of muscular contraction, is now supported by results obtained through the study of the electrical changes set up in muscle by artificial stimulation. In brief, the chemical changes of disassimilation, coincident with functional activity, which are brought about by stimulation of the motor nerve, cause the active part of the tissue to become electro-negative to the resting part.

On the other hand, certain other efferent nerves, having an inhibitory effect, cause, when stimulated, the part of the muscle under their influence to become electro-positive to the resting part. In all probability these nerves also excite chemical assimilation and the absorption of energy.

It is approaching an anti-climax to turn from such a conception as this to the arid field of glandular electricity. Here the mechanical difficulties in the way of experimentation have affected the purity of results to such a degree that little of physiological importance can, as yet, be predicated from the work. In conclusion, a word of admiration is due the translator to whose fortitude we are indebted for this work in its present form. The rendition seems, for the most part, to be excellent; and the bookmaking by Macmillan is, of course, of the best.

HENRY SEWALL.

UNIVERSITY OF DENVER.

The Coming Ice Age. By C. A. M. TABER. Geo. H. Ellis. 1896. Pp. 94.

The difficulty of accounting for the Glacial period is so great and the disagreement of glacialists is so profound that one cannot but welcome any sincere effort to shed additional light upon the subject. Especially is one inclined to give a candid hearing to an experienced navigator who has been led to study the effects of ocean currents upon climatic conditions. Such is the author of this little volume, who, in his extensive voyages had his attention directed to the subject at an early date, and in later years has made his personal observations the basis for collecting a large body of facts otherwise attainable.

The theory of the author is that a land connection between Patagonia and the Antarctic Continent, or a great diminution of the channel between those lands, would produce an effect upon oceanic currents favorable to the glaciation of both hemispheres. In supposing such a land connection he is in company with many zoologists who have inferred the same from the unique distribution of the plants and animals of the southern hemisphere.

Assuming this extension of land from Patagonia to the Antarctic Continent, the effect upon the currents would be, according to the author, as follows: The prevailing westerly winds in the south temperate zone would pile the waters up against the western side, and would drive them away from the eastern side of the southern part of this continent. The shape of the continents and the general direction of ocean currents are such that during this condition of things there would be a movement of water towards the south pole in excess of that moving toward the north pole. This accumulation of water about the south pole would be increased by the attraction of the water until there was a submergence of the isthmus connecting Patagonia with the Antarctic Continent, such as to allow a free passage from the higher levels of the Pacific to the lower levels of the Atlantic in that latitude. This water from the Pacific, being a cold current, would displace that which had formerly been drawn down from the tropics on the east side of South America, and thus lower the temperature of the Antarctic Continent and produce conditions favorable to glaciation, such as exist at the present time. These conditions he believes to be cumulative.

This very general statement of the theory passes over many details, and it may be that it does not in all respects fairly represent the author's views. But we are compelled to confess that his style is so obscure, and his digressions are so frequent, that we have found it difficult to be sure that we have comprehended his meaning. The author's confidence in the stability of the earth's crust is such that he is not willing to grant the moderate changes of level in the sea-bottom south of Patagonia which would be necessary to secure the submergence there which his theory demands; therefore, he is compelled to throw the whole burden upon the winds and the augmenting attraction of the

accumulating water. But it is difficult, not to say impossible, to believe that these forces would be adequate to the production of any such results as he supposes. The total amount of displacement which could result from them could be only a few feet.

Combined with the theory of moderate oscillations in the earth's crust at the proper places, Captain Taber's views are helpful in appreciating the effect of the ocean currents in so distributing heat and moisture as to produce glacial conditions both in the southern and northern hemisphere. But, unless he admits these changes of land level, we see little force in his arguments, and consequently his prognostication of a coming ice age is without any scientific basis.

G. Frederick Wright.

Researches upon the Antiquity of Man in the Delaware Valley and the Eastern United States. By Henry C. Mercer. Ginn & Co., Boston. 1897. 8vo. Illustrated. Pp. 178.

This volume is one of the series in 'philology, literature and archæology' published by the University of Pennsylvania. They are not intended to be 'popular,' but to convey the products of original research work. Such is the character of the present number. It is a plain and careful description of a series of studies conducted in the last few years, with the object of finding out whether there is sufficient evidence in the locality selected to assert that man lived there in the glacial or early post-glacial period.

Such assertions have been and are confidently advanced by several prominent American archæologists, especially with reference to the exhumation of chipped stones from the glacial gravels at and near Trenton, New Jersey.

On this particular point Mr. Mercer's personal researches are negative. His repeated examinations of the Trenton grounds 'failed to reveal a specimen in place' (p. 32); the caves he examined along the Delaware river contained nothing of man's handiwork which pointed elsewhere than to the Indian as we know him; and the so-called 'turtle backs' of argillite, found in the Trenton gravels, were probably 'intruded by modern Indians' (p. 60); and, finally nothing was found 'to corroborate the alleged antiquity of the chipped blades from Trenton,' and not a little to weaken it (p. 85).

These results, though in a measure negative, leave the supporters of the 'glacial man' theory at Trenton, with a large fraction of their argument exploded, since much has been made of the 'argillite implements' as proving antiquity. Now we know that whole quarries of argillite were worked by the modern Indian.

Other essays in the volume describe the exploration of an Indian ossuary on the Choptank River, Maryland, with a description of the physical characters of the bones by Professor Cope, and a discussion of their diseased (probably syphilitic) conditions by Dr. R. H. Harte; investigations by Mr. Mercer in an aboriginal shell heap on York River, Maine, in which traces of cannibalism were discovered; and excavations at the 'Indian house' and at Durham Cave, by the author. Among other interesting facts which Mr. Mercer has been enabled to substantiate by those studies is that in long post-glacial times the peccary, the tapir, the mastodon and the fossil sloth (*Megalonyx*) roamed the forests of the eastern United States. This, however, 'refers to an epoch in the past removed by many milleniums from the discovery of America' (p. 175), in the author's opinion.

The earlier pages of the volume recite several important investigations of the author in the 'quaternary' deposits of France and Spain. These gave him an excellent standard of comparison in his American work and the thoroughly scientific manner in which he carried it out is visible on every page.

There are a number of accurate and well-taken illustrations of localities and specimens, and the notes will aid the student in gaining access to the literature of the subject. It is to be regretted that no index was prepared.

D. G. Brinton.

University of Pennsylvania.

SCIENTIFIC JOURNALS.

PHYSICAL REVIEW, MARCH–APRIL.

The Lead Cell: By B. E. Moore. The extension of the theory of free ions, solution ten-