Books

The Planets: Their Origin and Development. By Harold C. Urey. 245 pp. Yale University Press, New Haven, Connecticut, 1952. $5.00.

This book is a presentation and compilation, in book form, of the substance of the Silliman Lectures, presented by Professor Urey at Yale during the spring of 1951. It is divided into six chapters entitled The Origin of the Solar System, The Moon, The Terrestrial Planets, Chemical Processes during the Formation of the Planets, The Heat Balance of the Earth, and The Abundances of the Elements and The Chemical Composition of the Solar System.

Professor Urey reviews the main astronomical evidence regarding the moon and the various planets as well as the geological and geochemical evidence regarding the earth. He discusses the several theories regarding the formation of the planetary system, and then shows how modern physical chemistry explains many of the presently observed properties of the earth and planets. He discusses in detail such problems as the changing equilibria during the planets' history, and the chemical exchanges between various components of the atmospheres of the planets, the water and carbon abundances, and such geophysical phenomena as limestone deposition.

His main conclusions, that the earth and terrestrial planets could have been formed at a lower temperature than had previously been assumed and that the iron in the earth was once more uniformly distributed than now, are both significant advances in our buildup of knowledge. To the discussion he brings his expert knowledge of the many and complex processes of physical chemistry.

It is perhaps not surprising that the book deals mainly with the earth. Certainly far more is known about the composition and the interior of the earth than about any other planet. The major planets are only briefly discussed.

One or two definitions and conclusions are rather startling. On page 5, the author flatly calls the solar system a double-star system, with Jupiter the secondary. One might disagree with this view by pointing out that a cold planet can hardly be regarded as a star unless we revise our definitions radically, and further that Saturn has almost the same right as Jupiter to be included if the definition is so rewritten. With reference to his conclusion that a substantial amount of iron phase exists on the moon, one wonders whether in this case the moon might not exhibit a larger magnetic moment than it does. It will be recalled that cosmic rays show neither a cut-off nor a twenty-seven day periodicity which might be expected if a substantial magnetic moment were associated with the moon.

The book is carefully written and is generally free from obvious errors and misprints (although on page 62 the text refers to Table 1, which should obviously read 4). The data and tables of material are well selected and show careful study, and the printing and general format are satisfactory.

The book should be of interest to all students of the solar system. It is indeed excellent intellectual exercise, and makes stimulating reading. Urey's writings have undoubtedly stimulated much new interest and respect in the science of geochemistry.

Serge A. Korff
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The Aurorae. Volume I. By L. Harang. 166 pp. John Wiley and Sons, Inc., New York, 1952. $4.50.

Dr. Harang's work, a review of the present knowledge about the aurorae, is divided into eight chapters: The Form and Appearance of Aurorae, The Positions in Space of the Aurorae, the Spectrum of the Aurorae, Other Light Effects in the Auroral Region, Earth-Magnetic Storms and the Aurorae, the Corpuscular Theory of the Aurorae, The Upper Atmosphere and the Aurorae, and the Ionosphere, Aurorae, and Earth-Magnetic Perturbations.

A good summary of the present knowledge, the book is suitable for undergraduate or graduate student collateral reading in a course on the upper atmosphere. The mathematical level presupposes calculus. The volume abounds in good charts and diagrams and the majority of the important features are well described and illustrated. Although it is clearly not intended to inform the specialist, even he will benefit from having so complete a bibliography and tables of data in one place. The book is well written, logically organized, and constitutes a useful addition to the available literature on this subject.

S. A. K.

Atomes, Spectres, Matière. By Yvette Cauchois. 636 pp. Éditions Albin Michel, Paris, France, 1952. 1.800 fr.

A fairly detailed text on atomic physics, the present volume starts out describing the atomic nature of matter, and proceeds to give a treatment of almost all phases of the subject, including thermodynamics, crystal structure and x-rays, the electronic charge and charge-to-mass ratio determinations, spectra, Bohr theory, resonance and fluorescence, introduction to wave mechanics, and the wave-particle duality. The level assumes calculus.

As a text for seniors and beginning graduate students, this book would be about right. It covers all the main points and most of the incidental ones, is well written and logically put together. One could wish that as good

and as comprehensive a text were available in English. Possibly some of our Spanish-speaking neighbors to the south, for whom the transition to French is less troublesome than it is for some English-speaking persons, could adopt it directly. Certainly any graduate student studying for his language examination could do much worse than read this, since he would learn both physics and French simultaneously.

