

the usual order. A short chapter on confocal conics is inserted, while the treatment of higher plane curves and of solid geometry are unusually brief.

The most interesting novel feature is the early introduction of the determinant notation and its continued use throughout the book. In the first equation of the straight line (*i. e.*, in terms of the coordinates of two known points) the determinant form is given side by side with the explicit equation. Even if the student has had no previous treatment of the determinant, a few minutes of class-room explanation will enable him to grasp this simple form and the continued use will certainly give him that realizing sense of the geometric value of this notation which he too often fails to get in his formal course in algebra.

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*Lehrbuch der analytischen Geometrie.* Erster Band: *Geometrie in den Grundgebilden erster Stufe und in der Ebene.* Von L. HEFFTER und C. KOEHLER. Leipzig, Teubner, 1905. 8vo. 16 + 526 pp.

THIS volume is in strong contrast to the book just noticed. While the authors aim to make the treatment elementary, they wish to give the student an introduction, at least, to the modern methods of relating the various parts and kinds of geometry into one comprehensive whole. They endeavor to follow the way suggested by Cayley's Sixth memoir on quantics and sketched by Klein in his Erlangen Programm. They consider that this can be done only by the early introduction of the transformation group, proceeding from the projective group to its subgroup, the affine, and then to its subgroup, the so-called "äquiform"; and not in the inverse order. This first volume contains the geometry in all spaces of one dimension, and in the plane. The second will be devoted to the finite "Bündel" and to ordinary space. In each case, the procedure is from projective to affine and then to æquiform geometry.

A condensed account of the contents will be useful in giving some idea of the ground covered. After an introductory chapter devoted to definitions and a few general considerations, there follows the first part, which is on geometry in spaces of one dimension. The first chapter relates to projective and affine geometry in the point range. The next takes up the quadratic equation and the point pair and its involution. This part is concluded by a consideration of the projective and