have been previously incubated. Blastoderms vary from 4 to 11 mm. in diameter.

Incubation 8. Nine eggs at 24.5 degrees C. for 6 days, 1½ hours gave one primitive streak 1.5 mm. long as the greatest development. Blastoderms vary from 4 mm. to 1 cm. in diameter.

Incubation 9. 11 eggs at 24 C. for 6 days, 19 hours. Blastoderms vary from 5.4 mm. to 7 mm. in diameter. With the exception of a degenerated 2-days chick only 4 of the 11 blastoderms showed a trace of the primitive streak.

The Fishes of Africa as Exponents of former Geographical Conditions: By THEODORE GILL, Smithsonian Institution.

The fishes of Africa represent two very different elements. One is composed of Asiatic types; the other of South American types. The latter indicate a former connection direct or mediate with South America; the latter are in conformity with the present association of the continents.

The Moringuid Eels and their Geographical Distribution: By THEODORE GILL and HUGH M. SMITH, Washington, D. C.

The Moringuid eels are remarkable for their very elongate body disproportionally elongated abdominal cavity, and remoteness of the heart from the branchial apparatus. The family had been supposed to be peculiar to the oriental seas, but a recent discovery has directed the attention of the authors to the American eels generally and it was recognized that 3 genera previously associated with Muræenesocidae really belong to the Moringuidæ. *Stilbiscus* indeed is a synonym of the type genus, *Moringua*. A new species of the related genus *Apthalmichthys* has also been added to the American fauna.

The History of the Word Mammalia: By THEODORE GILL, Smithsonian Institution.

The word mammalia was first introduced by Linnæus, in 1758, as the expression of a concept first appreciated by him. It was formed in analogy with animal. Simple as the explanation is it has never been recognized.

C. H. EIGENMANN,
Secretary.

SCIENTIFIC BOOKS.

An Introduction to the Study of the Comparative Anatomy of Animals. By GILBERT C. BOURNE. Vol. I. London, George Bell & Sons; [New York, Macmillan]. 1900. 16mo. Pp. xvi + 269. Price, $1.10.

It is rather difficult to form an adequate estimate of a work from its first volume. It is not easy to get the author's perspective; and then there are so many things left in doubt which the remainder of the series may straighten out. The plan of Mr. Bourne's work is peculiar. It starts out with a general chapter which deals with fundamental morphological and physiological principles, and then takes up the frog, treating first of its anatomy and then of its histology. This last subject leads up to a consideration of the cell, and this is followed by a consideration of the early history of the frog. The remainder of the book is occupied by detailed accounts of several Protozoa, Hydra and Obelia. We are promised that the second volume will deal with the Cœlomate Metazoa.

A rather careful examination shows few errors, yet there are several points on which the student will need fuller information than the volume affords. Thus terms are used without explanation or definition, while here and there comparisons are made which will not be intelligible because the student has no information as to one of the subjects of comparison. While finding fault it might be well to ask why it is that many English writers persist in the use of the terms epiblast, mesoblast, and hypoblast. It is not easy to see how the work can be used in courses of comparative anatomy as usually given in America, except as a reference book for occasional use. Its wealth of detail concerning forms usually studied in the laboratory would be seized upon by many students as affording answers to the questions which they are asked and are expected to obtain from the animals themselves.

On the other hand, it contains much information which is of value to the student and which the beginner might fail to find out for himself. The discussions of individuality, alternation of generations, and sexuality are especially good.

The book is well printed and its fifty-three illustrations are well chosen and clear.

J. S. Kingsley.

Professor Mosso's Lectures at the Clark University Decennial.

Two lectures were delivered by Professor Angelo Mosso at Clark University during its Decennial Celebration, in the summer of 1899, which seem to deserve wider publication than they will obtain through the volume issued and distributed by the university in commemoration of that event. This volume has been already reviewed in Science, without, however, special reference to the contents of these addresses.

The former of the lectures, of which notes are here presented, is called 'Psychic Processes and Muscular Exercise.' It would be difficult to exaggerate the importance of the ideas presented, although the campaign against present public opinion which a practical realization of some of its consequences would demand might well discourage a Pestalozzi. The logical conclusion has, however, been arrived at both by the psychologist and by the medical man, as well as by the physiologist, who is both.

One of the most important of the rising beliefs of American medical men regarding common school education is corroborated in this address by the eminent Italian. In it he sought to show "how intimately related are mental processes and movements. If we desired to make a pedagogical application," he says, "we might say that physical education and gymnastics serve not only for the development of the muscles, but for that of the brain as well."

Children should begin reading and writing only after they are nine years old, and it is becoming evident that as much time should be devoted to muscular exercise as to intellectual exercise. No absolute local separation of movement and sensibility is demonstrable. Muscular fatigue exhibits phenomena identical with intellectual fatigue. Internal reflex phenomena seem largely to condition attention which, therefore, is not wholly within the will's control. Nerve cells have only a small power of resistance and show, on the average, every ten seconds a tendency to rest. It is probable that only part of the brain is active at a time—the various parts relieve each other. The structure of all nerve cells seems to be the same—it is only their relations which are different. The more mobile any animal's extremities the more intelligent, other things being equal, he is: the most mobile parts are those which are the most sensitive.

The other address, called by Professor Mosso 'The Mechanism of the Emotions,' adds not a little to our knowledge of the somatic aspect of emotion, dealing especially with the sensitivity of the bladder—one of the most sensitive of the viscera.

The seat of the emotions of joy and of sorrow seems to Professor Mosso to lie undoubtedly in the so-called sympathetic nervous system. In 1881 he noticed (with Dr. Pellacari) the contraction of the bladder during weak sensations. Besides those of the bladder, he has studied the movements of the stomach and intestines, including the rectum.

The bladder's movements are both active and passive, but the former are of chiefer interest and alone are considered here. The experiments were conducted both on dogs and on women. The instrument employed was his own plethysmograph, a very valuable hydraulic arrangement too well known to need description here. This was connected with the bladder by means of a 'female catheter.' The human subjects studied were young women in the hospitals, who, of course, volunteered their services. He recorded in the cases of both the women and the dogs the thoracic and abdominal respiration and the movements of the bladder independently. He considers that the bladder exhibits 'the most delicate reflex movements which occur in the organism.' The bladder contracted not only to very slight emotional stimuli, but also to changes in the organism instigated by problems in mental arithmetic.