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.

The book, however, should prove useful as a reference book on the literature of the subject prior to 1938.

W. SEIDEL

Dimension Theory. By Witold Hurewicz and Henry Wallman. (Princeton Mathematical Series, no. 4.) Princeton University Press, 1941. 156 pp. $3.00.

In contrast with Karl Menger's well known *Dimensionstheorie* which could claim a considerable measure of completeness at the time of its publication (1928) the present modest volume includes "only those topics . . . which are of interest to the general worker in mathematics as well as the specialist in topology." Despite this self-imposed limitation, the authors have presented a simple and connected account of the most essential parts of dimension theory. They have treated this branch of topology—hardly surpassed in the elegance of its results—with discrimination and technical skill (it should be pointed out that the senior author is one of the outstanding builders of the theory). The result is an unusually interesting book. It must have been a pleasure to write; it was certainly a pleasure to read.

The dimension of a space is the least integer n for which every point has arbitrarily small neighborhoods whose boundaries are of dimension less than n; empty sets are of dimension -1. This well known recursive definition is due independently to Menger and Urysohn although its intuitive content goes back to Poincaré. It would be natural to expect that a theory based on such a definition would be purely point-set theoretical in character. The remarkable thing is, however, that there exist a number of equivalent definitions of dimension, each belonging to a different domain of ideas and each "right" and natural in its domain. The dimension of X can be defined, for example, as the least n such that X can be approximated arbitrarily well (in a certain sense) by polytopes of dimension not exceeding n. Or, dim X can be defined as the least n for which every continuous mapping of an arbitrary closed subset of X into an n-sphere S_n can be extended to a mapping of the whole of X into S_n. The first of these definitions brings the concept of dimension into the realm of algebraic topology (complexes, homology theory, and so on) and the second gives it a place in the theory of continuous mappings. By a skillful interplay between these two settings for dimension theory, the authors obtain a simple characterization of dimension purely in terms of homology theory. The technique which leads so smoothly to this result includes the use of cohomologies and character groups,—an indication of the thoroughly contemporary quality of the book.