man Portland cement makers, adulteration with slag and other similar materials is carried on by some of the manufacturers to an alarming extent. No one ever heard of a maker of natural cement in this country adulterating his product. It would not pay, for there is no material, useful for that purpose, so cheap to him as the natural cement rock. Honesty, therefore, in this respect, is reasonably well assured.

An over-clayed natural cement will behave better under test than an over-clayed artificial cement. The cause of this is to be found in the much finer condition of the former. Neither of them will act well in frosty weather. An engineer uses what he may consider a first-class natural cement late in the fall, and finds it to scale and disintegrate. He uses Portland in the same way, and it remains firm; and he is more than ever convinced of the superiority of the Portland. But he has unwittingly drawn an unfair comparison. The natural cement that he had selected, however well it may have acted earlier in the season, was over-clayed, and therefore required more water than a well-balanced cement, and consequently it was more liable to expansion and disintegration by frost. It is an error to suppose that the natural cements of this country are all about alike, and that the testing machine will very quickly tell us of whatever differences may exist. A well-balanced cement will withstand the action of frost many years, while an over-clayed one will not, whether natural or artificial, and of this the testing machine gives no indication. If we take two cements, the one being natural and the other artificial, and so nearly alike in composition that a chemist could not distinguish any difference, both being made up of correct combining proportions, the artificial will test higher than the natural product; but can it be truthfully maintained that it is the better of the two?

If we are governed by the prevailing public opinion, we must admit it, for the testing machine says it is so. Had the chemistry of cement and the laws governing combining proportions been made more of a study in the past, we should not now see the whole question submitted to this crucial test, called tensile strain.

Commencing with the year 1825, when Portland cement was first produced, until 1858-60, the natural cements were sold at a price fifty per cent. higher than the artificial cements would bring in the markets of England. Then the tensile strain testing machine was brought into use, and, to the surprise of all concerned, it was found that the artificial products tested higher than the natural brands. This was a revelation that brought joy to the hearts of the heretofore languishing manufacturers, and produced a correspondingly depressing influence over the fortunes of the manufacturers of natural cements. If the Portlands were superior to the natural cements, it is a little strange that such engineers as Grant, Coulson, Mann and others had not discovered it in all those years prior to 1860. But the tensile strain fever had set in, and men argued then, as they do now, that if one cement sustains a higher tensile strain than another, it must be better because it is is stronger. And this argument seems unanswerable, and, coupled with the fact that it is a quick and ready means by which the engineer may draw conclusions, has been the cause of its adoption to such an extent that to-day the engineer is considered behind the times who does not have excess to a testing machine.

Looking at this point from the standpoint of one who has had over 30 years of practical experience in the manufacture of cement; witnessing the entire rise and growth of this modern giant, the testing machine; always ready to adopt any and everything looking to an improvement in the the quality of hydraulic cement; studying the action of all the leading brands in the market under varying circumstances, and devoting much time to the deeply interesting study of endeavoring to discover the connecting link that ought to exist between high tensile test and first quality, and oftentimes seeing a cement that was notoriously over-clayed test 100 pounds to the square inch, while another cement nearly perfect in its composition testing barely 60 pounds, and the resident engineer deciding unhesitatingly in favor of the higher testing brand, without a thought bestowed on the question of analysis and combining proportions, and all that goes to render a cement capable of withstanding the changes incident to this trying climate with its extremes of heat and cold, we have sometimes been forcibly reminded of the old adage that "a little knowledge is a dangerous thing."

During the past summer a professor of high repute in one of our leading colleges condemned outright one of the best natural cements I ever knew, a cement that had been thoroughly tried in the construction of masonry in bridge piers, where the current was so powerful and the flow of ice in the spring so terrible that the late Col. Eads declared that no bridge piers could be built to withstand the shock. I mention this to illustrate the workings of the testing machine. If it can deceive a professor in one of our foremost colleges who can it not deceive?

Imagine the fantastic tricks it is capable of playing among the ranks of the city engineers throughout the land. First one brand forging ahead, then another. At last one is reached that shows so far ahead that it soon becomes a hot favorite, and he feels like tying to it. One more trial and it drops away in the rear, and the engineer scratches his head.

(To be Continued.)

A correspondent, writing to *Stone*, says: "It has been quite recently demonstrated that slate, ground up and bolted, can be made into a plastic mass, involving great pressure, and the product then subjected to great heat, changed into an enduring and solid stone. The paste can be formed into anything that can be formed into moulds or by the hands, and everything that is now made from the actual stone can be formed in this way."

