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

be acceptable on its own, but, in addition, the randomness of the RAND deck, on which these tables are based, has been checked [1] and thus provides a check on the randomness of the permutations, and vice versa.

In the experimental sciences the most frequent uses of random numbers are in connection with assignments of experimental units, and for this purpose tables of random permutations are required. Cochran and Cox [2] give 1000 permutations of the integers 1–9 and 1000 permutations of the integers 1–16. For small numbers, creating a permutation from tables of random numbers is not difficult; however, in permutations of 20 or more numbers the work involved is not negligible, and one would accordingly predict that the Moses-Oakford tables will be extensively used in the experimental sciences.

J. M. CAMERON

National Bureau of Standards
Washington 25, D.C.

1. RAND CORPORATION, *A Million Random Digits with 100,000 Normal Deviates*, Free Press, Glencoe, Illinois, 1955.
2. W. G. COCHRAN and G. M. COX, *Experimental Design*, second edition, John Wiley and Sons, Inc., New York, 1957.

13 [K].—J. ARTHUR GREENWOOD & H. O. HARTLEY, *Guide to Tables in Mathematical Statistics*, Princeton University Press, New Jersey, 1962, lxii + 1014 p., 26 cm. Price $8.50.

Greenwood and Hartley's *Guide* will be on the desks of all sophisticated users of statistical methods and of all applications-oriented statisticians. It will be on a nearby bookshelf of nearly all theory-oriented statisticians. The rapidly increasing use of statistical methods in science and industry and the rapid expansion of the body of available statistical methodology has caused a corresponding increase in the production of tables to facilitate application of the new methods. While a new high-speed calculating machine may, in many cases, calculate a needed constant more quickly than it can consult a table, statisticians who do not have access to such a machine need tables, and statisticians with high-speed machines use tables anyway rather than to program the calculation of the needed constants. Fortunately, the new machines have made table-making less expensive. The *Guide* will direct one to an appropriate table if it is among the approximately 1500 tables, published mostly before 1961, which the authors have catalogued.

The body of the *Guide* is arranged in chapters, sections, and subsections to facilitate rapid discovery of the catalogue of tables of the type sought. Within each section and subsection the authors have described the functions tabulated, either by exhibiting a functional form or by describing the method of calculation. Authors of guides to mathematical tables have noted great difficulty in producing such descriptions for statistical tables. Happily the authors have done even more and, except for tables of types which have been in wide use for many years, have described the purpose for which each table was intended. The authors have been remarkably successful in giving concise, yet fully adequate explanations. In a few cases where there is no concise explanation possible, the reader is told where a competent explanation can be found. The range of the table and the number of decimals or significant figures tabled are, of course, given and frequently there are