quantity of finely ground colloidal clay, this being mixed with the cement before the water is added. To illustrate the effect of these methods, Mr. Gaines gives the following notes: "Two lots of concrete are prepared from the same ingredients and in the same proportions, but not treated by any of his special methods. Specimens from the first, 28 days old under 80 pounds pressure, allowed 524 grams of water to pass through in ten minutes, and specimens from the other, 33 grams. Two lots, identical in every other way except for the addition of an alum solution, allowed only 2 grams to come through. Concrete in which there was 10 per cent. of clay, but no electrolyte, did not allow a drop to penetrate. When both an electrolyte and clay had been used there was an unmeasurable trace.

These tests were made with two-inch cubes, and the supposition is that a slightly greater thickness would have been absolutely impermeable. Another result of treatment here mentioned is that the strength of the concrete is increased from twenty to fifty per cent. Mr. Gaines believes that the ions, or particles, carrying electrical charges in the water, promote chemical combinations and also form a glue-like substance in the mixture.