ments. One finds in it an intense national life and, at the same time, many interesting evidences of the influence of several different civilizations. Eleven different languages are officially recognized by being printed upon the paper money.

O. H. TITTMANN,
JOHN F. HAYFORD.

SCIENTIFIC BOOKS.

Mars and its Mystery. By EDWARD L. MORSE. Boston, Little, Brown and Company. 8vo. Pp. 192.

This book is distinctly a plea for the existence of intelligent inhabitants upon our sister planet, the argument being based largely on the observations of Professor Lowell at Flagstaff, Arizona. The author begins by pointing out that because a man is an astronomer, this fact by no means qualifies him to act as a judge upon a question of this sort. It is doubtless true that astronomers as a rule know little of the appearance of the surface of Mars, and but few of them have ever seen it under favorable conditions. Nevertheless, it must be admitted that a man who is familiar with the difficulties of telescopic observations, under varying atmospheric conditions, would be a better judge of the value of telescopic evidence than one who had never looked through a telescope, and took it for granted that the planet looked exactly as it is drawn on paper.

A large part of the book is devoted to an examination of the views of various astronomers and amateurs as to the interpretation of the various markings seen upon the planet's surface. The book is marred in one or two places by a rather savage personal attack upon a British astronomer in good standing, partly, apparently, on account of his religious convictions! Considerable attention is paid to the appearance of various systems of natural cracks, such as appear in pottery, dried mud, and the surface of the moon. Two interesting plates are given, in which these are compared with maps of railway systems, canals, and the markings upon Mars. The argument is drawn that the last look, and are distributed, much more like the artificial than like the natural lines. Whether such is the case or not, the critic will be likely to ask "But would the markings on Mars, if we could see them well, really resemble the drawings that Professor Morse publishes of them?" This is the very *crux* of the whole question, and until this has been definitely decided, most astronomers will consider the existence there of intelligent inhabitants as unproved, although perhaps not impossible.

The main and generally accepted facts relating to the planet's surface are briefly stated, and are followed by an interesting and rather amusing account of the author's own difficulties in seeing even the well-known and most clearly defined markings of the planet. He certainly had much more difficulty than would have been expected, considering the careful training of his eye in his own professional work.

One of the most interesting chapters of the book is that devoted to the discussion of the variety of conditions under which life exists upon the earth. Here our author is more nearly on his own ground, and states a number of interesting facts, many of which it is safe to say will be new to the majority of his readers. From them he argues that the slightly dissimilar physical conditions that exist upon Mars would not interfere with the existence there of life in some of its various forms, such as we know it upon the earth.

In closing, it may be said that the book is interesting, and well worth reading to all those who wish to learn the opinions of various authorities on the most fascinating of all the planets.

WILLIAM H. PICKERING.
HARVARD COLLEGE OBSERVATORY.

First Course in Zoology. A text-book for secondary schools, normal schools and colleges. By THOMAS WALTON GALLOWAY, Ph.D., Professor of Biology in James Millikin University. P. Blakiston's Son and Company.

This book adds another to the list of text-books in zoology, of an elementary nature, which have appeared within the past half dozen years, and is indicative of the growth

of interest in the subject among educators. Unlike most of this number, the present book purports to be adapted to either secondary school, normal school or college grade. In one respect this is a point worthy of consideration, in that it seems to recognize the correct pedagogical principle of the essentially similar aims and methods of the elementary course, whether in school or in college. On the other hand, it involves the difficult problem of furnishing a course of instruction, suited in character and extent to students of the varying capacity and training of the second or third year of the high school and the corresponding second or third year of the normal school or college, the periods in which such course is likely to have its place. The task is not, perhaps, impossible, but confessedly difficult; and to the reviewer's thought the present book has not clearly solved the problem.

For the average school course the book includes too much, and too difficult work; while for the college course it seems to fall as far short. For the normal school, and this is probably the grade of work more directly aimed at by the author, the book would seem to be well suited.

In method of arrangement the book follows rather closely the well-known 'Lehrbuch der Zoologie' of Hertwig, best known to American teachers of zoology through Kingsley's translation under the title 'Manual of Zoology.' That is, there are two parts to the book. (I.) General Principles; (II.) Special Zoology. Under the first part is a series of chapters dealing with protoplasm, the cell, the tissues, physiology, adaptation, etc. Under the second part is taken up a review of the entire animal kingdom, from protozoa to mammals. That there are elements of value in this method of presentation will not be questioned. That they are of the fundamental and supreme importance assumed by their authors is not so clear. To the writer the method has always seemed open to serious objections. For example, to begin such a course with the study of the morphology and physiology of protoplasm, followed by an attempt to clear up the intricacies of cell morphology, including the details of cleavage, chromosomes, centrosomes, spiremes, with prophase, metaphase, etc. (cf. pp. 22–35), reverses one of the fundamental canons of sound pedagogy, long since pointed out by Huxley, and now generally recognized by most teachers of zoology.

