

SHORTER NOTICES.

Encyklopädie der Elementar-Mathematik. Ein Handbuch für Lehrer und Studierende. Von HEINRICH WEBER und JOSEF WELLSTEIN. Zweiter Band, *Elementare Geometrie*. Bearbeitet von HEINRICH WEBER, JOSEF WELLSTEIN, und WALTHER JACOBSTHAL. Leipzig, Teubner, 1905. 8vo. 280 figures. viii + 602 pp. Dritter Band, *Angewandte Elementar-Mathematik*. Bearbeitet von HEINRICH WEBER, JOSEF WELLSTEIN, und RUDOLF H. WEBER. Leipzig, Teubner, 1907. 8vo. 358 figures. ix + 666 pp.

EVERY live teacher of secondary school mathematics is aware of the superficial character of most text-books. In the nature of the case, teaching for younger pupils must exclude far more than it presents. But if the teacher himself restricts his study to the range prescribed for pupils, very little mathematical interest is kindled in his classes. Practically the same result is reached if the sole scientific interest of the teacher is in fields remote from his pupils' studies. The authors of this three-volume encyclopedia of elementary mathematics plan to intensify by fundamental criticism, and revivify by extensive applications to questions of physics, the interest of the young teacher in his every-day work. This does not conflict by any means with the programme of modern universities — to train the future teacher by research in some region on the frontiers of scientific knowledge. Rather it supplements that programme, and strengthens the position of its champions, by showing how to apply the method of the university seminar to the problems of the school-room.

The book on geometry begins with a critical and historical survey of the notions point, straight line, surface, plane, parallel. The antithesis is developed between what the authors call natural and logical geometry, the latter reached only by a limit process of idealization. Most appropriate is then the quite full examination of a second system of geometrical objects, the totality of spherical surfaces that contain a fixed point O ; for in this system there is an exact correspondence to the objects of ordinary euclidean geometry, while the images are radically different. Straight lines are replaced by circles through O , and planes by spheres through O . Tried upon this material, the Hilbert axioms of connection and of order lose their appearance of artificiality and become novel observations