teach and in what order? A very useful but rather out of place chapter on the theory of irrational numbers is interjected at this point. The theory and application of the Dedekind cut as well as Cantor's theory of irrational numbers are outlined quite fully. Strenuous objection is made to the custom of American texts of applying directly the laws of arithmetical proportions to geometrical quantities. Rational advice is also given against the tendency to number theorems and operations one, two, three, etc., and to compel students to commit this enumeration.

The last seven chapters treat topics rarely found in an elementary American text. The discussion of similarity of plane figures, with some suggested applications, is valuable. The extension of the idea of similarity to circles is very fruitful. Various methods of "measuring" circles are treated, including Huygens' method, although this is pointed out as being of doubtful value in the lower schools. Anharmonic ratios of points on a line and of lines through a point are treated with elegance, and considerable space is devoted to pole and polar with respect to a circle. It seems unfortunate that American texts ignore so largely these fruitful and interesting fields. Pencils and nets of circles, with their properties, are discussed in one chapter and inversion in the plane in another. The last chapter is a long discussion of the Apollonius tac-problem. The methods of Apollonius are first discussed, then the modern solutions of Gergonne, Massfeller, and C. Adams are criticised and tested bv Study's criteria. The authors' discussion of Study's criteria for the best solution of a construction problem is not without interest. This last half of the book is replete with brief scientific discussions and helpful remarks which the reviewer must refrain from pointing out in more detail. The authors are not entirely free from some of the faults they inveigh against, but the volume doubtless deserves a place among other books of its kind, for it is fearless in its criticisms of others, is thorough in research, and has the merit of bringing the history and bibliography up to date.

D. D. Leib.

Complementi di Analisi algebrica elementare. By Federico Amodeo. Luigi Pierro, Naples, 1909. 284 pp.

This little volume is one of a series of elementary text books by the same author and is intended for use in the Istituto Technico of Italy. The author says in the preface that a stu-

dent should know the things contained in this book before he enters the university. This makes the volume interesting, as it shows us what is considered a good university preparation in Italy. This is not so different from our own ideas, but many of the subjects here treated we reserve for a course in college algebra. However, many conceptions which we teach in college algebra or at a later period the Italian student gets before he begins his second course in algebra for which the present book is intended. Some of these conceptions are interval, independent variable, inverse function, geometric representation of a function, and sequence of numbers.

The book contains seven chapters the titles of which will sufficiently indicate the contents: Calculus of combinations; Continued fractions; Analysis of indeterminates of the first degree; Inequalities and systems of inequalities; Discussion of equations and problems and equations of second degree; Finite and continuous functions, limits, indeterminate forms; Maxima and minima, discussion of functions. The book also contains an appendix on geometrical conics. Each chapter closes with an excellent set of problems.

Ordinarily the Italian student devotes much more time to the study of elementary mathematics than the American student. But as here indicated, the time is not spent in anticipating college work, as is often done by preparatory schools in this country, but is devoted to doing more thoroughly the ordinary elementary work.

The presentation shows the author to be a master. But the general appearance of the book from the publisher's point of view would not be considered good in this country.

C. L. E. MOORE.

College Algebra. By H. L. RIETZ and A. R. CRATHORNE. New York, Henry Holt, 1909. xiv + 261 pp.

THE introduction to this text is concerned with the reasoning in the transition from numerical to literal quantities. Addition and multiplication are regarded as fundamental operations and no attempt is made to define them. Their laws, including their commutative, associative, and distributive properties, are given as assumptions. Subtraction is then defined with reference to addition, and division with reference to multiplication. The algebraic use of these four operations including the laws of real indices is discussed in some detail in the same chapter. The