

parts of an inch, U. S. and metric equivalents and wire gauge sizes.

No tables of logarithms or natural functions are given. Radian measure, identities, trigonometric equations and answers to the exercises have been omitted.

F. M. MORGAN.

College Algebra. By W. B. FITE. Boston, Heath, 1913.

A CHARACTERISTIC tendency in mathematics during the last fifty years or more has been in the direction of a more severe criticism of the proofs of theorems. Hence, Professor Fite is adopting the modern point of view when he aims "to present the elementary principles of algebra in a simple and direct way and to give a rigorous proof of the theorems used." But just at this point one of the real dangers in the teaching of elementary mathematics arises. Those who are interested in emphasizing rigor are likely to be sidetracked by minutiae to such an extent that the subject as presented by them appears too abstract to the beginner, to whom concreteness in any subject is an absolute necessity. With these facts in mind one might say that the aim of the modern text book in algebra should be to present the subject as concretely as possible and at the same time to develop the critical attitude in the mind of the student. I shall examine Professor Fite's *College Algebra* chiefly along these lines.

First of all it should be noted that the book is meant to be a *college algebra*. Although all of the subjects treated occur in most of the texts which are used in secondary schools it seems to me that some of the subjects, notably the analytic geometry introduced, belong exclusively to college work. This does not mean that the graph and graphical methods should not be used in secondary work; they should be, by all means. Also, the problems which have been selected are largely new and very attractive, and are of sufficient difficulty to make the average freshman think.

Throughout the book the author has made extensive use of graphical methods and has evidently tried to appeal to intuition and to make the subject tangible by practical illustrations of the principles involved. To this end the problem of finding the equation of a circle through three points is introduced as an application of the solution of simultaneous linear equations in three variables. This is better than to refer to three planes,

which is always somewhat unsatisfactory at this period of study. A great many more problems from geometry appear than one usually finds in such texts. The same might be said of physical problems, for which an appendix has been added concisely explaining the fundamental laws of physics. The author does not hesitate to state facts which can be ascertained only by means of higher mathematics to be used as the basis of an algebraic problem; this, to my mind, is an excellent method of encouraging the thoughtful student to pursue the study of mathematics further. To the student who can handle the formal work of the book and understand the problems, algebra should be a tool by means of which certain kinds of information might be obtained.

The importance of rigor is never forgotten. In an early chapter the operations which may be legitimately used in the solution of equations are stated and illustrated. The chapter on mathematical induction—a difficult topic to teach successfully—is admirable in this respect. In the proof of the remainder theorem in §142 that the two sides of the expression are *identically* equal is carefully noted; some texts seem to forget the importance of this step. Another evidence of this spirit of precision appears at the bottom of page 177 and need only be mentioned here. Several proofs are very properly omitted; for instance, the proof that every polynomial in x has at least one root is merely referred to historically; the proof of De Moivre's theorem is left to the student; but all theorems which are proved at all are *rigorously* proved, and wherever it is necessary critical observations are added.

Among other features of the book may be mentioned the chapter on complex numbers. The presentation of this subject is somewhat new and very attractive. The chapter on Inequalities contains much which is useful and which does not appear in any other modern text with which I am familiar. In the proof of theorems by mathematical induction illustrations are given which show convincingly the necessity of both parts of the proof.

I have the following adverse criticism to offer. An exceedingly long and complicated sentence for a text book occurs at the bottom of page 22, the purpose of which could have been accomplished better by several more illustrative examples. The subject of undetermined coefficients could have been briefly explained; the omission of this powerful instrument of

algebra to make place for so much geometry is hardly justifiable in a text of this kind. Possibly it would have been of advantage to pay more attention to the theory of the quadratic equation—a subject which so many freshmen have not mastered. On page 155, line 4, the word “inequalities” should be changed to “equalities.”

Finally, it is my opinion that the book is distinctly a college text; that the subject has been concretely presented, and that an effort has been made to awaken the spirit of critical revision in the mind of the student.

JOSEPH EUGENE ROWE.

Das Problem der Kreisteilung. Ein Beitrag zur Geschichte seiner Entwicklung. Von DR. ARTHUR MITZSCHERLING. Leipzig, Teubner, 1913. vi + 214 pp. M 7.

THIS book falls naturally into three sections, treating the following topics: (a) the division of the circle into equal parts, (b) the trisection of angles, (c) the polysection of angles. Each section is written from the historical point of view and contains for its general topic an account of the relevant geometric constructions, both exact and approximate, and of instruments by means of which the corresponding practical constructions may readily be made.

The book will be of interest to those who desire an elementary historical account of the topics treated.

R. D. CARMICHAEL.

Allgemeine Theorie der Raumkurven und Flächen. Von V. KOMMERELL und K. KOMMERELL. (Sammlung Schubert XXIX and XLIV.) Zweite Auflage, I. Band, 1909, pp. viii+172; II. Band, 1911, pp. vi+188. G. J. Göschen'sche Verlagshandlung, Leipzig. Price 4.80+5.80 marks.

WITHIN the last two or three years, new works, or old works in new editions, have accumulated rapidly in the field of differential geometry. For do we not have Bell, Darboux, Demartres, Forsyth, Knoblauch, Kommerell, Lilienthal, Salmon, Scheffers, and Smith? There are many American colleges, no doubt, where lecture courses, and texts in a foreign language, are deemed inadvisable. In such places the teacher who offers an introductory course in differential geometry is distinctly at a loss. Bell, Frost, Salmon, and