Theory of Errors and Least Squares. A Text-book for College Students and Research Workers. By LeRoy D. Weld, M.S. New York, The Macmillan Company, 1916. 8vo. Pp. xii + 190.

The two pages of "Preface" of this book made a very unfavorable impression on the reviewer. It would take too much space to point out the expressions that seemed catchy but meaningless or non-committal. It gave the impression that possibly the author had not caught the fundamental purpose and nature of the method of computation discussed in the volume. The idea of having the theory for its amateurish "satisfaction" and of getting it "in an evening or so and then put it into immediate practise" did not at all harmonize with the reviewer's knowledge that only a fairly experienced observer has much real use for the method of least squares in his computations.

As a text-book for "undergraduates," unless they are classed with the "casual readers," it presupposes a half-year at least of training in the calculus. Compare pages 54, 57, 60, 67, 71, 90 and others. Any student of the desirable amount of inquisitiveness would like to know under what conditions and to what extent he may play such tricks of the calculus as he sees, *e. g.,* following equation (*h*) on page 181; and it would take considerable advanced calculus to make it all clear to him.

As a book for "handy reference" it would be vastly more useful by having a carefully prepared, detailed index. This need is partially met by "Appendix F. Collection of Important Definitions, Theorems, Rules and Formulas for Convenient Reference," pp. 185 sq. Throughout, references are made to Article, Equation (number), or even to Chapter, without adding the page, which would facilitate the use of the book, since only page numbers appear on the tops of the pages. It would help much to have the number of the page on which each formula originally appears given as well as the number of the formula on pp. 188–190, and elsewhere.

Happily, the "Preface" is the poorest part of the whole book and that may be omitted by the reader. On pages 17 and 28 the author states clearly the "special office of the method of least squares," yet he nowhere emphasizes the fact that he is dealing with a method of *computation.* He does not make use of the splendid opportunity of forcing and fixing upon the attention of the reader the facts that the method does not improve the quality of poor or careless observations, and that only the beginning student carries readings as of grams out to six or seven decimal places (see any reference to grams, *e. g.,* p. 155). It further would not be difficult and much worth while to point out that in the formula $y = ce^{-h^2x^2}$ (24), p. 56, the exponent must be an abstract number so that $1/h$ and x must be measures in the same unit. The types of readers for whom the book is intended are the very ones that should have these matters indelibly impressed upon them. Although it is sometimes stated that illustrations are from students' work, it is passing strange that the author should have let such matters escape his notice.

Barring two cases of questionable English, pp. 65, 170, that only a purist might notice, the book is quite free of errors of speech and of typography. The treatment is remarkably clear and well-ordered. The topics are nicely correlated. Especial attention should be called to Chapters IV. and VIII., and to Art. 27 of the former chapter in particular. Lucid is not too strong to describe some portions of the book. On the whole, readers who want only a general idea of what the theory is about can scarcely find a more concise and clear presentation for that purpose. The numerous, excellent, well-chosen exercises at the end of each chapter will, if solved, greatly enhance the permanent value of the book.

The adverse criticism is herein placed first so that the reader may finish the review with the desire to get and read the book, and find it as interesting and profitable as the reviewer has found it.

Charles C. Grove

ARISTOTLE'S ECHENEIS NOT A SUCKING-FISH

In the course of a rather extensive series of researches on the shark-sucker, it has been