notes contributed by the author. The printing is in the familiar style of the Cambridge University Press, with the added luxury of a marginal index.

T. H. GRONWALL

Euclides Danicus. By Georg Mohr. Amsterdam, 1672. Copenhagen, Høst, 1928. Price $2.50.

Towards the end of the eighteenth century Mascheroni arrived at the amazing conclusion that all euclidean constructions may be executed with compasses alone, without the aid of the ruler. This was the starting point for the study of the rôle of instruments in geometric constructions, so successfully carried out during the nineteenth century. But Mascheroni's book *Geometria del Compasso,* (Pavia, 1797), remained the standard work on Mascheronian constructions. It has been superseded only very recently (A. Quemper de Lanascol, *Géométrie du Compas,* Paris, Blanchard, 1925).

Had Mascheroni died in childhood would science have been deprived forever of Mascheronian geometry? Usually such a question is a moot one. Not so in this case. In 1672 a Danish mathematician, Georg Mohr, published a book in Dutch and in Danish simultaneously, which contains Mascheroni's basic result and a good many of his problems. Little is known about Mohr. Leibnitz mentions him in one of his letters. Mohr's book passed completely unnoticed. Mascheroni says explicitly in the preface of his *Geometria* that he knows of no previous work of this kind. There is no reason to doubt his word.

Due to the efforts of J. Hjelmslev, the Danish Scientific Society has published a facsimile copy of the Danish edition of Mohr's book together with a German translation of it. The Danish Society deserves to be congratulated for having rescued this book from oblivion. While the book does not add to our geometric knowledge, it is an interesting historical document, in more than one respect. The typography of the book is excellent.

N. A. COURT

Hoehere Mathematik. Teil I. *Differentialrechnung und Grundformeln der Integralrechnung, nebst Anwendungen.* By Rudolf Rothe. 3d edition. Leipzig, B. G. Teubner, 1930. vii+189 pp.

This edition differs but little from the first and second editions (reviewed in this Bulletin, vol. 31, pp. 556–7, vol. 33, p. 791). The changes consist of a few alterations and corrections in the text, the addition of a paragraph relating to moments, which might well have received more extended treatment in volume II, a paragraph in the discussion of Taylor's formula, and a paragraph deriving Lagrange's rule for maxima and minima of functions of more than one variable with supplementary condition, in which the author assures us that the vanishing of the jacobians: $\partial(f,g)/\partial(x,z)$ and $\partial(f,g)/\partial(y,z)$ is equivalent to the existence of a *constant* λ such that $\partial f/\partial x+\lambda\partial g/\partial x=\partial f/\partial y+\lambda\partial g/\partial y=\partial f/\partial z+\lambda\partial g/\partial z=0$.

T. H. HILDEBRANDT

Analytische Geometrie. By L. Bieberbach. Leipzig and Berlin, Teubner, 1930. iv+120 pp.

This little book (volume 29 of Teubner's Mathematische Leitfäden) presupposes an elementary knowledge of the subject. The novelty of the treatment lies in the introduction from the outset of vectors and matrices. The treatment of the geometry of the triangle by vectors is very elegant, as is the application of matrices to the study of orthogonal coordinate transformations and the classification of quadrics.

T. H. GRONWALL

Methoden der Praktischen Analysis. By Fr. A. Willers. Göschens Lehrbücherei, Band 12. Berlin and Leipzig, de Gruyter, 1928. 344 pp.

This book treats numerical, graphical, and some instrumental methods of practical analysis. While the most important is the numerical, by which an approximation to any desired degree of accuracy may be reached, the author has felt the importance of treating the less precise methods because they frequently give results which are sufficiently accurate for the purpose in hand and in other cases provide easily a first approximation to more refined results by the numerical method. Lack of space has made it necessary to limit the applications in neighboring fields and the author regrets particularly that he has had to omit almost everything from mathematical statistics.

The first chapter considers the general problems involved in calculations with approximate numbers and describes the mechanical aids to computation, particular attention being given to various special types of coordinate paper. The second chapter, which is fundamental to those which follow, develops standard methods of interpolation including numerical differentiation and integration. In the third chapter we find a treatment of approximate integration and differentiation by various formulas and types of integrating machines. The fourth chapter is devoted to methods of approximating the roots of equations, including systems of linear equations and the complex roots of algebraic equations. The last paragraph gives a brief treatment of linear difference equations. Empirical formulas and curves, particularly those involving periodic functions, are described in Chapter Five. The sixth chapter explains graphical and numerical methods for obtaining approximate solutions of ordinary differential equations.

The last four chapters are independent and each is based on Chapter Two alone. This volume is to be recommended as a convenient reference book for any one confronted by a problem the solution of which requires the approximate methods listed above.

W. R. LONGLEY

Mathematische Existenz. By Oskar Becker. Untersuchungen zur Logik und Ontologie mathematischer Phänomene. Halle, Niemeyer, 1927. 370 pp.

This appears as a "Sonderdruck aus: Jahrbuch für Philosophie und phänomenologische Forschung, Band VIII," and as such has a double pagination. The work is a critical, searching study of the problem of mathematical existence in its present controversial status. It should be read in connection with the recent prior articles of Hilbert, Brouwer, Weyl and others. One is plunged in the first few pages into the present conflict concerning the foundations of mathematics as championed by Brouwer for Intuitionalism, and by Hilbert for Formalism, It is of significance that there is no present