S. A. K.

Briefly Noted

Nuclear Engineering

The Role of Engineering in Nuclear Energy Development, a report of the proceedings of a symposium held last September at Oak Ridge, consists of seventeen papers by leading figures in the atomic energy field on such subjects as "Engineering and the Objectives of the Atomic Energy Commission", "Some Economic Aspects of Atomic Power", "The AEC Reactor Program", and "The Contributions of Engineering to Nuclear Energy Development". Held under the joint sponsorship of the Oak Ridge National Laboratory, the Oak Ridge Institute of Nuclear Studies, and the American Society of Engineering Education, the symposium was intended to accelerate the spreading of education in nuclear engineering throughout the nation's technical schools "so that U. S. industry may participate more fully in, and derive greater benefits from, the Atomic Energy Program". Orders for the volume (TID 5031; 509 pp., $1.40) should be addressed to the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

The Atomic World

Despite its title, *First Principles of Atomic Physics* by R. F. Humphreys and R. Beringer (Harper and Brothers, New York, 1950; 390 pp.; $4.50) is an introductory and essentially nontechnical physics textbook. Making no attempt to be comprehensive, the authors cover "the physicist's concept of the atomic world" and their presentation of classical physics is limited to that material which furthers this view. Throughout, emphasis is placed on particle physics, with such topics as circuit theory and electrical and mechanical machine theory receiving only cursory treatment. The book was written for an intensive one-semester course, and probably is suitable also for a more leisurely full-year course. No mathematics past elementary algebra is used.

German Physics Encyclopedia

A new German dictionary of physics, *Physikalisches Wörterbuch*, edited by Wilhelm H. Westphal and compiled by 80 specialists in the physical sciences (about 1600 pages; Springer-Verlag, Berlin, Germany, 1952; DM 148.–) presents a compendium of approximately 10,500 entries, 1800 illustrations, a short history of physics, and a table of personal data of some 800 physicists.

Books Received

PRINCIPLES OF LIGHTING. By W. R. Stevens. 482 pp. Constable and Company Ltd., London, England, 1951. 35s.

APORTES TEORICOS AL ESTUDIO DEL EFECTO CHERENKOV. By A. Battig. 69 pp. Universidad Nacional del Tucumán, Tucumán, República Argentina, 1951.

THE THERMODYNAMICS OF THE STEADY STATE. By K. G. Denbigh. 103 pp. John Wiley and Sons, Inc., New York, 1952. $1.75.

D.C. POWER SYSTEMS FOR AIRCRAFT. By R. H. Kaufmann and H. J. Finison. 206 pp. John Wiley and Sons, Inc., New York, 1952. $5.00.

THE DESIGN AND ANALYSIS OF EXPERIMENTS. By Oscar Kempthorne. 631 pp. John Wiley and Sons, Inc., New York, 1952. $8.50.

ELECTROMAGNETICS. By Robert M. Whitmer. 270 pp. Prentice-Hall, Inc., New York, 1952. $5.00.

PRISM AND LENS MAKING (Second Edition). By F. Twyman. 629 pp. Hilger and Watts Ltd., Hilger Division, London, England, 1952. Distributed by the Jarrell-Ash Company, Boston, Massachusetts. $11.25.

NOMOGRAPHY AND EMPIRICAL EQUATIONS. By Lee H. Johnson. 150 pp. John Wiley and Sons, Inc., New York, 1952. $3.75.

DIFFUSION IN AND THROUGH SOLIDS (Reissue). By Richard M. Barrer. 464 pp. Cambridge University Press, New York, 1952. $9.00.

ELECTRICAL MEASUREMENTS. By Forest K. Harris. 784 pp. John Wiley and Sons, Inc., New York; Chapman and Hall Ltd., London, England, 1952. $8.00.

THE EXACT SCIENCES IN ANTIQUITY. By O. Neugebauer. 191 pp. Princeton University Press, Princeton, New Jersey, 1952. $5.00.

A BIBLIOGRAPHICAL SURVEY OF FLOW THROUGH ORIFICES AND PARALLEL-THROATED NOZZLES. By T. H. Redding. 196 pp. Chapman and Hall Ltd., London, England, 1952. 32/6d.

RADIO ASTRONOMY. By Bernard Lovell and J. A. Clegg. 238 pp. Chapman and Hall Ltd., London, England, 1952. 16s.

CLASSICAL MECHANICS. By D. E. Rutherford. 200 pp. Oliver and Boyd Ltd., London, England, 1951. 10/6. (U. S. Distributors Interscience Publishers, Inc., New York).

THE ASTRONOMICAL UNIVERSE. By Wasley S. Krogdahl. 599 pp. The Macmillan Company, New York, 1952. $6.25.

ELEMENTS OF THERMODYNAMICS AND STATISTICAL MECHANICS. By E. O. Hercus. 153 pp. Melbourne University Press, Australia; Cambridge University Press, New York, 1952. $3.75.

CHEMICAL CALCULATIONS—AN INTRODUCTION TO THE USE OF MATHEMATICS IN CHEMISTRY. By Sidney W. Benson. 217 pp. John Wiley and Sons, New York; Chapman and Hall Ltd., London, England, 1952. $2.95.

EINFÜHRUNG IN DIE KRISTALLOPTIK. By Eberhard Buchwald. 138 pp. Walter de Gruyter and Co., Berlin, Germany, 1952. DM 2.40.

JENAER JAHRBUCH, 1951. Wissenschaftliche Veröffentlichungen des Zeisswerkes. 290 pp. Kommissionsverlag Gustav Fischer, Jena, Germany, 1951. DM 20.00.

THERMODYNAMICS FROM A GENERALIZED STANDPOINT. By J. L. Finck. 124 pp. Flatbush Publications, Brooklyn, New York, 1951. $4.00.