BOOK REVIEWS

(Editor's Note: Louis H. Roddis, a graduate of the Naval Academy, was a member of the Naval group under Admiral Rickover which directed the nuclear submarine project from its earliest days. He transferred to the U. S. Atomic Energy Commission where he was deputy director of the Reactor Development Division for several years. He is now president of the Pennsylvania Electric Company. Mr. Roddis is currently the chairman of the Maritime Research Advisory Committee, National Academy of Sciences—National Research Council.)

International Control of Nuclear Maritime Activities. By LEE M. HYDEMAN AND WILLIAM H. BERMAN. The University of Michigan Law School, Ann Arbor, 1960. 350 pp.$ 4.50.

This interesting document sheds considerable light on a field which is, to say the least, confusing both technically and legally.

The average administrator, engineer, or scientist in the atomic energy field will find it considerably easier to read than the average lawyer. Although the book deals with problems of international control and law, it is so written that those without legal training will have no difficulty with it. However, for one without a background in the atomic energy field, the prior reading of an elementary text on atomic energy technology would simplify the understanding greatly.

The book deals principally with problems of hazards and controls and touches rather lightly on liability matters. It considers both the immediate pressing problems of the transporting of radioactive materials and sea disposal of radioactive materials as well as the problems posed by nuclear powered vessels. The present legal rights as set forth in international and admiralty law are covered in considerable detail. The book concludes with a specific series of recommendations for multinational action through three international conventions which are recommended to be held under the auspices of the International Atomic Energy Agency. It is suggested that a convention on the international transport of radioactive materials by sea, air, road, and rail be convened, that also a convention on the disposal of radioactive wastes and one on the safety of nuclear powered vessels be established.

This book was undertaken and published by the Atomic Energy Research Project of the University of Michigan Law School of which the authors were co-directors at the time it was written.

I suggest it as required reading for anyone in a responsible position in the atomic energy business today.

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(Editor's Note: Mr. Colomb, a Swiss, assisted the United States in the construction and operation of the pool-type reactor at the Geneva Conference in 1955. He received his B.S. degree in physics at the Federal Institute of Technology in Zurich, Switzerland in 1954 and his M.S. degree in nuclear engineering at the Massachusetts Institute of Technology in 1956. He is currently employed at the Oak Ridge National Laboratory in the Reactor Operations Division where he has been engaged in research on the control of reactors.)

L'Electronique Nucléaire—Nuclear Electronics, Volume II. International Atomic Energy Agency, Kärntner Ring, Vienna I, Austria, 1959. 378 pp. $4.00.

This volume contains a compilation of papers given at the International Symposium on Nuclear Electronics (Paris, 1958). It brings out electronic applications used for solving problems regarding atomic energy and nuclear physics.

This book is divided into four main sections, each comprising from seven to twelve papers and followed by a report of the discussion which took place afterwards. These sections are

Reactor Control: Simulation
Equipment for Prospection and Protection
Centralization and Exploitation of Results
Transistorized Equipment, Standardization, and Components.

As can be expected from such a survey, there are articles of a very general interest and others which appeal more to the specialist.

The simulation of reactors and atomic power plants provides a series of careful studies. Some theoretical papers deal with problems of nonlinear kinetics and the stability of reactors and their control systems.

The section on Equipment for Prospection and Protection points out clearly the similarity of these two kinds of instrumentation. It describes interesting means of sorting uranium and thorium containing minerals and of controlling their grade. It also presents various types of instruments used for radiation detection as well as for the determination of air contamination. More particularly, it includes a description of an instrument measuring small air-borne plutonium concentrations in the presence of the natural radon background.

The papers given in the third section can be classified in two categories: first, those dealing with the interpretation of data resulting from nuclear physics measurements; and second, the ones referring to the utilization of data registered during operation of reactors and atomic power plants.

The last section contains various descriptions of transistorized equipment such as stabilized power supplies, time-of-flight selectors, and prospection instruments.

This volume will be of definite use to people interested in reactors and atomic power plants control as well as to the

electronician specialized in the construction of equipment of one particular kind.

Out of the 39 papers given in this publication, 26 have been written in French by scientists working on the program of French atomic energy. This implies that more than half of the described systems and equipment are of French conception.

It is unfortunate that the proceedings of this symposium which took place in 1958 have only been published at the end of 1959. The growing development of this particular field makes such a book rapidly out-dated.

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(Editor's Note: Dr. Murray's principal interests are nuclear radiation detectors and the physics of solids.)

