

SHORTER NOTICES

Les Applications des Probabilités. By P. Van Deuren, Paris, Gauthier-Villars, 1935. xvi+556 pp.

This interesting volume on applications of probability is a continuation of Van Deuren's *Théorie des Probabilités*, which was reviewed earlier in this Bulletin.* Retaining the formal or "didactic" mode of presentation, the book deals with statistics, errors of measurements, play or speculation, life insurance, artillery fire, the "normal numbers" of Borel and continued fractions, statistical mechanics, astronomy, telephone problems—with appendices on the Tchebychef theorem and correlation. The references to other writers are few, especially in the earlier chapters where the material is made up largely of the standard or classical applications of probability from the standpoint of moments. The treatment of these problems, however, is individualistic, the author using the conceptions of *concentration* of variables and *practical certainty* as developed in his volume on the theory of probability.

In the theory of speculation there is discussed not only the plays that are equitable, but those with a slight advantage to the banker; and a parabola (p. 274) exhibits graphically the banker's risk. This is a natural prelude to the discussion of the loading for expenses in life insurance policies. The author refers to the Institute of Actuaries Text-Book, by G. King, and to some extent shows the connection between his own notation and that of the Text-Book. It might have been well to call attention to the fact that the author's fundamental *moment statistique*, r , is the complete expectation of life at age zero (p. 331). The constants for the Makeham graduation in the Text-Book are given (p. 341), and two methods are suggested for graduation—neither of which is that used in the Text-Book. In the chapters on life insurance, the reader should notice that the author is dealing primarily with payments made continuously, and that in the case of annual payments (p. 368) the first payment is due six months from date. Commutation symbols here, therefore, do not have their usual interpretation. To find the adequacy of the loading, the author suggests tests not usually made by insurance companies (pp. 386, 394).

Of special interest are the chapters on artillery fire (pp. 411–480) which the author as Professeur à l'École Militaire de Belgique is so well prepared to write, giving in detail material not usually found in books on probability.

In connection with the treatment of the *normal numbers* of Borel, the author exhibits the first five hundred decimals of π , and comments on the somewhat spectacular shortage in the sevens. The chapters on statistical mechanics and telephone problems are attributed to Lieutenant du Génie R. Marchant. In the former are discussed the Maxwell laws, Heisenberg's principle of indeterminacy, the theory of Bose-Einstein and that of Fermi-Dirac. The chapter on astronomy is attributed to R. Hennem.

In many ways, Van Deuren's book is unique; and it is well worth reading.

E. L. DODD

* Dodd, vol. 42 (1936), pp. 16, 17.