

homogeneous systems of linear equations, and anharmonic ratio. After some applications to spherical trigonometry and to statics he discusses without using vectors the following topics in the order named: rotation in the plane, coaxial quaternions and ordinary complex numbers, spirals, linear fractional transformations, reflection on a circle and on a line, fundamental geometric forms of the first kind and projective relations between them, involutions on one-dimensional forms, Pascal's theorem, projectivities between planes, projective generation of conics, etc.

The second volume has two divisions. In the first, *Hauptpunkte der Analytischen Geometrie des Raumes*, the projective properties of ordinary space and of quadric surfaces are treated; in the second part, *Grundbegriffe der Differential- und Integralrechnung*, rigorous treatments are given of convergent sequences, limiting values, the operation of passing to a limit, and the derivative and differential of a function. After computing the derivatives of some elementary functions, he studies the Leibnitz fundamental theorem, namely, $dF(u) = F'(u)du$, where $u = f(x)$, then the mean value theorem, and closes with the use of integration to determine areas of plane surfaces and lengths of curves.

Since the book is designed for *Hochschulen* as well as for *Universitäten* the reviewer assumes that the student would have no previous knowledge of the subjects treated and believes that these books alone would not give an adequate knowledge of analytic geometry or of projective geometry or of the calculus, though they might be used to advantage to supplement texts which are more elementary and at the same time more complete, or to follow a first and more complete treatment of the subjects enumerated. There are few examples and no exercises for the student, nor is there a prefatory word from the author to give a clue either as to the mathematical maturity of the students for whom his books are intended or as to the length of time he would expect them to spend on this amount of material.

MAYME I. LOGSDON

Krise und Neuaufbau in den exakten Wissenschaften. Fünf Wiener Vorträge. Leipzig and Wien, Deuticke, 1933. iv+123 pp.

This volume consists of five general addresses on the present state of physics, with authors and titles (in translation) as follows:

Hermann Mark: The shock of classical physics due to experiment.

Hans Thirring: The transformation of the system of concepts of physics.

Hans Hahn: The crisis in outlook (*Anschauung*).

Georg Nöbeling: The fourth dimension and curved space.

Karl Menger: The new logic.

R. D. CARMICHAEL