

critical points. J. E. Mayer, J. G. Kirkwood, and O. K. Rice discuss the statistical mechanical theory of melting from somewhat different points of view: Mayer from vacancies, interstitials, and wrong atoms; Kirkwood from the probability distribution function for pairs of molecules; and Rice for the particular case of argon. Diffusion in alloys, salts, oxides, and glasses is covered in a comprehensive article by F. Seitz. Nucleation theory is treated by R. Smoluchowski. M. J. Buerger discusses crystallographic aspects of phase transformations in solids.

In the second group, M. L. Huggins treats transitions in the silver halides using the Born-Mayer methods. F. C. Kracek and J. F. Schairer are both concerned with transformations in silicate systems and W. A. Weyl with transformations in glass. All of these include much experimental data. B. Mathias gives a brief survey of ferroelectrics revised to include recent work on perovskites and ilmenites done since the conference.

Turning to the papers on metals, C. S. Barrett is concerned with transformations in pure metals, with emphasis on the lithium transformation. Order-disorder transitions are reviewed by S. Siegel. A very complete survey of precipitation by A. H. Geisler with more than 800 references to the literature is a valuable feature of the book. Eutectoid reactions, with particular reference to their own work on the growth of pearlite, are discussed by R. F. Mehl and A. Dube. The final article is one on the martensite transformation by M. Cohen which reviews experimental data and includes a section on the thermodynamics of the transformation.

There is, as to be expected, a wide difference in viewpoints and treatment of the various authors which makes for difficult reading. With a few exceptions, there appears to be little connection between the theoretical papers in the first part and the experimental papers which follow. The conference has no doubt been of help in bringing a greater uniformity of outlook to those attending, and the book, in reaching a wider audience, should be a great stimulus in this direction.

Probably the most important general theory required for an understanding of phase transitions in solids is that of nucleation and growth. Precipitation in alloys, transitions in pure metals, eutectoid and martensite transformations all occur by formation and growth of nuclei. Much progress has been made, in fact, in nucleation theory since the date of the conference. For example, the nucleation theory of martensite transformation, only briefly referred to in the book in a discussion by J. C. Fisher, has led recently to a much greater understanding of how the transformation comes about. The theoretical papers given at the conference are no doubt basic to a fundamental treatment of nucleation and growth, but much work remains to bridge the gap between theory and experiment.

The book is a valuable addition to the literature. It contains much information not found elsewhere, and should be of interest to metallurgists, physicists, and others in related fields. It is unfortunate that three years should have elapsed between the conference and

the publication date. While the book is of permanent value, it would have had greater influence on research if it had appeared within a year or so of the conference.

The editors, authors, and publishers are to be commended for producing a book which is clearly printed with excellent figures and illustrations.

John Bardeen
University of Illinois

Briefly Noted

Scholarships and Fellowships

A new 248-page edition of the U. S. Office of Education's publication *Scholarships and Fellowships Available at Institutions of Higher Education*, by Theresa B. Wilkins, has recently appeared. Two earlier compilations were published in 1931 and in 1936. The new volume contains in summary form all of the information that could be obtained for the year 1949-50 by means of a questionnaire that was sent to more than 1800 colleges and universities in the United States. Somewhat fewer than fifteen hundred institutions responded to the questionnaire, and of these about twenty percent reported that they offered no scholarships. The present study lists 141,554 scholarships and 15,369 fellowships as having been available, with a value in excess of forty-one million dollars, and nearly as many again in each category as awarded in 1949-50. Scholarships are defined as awards for undergraduate study, and fellowships as those for graduate study.

Thirty-eight institutions reported more than two hundred awards in physics, although it should be noted that twenty-three additional awards are listed under the subject "Atomic Energy", twelve under "Natural Sciences", and almost four hundred under "Science". The compilation does not contain information on awards that are made available by private or industrial foundations or by federal agencies except in those instances when scholarship funds are set aside expressly for study at a particular institution. It therefore does not begin to reflect the actual opportunities available for students in search of scholarships or fellowships in the United States. It does, however, provide a reasonably complete summary of the awards offered at individual colleges and universities. The new report (Bulletin 1951, No. 16, Federal Security Agency, Office of Education) may be obtained for 55 cents from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Mesospheric Physics

The *Proceedings of the Colloquium on Mesospheric Physics*, held in Cambridge, Massachusetts in the summer of 1950, have recently been issued as a 200-page volume under the editorship of N. C. Gerson, who served as chairman of the colloquium. The discussions include a wide variety of topics, including spectrographic methods of observation, made either from rockets or from the ground, radio wave probings of

the ionosphere, laboratory experiments dealing with recombination and diffusion, and probable photochemical reactions in the ionosphere and mesosphere. A number of the more than thirty conferees were visiting scientists from abroad. F. L. Whipple, J. Sayers, R. v. d.R. Woolley, and R. Penndorf served as chairmen of the four main sessions of the colloquium. The *Proceedings* were published by the Geophysics Research Division, Air Force Cambridge Research Center, Cambridge, Massachusetts, the sponsor of the colloquium.

