in Professor Halsted's Elementary Treatise on Mensuration, 1881.* Judging by the preface to the fourth edition of this work and by its denomination as "*New* prismoidal formula" it would appear that the author believed the result to originate with himself.

The historical note on π (pages 151–2) needs to be revised. Ludolf van Ceulen indicated the equivalent of the number π to 35 decimal places not 30.† Vega gave only 136 decimal places correctly, not 140.‡

Except for the lack of an index the French is a great improvement on the English edition. Apart from the figures (e. g., 58, 63, 91, 108, 113 are by no means up to the usual standard set by Gauthier-Villars) the pages are exceedingly attractive and it is to be hoped that a third English edition introducing still further improvements may not be long delayed. The work is full of interest and deals with a discussion of fundamentals in geometry, in an attractive style; and there can be little doubt that the number of universities using Professor Halsted's text in connection with courses on the Foundations of Geometry, will steadily increase.

The Japanese edition of the Rational Geometry which Sommerville lists§ as published in 1911 has not yet (in May, 1912) appeared.

R. C. ARCHIBALD.

Elementary Analysis. By P. F. SMITH and W. A. GRANVILLE. Boston, Ginn and Company, 1910. x + 223 pp.

THE number of textbooks in analytic geometry and calculus is rapidly increasing. But nearly all are intended for the use of students in engineering or for students who intend to specialize in pure or applied mathematics. In view, however, of the recent remarkable development of the natural sciences along mathematical lines, a brief course in analytic geometry and calculus is desirable for the general student who takes one year of mathematics as an elective beyond

Zeitschrift für Mathematik und Physik, vol. 23 (1878), p. 413 (dated Mai, 1877).—T. Sinram, *Archiv der Mathematik und Physik* (Grunert), vol. 63, p. 443 (November, 1878).

* Page 130.

† Bierens de Haan, *Messenger of Math.*, vol. 3 (1874), p. 25; copy of inscription on van Ceulen's tombstone.

‡ G. Vega, Thesaurus Logarithmorum, Leipzig, 1794, p. 633, and W. Shanks, Contributions to Mathematics, London, 1853, p. 86.

§ Bibliography of Non-Enclidean Geometry, 1911.

the required trigonometry and college algebra. The present-day tendency is also to correlate the various branches of mathematics, which, no doubt, is a step in the right direction, provided the idea of correlation is not carried too far.

The little book under consideration is an attempt to solve the problem of writing a textbook, especially adapted to a brief course in analytic geometry and calculus, in which the two subjects are brought into closer contact. The object of the authors is to provide a course which will give the student a broad outlook and which possesses a distinct cultural value. In this attempt the authors has been very successful.

The book is adapted to a course of about seventy-five lessons. The first five chapters deal with the elements of analytic geometry including cartesian coordinates, curves and equations, lines and circles, and curve plotting. No chapter is devoted to conic sections, as is usually done in most textbooks. Examples illustrating the different kinds of conic sections are given, but they appear simply as illustrations of general analytic methods.

In the next seven chapters the fundamental principles of the differential calculus are treated, and the topics considered are differentiation of ordinary functions, tangents, maxima and minima, rates, and differentials. The last four chapters deal with integration of the standard elementary forms, constants of integration, and applications to areas and volumes of solids of revolution.

The treatment throughout the book is very clear and to the point, and the great number of attractive and well-selected problems will be greatly appreciated by the teacher. Great emphasis is laid on graphical representation, and one prominent feature is the discussion of concrete examples before the discussion of a general formula is taken up. It is also very pleasing to note the great care and simplicity with which such subjects as the angle between two lines, the area of a triangle, the limiting value of a function, and several others are treated.

One of the greatest difficulties in writing an introductory textbook in calculus is to give definitions and proofs which a beginner can understand, and at the same time to avoid making any statements which are not correct. It is, of course, impossible to employ the refinements of modern rigor in a book of this kind. The authors make the distinction between proof and illustration very clear and are very successful in avoiding positive inaccuracies. The only place where the discussion might have been made a little clearer is on page 126, where the number e is defined as the limiting value of $(1+z)^{1/z}$.

The typography and arrangement of matter on the page are excellent, and the book as a whole is very attractive.

JACOB WESTLUND.

Second Course in Algebra. By H. E. HAWKES, W. A. LUBY and F. C. TOUTON. Ginn and Company, 1911. vii + 264 pp.

IN arranging this Second Course to follow the first year's work in algebra the authors have made the student's return to the study of mathematics both interesting and easy. The review of the main features of their First Course in Algebra as given in the earlier pages of this book is of course quite essential. It is presented in a way that leads the reader to more mature and accurate habits of thought; he is frequently shown certain limitations on what he supposed were very easy and familiar operations. From the very beginning of the text there is evident a definite effort to induce him to discriminate accurately and logically. We regret to note later in the book a few unfortunate digressions from the rigorous method of presentation that is so admirable at the beginning. The treatment of linear equations is given a new interest for the reader by the introduction of second and third order determinants. With these of course no proofs are given and little use is made of even the more elementary theorems in determinants. Simply to teach the student the actual use of determinants in the solution of systems of linear equations is certainly the wisest procedure at this stage. Graphs are used quite extensively in the solution of both linear and quadratic equations. A number of very instructive illustrations are given in which the solution of two quadratic equations may be reduced to the solution of a system of linear equations. The straight lines are shown in the graph to pass through the intersections of the conics. This visualizing process ought to give the algebraic manipulation a much more tangible significance. The reviewer does not advocate any proofs with regard to the properties of these conics, with the possible exception of the circle, but he does feel that the straight line and linear equation should be