

NEW TEXT-BOOKS IN PHYSICS.

Physics for High School Students. By HENRY S. CARHART and HORATIO N. CHUTE. Boston, Allyn & Bacon. 1902.

Physics; a Text-Book for Secondary Schools. By FREDERICK SLATE. New York, The Macmillan Company. 1902.

Principles of Physics. By FRANK M. GILLEY. Boston, Allyn & Bacon. 1901.

A Laboratory Manual of Physics. By HENRY CREW and ROBERT R. TATNALL. New York, The Macmillan Company. 1902.

Physical Determinations. By W. R. KELSEY. London, Edward Arnold; New York, Longmans, Green & Co. 1902.

No criticism of a school text-book can be quite fair without a clear apprehension of the author's point of view, which may differ quite radically from that of the critic. In the absence of an opportunity for personal interchange the critic has no resource but to judge from his own standpoint, incurring the risk of appearing to indulge in too much praise or too much censure, in proportion to the degree of accordance or discordance between himself and those whom he wishes to treat with justice.

The first of the group of books named is a new and wholly rewritten edition of a text-book issued nearly ten years ago, which has been extensively used. Each of the authors had already become well known as an expositor, the one in the university and the other in the high school. Each holds firmly to an opinion, which has been repeatedly expressed in print by the present critic, that in physics the class room and the laboratory should be provided with separate books, which may be equally necessary to the student. That intended for the class room should be confined to a clear, well-methodized presentation of principles, accompanied with a goodly number of well-graded numerical problems. There may be outline descriptions of experiments, but only of such as are suitable for class room demonstration, to be performed by the teacher. For the elementary laboratory, on the contrary, the student needs a manual in which the instructions are chiefly for his guidance in manipulation. The class book is not a mere

reading book. Its use is necessarily accompanied with much oral discussion by the teacher, and for this provision should be made in the text by much judicious omission of details. According to prevailing American usage the class book serves as the basis of much recitational work, and in its preparation this end should be kept always in view. No modern teacher will merely 'hear lessons' from it; but for convenience in actual use a well-arranged text-book is an important aid; and one that is written by even a fine scholar without the teacher's instinct or experience may be a source of keen suffering to its user, whether young or old.

Messrs. Carhart and Chute have been particularly successful in fulfilling these conditions in this new edition of their class text-book. The amount of mathematical preparation expected of the student is small, but formulas are introduced enough to make him appreciate their value in the solution of problems. Illustrations are sufficiently numerous, always simple, and none of them superfluous. Both metric and British systems of units are employed, the preference in general being given to the former. The book is well arranged, with many short paragraphs and suggestive headings; and its statements are clearly and carefully worded. It is worthy of unreserved commendation.

The volume by Professor Slate was prepared for California high schools, and in some particulars its aim is perhaps a little higher than can be reached by many of those for whom it was written. The style is discursive, such as might be adopted by a lecturer who is accurate and conscientious, but who does not emphasize salient ideas to any great degree. In arrangement the subdivision is not so clean cut as in the volume by Carhart and Chute, and long paragraphs are frequent, but the reasoning is generally good and suggestive. The book may be regarded as the reproduction of a series of well-prepared lectures, without the interruption of experimental details. An admirable outline of experiments, intended to aid the teacher, is reserved for the latter part of the volume. This includes many references to Chute's 'Practical Physics,' to which the

author offers a deserved tribute. Another valuable feature is the list of references for collateral reading, the outcome evidently of long-continued use of the note-book in the author's own reading. The order of presentation of the successive topics is a little different from usual, and out of 346 pages only 49 are devoted to magnetism and electricity, including 5 closing pages on electrostatics. Formulas are but sparingly employed and no problems are offered. To many this may seem a distinct element of weakness.

Mr. Gilley's book is a mixture of class text-book with laboratory manual, and as such it may be commended to those who are partial to such a mixture. The opening chapter treats of density, both experimentally and theoretically, density being defined as the quotient of weight by volume. This identification of mass and weight is convenient, but obviously not always allowable. Much space is occupied with minute instructions and precautions for the guidance of the student in manipulation, and there are many indications that the author is ingenious and energetic as a teacher. He has introduced many well-chosen problems, and his theoretical discussions are generally satisfactory. Like Professor Slate he gives scant attention to electrostatics, less than 4 pages out of 530 being thus devoted to 'surface electricity.' For elementary students this plan has much to commend it. Much of what passed for school instruction in the subject of 'frictional electricity' a half century ago was mere trifling; and such theoretic discussion as can now be given about it requires greater maturity than that of the high-school student. Passing now to a manual which is not a mixture but intended exclusively for the laboratory, the high-school guide by Professor Crew and Dr. Tatnall is exceedingly good. Only simple exercises have been selected, involving for the most part apparatus that is commonly in use or fairly inexpensive if specially made. Nearly every exercise is introduced with references to one or more of seven elementary text-books in which the student may find a discussion of the theory involved. Then comes a list of the apparatus to be used; a clear statement of the problem to be experi-

mentally solved; such instructions as are needful for the manipulator; and, finally, in the earlier part of the book, tabular forms are given to aid the student in acquiring methodical laboratory habits. These forms are discarded for the most part after the second chapter. Some of the exercises are merely qualitative, especially in electricity. Of those that are quantitative some will perhaps be welcomed not only in the high school, but for beginners in institutions that assume more pretentious names.

Kelsey's 'Physical Determinations' are intended for students of rather more advanced grade, having been written for a technical school. The author's aim was 'to supply outline directions which might enable a class of students to proceed with work until the demonstrator could give individual instruction to each group.' Discussion of detail is hence omitted, and to such an extent that the book does not seem destined to meet 'a long-felt want' in very many American laboratories, in view of the considerable number of more helpful books of this kind already in the American market. The explanations of theory are not always very clear, inconveniently long steps being occasionally taken; nor are the instructions about manipulation sufficiently full to warrant the student in making much headway with his work while impatiently waiting for the arrival of the demonstrator. Nevertheless the book would never have been prepared had not its material served a useful purpose in the laboratory for which it was intended.

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WASHINGTON AND LEE UNIVERSITY,
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SOCIETIES AND ACADEMIES.

RESEARCH CLUB OF THE UNIVERSITY OF MICHIGAN.

SINCE last reported, the club has held two meetings. At the first meeting Professors Russell and McMurrich gave papers; the former, using lantern slides, detailed his explorations in Idaho last summer, and the latter addressed the club on the phylogeny of the muscles of the human forearm. At the last meeting of the year, held in May, Professor Craig explained the process by which