

the silty and probably lacustrine deposits on the plains farther east of the mountains than the region here described, may not all the facts of composition, structure and fossil contents, above set forth, be explained as well by fluvial as by lacustrine conditions? Instead of assuming a series of warping and tilting movements by which lake basins were made and drained, is it not equally legitimate to assume changes of altitude, attitude, climate, drainage areas, etc., by which the rivers of the region altered their behavior from aggrading to degrading? The decision between these alternatives must, of course, not be attempted by an observer away from the ground; but in the meantime the lacustrine origin of the Arapahoe and Denver beds does not seem to be fully substantiated.

If they should finally be shown to be fluvial, several corollaries that follow from the acceptance of a lacustrine origin would require modification. For example: "Movements of elevation and subsidence, rather of an epeirogenic or continental nature, are indicated by both Tertiary and Pleistocene deposits that have a lacustrine origin, since the present inclination of the plains region, which shows an average descent, in round numbers, of 10 feet to the mile from the foothill region to the valleys of the Missouri and Mississippi, would not admit of the holding of lake waters on its surface." (P. 40.) Fluvial deposits are, on the other hand, characteristically inclined; and the present slope of the Plains may be not far different from their slope when the Arapahoe, Denver and later beds were formed, if they were spread out by aggrading rivers. I cannot help wondering whether even the peculiar cases of lapsing and overlapping strata, so well worked out by Eldridge about Golden and Boulder, may not find at least some part of their explanation by alterations of fluvial accumulation and denudation, prompted by

changes in grade, climate, drainage, area, etc., rather than depend altogether on movements of elevation and depression. The latter interpretation seems to postulate essential horizontality and rather regular continuity of strata at time of deposition; the latter permits or even requires significant declivity, inequality of thickness and irregularity of overlaps at time of deposition. Indeed, since the question of the fluvial origin of some of the younger deposits on the Plains has been accepted by geologists familiar with that great field, the possibility of a fluvial origin for some of the older formations springs to mind. The coarser and non-fossiliferous strata of the foothill belt in particular may, perhaps, be the fluvial equivalents of finer and fossiliferous strata of lacustrine or marine origin farther eastward on the Plains.

W. M. DAVIS.

CAMBRIDGE, MASS., September, 1897.

THE GRANT SARCOPHAGUS.

ON one of the most beautiful sites on the Island of Manhattan stands the mausolæum which the gratitude of a nation has erected to the memory of its illustrious hero.

The altar in this temple of the dead is the sarcophagus, beautiful and imposing in its severe simplicity. The stone out of which it is hewn is a dark red granite, quarried at Montello, Marquette county, Wisconsin.

Concerning the granite of this region Professor Allan D. Conover wrote: * "The rock shows almost no tendency to decompose. It has a medium grain, close texture, is of a bright pinkish color, and without sign of arrangement of the ingredients in lines. These are: Rather large flaked, pinkish, cleavable feldspar, predominating;

* Gannett's Report on the Building Stones of the United States and Statistics of the Quarry Industry for 1880.

somewhat granular, fine, pinkish, translucent quartz, abundant; and greenish-black mica sparsely scattered in blotches made up of very fine flakes. In places thin, light green epidote-colored seams occur.

"Though this granite may be somewhat difficult to obtain in dressable masses, it would probably make a very handsome and durable building and ornamental stone."

Cover and box were quarried from the same ledge of stone; in other words, the original was a monolith in the quarry. For ease of working, however, and in accordance with custom and usage, this monolith was cut up into pieces approximating to finished sizes before being sent from the quarry. About six months were needed to complete the work after it was begun.

It its entirety the sarcophagus weighs seventeen thousand pounds; the largest piece weighs nine thousand pounds. Its entire length is ten feet four inches; it is five feet six inches wide and four feet eight inches deep.

The pedestal on which it rests is made of dark gray granite from Quincy, Mass.

A fragment of the sarcophagus, analyzed by the writer, was found to have the following composition:

	Per cent.
Silica, SiO_2	75.40
Aluminum oxide, Al_2O_3	11.34
Iron oxide, Fe_2O_3	4.16
Calcium oxide, CaO	0.90
Potassium oxide, K_2O	6.44
Sodium oxide, Na_2O	1.76
	<hr/> 100.00.

Its specific gravity (17.5 °C.) is 2.635. The stone is a true granite, accepting as such granite having for its essential constituents quartz and potash feldspar. The feldspar is orthoclase, in which some of the potassium is replaced by sodium.

Mausolæum and sarcophagus were erected under the direction of C. W. Can-

field, Esq., of the New England Monument Company, to whose courtesy the writer is indebted for the details given and for the fragment of the sarcophagus subjected to analysis.

FERDINAND G. WIECHMANN.

BOTANICAL NOTES.

BOTANICAL ACTIVITY IN JAPAN.

A RECENT bulletin of the Imperial University of Tokyo (College of Agriculture Bull., Vol. III., No. 3) indicates a degree of activity in the study of botanical problems which must challenge the respectful attention of botanists in Europe and America. It is not too much to say that the papers which appear in this bulletin are of a higher order of merit than are the papers in most of the similar bulletins from American universities, or colleges of agriculture. The titles alone are sufficient to indicate the high scientific value of the bulletin: 'On the origin of sake yeast (*Saccharomyces sake*),' 'Note on a grape wine fermented with sake yeast,' 'On the behavior of yeast at a high temperature,' 'On two new kinds of red yeast,' 'On Brom-albumin and its behavior to microbes,' 'On an important function of leaves,' 'On the behavior of active albumin as a reserve material during winter and spring,' 'On the physiological action of neutral sodium sulphite upon phænogams,' 'On the poisonous action of ammonium salts upon plants.' The most important paper is probably that by M. Suzuki on a function of leaves, in which the author summarizes the results of numerous experiments as follows: "The conclusion seems justified that reserve proteids in the leaves are decomposed into amido-compounds during the night, and the latter are transported from the leaves to the other parts of the plant. The migration of amido-compounds appears to proceed rapidly, as I have found no large quantity in the leaves