chology' is unpsychological. Psychology is not primarily concerned with the time of sense, but with the sense of time, that is, it is not primarily concerned with the physical or physiological. Hence to make memory merely some simple function of time, as logarithmic, just as we find gravity to vary inversely as the square of the distance, is an enticing but false simplification of psychic act. While the physics of psychology is an interesting if somewhat limited field, it does not deserve the term 'the New Psychology.' 'The New Psychology' is that which has felt the stimulus of evolutionism, and whose standpoint is not physical but biological. The psychic phenomenon is a life method, and thus memory is a function of and for life, a mode of building up experience into a whole which should serve the individual and race as a sort of psychic capital.

Now the failure to take biology as the main standpoint leads to the very unsatisfactory remark (p. 208) that similarity, contrast, etc., are not real laws of association in memory, but only 'schemes for classifying associations,' and that the 'real law' has never been found. That is, we understand that some psycho-physical law yet undiscovered is the real scientific explanation, and the present psychology of memory by laws of similarity, contrast, etc., has little or no value. But appreciation of likeness and sameness, for instance, is of the greatest importance to the living organism, as in recognition of food, mate, etc., and hence it has become a prime method or law of mental organization. Mind in animals and men is not a general exhibition of elemental energy in space and time, but a practical device for the advantage of the individual and posterity; hence the laws of association, as commonly given, are vital laws and real laws of connectivity in mind reaching to adaptation.

We conclude that to come to the study of mind by the way of physics is to come by a back door. While we should certainly try to enter by every door that can be found back, side or front, yet the best, most comprehensive and reasonable view comes by way of the front entrance through biology.

Hiram M. Stanley.

Lake Forest, Ill., April 25, 1898.

THE CAUSES OF NATURAL ARCHES.

To the Editor of Science: The note in your April 22d number regarding the natural bridge in Utah is interesting, but I should like to supplement it by stating another interesting thing, namely, that there are in the great arid region a large number of these natural arches. In the Canyon of Desolation, on Green River, they are particularly common, and from the surface of the river some of them seemed of huge proportions. All I have seen occur in formations exactly similar in kind—homogeneous sandstones with tendencies toward conchoidal fracture—and my observations are against the wind erosion theory as a prime factor.

The beginning appears generally to be in some natural crevice or cleft on the face of the bare cliff wall, where water is able to penetrate and allow frost to start operations by throwing out a fragment that leaves a cavity almost a miniature of the final perforation which marks one further period in the demolition of the cliff. This fragment is followed by many others, till the cavity presents the appearance of an alcove with arched top, and a talus floor. The arch gradually deepens into the cliff, and I have seen one so deep that its floor was a lake, with a grove of trees at the opening. Frequently, if not generally, the deepening is assisted by water percolating from above.

At a certain depth, if the cliff is a thick one, the arch begins to protect itself, and the excavation proceeds more slowly. It becomes a cave with floors of various character according to circumstances that vary with other conditions. But if the cliff is comparatively thin the wearing finally cuts through to the opposite side, and then wind erosion becomes a more potent factor. I have seen many examples of every stage of progress, and I have seen at least one beginning where a rain torrent was in active operation, and made a sketch of it. Frost, and the disintegrating and dissolving power of water combined with structural tendencies, appear therefore to be the chief causes of these natural arch forms.

F. S. Dellenbaugh.

New York, May 3d.