BOOK REVIEWS

Mathematical Methods of Statistics. *Harald Cramér.* Uppsala, Sweden: Almqvist and Wiksell, 1945. pp. xvi, 575. (Princeton, N. J.: Princeton University Press, 1946. $6.00)

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This book represents a contribution of a novel kind to the statistical literature and will render valuable services both as textbook and reference book. Of its three parts the first one (134 pages) is entitled *Mathematical Introduction* and develops the necessary formal mathematical tools. The second part (186 pages) is devoted to *Random Variables and Probability Distributions*, that is to say, to a chapter of the modern theory of probability. The third, and main, part of the book (some 233 pages) is entitled *Statistical Inference*. Ordinarily these three topics would require consultation of three or more books, and these would rarely be found on the same shelf. However, the masterly exposition succeeds in creating the impression of natural unity and harmony. The ideas are developed with elegance and apparent ease as if the line of presentation followed a well explored path. The uninitiated will not notice how unconventional the treatment is and how the very selection of topics depends on the author's scientific personality.

It is hardly necessary to point out that Cramér's book fills an urgent need. The emergence of statistical theory and methodology as an exact science, firmly grounded in mathematical probability, is only of recent date. Its rapid development went hand in hand with an extraordinary increase of the number and importance of its various applications. Under such circumstances there was naturally little time for an exposition of the theoretical foundations and ramifications. Modern statistical inference has its roots in the classical limit theorems of probability. Now classical probability used to consist of a bewildering collection of special and mutually uncorrelated problems; unified guiding principles and methods are a rather new development and have not yet found expression in the textbook literature. The original investigations are usually written in an exceedingly abstract language and the existing close ties to applications are not apparent. Consequently, there is no easy access either to probability or statistics and it is often difficult to establish whether, or to what extent, various assertions have actually been proved. The present book therefore closes a serious gap in the literature and will greatly facilitate both teaching and research.

Of the 12 chapters of the *Mathematical Introduction* 9 are devoted to the theory of measure and integration. The antiquated theory of the so-called Riemann integral (kept alive by elementary textbooks) considered only point functions $y = f(x)$, where the independent variable is a point. The temperature at a given point or the velocity at a given moment are typical examples. Many mathematical considerations simplify greatly if from the very beginning also set