

detract from their value? The cubic on page 228 is not given as it is in Cardan's work; but again, is it therefore less valuable to such as will read this book? It is probable that the question cannot be definitely answered as to how much material of this kind should be given, and probably there is a fair basis for argument as to how exactly it should be reproduced.

In view of the fact that no history of mathematics has ever been written that has not been subjected or could not be subjected to severe criticism with respect to its statements, as witness Eneström's perennial criticisms of Cantor, it will hardly be expected that Professor Cajori's latest edition will, under all the circumstances of its publication, be found to be without flaw. It is, however, interesting to see that the work has been found to be so helpful as to warrant this partial revision. Readers may be pardoned if they join with the author in the regret that a radical revision was impossible for reasons that are apparently commercial.

DAVID EUGENE SMITH.

A Text-Book on Practical Mathematics for Advanced Technical Students. By H. LESLIE MANN, B.Sc., A.R.C.Sc. Longmans, Green and Co. (New York), London, 1915. xi + 487 pp. Price \$2.10 net.

As is the case with many texts of this type, the material and its arrangement are determined by some restricted need and the personal preference of the author. This text, we are told, is based on the work of the senior students at the Woolwich Polytechnic, following the line of the author's lectures there to the students in mechanical and electrical engineering during the past nine years. Though based on the work of the seniors, "the book is meant to cover a two or three-years' course" assuming "a knowledge of the fundamental principles of algebra, trigonometry, and mensuration, and the use of logarithms and squared paper."

The arrangement will be likely to impress all teachers of mathematics and most teachers of engineering in America as rather reverse in portions of the book to their accustomed order. In several places we were given the sensation of moving backward into the subject. We cannot see what personal preference led to the scrappy, unsystematic treatment of algebra covering seventeen full pages, eight of which are devoted to approximations and applications of approximate

computations, and to giving a cumbersome way of getting the approximate roots of a quadratic equation. Radicals or irrational quantities seem throughout to be replaced by their value to two or three places even when they occur in denominator or divisor. The proper use of significant figures has not received attention.

An elaborate review of trigonometry, including complex quantities and their graphic representation, pages 19–60, is neat and serves its purpose well; yet in passing we observe the order of the cases in the solution of triangles is: I. When three sides are given, II. When two sides and an angle are given, III. When one side and two angles are given. We are far more surprised to find very little of analytic geometry and to have that little introduced in Chapter V by the geometry of three dimensions, pages 61–78, with a touch of plane analytics on the next two pages in defining slope and derivative and no more until Chapters VIII and IX, pages 115–142, which treat also minimum point, point of inflexion, maxima and minima, tangent and normal, angle between a line and a curve, curvature and center of curvature, in order. The treatment of integrations, pages 143–191, and of definite integrals, pages 192–221, is possibly more nearly in the usual order than any other portions of the book. The remainder of the text is devoted to applications of the former subjects. The numerous exercises are very good and seem to come from actual engineering experience.

The last 60 pages are devoted to finite differences and applications. In paragraphs 217 and 220, where the matter of fitting curves to data is treated under the titles “The straight line law” and “General determination of laws,” the author seems not to recognize the fact that in curve-fitting the most difficult part by far is the selection of the *type* of equation, but dismisses it by saying “a probable law connecting x and y is known or assumed, and it is necessary to prove that the given tabular values do actually satisfy the law,” page 448, and “It is highly probable that one of the three laws

$$y = a + bx^n \quad (1), \quad y = b(x + a)^n \quad (2), \quad y = a + be^{nx} \quad (3)$$

will suit the given values,” page 452. It is due the author to state that he has much company in failing to recognize the above fact, and that we are very glad to see these last sixty pages.

We admire the author's aim in making the calculus the center and unity of the book, and his position in claiming that "the calculus cannot be successfully applied to the problems which occur in actual practice until the student has become thoroughly familiar with its underlying principles and methods, and this familiarity can only be obtained by steady practice. It is unfair to a student to give him as a standard form

$$\int x^n dx = \frac{x^{n+1}}{n+1}$$

and then expect him to use it as a formula to integrate any function which might resemble it, or by some means reduce to it. This might be working along the line of least resistance, but it is not educational: neither is it to the best interests of the student to whom sound work in differentiation and integration is an absolute necessity."

The text closes with a list of the answers to all the hundreds of exercises and an index. Example 27, page 17, attracted our attention, so we solved it only to find the "true value" .34315 instead of .3429 in the first part, and in the second part .3774 instead of .3781, making the percentage of error 0.318 instead of 0.503 per cent as printed. The difference is probably due to the fact that we rationalized the denominators and divided. The answers should not be carried out so far at any rate.

The publishers have made the book attractive; even the relative dimensions as well as the appearance of the pages are inviting.

CHARLES C. GROVE.

NOTES.

THE April meeting of the Chicago Section of the American Mathematical Society will be devoted in part to a symposium on divergent series and modern theories of summability, the principal speakers being R. D. CARMICHAEL and C. N. MOORE.

AT the annual meeting of the Mathematical Association of America E. V. HUNTINGTON was elected president, D. N.