

clude: the units and dimensions of **E**, **D**, **B**, and **H**; the choice of **B** or of **H** as fundamental magnetic vector; the choice of poles or of Amperian currents as the fundamental concept; the localization of energy, in the field or elsewhere; and the separation of the total force on any mass into an "electromagnetic" and a "mechanical" part. Dr. Kraus has avoided some though not all of these epistemological traps. If he deludes himself when he claims to have locked the energy in a volume element, he is on firm ground when he exercises his right to assign dimensions arbitrarily. He defends his choice of units (Giorgi mks) pragmatically, with a statement that they "have many practical advantages". I wish he had been more explicit on this point. Does he find it an advantage to have free space inhabited by four field vectors instead of two? Or does he put up with this because he thinks it is necessary in order to enjoy the advantages of mks mechanical units and practical electrical units? It is possible to enjoy those advantages without paying that price. All that is necessary is to write the Gaussian equations with a slight modification: insertion of a constant, which is set equal to 4π to get back the Gaussian system and to 1 to get the Lorentz-Heaviside. The same equations then work perfectly with meters, kilograms, seconds, and coulombs. I prefer them to the Giorgi equations.

Since I have criticized some features of the book, I must in fairness remark that the same features are found in almost all books on electromagnetics. On the other hand, this book is clear on a number of matters that are usually left obscure. Notable in this respect are the discussions of electromotive force in a cell and of motional electromotive forces. Where Dr. Kraus has seen a logical difficulty in previous presentations, he has attacked it vigorously and produced a better presentation. To the many teachers who have encountered these same difficulties, this book will be very useful.

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Electron Optics

An immense amount of information on electron optics is to be found in *Grundlagen der Elektronenoptik* (699 pp.; Springer-Verlag, Vienna, Austria, 1952; \$28.60) by Walter Glaser, the well-known pioneer in this subject. Divided into three sections on imaging fields and Gaussian refraction, theory of geometric aberrations, and electron optics and wave mechanics, this book is probably the most complete single reference on the theory of electron optics and its applications yet written. The mathematical treatment is given in detail and the book should be very helpful to students as well as workers in the field despite the language difference. Although the price is rather high, it is at least partially compensated for by the high quality of the printing.

Courant-Hilbert Translation

The classic *Methods of Mathematical Physics* by Richard Courant and David Hilbert was published in

Berlin in 1924, and since then has been the introduction to the mathematics of theoretical physics. Its unique position is attested to by its extensive use in this country, despite having been written in German. The appearance of an English version of Courant and Hilbert is therefore most welcome. Prepared under Courant's direction, the first volume (577 pp.; Interscience Publishers, New York, 1953; \$9.50) is based on the second German edition of 1930, with some additions and modifications. The contents are divided into sections on linear algebra, series expansions, integral equations, the calculus of variations, and an extensive discussion of eigenvalue problems. Volume II is to appear subsequently.

Review of Engineering Research

Review of Current Research and Directory of Member Institutions, Engineering College Research Council of the American Society of Engineering Education, is a biennial review of research in progress in the member institutions of the Engineering College Research Council of the American Society for Engineering Education. The 103 institutions listed are the accredited engineering colleges. The information listed under each is the following: mail address, research officers, research policies, research expenditures, short courses and conferences, and research projects now active. Under research policies are included statements on faculty and student research, conditions under which research is taken on, patent policy, and sometimes details of funding, service charges, etc. Active projects are listed by departments or under established research centers. Sometimes manpower engaged and sponsorship are indicated. About 15% of the institutions list research under way in physics and chemistry. (Edited by V. E. Neilly; 330 pp.; Engineering College Research Council, ASEE, State College, Pennsylvania, 1953; \$2.50.)

Laplace Transforms

Die Laplace-Transformation und ihre Anwendung, by Paul Funk, Hans Sagan, and Franz Selig, is a smoothly written elementary text (in German) on the theory of the Laplace transform and a few of the simpler applications. Topics touched upon are the connection with the Heaviside operational method, simple circuit-theory examples, the simple transmission line, heat flow, and asymptotic expansions. There is no table of Laplace transforms. (106 pp.; Franz Deuticke, Vienna, Austria, 1953; paperbound.)

Tables of Coefficients for the Numerical Calculation of Laplace Transforms (36 pp.), by Herbert E. Salzer, is number 30 in the NBS Applied Mathematics Series and is available from the Government Printing Office, Washington 25, D. C. for 25 cents. A brief introduction to Laplace transforms and their application is given along with schedules of the explicit expressions for the Lagrange interpolation coefficients and their Laplace transforms. The tables give the Laplace transforms of the Lagrange coefficients for the two-point through the eleven-point formula and $n!/p^{n+1}$.