BOOK REVIEWS

On the Principles of Statistical Inference. By Abraham Wald. (Notre Dame Mathematical Lectures, No. 1.) Notre Dame, Indiana, 1942. 50 pp. $1.00.

The University of Notre Dame has started its new series of mathematical publications, the "Notre Dame Mathematical Lectures," by four lectures on modern theory of statistics, delivered by one of its most brilliant proponents, Dr. Abraham Wald. While wishing the new series the best of success one can somewhat regret that, probably, considerations of cost have prevented it from appearing in a printed form. The little book is lithoprinted and lithoprinted very well, with all the formulas perfectly legible. Still, in a printed form it would look much better. We may hope that in time a private benefactor or an institution will be found who could provide funds for giving good mathematical publications the external form that they deserve.

As mentioned, Dr. Wald's booklet contains four lectures. However it is divided into six chapters, I. Introduction, II. The Neyman-Pearson theory of testing of a statistical hypothesis, III. R. A. Fisher's theory of estimation, IV. The theory of confidence intervals, V. Asymptotically most powerful tests and asymptotically shortest confidence intervals, and VI. Outline of a general theory of statistical inference. Having in view a mathematical reader the booklet has nothing in common with numerous books "on statistical methods;" is not concerned with applied problems of a particular character but deals with fundamental conceptions, actually covering about all the most important that were achieved during the last 25 years or so. Compared with this scope the size of the booklet is very small and therefore the presentation of certain sections necessarily short. This applies especially to the first 28 pages, given to the description of what had been done before Dr. Wald himself appeared as an active contributor to the theory of statistics with his conceptions of asymptotically most powerful tests and of general statistical inference. In spite of the shortness of presentation the book is exceedingly informative. In fact, it could be used as an excellent source of information for all those mathematical readers who, without hunting for articles spread in a number of journals, would like to get a bird's eye view of what is being done in the field of mathematical statistics.

There are just two gaps that one can regret in the latter respect.

When speaking of the problems of estimation by intervals the author indicates the distinction between the theory of confidence intervals and that of fiducial argument as developed by R. A. Fisher. However, while giving an outline of the former the author does not present any information about the latter, except for references to several papers by Fisher.

Another gap is the omission of at least a few details concerning tests of composite hypotheses and problems of estimation of some but not all the parameters that may be involved in the probability law of observable random variables. As these statistical problems have created problems of pure analysis, those of the so-called "similar regions," not previously considered, their description in a book like that under review might have contributed to its value and increased the chances of the problems getting a speedy and more satisfactory solution than the one that is available now.

However, to say that a book meant to be short is actually short, should not be considered as a criticism.

JERZY NEYMAN

Les Fonctions Multivalentes. By M. Biernacki. (Actualités Scientifiques et Industrielles, no. 657.) Paris, Hermann, 1938. Fr. 66.

The notion of multivalent functions was first introduced and developed by Paul Montel in his book, *Leçons sur les Fonctions Univalentes ou Multivalentes*. An analytic function of a complex variable in a region is said to be multivalent of order p (or p-valent) in that region if it assumes no value more than p times and at least one value exactly p times. The case $p=1$, that of univalent functions, has been studied extensively and has yielded a unified and rather complete theory. The extension of this theory to any positive integral p is considerably more difficult and the resulting theory is far less complete.

The author collects these results with the intention of aiding future research in the field. Most of the results are stated without proof, whenever the known proofs are at all complicated. The first chapter deals for the most part with extensions of the theory of univalent analytic functions to the general multivalent case and to other related classes of functions. The second chapter deals with meromorphic multivalent functions. The last chapter takes up a few results connected with systems of functions.

It is unfortunate that the book was written before the appearance in 1940 of important papers of D. C. Spencer on the subject of finitely mean valent functions which have greatly clarified the whole notion of p-valence.