

BOOK REVIEWS

Advanced Laboratory Practice in Electricity and Magnetism. EARLE M. TERRY. Second Edition, 1929. Pp. 318, figs. 175. McGraw-Hill Book Co., New York. Price \$3.00.

This is a second and somewhat larger edition of Professor Terry's well-known manual for use in a course which in many institutions is called "Electrical Measurements." The introduction a dozen or so years ago of the use of audiofrequency oscillatory currents into laboratory experiments and the development of very sensitive telephone receivers revolutionized the methods (and the theory) of the measurement of capacitance, and self and mutual inductance. The first edition of this book was outstanding in its use of these newer methods. In the new edition the number of experiments has been increased by about 25 percent, most of the new ones being on three-element vacuum tubes and oscillatory circuits. These new experiments have been so planned that they may be used in a course on radio communication. The extensive use of vacuum tubes in many types of physical measurements makes it desirable to give in our advanced laboratory courses experiments in this field. The same clearness that was characteristic of the presentation of both the theoretical and the experimental parts of the first edition is shown in the additions.

The manuscript for this edition was finished by Professor Terry before his death and the responsibilities connected with the publication were undertaken by Professor H. B. Wahlin, a colleague in the University of Wisconsin.

O. M. STEWART

The Electromagnetic Field. MAX MASON AND WARREN WEAVER. Pp. xiii+390. University of Chicago Press, 1929. Price \$6.00.

In his attempt not to discourage the student with lengthy analysis and fine reasoning the author of the average text on electromagnetism glosses over many delicate logical difficulties in a way that often proves very disturbing to the thoughtful reader. The authors of the present volume, on the other hand, have attempted to present the fundamentals of the classical electromagnetic theory with as great a degree of mathematical rigor as the subject permits, and have been exceptionally successful in achieving their objective. Their argument requires in many places the closest attention on the part of the reader, but any effort on his part is well repaid by the very much clearer understanding of the subject which he gains. The treatment is necessarily quite mathematical, and the close analysis of the subject which the authors have undertaken has necessitated a rather annoying recourse to subscripts and accents. The book is hardly one which can be recommended as an introductory text in electromagnetism but to the advanced student who is looking for a rigorous development and critical study of the subject it should prove invaluable.

The very elegant treatment of the difficult subject of dielectrics in electrostatic fields merits particular commendation. In so far as the potential theory aspect is concerned it leaves little to be desired. On the other hand the equally difficult subject of stresses in dielectrics and on conducting surfaces, which is perhaps more puzzling to the student than any other part of electrostatics, has hardly received an adequate presentation.

The authors make no attempt to develop the relation between electrodynamics and the special relativity theory, nor do they make any use of four-dimensional vector analysis. Instead of the significant three-dimensional vector notation of Gibbs they have preferred to use the parentheses, brackets, divs and curls which European writers generally employ. They have been careful to avoid any mention of lines of force either electric or magnetic, a procedure which can hardly be claimed to increase rigor while it deprives the reader of the aid of a convenient geometrical picture. A feature much to be commended is the placing of an introduction at the beginning of each part of each chapter and of a concluding paragraph at the end. In this way the reader is given an idea of the aim of each part before he enters upon

the analytical details and he gains from the conclusion at the end a perspective which he might otherwise miss.

The book is divided into four chapters each of which contains several parts. The titles of the chapters are "Coulomb's Law and Some Analytic Consequences," "The Electrostatic Problem for Conductors and Dielectrics," "Magnetostatics" and "The Maxwell Field Equations." In addition to the formulation of Maxwell's equations the last chapter takes up the activity equation, electromagnetic waves, retarded potentials, and the concept of electromagnetic mass. The discussion of the activity or energy equation is especially clear and searching. At the end of the book are a mathematical appendix on vector analysis, a formula index and a general index.

While the book contains much analysis the physics of the subject is by no means neglected and every difficult point is carefully and fully explained. The process of averaging in the case of a dielectric, for instance, is discussed in much detail with illustrations drawn from outside the subject of electromagnetism. The whole work gives every evidence of the most careful and painstaking preparation. It constitutes unquestionably the foremost critical study of electromagnetic theory in the English language.

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