NUCLEAR SCIENCE AND ENGINEERING: 19, 475-478 (1964)

Book Reviews

Pile Neutron Research in Physics. Proceedings of a Symposium, Vienna, 17-21 October 1960. IAEA. 654 pp. $12.00.

Close scrutiny of the book, *Pile Neutron Research in Physics,* dispels a first impression that it is merely another compilation of reports presented by specialists of the overall reactor oriented programs of large government laboratories. Nevertheless, a question immediately arises with the reader, at least in a college professor's mind. It is, "What is the value of such a book to me?" Many of the reports are concerned with the assembalge of large and expensive experimental apparatus for use in neutron diffraction and capture gamma-ray measurements, which could not possibly be purchased by the average university. For this reason, perhaps, the book would not be too useful to persons initiating reactor oriented nuclear research in a university; unless, of course, an unusually large research budget was available. The exception in possible usefulness of the material might be in some of the rather ingenious experiments reported by the FRM group at Munich, which certainly are informationally intriguing. One fact which does, however, become quite apparent upon perusal of the book is the advanced status of nuclear physics research utilizing nuclear reactors. It is certainly true that this collection of papers can well serve to inform the reader of the current research areas being pursued, and the present state of knowledge at the frontiers in these areas.

The book is conveniently divided into eight descriptive sections, with Section A being a commemorative address presented by Dr. H. Palevsky, eulogizing Dr. Donald J. Hughes, representing an excellent tribute to a former great scientist. However, there is considerable overlap of the material of the succeeding sections. The first two of these (Sections B and C) constitute a series of reviews of pile neutron physics research at the various laboratories represented at the conference. Section D covers pile neutron nuclear physics experiments. Then Section E is concerned with selected problems of research in nuclear physics, and describes several new techniques that have been developed to carry out specific experiments.

Sections F and G contain further reviews of neutron research in liquid and solids, again using, for the most part, neutron diffraction techniques. In Section H there are several valuable papers describing experimental facilities and newly designed apparatus. This section could be of considerable value to research groups planning to build or modify neutron diffraction facilities for use with a relatively high powered research reactor.

In conclusion, I believe the book is worthy of purchase by persons actively engaged in reactor oriented research around a big reactor, and also by persons who want to keep up with the frontiers of knowledge in certain areas of pile neutron research.

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About the Reviewer: Dr. R. G. Cochran received his AB and MS degrees from Indiana University and his Ph.D. from The Pennsylvania State University. From 1950 to September, 1954 he was employed as a physicist in the Physics Division of the Oak Ridge National Laboratory. In 1954 Dr. Cochran joined the faculty of Penn State University, later becoming Director of the Research Reactor Facility. Since 1959 Dr. Cochran has been Head of the Department of Nuclear Engineering and the Nuclear Science Center at Texas A&M University.

Radiation Hazards and Protection. 2nd Edition. By D. E. Barnes and Denis Taylor. Pitman, New York, (1963). 221 pp., 63 figs., $8.50.

This book, originally published in 1958 and revised in 1963, is an elementary treatise on radiation protection and the measurements involved. Though it should prove useful to technicians in the field, it will be of limited value to most readers of *Nucl. Sci. Eng.*

The authors provide a brief introduction to the nature of the particulate and electromagnetic radiation with which they are concerned and dis-

cuss the methods of measurement. Much of the book is concerned with the problems of the health physicist and could supplement on-the-job training for HP novices. Qualified HPs, however, will find the book too pedestrian and not sufficiently stimulating.

Though the occasional mention of transistorized circuitry indicates some concession to modern practice, it is apparent that there has not been sufficient up-dating in the current revision. The 1953 pulse spectrum display on page 74 is as out of date as a two-dollar bill.

In reviewing the first edition (*Nucl. Sci. Eng.* **10**, 4, 1961), L. S. Taylor stated "It is unfortunate that in a few spots the book is already dated. In June 1958 when it was first published, present day concepts regarding radiation dosimetry and units were already available. These do not appear anywhere in the book. Similarly, at that time some rather radical changes had been made in the concepts of radiation protection standards and these also do not seem to be reflected." This statement is equally true of the 1963 edition. The "rep," long since discarded by the ICRP, is still included and the definition given for the "rem" is not correct. In rapidly moving fields, such as the one covered, authors are faced with the difficult task of avoiding what may rapidly become dated while at the same time providing enouch substance to prove of value—a challenging tight-rope, indeed.

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About the Reviewers: L. Costrell is currently Chief of the Radiation Physics Instrumentation Section of the Radiation Physics Division of the National Bureau of Standards. He is Chairman of the ASA Technical Committee on Radiation Instruments and is a past chairman of the IRE Professional Group on Nuclear Science.

A. Schwebel is Senior Health Physicist at the National Bureau of Standards. He is president-elect of the Baltimore-Washington Chapter of the Health Physics Society. Both L. Costrell and A. Schwebel have been involved in radiation physics since 1946 when they joined the Radioactivity Section of the National Bureau of Standards.

Neutron Detection. By W. D. Allen. 45 shillings, Geo. Newnes Ltd., London.

The author of this little (190 pages) volume has succeeded admirably in his stated purpose of addressing the book "to those who, with some background knowledge of nuclear physics and particle detectors, require a more detailed knowledge of the main methods of neutron detection." His style is always lucid and clear, and the book is a pleasure to read. After the introduction, which contains some historical comments, a discussion of the principles of neutron detection, and a survey of neutron sources, the remaining four chapters deal with the reactions used in neutron detection, the chief instruments of neutron detection, applications of neutron detectors, and neutron standards. The author does a good job of qualifying his general statements so that his main points stand out clearly, but with appropriate indications of their limits of validity. When he discusses a matter very briefly, he makes it possible for the reader to get more detailed information readily, usually by a footnote reference to a book, a published paper, or a laboratory report.

An extremely useful feature of the book is its extensive reference index and bibliography, which occupies 26 pages and is arranged according to the topics covered in the text. The references are well-chosen and show a working familiarity with the entire field. They cover unpublished laboratory reports as well as the journal articles. There is also a set of 12 appendices which present a number of experimental curves along with the discussion of several terms, such as cross section, used in the text without definition.

The book was first published in 1960, and the latest references in it were published in 1959. Thus the strongest impression the reader gets is an increased awareness of the very large amount of work done and the advances made both with respect to apparatus, such as semiconductor particle detectors, and with respect to the analysis of data, such as in the case of the thermal-neutron flux perturbation problem, since the book was written.

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About the Reviewer: Ernest D. Klema is Professor of Nuclear Engineering and Chairman of the Department of Engineering Sciences at Northwestern. He was concerned with the measurement of fission cross sections at Los Alamos from 1943-1946. He taught at ORSORT from 1950-1952, and was in the Physics Division at ORNL from 1950-1956. He was Chairman of the Subcommittee on Neutron Standards and Measurements of the National Research Council from 1958 to 1963. His present research interests include the study of (d,p) *reactions by means of high-voltage surface-barrier silicon detectors.*