to come. This volume is printed in Christiania and issued at the cost of the Nansen fund for the advancement of science. Large and thick as the volume is, the excellent paper used makes it light enough to handle with ease, while the typography and illustration are first class.

The work opens with an introduction by the editor in which the services of those who made the expedition possible are given due appreciation and grateful acknowledgment made of the enthusiastic devotion of the members of the party to their often multifarious labors. The absence of a detailed chart of the movements of the expedition is explained by the fact that the computation of the astronomical data is not yet fully completed and it was undesirable to delay the publication of memoirs ready for the press. The chart therefore will appear in the second volume. The various memoirs will be printed as soon as ready, each separately paginated but carrying a serial number by which it may easily be referred to.

Five memoirs appear in the present volume. The first, by Colin Archer, gives a full description of the construction of the *Fram* with diagrams. This will be of permanent value to those contemplating future exploration of the icy regions. The soundness of the theories upon which the vessel's construction was based is sufficiently proved by the fact that, after all her battles with the ice and other experiences, a careful survey showed that with the exception of the bending of one of the metallic fenders of the rudder, she had sustained no injury whatever.

While Nansen was enjoying the hospitality of Jackson at Cape Flora, he obtained a collection of invertebrate fossils from a stratum of clay below the basalt of the cape. This collection is very fully discussed by Dr. J. F. Pompeckj who finds the fauna to be of upper Jurassic age. A few plant remains were obtained from deposits occurring in depressions on the upper surface of the basalts. These are reported on by Nathorst who finds them to be probably of the uppermost Jurassic epoch. From these facts the basalts would appear to be also Mesozoic, though hitherto they had been supposed to be Tertiary. Robert Collett and Nansen discuss the birds obtained by the expedition. Excluding those belonging to the fauna of the coast of Siberia, the bird life of the Polar Sea appears in this region to comprise but one land form, the snowbird (*Plectrophenax nivalis*), the rest being seafowl, gulls, auks, etc., of which thirty species were obtained. The rarest and most interesting of these is the rosy gull (*Rhodostethia rosea*). The ivory gull, the fulmar and the kittiwake were the most abundant. The food of the seafowl proved to be chiefly crustacea and small fish, obtained from cracks and water leads which occur in almost all the floes from time to time.

The last and most voluminous article is by Professor G. O. Sars, who describes the crustacea and illustrates them by a magnificent series of autotype plates which will call forth the admiration and gratitude of all carcinologists. Most of the crustacea are copepods, minute shrimps which serve as the chief food of the whale and seafowl. The westerly drift from the Siberian coast brings with it quantities of minute algæ and diatoms upon which the crustaceans subsist. They belong to the superficial stratum moved by the prevalent winds. Professor Sars, however, believes that the fauna of the deeper waters is derived from the Atlantic inflow below the superficial stratum. Among them it was a surprise to find, associated with strictly polar forms, several heretofore known only from the tropics, the Mediterranean and even the Caspian Sea. Very few marine animals except crustacea were found in the Polar basin. A tiny tomcod (*Gadus saida*) was the only fish observed in the high north.

The second volume will probably contain the astronomical, magnetic and pendulum observations, with charts and diagrams, discussed by Geelmuyden, Steen and Schiötz and may be expected to appear very soon.

W. H. DALL.

Biological Lectures from the Marine Biological Laboratory of Woods Holl. 1899. Boston, Ginn & Co. 1900. Pp. 282.

This annual, whose appearance is always awaited with interest, has enlarged its scope so that it no longer, as formerly, includes only lec-

tures 'delivered at' Woods Holl, but contains in addition to such lectures essays written especially for the volume by persons not in attendance at the session, but in sympathy with the work of the laboratory. At present, then, the volume may be said to be representative of American biology. In its scope the volume is unique; its contents are addressed by naturalists to a general biological audience—an audience which demands at once that the author shall have something worth while to say and that he shall say it in an intelligible manner, free from the burden of a very special and technical nomenclature, while scientific rather than popular.

There are sixteen lectures in this volume, of which four are botanical. D. H. Campbell treats of the 'Evolution of the Sporophyte'; D. P. Penhallow of the 'Nature of the Evidence exhibited by Fossil Plants'; and D. T. MacDougal has two papers on the 'Influence of Vertical Air Currents upon Distribution' and on 'Mycorrhizas,' respectively. Then follow three papers of general psychological interest; two by Edward Thorndike on 'Instinct' and 'The Associative Processes in Animals,' based on his own illuminating investigations, and one by H. S. Jennings giving a resumé of his brilliant results on the 'Reactions of Unicellular Organisms.' C. H. Eigenmann contributes a paper on 'The Blind Fishes' and A. Hyatt, a 30-page paper on 'Some Governing Factors usually neglected in Biological Investigations,' which calls for an appreciation of meta-genetic (gerontic) stages in ontogeny, defends the 'law of tachygenesis or accelerated development' and argues for the memory theory of heredity. A. G. Mayer discusses the ontogenesis and phylogenetic significance of color in Lepidoptera. A. Mathews analyzes the different methods of animal secretions and combats the theory of special secretory nerves. T. H. Morgan discusses some old and new interpretations of regeneration. G. N. Calkins draws important general cytological conclusions from the varied forms of nuclear division in protozoa. C. M. Child after giving his researches on spiral cleavage concludes that it is the organism—the individual—which is the unit and not the cell. The reviewer writes of the aims of the quantitative study of variation and J. Loeb tells of his success in getting unfertilized eggs of sea urchins to develop into larvæ under the action of magnesium chloride. The mere enumeration of these subjects indicates that biological investigation in this country to-day occupies a broad field.

C. B. Davenport.

A Manual of Elementary Practical Physics. By Julius Hortvet, B.S. Minneapolis, H. W. Wilson. 1900.

During the last few years which have been signalized by the great extension of laboratory instruction in physics in the secondary schools of this country, so many new text-books of physics have been published that one can scarcely treat a new-comer without prejudice. These books must avoid a Scylla and Charybdis quite as dangerous as those which threatened Ulysses. On the one hand they fail by trying to be too general, applicable to too many cases, the school, the college and even the university; on the other hand they represent some particular, special course which their author has worked up, too often with some personal hobby for certain things. In this last class fall those courses which are designed as an entrance requirement for some college, and which are too much elementary mechanics and too little physics.

Mr. Hortvet has recognized that it is his duty to give his students the best possible course in general physics which they can utilize, without leaving it to a possible college course to give the real fundamentals. It is the business of the college to coordinate its work upon that of the high school, provided only that the high school is doing the right work and doing it well. Mr. Hortvet understands that his laboratories are neither kindergartens nor research laboratories.

Many teachers with the catch words of *intensive*, rather than *extensive*, fail to apprehend the real meaning of the terms, and are so extensive in their desire to be intensive that the scholar is lost in a mass of details and gets no fundamental principles. These teachers feel that they could not touch the subject of refraction of light without including anomalous dispersion and double refraction, and hence dawdle