

dynamical principles. Chapters ix.—xii. deal with stresses and strains in joints, frames, and girders; chaps. xiii.—xv. with centres of gravity, friction, and curved paths; and the last with mechanisms.

(2) This introduction to the study of fluids is intended "for candidates for entrance scholarships and other examinations, for naval and military preparation, for those technical students taking the Board of Education lower examination in theoretical mechanics (fluids), or any of a similar character held by the various provincial educational unions." For these purposes it would seem to be an adequate and sound presentation of the subject. In addition, it will also serve to give the student a sound knowledge of the subject—a result almost as important. Part i., on the mechanical basis of the subject, might possibly have been omitted with advantage as the majority of students would come to the study of fluids with a preliminary knowledge of dynamics from other sources. The succeeding parts deal with liquids at rest, in motion, properties of gases, and finally with applications. This last contains a valuable addition to the usual list of old friends, and deals with a number of recent inventions of special interest as illustrating principles. The book affords an excellent example of the combination of logical development and exactness of ideas with the stimulating effect aroused by dealing with real problems.

(3) The scope of this book is best shown by the following extracts from the preface. "This book is intended as a text-book for use in connection with a course of experimental lectures." "The aim of the writer should be to present fundamental principles clearly and accurately." "I have endeavoured to leave out everything not of fundamental importance." "The kind of text-book which contains a little about everything does more harm than good." It is thus seen how much the intention of the author differs from that of the generality of writers of text-books for first year and elementary students. The result is a very clear and excellent introduction to the subject of mechanics, properties of matter, heat, sound, and light, suitable to the needs of university students in their first year and taking curricula for pure science, medicine, or applied science. It is a book for which examinations should be suitable, laying sound foundations for future developments in greater or less degree as may be required for the more specialised curricula of the second and third years. Where an effort has been made to circumscribe the field, differences of opinion may arise as to whether it may not have been carried too far, but each individual

teacher can always remedy this in the case of his own students. For example, it may be doubtful if it is desirable to leave out all consideration of radiation or whether more application of principles to explain common and everyday experiences might not have been given with advantage—in spite of the fact that to the author such things may be hackneyed.

No sets of examples for exercise are given. This is a disadvantage for private students. Any competent teacher giving a course of experimental lectures will have his own selection. To such the book can be confidently recommended. It has the good paper, printing, and clearness expected from the Pitt Press. It is curious to see in a book printed in an English University a statement that thermometers may be standardised by sending them to the Bureau of Standards at Washington, U.S.A., or similar institutions in other countries. In another edition the explanation of the total reflection of the ordinary ray in a Nicol's prism should be amended. Also the melting-point of sodium thiosulphate ("hypo") is not 99° C.

OUR BOOKSHELF.

A Course in Invertebrate Zoology. A Guide to the Dissection and Comparative Study of Invertebrate Animals. By Prof. H. S. Pratt. Revised edition. Pp. xii+228. (Boston and London: Ginn and Co., 1915.) Price 6s.

THIS book is intended as a guide to the study of each of the larger groups of invertebrates. About forty animals are considered in the space of 196 pages, consequently the descriptions of many of them—clear so far as they go, and accurate, the lapses being few and of little moment—are brief, though several, *e.g.* the squid, are more fully treated. The chapters deal respectively with the arthropoda, annelida, flat worms, polyzoa, mollusca, tunicates, echinoderms, Cnidaria, sponges, and protozoa. The revised edition contains instructions for the examination of six types not included in the first edition, namely, a fly, spider, oyster, sea-cucumber, *Gonionemus*, and a sea-anemone. In the account of the fly attention is directed to the "antennæ, with their pinnate terminal portion" (the portion referred to—the arista—is, however, not terminal but dorsal), but the palps are not mentioned, and no attempt is made to elucidate the structure of the proboscis.

In the classification given in the appendix the sponges are classed with the Cnidaria as cœlenterates—implying a relationship which modern work has shown to be untenable; another obsolete feature is the retention of the "phylum" Vermes to include a heterogeneous assemblage of animals—flat and round worms, rotifers, polyzoa, brachiopods, Phoronis, Chaetognatha and Sipunculoidea (the annelids are placed in a separate phylum).