deals with the propagation of electromagnetic waves in homogeneous media and along transmission lines, giving only some remarks of less than a page to propagation in waveguides.

In part 2, on electron theory, the interaction between an electron and an electromagnetic field is discussed, with some consideration given also to the radiation of an oscillating electron. In the next chapter the molecular picture of a dielectric is drawn and polarization of a substance and dispersion in the optical region are discussed. Chapter 3 then deals with magnetic substances, and the movement of an electron in an external magnetic field is considered. Diamagnetism and paramagnetism are discussed briefly. Even shorter is the paragraph on ferromagnetism and gyromagnetic effects! The fourth chapter of part 2 deals with electrical conductivity of gases, liquids and metals, and here we find some remarks on the phenomenon of superconductivity.

Part 3, on special relativity, starts with an historical review of the measurement of the speed of light. Transformation equations and invariant quantities are then explained. One chapter is devoted entirely to the Lorentz transformations, another one to the mathematics of relativity where some use of tensor analysis is made. The author then concentrates his effort on relativistic electrodynamics considering electromagnetic field tensors, the Doppler effect and the fields of a moving point charge. In the paragraph on relativistic mechanics some basic principles of particle accelerators are given. Vector analytical formulas used in the book are summarized in an appendix. For each chapter problems and answers are given.

The content of this book is not purely theoretical; the author stresses technical applications of the principles. That is probably the reason why during study of the book one has the feeling that the subjects treated do not form a well balanced text on electrodynamics, but form rather a selection of principles and applications related to that field. The reader may not be interested in some subjects treated; others he may miss. As a whole the book gives the main principles of electrodynamics, but not so much from a didactical as from the author's point of view.

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An explosively growing field

MECHANICAL BEHAVIOR OF MATERIALS. By Frank A. McClintock, Ali S. Argon. 770 pp. Addison-Wesley, Reading, Mass., 1966. $17.50

by H. M. Otte

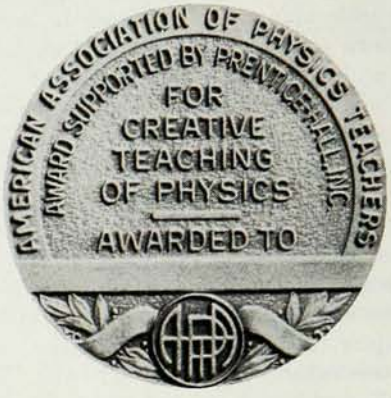
The most impressive aspect of this book is the relative depth of treatment of the subject, unusual when the coverage is as broad as in this case. All but five of the 22 chapters were written by the author-editors. Chapter 6 on "Deformation in Polymers: Viscoelasticity" is by E. Orowan; chapter 18 on "Fatigue" by G. S. Reichenbach; chapter 20 on "Friction and Wear" by E. Rabinowicz; chapter 21 on "Fibrous Materials" by S. Backer and chapter 13 on "Hardness" by M. C. Shaw of Carnegie Institute of Technology.

Uniformity of presentation and layout is maintained well throughout the book. The beginning of each chapter has a synopsis, about a page or less in length, detailing the topics to be surveyed. At the conclusion of each chapter is a quantitative summary one to two pages long, followed by a list of selected references prefaced by brief comments on the major works in the particular field. After the references there is a collection of problems that, in some instances, takes up several pages. For those problems that call for a quantitative or specific answer, however, no solutions are provided. Throughout, "proofs left to the reader" are given as problems and are so indicated in the text by reference to the particular problem number. I feel that this approach detracts from the heuristic value of the book and may even prevent a wider acceptance of it outside of Massachusetts Institute of Technology.

McClintock and Argon, both professors in the mechanical engineering department at MIT, seemed to have had several objectives in mind for this book, which they wrote not only for their students and for their colleagues, but also for themselves. The objectives related primarily to its use by those in the first category, namely engineering students taking a second course in which they wish to concentrate on specific areas of materials behavior and continue perhaps directly to most of the current scientific and engineering literature on the subject. Among their colleagues who would wish to use the book possibly as a reference source, the authors include the materials scientist, the stress analyst, the materials processer and the design engineer. As for themselves, the authors feel they gained an appreciation of how fragmentary was their knowledge in their own fields. Such a discovery is likely to have been made by anyone undertaking such a task.

The book is divided into three parts. Part 1 (chapters 1–6) "Physics of Mechanical Behavior;" part 2 (chapters 7–12) "Mechanics of Materials;" part 3 (chapters 13–22) "Applications." In order to serve the wide range of background and degree of interest believed by the authors to exist even in one classroom, they have included many topics (and problems) in depth and breadth and indicated the appropriate sections by a suitable symbol. The book begins with a review of the various kinds of mechanical behavior and the development of stress, strain and elasticity. The elastic concepts are then used at nearly the atomic scale to develop the theory of dislocations. After considering polymers, which exhibit all levels of structural perfection and behavior ranging from elastic to viscous to plastic, they return to the macroscopic scale with a general formulation of the constitutive equations. Solutions of these equations, especially around holes and notches, provide important tools for studying the various modes of fracture. Other applications of the physics and mechanics are to damping, creep, friction, wear and the behavior of composite materials as illustrated by textiles. The concluding chapter presents several case studies.

A list or table of symbols adopted by the authors would have been a



The Robert A. Millikan Lecture Award

awarded by the American Association of Physics Teachers

Early in 1963, a motion from the floor at the annual business meeting of the American Association of Physics Teachers suggested "that an appropriate memorial lecture be established for summer meetings of the Association to serve as a highlight of this meeting and be the summer complement to the Richtmyer Lecture." Independently, but at the same time, Prentice-Hall made a proposal to support an award to be presented by the AAPT for outstanding teaching in physics.

