

**Progress in Fast Neutron Physics.** Edited by Gerald C. Phillips, Jerry B. Marion, and Jacob R. Risser. University of Chicago Press, Chicago, (1963). 397 pages, \$8.50.

The preparation of review papers as such has become relatively unusual in physics. The review paper has been replaced by the review talk presented at a topical conference. The subsequent publication of the conference proceedings then provides a set of papers which are more-or-less related and which may be organized loosely into a book. At best, the speed of publication of conference proceedings more than compensates for the more careful presentation that may be achieved in the review paper. The proceedings of the Rice University Conference on "Progress in Fast Neutron Physics," held in February, 1963, were published within eight months after the conference - a good record.

The stated purpose of the twenty-two long and five short papers included in the proceedings is to "summarize the current status of this important field of nuclear research." This objective is met in general. In most areas, the reviews cover research since the preparation of Marion and Fowler's *Fast Neutron Physics* and many authors contributed to both books.

Topics covered include monoenergetic neutron sources, sources of polarized ions and neutrons, and the continuous neutron spectra produced due to the deuteron breakup in deuteron-produced "monoenergetic" sources. Results on neutron reactions indicate areas of agreement with both direct interaction and compound nucleus calculations. Neutron and gamma-ray spectral data from neutron inelastic scattering and radiative capture illustrate the remarkable recent advances in techniques in these areas.

Other descriptions of experimental techniques cover solid-state detectors, problems of angular-distribution measurements of scattered neutrons, and preparation of polarized targets. Havens and Newson present results obtained by time of flight and with monoenergetic sources which show that the long-standing gap in neutron energy between these two techniques has been closed. The energy at which the methods meet is a subject for vigorous resolution.

Recent polarized-neutron scattering results are reviewed and Willard gives a historical survey of neutron scattering. Other historical papers include a commemoration of Tom Bonner, for whom the conference and proceedings are intended as a memorial, a fascinating account by Cockcroft of his early work in nuclear physics, and an authoritative description of the development of the Van de Graaff accelerator by Herb.

Finally, Bretscher outlines the increasing demands for nuclear data for reactor design. His cogent but brief (nine pages) account is perhaps the most pertinent of the book for many ANS members. Bretscher points out that even for fast reactors the neutron spectrum peaks in the few-keV energy region for the large, dilute systems of interest today. Since only three of the contributions to this volume consider neutron energies as low as the keV region, the direct interest of the reactor designer in the material of this book will be limited.

In summary, for reference in this area one should first consult both volumes of *Fast Neutron Physics*, which is already seriously out of date in many sections. Then it is possible to turn to the present volume to see what has happened recently.

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*About the reviewer: Fred Maienschein is Associate Director of the Neutron Physics Division at the Oak Ridge National Laboratory where for several years he has been making measurements of gamma-ray spectra of interest in the shielding of reactors and (currently) of manned spacecraft. He is Vice Chairman of the Shielding Division of the American Nuclear Society and a member of the U. S. Atomic Energy Commission's Advisory Committee on Reactor Physics and the European-American Committee on Reactor Physics.*

**Nuclear Radiation in Geophysics.** Edited by H. Israel and A. Krebs. Academic Press, (1962). 430 pp. \$18.00.

*Nuclear Radiation in Geophysics*, as the title indicates, is a book of complex and varied information. It is presented by authors from different disciplines. Some articles are written in English and some in German. Such a book, by nature, cannot be as uniform as one written by a single author. There had to be some heterogeneity and overlapping. The book, however, fulfills the editors' concept as set forth in that each individual chapter of the survey should be presented by an expert in the proper field in his own style and in his own words. The book attempts "a summary statement on the role of natural, artificial, and man-made radioactivity - of nuclear radiation in the broadest sense of the word - in the geophysical area with the goal to sketch the essential features of our science, the principal directions of current inquiries and of future research."