Some Theory of Sampling. By WILLIAM EDWARDS DEMING. John Wiley & Sons, Inc., New York. 602 pages. c 1950.

FRIENDS and associates of Dr. Deming and other research workers have awaited the publication of this book with some impatience for a number of years. The delay is by no means a net loss, for the author includes new materials and results of experience of very recent date. This work may well prove to be the definitive treatise in the field of statistical sampling theory, particularly as it relates to sampling surveys. The author at a comparatively early age deserves to be recognized as the dean of scientific statisticians in the Federal service, where he has initiated, participated in, and accelerated many of the advances in the science.

Some Theory of Sampling is both a reference work and a classroom text, with sufficient clarity and detail to serve for self-instruction as well. Although the author states that college algebra is usually sufficient but "occasionally some forgottten calculus may need refreshment," this reviewer is convinced that a good grounding in calculus is needed for complete assimilation of the sections dealing with sampling theory. It is true that only a fraction of the more advanced sections make this requirement, and the remainder of the portions on theory do not pass beyond college algebra, particularly those dealing with actual survey experiences, survey planning, and the extended discussion of errors and biases. Other sections, and some entire chapters, do not require mathematical proficiency of any description.

A wealth of exercise and illustrative material supplements the text; most of this appears to be drawn from the extensive classroom and practical experience of the author. The exercises are carefully organized and graded and are designed to cement and extend the theorems developed in the text and to bring out lesser known but important properties of statistical functions and distributions.

Fellow workers know well, and sometimes to their chagrin, the passion for consistency, thoroughness, and rigor, that so particularly characterizes the research and writings of Dr. Deming. His students have had opportunity to benefit from his talents for organization and integration of materials into a logically connected sequence which leads comfortably from elementary principles to advance theory and applications. Both features are found in this book. Complete derivations and proofs are provided for important theorems and formulas. The author obviously does not believe in propounding statistical mysteries nor in requiring the reader to accept propositions on faith.

The main purpose to which this work is addressed is to develop understanding and proficiency in methods for evaluating sampling precision of averages, totals, and other statistical estimates, for each of a wide variety of sampling and survey procedures, and thus to provide the basis for selection of the most efficient procedure under limiting conditions which must be met in each application. Sections on the Gamma and Beta functions, treating their mathematical properties and statistical applications, are probably unmatched in any other writings in the field. Other statistical functions, treated in original fashion and with unusual detail, include the point binomial and the hypergeometric series. Theory and method for acceptance sampling and quality control are carefully developed with special reference to the pioneer work of W. A. Shewhart and the recent development of sequential sampling is included.

The reader may occasionally wish for a clearer demarcation of end products, in the shape of formulas for direct application, from their preceding derivations. Notations sometimes appear cumbersome, but in most cases this probably is necessary, for further simplification would cause slight inaccuracies. Schemes for analysis of variance and their related experimental and sampling designs are not elaborated here. It is refreshing to find a modern author who recognizes that all of the foundations of theoretical statistics do not date from 1912.

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