ods of providing carbon dioxide, and anaerobic methods are covered in the third chapter. The fourth (on sterilization) and fifth (on microscopic methods) contain considerable discussion that is usually omitted from general laboratory books. Chapter 6, on quantitative aspects (80 pages), covers the statistics of error estimation and experiment design. The last, and very short, chapter provides short descriptions of stock-culture methods, phage techniques, ultraviolet irradiation, centrifugal methods, and buffers, but the descriptions cannot be really useful because so little information is presented.

The methods described are those that are familiar to most workers in microbiological laboratories, and although the section on statistics is somewhat longer than most, the information is very similar to that contained in many laboratory manuals for beginning courses in these fields (without the laboratory experiments, of course). The methods more closely related to biochemistry, which are now widely used in microbiological laboratories (chromatography, isotopes, and the like), are not considered, and while calculation of the curve of dose-response is much discussed, there is little mention of animal assay and its attendant techniques and problems. Thus, this is an updated version of older manuals on procedure, but there is place for such volumes, particularly now that the older manuals are increasingly difficult to obtain.

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Physics

Electromagnetic Fields and Interactions. vols. 1 and 2. Richard Becker. Fritz Sauter, Ed. vol. 1, *Electromagnetic Theory and Relativity* (xiv + 439 pp.); vol. 2, *Quantum Theory of Atoms and Radiation* (x + 403 pp.). Translated from the German edition by A. W. Knudsen and Ivor de Teissier. Revised by Günther Leibfried and Wilhelm Brenig. Blaisdell (Ginn), New York, 1964. Illus. $9.50 each.

The translation into English of these very successful German textbooks provides a most welcome addition to the literature available for advanced undergraduate and beginning graduate classes. The volumes will be particularly appreciated by those students and teachers who are concerned with emphasizing physical principles rather than the formal problem-solving techniques of applied mathematics.

Volume 1 is devoted to classical macroscopic electromagnetic theory and the special theory of relativity. It replaces the well-known *Classical Theory of Electricity and Magnetism*, by Abraham and Becker, published in English in 1930. The text is developed with CGS units, but the more important formulas are transcribed to MKSA (Giorgi) units for those who perfer them. An appendix gives a useful collection of formulas in both systems together with a conversion table.

The choice of material is standard, but the arrangement is more for the discussion of the physical principles of electromagnetic theory than for the solution of boundary-value problems. A special chapter is devoted to the electrodynamics of slowly-moving media, leading up to the relativistic formulation given by Minkowski. Although in American universities the latter theory is usually considered expendable, it may prove to be of particular interest to students interested in plasma and space physics. I would only question the retention of the Minkowski notation for "imaginary time." This terminological monstrosity should be consigned to a well-deserved oblivion.

A collection of exercises (with solutions) covering the whole volume is given in an appendix.

Volume 2, which presents a treatment of quantum mechanics and radiation theory, is complete in itself and can be used as a text independently of the first volume. The subject matter is largely that of standard wave mechanics, but it has a scope and emphasis that set it apart from the usual textbook fare. This arises from the emphasis placed on the theory of dispersion, no doubt reflecting Becker's long interest in this field. Historically this was the line of thought that led to matrix mechanics and the concept of virtual oscillators. The student thus is introduced to some important ideas concerning f-values of spectral lines and their connection with the Einstein coefficients which often are omitted in texts.

The discussion is carried through a short study of the second quantization procedure for Maxwell's equations and an introduction to the Dirac equation, with particular relation to the problem of spin. In this volume the exercises are placed at the end of the chapters, with solutions in an appendix.

Volume 3 will be devoted to electrical and magnetic phenomena in material media.

I would recommend these volumes to both teachers and students for class use. To the latter I would also recommend them for independent study, because they have few competitors in which the material is so readily accessible.

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Statistics

Introduction to Probability and Statistics. Henry L. Alder and Edward B. Roessler. Freeman, San Francisco, Calif., ed. 3, 1964. xiv + 313 pp. Illus. $6.

This book was written to serve as a text for a one-semester course in probability and statistics for students in all areas of the natural and social sciences; it requires mathematical knowledge equivalent to 2 years of high school algebra. "The limited level of mathematical preparation required for this book makes it necessary to state some theorems without proof. . . . To avoid mathematical difficulties associated with limiting processes, . . . discussions have been restricted, whenever possible, to the finite case; in particular, all populations are assumed to be finite."

The topics are those usually covered in books written at this level: organization and analysis of data, elementary probability, the binomial, normal, t, F, and χ^2 distributions, sampling, testing hypotheses, regression and correlation, and analysis of variance (one-way classification). In addition, the authors have included a chapter on index numbers and one on time series. The appendix contains a reading list of 21 books, nine tables, and answers to the odd numbered problems.

The major changes since the first edition are the addition to the second edition of material on the F-distribution and analysis of variance and the inclusion, in the third edition, of the Wilcoxon two-sample tests for paired and unpaired data and a section on transformations.