sampling distributions of some frequently-used statistics, with brief discussion of their construction and use. Their computation was motivated by the need for information on the behavior of these statistics (for example, their relative approach to normality with increasing sample size) for limited sets of data such as occur in measurement work where small numbers of specimens are used. The items tabulated are grouped as follows: (1) The probability level $P(\epsilon, n)$ of any continuous parent distribution corresponding to the level ϵ of the distribution of the median. This table is basic in the construction of the eight tables following. (2) Probability points of certain sample statistics for samples from six distributions: normal and double-exponential (mean, median), rectangular (mean, median, midrange), and Cauchy, sech, sech^2 (the median only, for these three). In all these nine tables, the sample size $n = 3(2)15(10)95$ and the probability levels are $\epsilon = .001, .005, .01, .025, .05, .10, .20, .25$. For the normal and double-exponential distributions there are also given the values of certain ratios useful for comparing the various statistics. (3) Probability that the standard deviation σ of a normal distribution will be underestimated by the sample standard deviation s and by unbiased estimators of σ based on s, based on the mean deviation, and based on the sample range. These results show striking biases in certain cases for some of the statistics in popular use. The sample sizes used for this table are slightly different from the others, all values to $n = 10$ and eight variously-spaced values to $n = 120$ being shown.

The user of these tables should not overlook the footnote on the first page. This warns that the probability level ϵ corresponds to the left tail for only the first table, and to the usual right tail for all other tables.

The explanations and implications in the brief text accompanying the tables are quite lucid and, unlike the facts of modern life, the price bears no relation to the effort in producing the tables, which anyone interested in detailed study of the distributions (or the results of such study) need, therefore, not hesitate in acquiring.

JULIUS LIEBLEIN

Applied Mathematics Laboratory
David Taylor Model Basin
Washington 7, D.C.

10 [K].—D. B. OWEN, *Factors for One-Sided Tolerance Limits and for Variables Sampling Plans*, Sandia Corporation Monograph SCR-607, available from Office of Technical Services, Department of Commerce, Washington 25, D.C., 1963, 412 p., 28 cm. Price $5.00.

Tables are given of a quantity k which is used to define single-sample variables sampling plans and one-sided tolerance limits for a normal distribution. The probability is γ that at least a proportion P of a normal population is below $\bar{x} + ks$, where $\bar{x}$ has a normal distribution with mean μ and variance σ^2/n, and fs^2/σ^2 has a chi-square distribution with f degrees of freedom. The quantity k just described corresponds to a percentage point of the non-central t-distribution, and is extensively tabulated. Tabulations of other functions computed from the non-central t-distribution, and various expected values are also given. Many other applications are discussed and various approximations compared. One section gives the mathematical derivations, and there is an extensive bibliography which has been cross-referenced to several indices of mathematical and statistical literature.

The variables sampling plans given are to be preferred to most other such variables plans (including the MIL STD plans) in cases where the protection of the consumer is of primary interest and the costs of items are high. These plans may also be preferred in other circumstances but an analysis of costs of the alternative plans should precede any decision on which plan to use.

AUTHOR'S SUMMARY

11 [K].—MARVIN ZELEN, editor, *Statistical Theory of Reliability*, The University of Wisconsin Press, Madison, Wisconsin, 1963, xvii + 166 p., 25 cm. Price $5.00.

This volume contains six papers presented at a seminar sponsored by the Mathematics Research Center, U. S. Army, at the University of Wisconsin May 8–10, 1962. The papers survey recent research developments and results in the statistical theory of reliability. They were written mainly for mathematical statisticians doing research in the area rather than for analytical statisticians or engineers wishing to use the latest techniques. However, the volume does contain some techniques immediately useful to the applied statistician with adequate mathematical background.

A paper by Richard E. Barlow, entitled "Maintenance and Replacement Policies," includes two tables that could be used in developing a replacement policy when the distribution of component life is not known but the first, or the first and second, moments of the distribution can be estimated.

The other articles are: "A Survey of some Mathematical Models in the Theory of Reliability," by George H. Weiss; "Redundancy for Reliability Improvement," by Frank Proschan; "Optimum Checking Procedures," by Larry C. Hunter; "Confidence Limits for the Reliability of Complex Systems," by Joan Raup Rosenblatt; and "Problems in System Reliability Analysis," by William Wolman.

BERNARD M. LEVIN

Data Processing Systems Division
National Bureau of Standards
Washington 25, D.C.

12 [K].—L. E. MOSES & R. V. OAKFORD, *Tables of Random Permutations*, Stanford University Press, Stanford, California, 1963, 233 p., 24 cm. Price $7.00.

This book presents random permutations of integers: specifically, 960 permutations of the integers 1–9; 850 permutations of the integers 1–16; 720 of 1–20; 448 of 1–30; 400 of 1–50; 216 of 1–100; 96 of 1–200; 38 of 1–500; and 20 of 1–1000.

The permutations were created from the RAND deck of a million random digits by an algorithm especially suited to machine computation and for which a flow chart is given. The randomness of the permutations of size 50 or less was studied by means of goodness-of-fit tests on the observed distributions of (a) the longest run up or down, (b) rank correlation with order position, (c) Friedman's analysis-of-variance statistic, and (d) the distribution of the square of a linear function of the deviation from expectation of the number of runs (up or down) of length 1, 2, and 3. The tests show two results significant at the 1 % level: in test (a) for permutations of 1–30, and in test (d) for permutations of 1–16. Such performance would certainly