have no entirely reliable results, it seems to me that by heating ordinary olive oil to 80°—90° C. for twelve or twenty-four hours, a suitable medium may be obtained.

Finally, I would like to remark that I am the last person to defend the view that these drops, exhibiting protoplasma-like movements, are directly comparable to protoplasm. Composed as they are of oil, their substance is entirely different from protoplasm. They may be, however, compared with the latter, in my opinion, firstly with regard to their structure, and secondly with regard to their movements. But as the latter depend on the former, we may assume that the amœboid movement of protoplasm itself depends on a corresponding physical constitution.

These drops, too, resemble organisms inasmuch as they continue for days to exhibit movements, due to internal causes, which depend on their chemical and physical structure. I do not believe that up to this time any substance has been artificially prepared which, in these two points, viz., structure and movement, has so much resemblance to the most simple forms of life as have these reticulated drops. I hope, therefore, that my discovery will be a first step towards approaching the problem of life from the chemico-physical side, and towards passing from vague and general hypotheses of molecular constitution to the surer ground of concrete conceptions of a chemical and physical nature.

It is, however, a special satisfaction to me to hear that in your country, which has given rise to so many and so celebrated men in biological science, my investigations are followed with interest and sympathy.

With friendly greetings, I am yours sincerely,

O. Bütschli.

ARCHÆOLOGY AND ETHNOLOGY.

The Use of the Phonograph in the Study of the Languages of the American Indians.—At the meeting of the American Folk-Lore Society in Boston, on April 19th, Dr. J. Walter Fewkes read a paper on experiments which he had lately made with the phonograph in recording the songs, legends, and folk-lore of the Passamaquoddy Indians.

The necessity for some means of accurately recording and preserving the languages of the Indians has lately been met by the invention of the phonograph. This instrument has now been brought to such a

stage of perfection that it can be profitably used for that purpose. Hitherto a source of error in recording aboriginal folk-tales has been the liability of the translator to incorporate his own interpretations with those embodied in the stories as heard by him, and, as a result, erroneous interpretations have been introduced which it is difficult to eradicate. In order that folk-lore, as far as applicable to aboriginal races, may be placed on a scientific basis, an accurate record of the story as told by the reciter is necessary. This can be accomplished by the use of the phonograph, and the records thus made can be indefinately preserved.

The essayist visited, for the purposes of study, a remnant of the Passamaquoddy Indians near Calais, Maine, and obtained from some of the older men many fragments of legends, stories, ancient songs, country out rhymes and conversations. He also obtained from the lips of Noel Josephs, who sang it when the ceremony was last performed, an old song used in the "Snake Dance." The words of this song are archaic and the music is said to be very ancient. He also took records of war songs, a curious "trade song," and the song sung by the chief on the evening of the first day of the celebration of his election. These songs have been set to music from the records taken on the wax cylinders of the phonograph, and the words have been written out by the same means. In several of the legends obtained by the use of the phonograph, songs occur which are said by all the Indians to be very ancient. Forty cylinders were filled with these records, some of which are stories yet unpublished.

The results of this experiment have, it is claimed, shown that the phonograph is an important help to the student of Indian folk-lore, not only in preserving the tales, but also in an accurate study of the composition of the music and the language.

To indicate its value, the spelling of the words, as spoken by the machine is found, to convey, as nearly as possible by phonetic methods, the pronunciation of the Indian words.

These studies of the Passamaquoddy language were undertaken as a preliminary to a visit to the Zuni Indians for the purpose of working out the archæological and ethnological results of the Hemenway Expedition. A more extensive account of these phonographic studies of the Passamaquoddies will be published in the next number of the *Journal of American Folk-Lore*.—J. W. FEWKES.