A similar criticism holds with reference to the chapters devoted to tissues, promorphology, and adaptations. To formulate these points in advance, outline the problems of evolution, etc., and rally about them the various data involved in their solution, is again to reverse the inductive order, presenting first that which ought to form the climax and conclusion of the course, thus depriving the student of the privilege of coordinating the facts as they develop. The chapters on general animal functions and something of tissues are, perhaps, very appropriate, though it has always been the method of the reviewer to develop these points as they arise in the progress of the course. And to devote fully one third of the entire book to such a preliminary study seems altogether disproportionate. Indeed, this course seems to include something of two ideals, namely, *biology* as distinguished from *zoology,* or in other words including two courses under a single caption.

In another respect the book is open to some criticism. The author postulates for the elementary course in zoology a four-fold purpose, viz., '(1) laboratory work, chiefly physiological, and in the larger problems of morphology rather than in minute dissection; (2) to field observation on physiology, life histories, the simpler problems of distribution and life relations; (3) to the body of the descriptive text, and (4) to classes of questions demanding reference to classical zoological authorities.' To each of these phases he would give an equal apportionment of time. It may be doubted whether for elementary pupils this would not prove impracticable, especially reference to such 'classical authorities' as Darwin, Wallace, Davenport's 'Experimental Morphology,' Lloyd Morgan's 'Animal Life,' Eimer's 'Evolution,' etc.

Of actual errors in statement of facts or principles there seem to be relatively few. In speaking of the larval life of echinoderms the author refers to them as 'free-swimming—

pelagic—' etc., seeming to use the terms as synonymous. Again, there is something of doubt in the validity of certain references to symbiotic relations, as in the following: '*Hydractinia* and even the sea-anemone form interesting partnerships with the hermit-crab.' This is all admirable and beyond dispute. But that 'the polyps cover up the shell occupied by the crab, thus concealing it from its enemies and its prey' may be seriously doubted. Indeed, every observer knows that there are more hermit-crabs without the hydroid colonies than with them. And furthermore, the reviewer has found larger colonies of this particular hydroid on bits of water-logged spars and on the piles of a dock than the combined colonies of scores of crab-shells.

The figures are for the most part well selected and executed. In a few cases figures are rather too diagrammatic for accuracy. In its mechanical aspects the book is a creditable piece of press-work. The typography is excellent and mistakes few. A slight one may be noted in the description of Fig. 68, where the expanded and contracted vorticellæ are wrongly indexed. C. W. H.

SCIENTIFIC JOURNALS AND ARTICLES.

The American Naturalist for October contains but two papers: 'The Naididæ of Cedar Point,' by L. B. Walton, and the 'Mechanism of the Odontophoral Apparatus in *Sycotopus canaliculatus*,' by J. C. Herrick. The microscopic Oligochæta have received little attention in this country and Professor Watson's paper deals with the local species systematically, giving a key to the genera and describing seven new species. Professor Herrick describes in detail the structure and workings of the rasping apparatus by means of which the winkle bores through and destroys so many clams and similar mollusks. He decides that Huxley's views were correct and that the radular membrane bearing the teeth slides back and forth over the supporting cartilage like a chainsaw.

The Bulletin of the College of Charleston Museum for October is mostly devoted to the early history of the museum which may possibly claim to be the oldest public museum of natural history in the United States. The rival claimant is the collection of minerals of Harvard which dates back to 1798.

The Museum News of the Brooklyn Institute for November has articles on the 'Housekeeping of a Large Museum,' 'The King Penguin' and on 'The Woodward Jade Collection.' This last contains a good *résumé* on the history of jade objects and the methods of working. The principal article in the Children's Museum section is devoted to 'Bird Life in Bedford Park.'

SOCIETIES AND ACADEMIES.

THE TORREY BOTANICAL CLUB.

ON May 23, 1906, the club held a special meeting in commemoration of the tenth anniversary of the commencement of work in the development of the New York Botanical Garden.

The meeting was held in the lecture hall of the Museum Building at the Botanical Garden. President Rusby presided, and there was an attendance of 125. The following persons were elected to membership: Percy L. Ricker, U. S. Department of Agriculture, Washington, D. C.; Miss Winifred J. Robinson, Vassar College, Poughkeepsie, N. Y.; Miss Bina Seymour, 115 West 84th Street, New York City.

After the election of new members the club listened to an illustrated lecture by its president on 'The History of Botany in New York City.'

Dr. Rusby presented a historical sketch of the development of botany in the city of New York, giving special attention to the history of local botanical gardens, of the botanical department of Columbia College and of the Torrey Botanical Club. The earliest local work related to the botanical gardens of Colden, Michaux and Hosack, and to the publication of local catalogues and floras. The second period was that of text-books, manuals and other educational works. Out of the associations resulting from local work, the Torrey Botanical Club developed so gradually that it was impossible to fix the date of its