

was born, and made much of it in his Treatise on Algebra in 1842. In the second part of the work the author begins with a dissertation on mathematical logic, a subject that has attracted so many writers in the last half century, and in the treatment of which the influence of Peano and Couturat is manifest. Chapter II treats of geometrography and the straight line, starting with Lemoine's work of twenty-five years ago and closing with the contributions of Poincaré and Russell. Chapter III develops the theory of non-euclidean geometry, and then shows the significance of various historical attempts to demonstrate the Euclid postulate or to found a geometry independent of this assumption. The work closes with a general discussion of the space concept.

Readers will find the chapters on the number concept and the non-euclidean geometry particularly interesting. As a genuine contribution to theory the book will be less regarded than as a résumé of the questions involved.

DAVID EUGENE SMITH.

*Encyclopädie der Elementar-Mathematik.* Von H. WEBER und J. WELLSTEIN. III Band: *Angewandte Mathematik.* Zweite Auflage. Erster Teil: *Mathematische Physik.* Bearbeitet von RUDOLF WEBER. Teubner, Leipzig und Berlin, 1910. 8vo. xiv+536 pages. 12 marks.

THE first edition of this encyclopedia was reviewed in the BULLETIN, volume 10 (1903-4), pages 200-204. In this second edition of the third volume, on applied mathematics, there are extensive changes. The original volume is divided into two; the present one, a treatise complete in itself on mathematical physics, and one to follow on graphics, probabilities, and astronomy. This modification has been made to satisfy many criticisms of the original, some of which deplored the wide omissions in a work that called itself an encyclopedia.

The present volume has three chapters on mechanics: functions of position and direction that appear in physics, analytic statics, and dynamics; two chapters on electric and magnetic fields: electricity and magnetism, and electromagnetism; two chapters on maxima and minima: geometric maxima and minima, and applications to the theories of equilibrium and of capillarity; two chapters on optics: geometric optics, and plane waves.