Mathematical Statistics, by Samuel S. Wilks. John Wiley and Sons, Inc., 1962. xvi + 644 pages. $15.00.

Professor Wilks has been promising for some time a new edition of his Mathematical Statistics, which ever since its appearance in litho-printed form in 1943 (Princeton University Press) has been accepted as one of the indispensable working volumes in the library of the graduate student in this subject. Now that the revised and much enlarged definitive volume has appeared, graduate students will be more than ever in Professor Wilks's debt.

This book is intended for readers with a good background in undergraduate mathematics; and although the author says that no previous knowledge of probability or statistics is assumed, it is unlikely that many students will come to the book without at least one elementary course in statistics as a foundation. Indeed, it is a great mistake to divorce mathematical statistics entirely from experimental or applied statistics. The student who has had some practice in obtaining, classifying and tabulating raw data, and in the numerical calculation and interpretation of averages, dispersions, regressions, correlations, etc., will have a much firmer grasp of these statistical concepts than a pure mathematician to whom they are just mathematical formulas. This is not to condemn the author for not including more practical statistics - he could hardly have done so without making the book altogether too unwieldy - but it is a plea for a good prior course in descriptive statistics.

Since mathematical statistics is based on probability theory, the book opens with a chapter on probability, presented in the modern abstract formulation due to Kolmogorov. A probability measure is defined as a set function on all sets in a Boolean field, satisfying three stated conditions, and by means of the theory of outer measure this concept is extended to the minimal Borel field containing the initial Boolean field. A probability space is defined as the triple (R, B, P) where R is a sample space, B is a Borel field of sets in R, and P is a probability measure on B. A random variable is a function which maps the sample points of R into points of the real line (or into points of n-dimensional Euclidean space, if the variable is n-dimensional). All this and much more is set out very clearly in a few pages, with references to more detailed presentations in standard works such as those of Doob, Feller, Loève and Halmos. The discussion is probably too condensed for a student to whom the whole subject is new, but for one who knows a little about sets and measure theory and has worked some problems in classical probability, this chapter should provide an excellent résumé of the basic concepts.

A treatment of distribution functions and moments, characteristic functions, stochastic processes and convergence is followed by more detailed discussion of the important discrete and continuous distributions met with in statistics. Then come sampling theory, statistical estimation (non-parametric and parametric), the testing of hypotheses, sequential analysis and decision theory, time series, and multivariate analysis, all in considerable detail. The chapters in the old edition on normal regression theory and analysis of variance are now included in a chapter on linear statistical estimation which precedes the general treatment of estimation theory. The sections on non-parametric inference and order statistics are new in this edition.

There are over four hundred problems, almost entirely theoretical, at the ends of the various chapters. Some of these introduce new and interesting results for which there was not room in the text itself. A fairly elaborate list of references, arranged alphabetically under authors, serves also as an author index, since the pages of the text on which the authors are cited are given after each reference.

A few misprints, mostly trivial have been noted. On page 78, line 12, sin x_1 should be cos x_1. The definition of correlation ratio on page 86 does not agree with the usual one (for instance, in Kendall and Buckland's Dictionary of Statistical Terms) and makes the ratio equal to unity for independent variates. The expression for the estimator of σ_B^2 on page 321 appears to be incorrect. However, a few minor flaws do not seriously detract from the great merits of a book which will be welcomed enthusiastically in every graduate school of mathematical statistics in the English-speaking world.

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<u>Les Méthodes en Génétique Générale et en Génétique Humaine</u> par Roger Huron et Jacques Ruffié. Masson et Cie, Editeurs, Paris, 1959. 556 pages.

This work is a masterpiece, both with respect to its contents and its manner of presentation. By emphasising in the brief and clear "Introduction" that heredity is only one of the factors (achieving its effect in interaction with the environment) effectively determining a living being's characteristics, it forestalls the current ill-applied criticisms which slander geneticists and their mathematical and biological collaborators with the accusation of "fatalism". The main body of the book lives up splendidly to the high expectations the "Preface" and the "Introduction" keyed up in the reviewer. Clear and concise summaries of the elementary algebraic and combinatorial theorems (underlying classical or Mendelian genetics) must be a delight to any mathematician or mathematically minded biologist. Even more pleasure may be derived from the manner in which these