

gravitational, thermal and capillary, due respectively to fluid pressure, osmotic pressure and surface tension. Charts were presented constructed from automatic, continuous records, showing that the ground water is constantly in a state of oscillation which may extend over a long period, may be seasonal, or may correspond with the high and low barometric waves associated with the movements of storms. The records presented show that the surface of the ground water in a well is much more responsive to atmospheric changes of temperature than the barometer itself, and during stormy weather the movements of the water surface are so complex and so short in period that a rapidly moving chronograph is required to separate them. Data from different wells and springs strongly suggest the existence of a lunar ground-water tidal disturbance. The variations in the rate of discharge of water from springs under barometric changes is very great, and the surface of Lake Mendota has been shown, even in winter when covered with ice, to be subject to extremely complex oscillation, some of which appear to be barometric. Professor C. R. Barnes, speaking on 'An Evolutionary Failure,' first discussed the meaning of the title, holding it applicable to those groups of organisms which do not give rise to higher forms. The evolutionary history of the mosses was briefly traced, showing that their ancestors diverged along two lines, one of which culminated in the mosses and the other in the seed plants. The cause of failure in the first case seems to have been due to the retention from lower stages of the two most important functions, nutrition and sexual reproduction, by the gametophyte; while success was attained in the other line by specializing the sporophyte for nutritive work.

W. S. MARSHALL,
Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of the Academy of Science of St. Louis on March 15, 1897, President Gray in the chair, present also thirty-five members and guests, a portrait of Dr. Enno Sander, who for the past thirty-five years has served uninterruptedly as its Treasurer, was presented to the Academy. Dr. Hambach spoke entertainingly

and instructively on what a geologist may find of interest about St. Louis, exhibiting specimens of the principal fossils and minerals characteristic of the local deposits, and indicating the best localities for the collection of certain specimens. One person was admitted to active membership.

WILLIAM TRELEASE,
Secretary.

SCIENCE CLUB OF NORTHWESTERN UNIVERSITY.

At a meeting of the Club held March 5th, Professor William Locy read a paper on the 'Primitive Sense-Organs of Vertebrates and their Relations to the Higher Ones,' of which the following is a synopsis:

The sense-organs differ from one another mainly in degree of differentiation and specialization. They may be regarded as forming a series at the lower end of which are the simplest sensory papillæ, and at the upper end the highest developed sense-organs. From the combined results of investigations on both invertebrates and vertebrates it seems probable that the higher sense-organs have been derived from those of a lower order, and that they have all been differentiated from a common sensory basis, and, therefore, are related in a direct way.

In vertebrates the sense-organs of the lateral-line system are the most generalized, and it seems probable that from these most of the others have been derived. Especial attention was directed to the earliest rudiments of the vertebrate eye, and the bearing of the facts on the phylogenetic history of the eye, was discussed.

THOMAS F. HOLGATE,
Secretary.

NEW BOOKS.

A Treatise on Rocks, Rock-weathering and Soils. G. P. MERRILL. London and New York, The Macmillan Company. 1897. Pp. xx+411. \$4.00.

An Outline of Psychology. EDWARD BRADFORD TITCHENER. New York, The Macmillan Company. 1897. Second Edition. Pp. xiv+352. \$1.50.

The Aurora Borealis. ALFRED ANGOT. New York, D. Appleton & Company. 1897. Pp. xii+264.