Meteorology

The *Compendium of Meteorology*, edited by Thomas F. Malone (1315 pp.), has been published by the American Meteorological Society through the support and sponsorship of the Geophysics Research Division, Air Force Cambridge Research Center. Under the direction of a committee with H. G. Houghton as its chairman, 102 authors were commissioned to prepare the one hundred and eight articles which comprise this book. A logical grouping of papers on related topics has resulted in a division of the book into twenty-five sections. The first part of the book is concerned with physical meteorology which leads into discussion of the upper atmosphere, which is then followed by the section dealing with extraterrestrial effects on the atmosphere and with the meteorology of other planets. Later sections include discussions of the dynamics of the atmosphere; various aspects of the primary, secondary, and tertiary circulations respectively; synoptic meteorology and weather forecasting; meteorology of the tropical and polar regions; climatology; hydrometeorology; marine meteorology, biological and chemical meteorology, and atmospheric pollution; clouds, fog, and aircraft icing; meteorological instruments and laboratory investigations; radiometeorology; and microseisms and their applications to meteorological problems. The *Compendium* can be ordered from the American Meteorological Society, 3 Joy Street, Boston 8, Massachusetts for \$12.00.

Acoustical Dictionary

A revised edition of the *American Standard Acoustical Terminology, Z24.1-1951*, a dictionary of terms for the entire acoustical field, including music, has recently been issued by the American Standards Association. Development of this standard was sponsored by the Acoustical Society of America in cooperation with the Institute of Radio Engineers under the procedures of the ASA. The needs of the physicist and the musician as well have been kept in mind in defining musical terms. Other sections are concerned with sound transmission and propagation, transmission systems and components, ultrasonics, hearing and speech, recording and reproducing, shock and vibration, underwater sound, general acoustical apparatus, and architectural and general acoustical terms. Copies of the standard may be obtained from the American Standards Association, 70 East 45 Street, New York 17, N. Y., at \$1.50 per copy.

Books Received

CONCEPTS AND METHODS OF THEORETICAL PHYSICS. By Robert Bruce Lindsay. 515 pp. D. Van Nostrand Company, Inc., New York, 1951. \$7.00.

ORGANIC SYNTHESIS. An annual publication of satisfactory methods for the preparation of organic chemicals. Volume 31. Edited by R. S. Schreiber. 122 pp. John Wiley and Sons, Inc., New York, 1951. \$2.75.

MANUAL FOR THE ILLUMINATING ENGINEER ON LARGE SIZE PERFECT DIFFUSORS. By H. Zijl. 196 pp., 120 ill., 49 graphs, many tables. Philips Technical Library, Eindhoven, Netherlands, 1951. Distributed by Elsevier Press Company, Inc., Houston, Texas. \$4.25.

PROGRESS IN PHOTOGRAPHY, 1940-1950. Volume I of an International Record. Edited by D. A. Spencer. 463 pp. The Focal Press, London and New York, 1951. Distributed by Pitman Publishing Corporation, New York. \$10.00.

SYNCHRONISATION OF AIR-JET GENERATORS WITH AN APPENDIX ON THE STEM GENERATOR. By Jul. Hartmann and Erik Trudsø. 39 pp. Ejnar Munksgaard, Copenhagen, Denmark, 1951. \$1.00.

THE AIR-JET GENERATOR AS A MEANS FOR SETTING UP WAVES IN A LIQUID MEDIUM. By Jul. Hartmann and F. Larris. 26 pp. Ejnar Munksgaard, Copenhagen, Denmark, 1951. \$0.75.

THEORY OF GROUPS AND ITS APPLICATION TO PHYSICAL PROBLEMS (Second Edition). By S. Bhagavantam and T. Venkatarayudu. 277 pp. Andhra University, Waltair, India, 1951.

PRACTICAL ELECTRON MICROSCOPY. By V. E. Cosslett. 299 pp. Academic Press Inc., Publishers, New York and London, 1951. \$5.50.

HIGH FREQUENCY TRANSMISSION LINES. By Willis Jackson. 152 pp. John Wiley and Sons, Inc., New York, 1951. \$1.75.

THE AURORAE. Volume I. By L. Harang. 166 pp. John Wiley and Sons, Inc., New York, 1951. \$4.50.

METHODS FOR MEASUREMENT OF AVERAGE VALUES OF ENERGY AND MOMENTUM OF β -RECOILS. By O. Kofoed-Hansen. 32 pp. Ejnar Munksgaard, Copenhagen, Denmark, 1951. \$0.75.

AN INTRODUCTION TO THE LAPLACE TRANSFORMATION. By J. C. Jaeger. 132 pp. John Wiley and Sons, Inc., New York, 1951. \$1.50.

AN INTRODUCTION TO ELECTRON OPTICS. By L. Jacob. 150 pp. John Wiley and Sons, Inc., New York, 1951. \$2.00.

MULTIPLE VALUED HARMONIC FUNCTIONS WITH CIRCLE AS BRANCH CURVE. By Siegfried F. Neustadter. 35 pp. University of California Publications in Mathematics New Series. University of California Press, Berkeley, California, 1951. \$0.50.

DIGEST OF THE LITERATURE ON DIELECTRICS. Volume XIV—1950. Edited by R. G. Breckenridge and Hans Thurnauer. 230 pp. National Academy of Sciences—National Research Council, Washington, D. C., 1951. (Free to members.)

QUANTUM THEORY OF MATTER. By John C. Slater. 528 pp. McGraw-Hill Book Company, Inc., New York, 1951. \$7.50.

EQUIVALENT CIRCUITS OF ELECTRIC MACHINERY. By Gabriel Kron. 278 pp. John Wiley and Sons, Inc., New York, 1951. \$10.00.

THERMODYNAMICS. By Alfred W. Porter. 123 pp. John Wiley and Sons, Inc., New York, 1951. \$1.50.