Analytische Geometrie der Ebene. By PAUL CRANTZ. Leipzig, Teubner, 1915. v+93 pp.

THIS little book, labeled "Analytic Geometry," deals exclusively with the straight line and the conic sections and contains no discussion of the general second degree equation. As indicated on the title page, it is intended for self-instruction. It is arranged in a very compact manner and probably contains a maximum of material for a book of its size. The idea of a translation of axes is introduced early and is used consistently in getting the equations of the conic sections with axes parallel to the coordinate axes.

No clear-cut definition of the equation of a locus is given. In developing the equation of a locus the author simply shows that all points on the locus satisfy a certain equation, omitting the converse theorem. The methods used in getting the equation of a straight line seem very awkward and make what is really a very simple theorem appear rather complicated. In introducing each of the conic sections, a method of construction is given. This, as well as the discussion of the locus from its equation, is helpful to the self-teaching student.

R. B. ROBBINS.

Wahrscheinlichkeitsrechnung und ihre Anwendung auf Fehlerausgleichung, Statistik und Lebensversicherung. Von EMANUEL CZUBER. Erster Band, dritte Auflage. Leipzig, Teubner, 1914. xii+462 pages.

THE first volume of the second edition of this work appeared in 1908. It was reviewed by H. B. Phillips in this BULLETIN, volume 20, pages 429–431. In this notice of the first volume of the third edition it will therefore be sufficient to call attention to the nature of the changes made in producing it from the corresponding volume of the second edition.

In the six years intervening between the publication of these two editions of volume I the literature of the calculus of probabilities has been enriched by the appearance of several works of importance. Of these mention may be made of the following: Borel's suggestive and illuminating "Eléments de la Théorie des Probabilités"; Liebmann's German translation of Markoff's treatise in the Russian language; a new edition of Poincaré's lectures on the theory of probability revised by the author himself; the first volume of Bachelier's "Calcul des Probabilités"; Carvallo's "Calcul des Probabilités."

Naturally these works have brought out some new results and have emphasized some fresh points of view, at least in particular parts of the theory. But Czuber has not found it necessary to recast his treatise in order to take account of these. It retains the same general form and arrangement as heretofore. But in many places there are minor alterations and improvements and occasionally a new portion of several pages. In addition there are a few minor rearrangements of old matter. On the whole the work is considerably improved. The printing is well done, no typographical errors of importance having been found. On account of its great importance in the theory of probabilities one desires a more satisfactory account of Stirling's formula for the asymptotic character of the gamma function than that given in § 14.

The following is a list of the principal additions: an elegant section (pages 72–80) on the theory of mean value and various applications of it throughout the book; a discussion (pages 83–89) of the use of continuous variables in the theory of probabilities; derivation of formulas (pages 119–128) for the product of binomial factors; a section (pages 239–249) on "Spielprobleme"; an important chapter (pages 273–286) on continuous probabilities in which are developed the fundamental ideas about continuous probabilities in the sense of Bachelier's use of this term; additional matter (see especially pages 413–423) containing a selection of typical problems illustrating the applications in this direction of the analytical representation of arbitrary distributions.

Besides these larger sections, which may be singled out as distinct additions, there are many of less extent scattered throughout the whole volume and contributing essentially to its improvement. As an example of these one may mention the theorems of Bernoulli and Poisson which are now treated from various points of view and illuminated by various analytical lemmas. Through these several improvements the author has accomplished his purpose "den Inhalt nach manchen Richtungen zu erweitern und zu vertiefern."

R. D. CARMICHAEL.

Annuaire pour l'An 1916 *publié par le Bureau des Longitudes.* Paris, Gauthier-Villars, vi+502 pp., with two appendices.

AN excellent "Notice" by M. G. Bigourdan on the mean barometric pressure and law of the winds in France is the chief