GRANOLITHOS—A NEW BUILDING MATERIAL.

By G. F. Stalker.

It is always an advantage to architects to have brought to their notice the qualities and properties of any material, artificial or otherwise, that is intended to be used for building purposes. And as it is on their recommendation that any new material will be brought into general use, or meet with an early death, the inventors of such materials are naturally ready to afford architects every opportunity and facility in their power to satisfy themselves as to their merits. It is not sufficient that a chemical analysis and recommendation should be attached to a new cement or stone. That is good so far as it goes. So also is a proper scientific test of its strength. But to find favor in the right quarter, and to obtain permanence in its use, the new material must be capable of being architecturally treated. For lack of this, many building patents of recent years have made a short successful run, and have ultimately landed the patentees in financial difficulties. The same may be said of such materials as have been made to depend upon cheapness for their success, for some cheap things are very dear, and nothing that can be done with them will ever make them look anything but awfully cheap. At the same time, after being satisfied that a building material is all that has been claimed for it, the next question an architect wants to be satisfied upon is that of its cost.

Granolithos is the name that has been given to a new building material, and, as the name suggests, it is a granite stone. It is composed chiefly of pounded granite and Portland cement, and is, in fact, a similar composition to the granolithic pavement now so well known and so largely used. This should be a strong recommendation of its durability and toughness. And this, together with the fact that before it sets it is very susceptible to impression, induced the Canadian Granite Company to make experiments with a view to the production of a material possessing all the properties of first-class building stone. The nature of the experiments has been such as almost to make success assured. Steps and flight of stairs, with and without nosings, curbs, sills, and other portions of plainer masonry were first attempted, and brought to a successful issue. Then diapers, rosettes and other methods of wall decoration so frequently employed in ornamental brickwork and terra cotta. From these to brackets, trusses and keystones successful progress was made, until now there is no kind of architectural detail, either plain or ornamental, which cannot be produced in granolithos, as well as can be done in stone or terra cotta.

The results, taken in connection with the strength and durability of the material, are eminently satisfactory. But granilithos possesses other and very important advantages in regard to its manufacture. It is quickly made, occupying less time in the production of plain or moulded work than stone treated in a similar manner. And, of course, when ornamental work is concerned, the saving of time in favor of granilithos is much greater. Again, it has been found, in the case of nearly every other artificial stone, only possible or safe to produce it in blocks of limited dimensions; whereas granolithos can be made in blocks of the largest dimensions necessary for buildin purposes. At the same time it can be made in blocks of the size of an ordinary brick; and, in this respect, it will be found a most serviceable material on account of its great hardness, for rounded or square corners, for archways, angles of bay windows and projections where damage is likely to occur. And, as in the process of manufacture, it is not subjected to the influence of heat or any other force having a tendency to warp or distort it, its lines are true and regular, and it suffers no shrinkage in the mass. In color it has been produced, so far, in grey, about the shade of ordinary limestone, and buff and red, very closely resembling those colors in terra-cotta.

But, with regard to the important question of cost, it is hardly possible to speak yet with any degree of definiteness. For with granolithos, as with every other material, the price will very much depend upon the amount of detail and ornament shown on the design to be produced in it.

THIS CANNOT BE REPEATED TOO OFTEN.

Stone should never be used immediately after quarrying. It should be exposed to the weather for a month anyhow before it is used. It thus becomes seasoned and will wear much better. When left to season the under side of the rock as it lay in the quarry should be exposed to the sun. When you buy stone for paving or similar purposes insist on its being turned over, that is reversed from the way it was in the quarry before it is laid. The reason for this is that the top surface is much softer, it being of later formation, stone forming from the bottom.—*Stone.*

A discovery of sandstone has been made on an island in Johnson Strait, up the coast from Vancouver. The purchaser has, it is reported, bonded it to a Victoria firm for $60,000.

To give a cold chisel a good temper is a question that is somewhat perplexing. We submit the following rule, says the *Chicago Journal of Commerce*, which, if followed in detail, will be found to be the most practical in its results: Heat the chisel to a low heat, so as not to raise the scale, and dip into a brine of salt and water, in quantities of one and ten quarts respectively. Leave heat enough in the tool to allow it being run down to a required hardness, which is designated by the pigeon-blue color. The chisel should be made stout enough to resist a pressure which in using would tend to spring it when put to a test.