In June of 1963, the Executive Board of the Association created the Robert A. Millikan Lecture to be given annually at the summer meeting. On January 25, 1966, the creation of a medal was authorized by the Executive Board and at that time the designation of the Robert A. Millikan Lecture Award was adopted for the medal. The Robert A. Millikan Lecture Award now occupies a similar place in the summer meeting to that occupied by the Oersted Medal Award at the winter meeting.

The Recipients of the Robert A. Millikan Lecture Award

H. Victor Neher delivered the first lecture, "Millikan—Teacher and Friend" on June 19, 1964.

On June 18, 1965, John G. King delivered the second lecture, "The Undergraduate Physics Laboratory and Reality."

Alan Mark Portis received the Robert A. Millikan Lecture Award for 1966 and delivered a lecture on "Electrons, Photons, and Students."

Gerald Holton of Harvard University will be the 1967 recipient. The lecture and award will be presented at the summer meeting of the AAPT at St. Lawrence University, Canton, N.Y., June 15-17.

supported by Prentice-Hall, Englewood Cliffs, N.J.

great convenience. However, the absence of this is compensated for by three fairly complete indexes for author, subject and materials. Omissions could be found; thus apparently, "fracture toughness" does not come within their terminology, although fracture is discussed in great length and detail. On page 21 I was puzzled to find only brass listed in the table of "... Some Common Inorganic Compounds and Alloys ..." under a column merely headed "Compound"! In contrast, there are occasionally useful nontechnical footnotes, such as on page 148 with respect to the way librarians list some books under, "International," "Conference," "Congress," "Symposium," the city, etc. rather than under the name of the editor. On page 443 there is a footnote comment on the use of "-er" and "-or;" apparently the former is common on newer and less legal words; thus "indenter" is used in preference to "indentor." These are all minor comments on a book that is a worthwhile addition to the technical literature and that makes a useful contribution to the dissemination of current information and understanding on the explosively growing field dealing with the mechanical behavior of materials.

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Physics at Kiel

300 JAHRE PHYSIK UND ASTRONOMIE AN DER KIELER UNIVERSITÄT. By Charlotte Schmidt-Schönbeck. 261 pp. Verlag Ferdinand Hirt, Kiel, 1965. Paper, DM 15

by R. B. Lindsay

In 1965 the University of Kiel celebrated the 300th anniversary of its founding. In honor of this event the book under review was prepared to tell the story of the development of teaching and research in physics and astronomy at this distinguished German institution of higher learning. In her preface the author says the work was stimulated by the well known astrophysicist A. Unsöld, who provided valuable advice in the course of writing.

The University of Kiel has an interesting history. Founded in 1665 by the Archduke Frederick III of Gottorf in Schleswig-Holstein, it passed in 1772 through the vicissitudes of European wars and politics to the domination of Denmark and remained a Danish institution until the war between Prussia and Denmark in 1863. The modern German university dates from this time.

In addition to providing a brief review of the general history of the university the author summarizes the careers of the various holders of the chairs in physics and astronomy over the years and tries to place the scientific contribution of each in the perspective of the development of these sciences throughout Europe as a whole. The results are a bit too sketchy to be successful as genuine history of science. To the physicist the most interesting thing brought out by the book is the rather large number of well known German physicists who started their careers in Kiel. These include Heinrich Hertz, Max Planck, Philip Lenard, Conrad Dieterici, Erwin Madelung, Walter Kossel, Hans Geiger and Otto Klemperer. Only a few of these, to be sure, stayed for more than three or four years in Kiel. Most used the place as a means of transferring rather soon to other institutions where physics seemed to command more attention.

The book is clearly written and contains some interesting sidelights on the personalities of the physicists whose work is described.

For practical use, too

ELECTROSTATIQUE, VOL. 2: PROBLEMES GENERAUX CONDUCTEURS. By E. Durand. 443 pp. Masson et Cie, Paris, 1966. 72 F.

by L. Marton

I have not had a chance to see the first part of Durand's work on electrostatics; if it is as good as the second part, many teachers of the subject will, or should, be interested in a closer look at this treatise.

In his preface to the second volume the author sketches briefly the contents of the first one. According to him, in volume 1 he started from Coulomb's law for two point charges and defined the potential. This was followed by deriving the force for a given field.

The second volume starts with the general properties of the potential and the transformations needed for arriving at the solution of the equations. Particular attention is paid to singularities and their treatment by numerical methods with the help of computers. The next chapter deals with different problems, such as the problems of Dirichlet, of Neumann, etc. and the methods used for their solution, such as separation of variables, Green's functions, conformal mapping, etc.

Chapter 3 is devoted to a treatment of conductors, the distribution of charges on them when in electrostatic equilibrium, the calculation of electrostatic forces, and so on. Chapter 4 is more mathematical, dealing with complex variables and conformal mapping, Schwarz-Christoffel transformations and similar subjects. This kind of treatment is continued in chapter 5 with a thorough presentation of separation of variables, development in series of different functions and the treatment of systems in a wide variety of systems of coördinates.

Each chapter ends with a number of practical problems with answers. In addition, the text contains a remarkable number of numerical examples illustrating the application of the mathematical principles developed in the different chapters. Thus the book can be recommended not only to the student, but to the practical user or designer of electrostatic systems, such as, for instance, elements of electron-optical systems. The general approach shows that the author himself is not only a teacher of applied mathematics, but a highly successful user of the methods exposed.

Components of thin films

THIN-FILM MICROELECTRONICS. L. Holland, ed. 284 pp. Wiley, New York, 1966. $9.00

by H. J. Hagger

The electronic engineer accustomed to design circuits with discrete components must for special applications switch now to the use of recently developed devices that are in both the