LIFE OF STONES.

Some months ago these pages had an article on the "Decay of Building Stones." The subject is worthy more than a passing paper, as it affects not only the permanency of public buildings, but the lasting qualities of the mementoes to our own dead. A run through the graveyards of the oldest settled portions of the country proves that some of our more recently formed stones possess an enormous amount of durability; the slates, for instance, outlasting even marble, to say nothing of sandstone. But the oldest stones which have been found, those retaining their inscriptions legibly, are those from such quarries as the Bolton Ledge, in Connecticut, specimens of which may be found in other localities. But the chief value of this stone is that it is a resistant to the acids in the atmosphere, especially those generated in manufacturing localities from combined smoke and steam emitters. This stone appears to be a slate impregnated with mica so closely mixed that it gives the entire surface an almost glassy appearance. It is much in favor for pavements for hospitals, chemical laboratories, and other places where the floor would be exposed to the action of acids and other chemicals. In the early story of the country, especially of New England, these stones, being easily quarried, were largely used for memorial headstones, and the inscriptions, although shallow, are still quite legible. Even when set on edge and exposed for a century or more to the changes of our northern climate, the layers refuse to separate, and even the face wears out sooner than the stone disintegrates.

Slates, of the dark blue color, have withstood the wear of a century and still retain all the sharpness of their inscription. There is something peculiar about this stone. It is simply a clay deposit under water, but it is a great resistant of water and is almost fire-proof — much more so than marble or granite.

Sandstones, either of the light shades or the dark red colors, are peculiarly susceptible to elementary or weather influences in this climate. Monuments in cemeteries composed of the Portland red sandstone show marks of weather wear within ten years. Buildings composed of this stone are defaced almost before the elements have given them the seal of age by their mellowing influence. Window stools of churches, steps, balustrades, hoods, and projecting caps peel off in flakes or crack as though under too much weight. This stone is only sharp sea-sand agglutinized and cemented by the oxide of iron. It disintegrates too rapidly on exposure to the atmosphere to be fit for enduring structures. So certain is this to those who cut the cheese-like stone from its natural quarry that their cemeteries, in close vicinage to the quarries, show very few of these stones in their monuments.

Granite, where not exposed to destructive heat, as to great fires like the memorable ones of Chicago and Boston, is very enduring. Its clean surface will not encourage even the attachment of moss, while sun heat and frost cold seem to have little influence on it. It is almost absolutely proof against chemical attacks from the atmosphere, and so for sustaining crushing force there is nothing in the merely mineral materials than can equal it, Quincy granite and Westerly granite approaching in their resistant qualities to crude cast iron.

Marble is a carbonate of lime, and this simple statement is sufficient to show that marble is not an appropriate material to meet our frigid Winters and torrid Summers. The public buildings that have recently been constructed of marble show already signs of decay. If our climate encouraged the cryptogamous growth on mural stones that the air of England, the British Isles, and even of Southern Europe does, our marble edifices might be sure of a life of ten or more generations. But there is no surety of permanency in the marble buildings erected nowadays. The marble is not pure, and the climate is not fitted for even the purest marble. Our granite and blue stone quarries will be forever our best resorts for building and monumental stone.—*Scientific American.*

SOLDERING ALUMINIUM.

The use of aluminium in the arts has been much restricted by our ignorance of any method of soldering it, either to itself or other metals. Now, however a French engineer, M. Bourbouze, has discovered a way of effecting both classes of the operation with ease. The process consists in plating both surfaces to be soldered, not with pure tin, but alloys of tin and zinc, or tin, bismuth, and aluminium, &c. Good results are obtained with all such alloys, but those containing tin and aluminium are best. They should contain different proportions, according to the work the soldered parts have to do. For parts to be fashioned after soldering, the alloy should be composed of 45 parts of tin and 10 of aluminium, as it is sufficiently malleable to resist the hammer. Pieces thus united can also be turned. Parts which have not to worked, after being soldered, may be united with a soft solder of tin containing less aluminium. This last solder can be applied with a hot soldering iron, as one solders white iron, or even with a flame. Neither of these solders requires any prior preparation of the pieces to be soldered. It suffices to apply the solder, and extend it by help of the iron over the parts to be joined. When, however, it is desired to solder certain metals with aluminium, it is best to plate the part of the metals to be soldered with pure tin. It is sufficient then to apply to the part the aluminium plated with alloy, and to finish the operation in the usual manner.

Engineering Notes.

THE UTILISATION OF THE NIAGARA FALLS.—At a recent meeting of the American Association of Civil Engineers, Mr. Benjamin Rhodes described what had been done and what might be done towards the utilisation of Niagara for electrical purposes. He said: "The power of Niagara can be estimated very approximately. The average flow of the river according to many careful measurements is 275,000 cubic feet per second. The fall in the river through the rapids immediately above the fall is 60 feet. The height of the falls is 165 feet, making a total of 230 feet; thus we have for the whole power 7,000,000 horse-power. To utilise this amount of power by water-wheels, generate electrical currents, and transmit to various cities within 500 miles, would necessitate a plant represented at $5,000,000,000. Such figures as these give some idea of the enormous amount of power here in reserve." He states that on the Canadian side the entire use of the falls is represented by a small over shot wheel, which propels a pump, furnishing a meagre supply of water to the adjoining village. On the American side there are five separate raceways, developing in all 800 to 1,000 horse-power. After describing the hydraulic canal, the greatest power now in use at Niagara, he says: "Further developments of power at Niagara may be made at little expense. The hydraulic canal can be deepened and widened, and wheels may be set under greater heads, the total amount thus made available here being equal to the necessities of many years. It may safely be said that the use of Niagara has just begun. Low water is unknown; troubles from ice are slight; hours of use are not limited to 8 or 10, but 24 hours in the day and 365 days in the year, and unlimited power is ready, making the most reliable, as it is the grandest, water-power in the world."

THE SILVER VOLTAMETER.—At the last meeting of the Physical Society for the present session, Lord Rayleigh, president elect of the British Association, exhibited the platinum-bowl voltameter which he has designed for measuring the strength of an electric current. This is the best means yet found for estimating the current in absolute measure. The platinum bowl is the cathode in his apparatus; the anode being a sheet of silver wrapped up in clean filter-paper sealed round it. The filter paper is a sheath for the anode to catch any grains of silver which may be loosened from it in the act of decomposition, and prevents them from falling on the bottom of the bowl or cathode. The bowl is filled with a solution of silver salt, the pure nitrate or pure chlorate being preferred. Silver acetate ought not to be used, as it does not give such good results. The anode is dipped in the solution till the sheet is quite immersed; and the current turned on. One ampère deposits 4 grammes of silver in an hour, therefore a quarter to half an hour is sufficient to give one to two grammes, a quantity which can be weighed with sufficient accuracy in a chemical balance. Any current from $\frac{1}{10}$ to 5 ampères can be successfully measured in this way.

NEW METHOD OF PRODUCING STEEL PLATES.—Dr. Henry Muirhead, president of the Physiological Society of Glasgow, has recently brought before that body some particulars of a method of manufacturing steel plates for shipbuilding and boiler-making purposes which is of much interest, although its