Radiations and Matter. By ANDRÉ BERTHELOT. Leonard Hill Books, Ltd., London, 1958. $5.75. (Translated by F. R. Paulsen from the French, **Rayonnements de Particules Atomiques, Electrons et Photons.** 180 pp., 103 Figs.)

This rather compact book dealing with the interaction of gamma rays and charged particles in matter originated as a series of lectures delivered to physics students at the Faculty of Sciences at Paris. As such, the contents are well arranged and cover in textbook fashion both theoretical and experimental aspects of the slowing-down of charged particles and the absorption of gamma rays. The topics included appear to encompass rather well the various aspects of a broad and diverse subject. The subject matter includes discussions of binding energies of atoms, cross sections and mean free paths, elastic scattering of charged particles, charge as a function of velocity, the range-energy relationship and stopping power of electrons and nuclei (including fission fragments), ion-pair formation, bremsstrahlung, multiple scattering of electrons, and gamma-ray interactions. The subject of neutron attenuation is not considered. The emphasis in the present book is directed toward giving the reader a panoramic view of the entire subject; in doing so, the author appears to have struck a good balance between discussions of theory and experiment. Theoretical results are liberally illustrated in a large number of figures. This fact contributes significantly to the usefulness of this book as a handy place to look up various functions and constants, e.g., the binding energies of K, L, and M electrons as a function of Z, calculated stopping power of various media to protons from 50 kev to 10 Bev, range-energy curves, gamma-ray interaction cross sections as a function of energy, etc. The information presented here, however, is not encyclopedic and does not go into the detail which is required to obtain the best value of, say, dE/dx of a proton or alpha particle in a given medium. The review of Whaling in the new *Encyclopedia of Physics*, Vol. 34, for example, gives a much more explicit and detailed presentation which one would consult to get numbers. This feature, nevertheless, does not detract from the present book as a comprehensive review of the subject which might profitably be read by advanced students or by those engaged in radiation physics. Numerous references throughout the book provide a guide to more detailed study of the literature.

It is most unfortunate and disappointing that this otherwise excellent little book has suffered sorely as a result of a loose, inaccurate, and sometimes completely erroneous translation. The distortions are, in many cases, easily deciphered, as when *scattering* appears as *diffusion*, and *selection rules* is translated *laws of forbidden energy levels*. *Momentum* is variously translated as *impetus, impulse, movement, quantity of movement, quantity of motion*, and *quantum of movement*. Errors of omission in translation lead to statements which are distinctly misleading, as when *maximum energy loss* is translated *energy loss* or when *back-scattered photons* appears as *diffused photons*. The most serious distortions, however, are those in which the author's original statement is translated with precisely the opposite meaning. As one example, a brief discussion is given of an equation describing the photoelectric cross section for K shell electrons which is applicable under the condition $Z/137 \ll 1$. Berthelot correctly states that this formula is limited in the case of large Z, whereas the translation reads, "The Sauter formula is limited to high Z values." In other instances, *below* is translated *above* and *lightest* occurs as *highest*. Finally, a number of misprints were observed in equations in which, for example, m appears as M, v as V, or $\lambda = \nu/C$. Some of these misprints occur in the original text, whereas others have been generated during the printing of the translated version. The net result is that the present translation is notably inaccurate and unreliable; the interested reader would do well to have a copy of the French text at hand to check suspicious or incomprehensible statements.

In summary, the original text appears to be a well-done survey of the general subject. The value of the present edition is very much in question as a result of a frequently distorted translation and apparent lack of proofreading.

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(Editor's Note: Our reviewer, Dr. Marshall Brucer, has been chairman of the Medical Division of Oak Institute of Nuclear Studies since its inception in 1949. This division of the Institute engages in medical research on diseases which can be studied, diagnosed, or treated by the use of radioisotopes. Dr. Brucer is well known in this field not only in the United States but throughout Europe and the friendly countries of the Far East.)

The Isotope Index, The Complete Guide to the Isotopes. Published by Scientific Equipment Company, P.O. Box 19086, Indianapolis 19, Indiana. J. L. Sommerville, publisher. 119 pp. plus advertising, $5.00. Illustrations only in the advertising. This index does not appear to be for sale in ordinary bookstores but is readily available from the publisher. July, 1959; revised every year.

International Directory of Radioisotopes. Two volumes published by the International Atomic Energy Agency, Kärntner Ring, Vienna I, Austria, July, 1959. Volume I, 264 pp. Volume II, 213 pp., $3.50 per volume. No illustrations. It is said that this is to be revised every two years. Distributed by National Agency for International Publications, Inc., 801 Third Avenue, New York 22, New York.

These are two catalogues of isotopes and isotope-labeled compounds. One of them, *The Isotope Index*, states in its