

## Applied Science

### STATISTICS HANDBOOK

#### Handbook of Methods of Applied Statistics

By I. M. Chakravarti, R. G. Laha and J. Roy. Vol. 1: Techniques of Computation, Descriptive Methods, and Statistical Inference. Pp. xiv + 460. 98s. Vol. 2: Planning of Surveys and Experiments. Pp. x + 160. 68s. (Wiley Series in Probability and Mathematical Statistics.) (New York and London: John Wiley and Sons, 1967.)

IN the preface to this handbook, the latest addition to the justly famous Wiley series, the authors state their aim—"to bring together under one title most of the essential techniques of quantitative inference"—and describe their method of achieving this aim—"In each part, every basic statistical method is described in detail with a precise explanation of its theoretical foundation. Then the computational procedure is discussed and illustrated by numerical examples completely worked out. These are followed by a large collection of selected and graded exercises". These are ambitious claims and in the main they are well realized.

This pattern of theoretical discussion, description of method and worked example enables the authors to be very informative about an immense range of topics, some of which require considerable sophistication on the part of the reader. Practically every basic statistical technique is thus presented, the only notable omissions being decision theory methods and spectrum analysis, although some topics such as the method of steepest ascent and quality control and sampling inspection schemes receive a more brief treatment. The organization of the material permits easy reference to particular topics, although bold faced type in place of italics for subsection headings would have facilitated this still more. Except in the second part of the first volume, the theoretical discussions are informative and sound and the methods suggested are varied and appropriate. By and large, one can only complain of relatively trivial errors of omission. Throughout the second part of the first volume, however, population and sample are confused both in the text and in the notation, a fault that in a work of less overall value would in my opinion damn the work completely. Fortunately, the third part, on statistical inference, appears to have been written by a different member of the team of authors and there, for the reader who gets that far, the misconceptions of the second part will be corrected.

The extensive collections of exercises are built on real data and indicate strikingly the many branches of science and technology in which statistical methods are applied. Unfortunately no solutions appear to be available. There are a few proof-reading errors, most of them obvious, although in the first volume the failure to use the bold-faced 'e' for the unit vector on page 412 makes possible its confusion with 'e' which is the number of degrees of freedom on page 417, and there is some misprint in the definition of convergence in probability on page 256. The index is, for a reference work of this type, only just adequate. No tables are given but references are given for most of the standard tables. References at the ends of chapters to books in which could be found formal proofs of the points made in the theoretical discussions would have been a valuable addition to this generally very useful compendium of statistical theory and method.

Despite these minor points and the more serious confusion in the second part, this handbook is a worthy

addition to the Wiley series and a pleasant reminder of the flair for statistics so frequently displayed by Indians.

M. E. SOLARI

### LASER INFORMATION

#### Laser Systems and Applications

By H. A. Elion, with a foreword by T. H. Maiman. Pp. xi + 624. (Oxford, London and New York: Pergamon Press, Ltd., 1967.) 147s. net.

OF the 624 pages in this book, 353 are devoted to a NASA special bibliography on lasers classified by subject matter and authors. Only the NASA accession numbers are given and no reference is made to the open literature. Presumably the buyer is paying nearly four guineas for this bibliography. This scarcely seems a good buy even for readers who have easy access to the eleven Federal Regional Technical Report Centres listed on page 607. More useful bibliographies are regularly published in the *Journal of the Optical Society of America* and the *IEEE Journal of Quantum Electronics*.

A further fifty pages are devoted to appendix 2 describing simple experiments in physical optics using gas laser beams. While this appendix would be a very useful guide for introducing gas lasers into sixth form teaching laboratories, it seems somewhat out of place in the present volume.

The remainder of the book is a readable, well illustrated account of the state of the art of applying lasers to a variety of problems. These include welding and machining; chemical and biological applications; holography and spectroscopy; ranging, surveying and metrology; communications and optical data processing and display. Little demand is made on specialized technical knowledge and mathematical formulae are kept to a minimum.

The notes on health hazards are sensible if brief. The tables of physical constants and characteristics of various types of lasers contain by far the most useful information in the book.

D. J. BRADLEY

### COMPUTERS ADVANCE

#### Advances in Computers

Vol. 8. By Franz L. Alt and Morris Rubinoff. Pp. xii + 345. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1967.) 116s.

*Advances in Computers* has now reached the eighth volume. Over the years, the editors have given us a series of timely and authoritative articles on subjects of current interest in the computer field. This volume lives well up to the standard that has been set in the past.

The first article, by Thomas N. Pyke, of the National Bureau of Standards, is on time-shared computer systems. The author defines time sharing as the simultaneous access to a computer system by a number of independent users. Pyke has obviously been in a position to follow closely the developments he describes, and the article can be strongly recommended to experts and non-experts alike.

Jean E. Sammet of IBM writes on formula manipulation by computer. She gives a good summary of the various systems that have been developed for doing algebraic manipulation of a formal kind (including dif-