$$F(z, a) = \int_{x_0}^{z} f(x, a)dx$$

is a continuous function of z and a," is added to the chapter on definite integrals.

Harnack's appendix on Fourier's series and Fourier's integral has been kept unchanged, but several pages of explanatory notes have been inserted in the form of an introduction to the appendix. The valuable notes and references to other works, given at the end of the volumes in the second edition, have been omitted in the third edition for the rather insufficient reason that they might discourage the student.

This calculus is a geometer's calculus. Over three hundred of the twelve hundred pages are devoted to applications to geometry. With the exception of the paragraphs on center of gravity, there are practically no references to mechanics or physics. All the problems given are worked out in detail. In fact, detail is one of the features of the work. The reviser rejoices in saying that as far as possible he has eliminated from the text such phrases as " the reader will easily see," " the proof is left to the student."

Profiting by the example of the second edition, this edition is quite free from typographical errors. The few found by the reviewer are unimportant. But there is one which may be misleading. The symbol Δ in the second volume is not from the same font of type as that in the first volume, and the difference in the two is sufficient to cause confusion to a beginner.

A detailed table of contents and a copious index make the work very valuable as a reference book, and Serret's Lehrbuch will no doubt continue to be one of the most used books on the shelves in the mathematical reading room at Göttingen.

A. R. CRATHORNE.

Vorlesungen über mathematische Statistik (Die Lehre von den statistischen Masszahlen). Von ERNST BLASCHKE, Professor an der Technischen Hochschule in Wien. Leipzig, Teubner, 1906. 263 pp.

THE present work has to do with the theory and application of statistical constants (statistische Masszahlen). It opens with views of different writers as to the field to be included under mathematical statistics. While it contains but little that is new in the line of theory, nearly every point is accompanied by an

apt illustration drawn from actual statistics. This with the many references to the literature makes the book very useful. The probability of life is kept in the foreground throughout. The author discriminates between mathematical and statistical probability, and holds that the two have a priori nothing in common. He gives methods of testing the identity of mathematical and statistical probability, that is to say, whether deviations are such as should be expected in the taking of a random sample.

The author divides statistical constants (Masszahlen) into intensive and extensive. Statistical probability belongs to the former and the various kinds of averages to the latter. On page 74 is the statement that the mode (dichteste Werte) is far the most important of the extensive statistical constants. The justification of this statement would be of interest when we consider it in connection with the almost universal acceptance of the arithmetic mean as a statistical average.

The representation of mortality by the formulas of Moivre, Lambert, Wittstein, and Babbage are classed as empirical representations, while the formula of Makeham is classed as an analytic representation. The chapter on the adjustment of observations contains in a clear form the methods of moments and least squares for fitting curves to observations; and criteria for the critical examination of the best adjustment.

Taken as a whole, the book is a useful contribution to that portion of mathematical statistics which finds its application in the probability of life.

H. L. RIETZ.

Elektrische Wellen-Telegraphie, vier Vorlesungen gehalten von J. A. FLEMING. Autorisierte deutsche Ausgabe von E. ASCHKINASS. Leipzig, B. G. Teubner, 1906. 185 pp.

IN 1903 Fleming delivered the Cantor lectures before the London Society of Arts. These lectures on wireless telegraphy were for a popular audience and necessarily were descriptive and general, not mathematical. The translation by Aschkinass enables German readers to follow the author in their own language — which is very important for the class of readers for whom the lectures are primarily intended. Perhaps the most noteworthy characteristic of the style which is adopted is the constant close touch with nature and the forcefulness of analogy between disturbances in the ether, with which most of Fleming's