ON LIFTING MONOLITHS.

DEAR SCIENCE: It is a subject upon which I have frequently thought, but concerning which I have seen nothing written, that all the megalithic and Cyclopean structures of the world were erected at a time or under circumstances that may be called pre-mechanical. Neither in America nor in any other part of the world has the account of the moving of a 'big stone' been written down. There is not a modern machine capable of lifting some of these great stones and herein lies the secret. If you will examine the twine, sennit, cables, ropes of modern savagery, you will at once see that in prehistoric times machinery could not have been utilized in lifting the great monoliths. There was not in all the world, during the periods when the megalithic monuments were being set up a derrick, or chain, or rope, capable of sustaining the weight. In Washington the stone cutters and contractors do not dream of hoisting the big stones that form the bases of monuments, though they are only pebbles compared with those of Teotihuacan or Baalbec. They move them on rollers, by means of crowbars and capstans turned by men or mules or horses, simple enough to have been familiar to the ancients. But even such affairs would be like rags hitched to a stone weighing a hundred tons or more. There is no use in looking for the machinery for the transportation of the megaliths; there was none. Time was the essential factor. A people that could pry up one end of a stone could put a roller under it. If they could move it twenty feet in a day, that would be over a mile in a year. Flotation, cribwork, inclined planes, levers, wedges were the utensils of horizontal and vertical motion. Count Wurmbrand has figured, in Matériaux pour l'histoire primitive et naturelle de l'homme, a company of men in India carrying a menhir upon a framework of wood and bamboo. If two hundred men could get around such a device and each bore two hundred pounds, the total weight could not exceed twenty tons. In studying the history of architecture one is almost justified in thinking that the size of the stone lifted has steadily decreased with the perfecting of lifting devices. Speed is the point aimed at. To fill a given space the modern crane derrick will do the work quicker with small blocks and much cheaper from every point of view than it could be done with a single large block. Without dwelling further upon the economic side, the fact remains that all the megalithic and cyclopean structures of the world were erected by means of the co-operation of human hands, using the simplest mechanical powers and without lifting machines of any kind.

OTIS T. MASON.

THE 'KANSAN' GLACIAL BORDER.

TO THE EDITOR OF SCIENCE: I have been extending the delimitation of the 'Kansan' glacial border westward from Lock Haven, Penna., during the past month, and a few of the points noted are of more than ordinary interest.

The first is regarding the possible existence of two glacial lobes from northeast and northwest which met and neutralized one another over the area north from Bradford, Penna., instead of proceeding south along the level valley of the Tunangeawant. A comparison of the 'Wisconsin' border of Lewis & Wright and the 'Kansan' border shows that they approach one another and almost coincide at the New York apex, while they diverge more and more as they extend southward. The 'Kansan' portion of the eastern lobe is lacking in fragments of crystalline rocks, while the same portion of the western lobe carries them. A study of the moraines of recession will easily settle the question thus proposed.

The second is that the 'Kansan' deposits over the Allegheny region bear out the deductions made from a study of similar deposits in eastern Pennsylvania that there has been but one epoch and that of comparative recency. A great deal of discussion has gone on regarding alleged 'high-level gravels' in the Allegheny region. This was on the basis of the 'Wisconsin' border being the extreme limit of ice action. The work of the past month shows that the Allegheny river was completely covered with ice as far south as Franklin (where the work is now being carried on), and all the localities noted by Messrs. Chamberlin, Wright and others along the tributaries to the Alle-

gheny from the north were covered by the Kansan advance and filled with its débris, They were afterwards more or less excavated and filled with later modified Wisconsin material; but immediately and at a moderate interval in the past, as is shown by two facts: the state of the crystallines in the Kansan drift, and the condition of the river gorges.

The writer, several years ago (*Am. Jour. Sci.*), made the statement that the majority of glacial students seemed to have failed to consider the state of the surface immediately before the first glacial advance. He, thereupon, stated that all portions of surface outcrops too hard to be ground into flour would form a rusty gravel, with the rustiness due to previous weathering, and not to lapse of time since deposition. This is fully proved in the Kansan drift in western Pennsylvania, where red granite cobbles have been found on top of the hills east of the Allegheny river, and from four to five hundred feet above it, and these have been glaciated on one or two sides, where the smoothed surface acquires the aspect of 'rusty gravel,' while on other sides the old surface weathering remains undisturbed to such an extent that the rock has lost entirely its black bisilicates, is completely kaolinized and is pulverulent. One side is scraped down to the hard and rusty interior, and the other remains as it lay on the surface when picked up by the ice. In the same way local Pocono and Carbonic sandstones will show a hard glaciated surface and a pulverulent angular surface in the same fragment and in hundreds of instances. These lie in red clay on local white sandstone. With these ancient relics are sparingly mixed river-rolled sandstones and shales as highly polished and as hard as any in the Wisconsin deposits. These are found under conditions which exclude their being residual from local weathered conglomerates, and, as in eastern Pennsylvania, they bear witness to the close association of Kansan and Wisconsin formations.

The best proof, however, lies in the state of the river bottoms. My assistant, Mr. Joseph Barrell, has discovered and studied the abandoned channel, not hitherto noted, of Oil Creek below Petroleum Centre, and will discuss it fully later. I wish to call attention to the importance of his discovery that both the old and the present channels are of equal depth; both are filled with Kansan and modified Wisconsin drift, and the creek has not cut down to its preglacial or Kansan level since the glacial epoch.

As the finding of Kansan drift over the region shows that high and low level gravels could accumulate from the same source, so the discovery of this filled valley, under exactly similar conditions which obtain in the Lehigh region, shows that Kansan and Wisconsin advances, as far as the State of Pennsylvania is concerned, were closely allied and not very remote.

Edward H. Williams, jr.
Lehigh University, August 3, 1896.

A LARGE LOBSTER.

The subject of the size attained by the lobster has been recently treated by Herrick in his work on the Habits and Development of the American Lobster.

Various exaggerated reports of lobsters weighing 30 to 40 pounds have appeared as newspaper items, but the authenticity of such statements is questionable.

Herrick describes a specimen captured at Boothbay, Me., in 1891, and now in the museum of Adelbert College, which is probably the largest on record which has received accurate measurements.

On April 10, 1896, there was captured near Block Island a fine specimen which closely approaches in size the one described by Herrick. This was entangled in a trawl line in deep water, and so captured. It passed through the hands of Mr. E. C. Smith, a lobster dealer of Newport, R. I., and is now in the possession of Mr. F. W. Wamsley, of Woods Holl. It is destined for the museum of the Academy of Natural Science at Philadelphia.

The specimen is a male, perfect in every respect, and weighed alive slightly over 22 pounds. I have carefully measured it and find that the total length from tip of rostrum to end of telson is 21 inches. The greatest breadth of carapace is $5\frac{1}{2}$ inches, while the girth just behind the cervical groove, from edge of branchiostegite of one side to same position on other side, is $13\frac{5}{8}$ inches. The crushing chela is on the left side. The