BOOK REVIEWS

Selection of books for review is based on the editors' opinions regarding possible reader interest and on the availability of the book to the editors. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.

MOSTLY OLD HAT

Title The Theory of Neutron Slowing Down in Nuclear Reactors

Authors Joel H. Ferziger and P. F. Zweifel

Publisher The M.I.T. Press, 1967

Pages x + 307

Price $13.50

Reviewer Noel Corngold

There is no doubt that the moderation of neutrons is important to the neutron chain reaction, or that the "classical" theory of the process has been quite thoroughly worked out in journal articles and reviews, and has been presented adequately in several text-books. Now we are presented with a book devoted entirely to the theory of slowing down. We find the classical material once again; we are hurried past Placzek functions, NRIA, the Rational Approximation, the First Fundamental Theorem, and all that. Since the book is based upon an eight-year-old manuscript, one encounters none of the recent refinements of these by now commonplace ideas. New material? There is no discussion of inelastic CM scattering, which is important to fast reactor systems, or of thermalization, which is important to thermal systems.

Why was the book published? We shall hurry past that question to point out that there are sections which merit attention. The transformation of scattering cross-sections is treated in considerable detail, and there is a section on numerical methods in which the reader is exposed to the ideas current in the 1950's. The latter is rather interesting; some of the discussion about practical calculation bears the mark of hard experience. It is characteristic that the computational scheme, THERMOS, which is very much in fashion today, receives one sentence, and a misleading one at that.

One does not have the impression that much care was expended upon the literary aspects of the book. Page 1 begins with a grammatical blunder, and a rapid reading finds "polynominal" on p. 189, "Plazcek" on p. 71, an erroneous reference on p. 142. We learn of "expanding functions," and are told to "adjointize" equations. Then, we are treated to sentences like, "Consequently, the limitations of the system, either decrease in reactivity or metallurgical limits, will be reached rather quickly in terms of total energy production by a core over its lifetime..." Got it? If not, consider that MIT Press surely employs copy editors. Consider, too, that both authors are "top-drawer" physicists. Their work should elicit a better review; their colleagues and their readers deserve better treatment. We shall look forward to it—next time.

For the past year Professor Noel Corngold has been with the Division of Engineering and Applied Science at the California Institute of Technology. Prior to that, he spent 15 years at Brookhaven National Laboratory, becoming leader of the Theoretical Reactor Physics Group. He is well known for his work in neutron transport theory and neutron thermalization. His PhD (Harvard, 1954) is in physics.

NEW AND IMPORTANT

Title Radiation Dosimetry, 2nd ed., Vol. II

Editors Frank H. Attix and William C. Roesch

Publisher Academic Press, 1967

Pages xviii + 462

Price $20.00

Reviewer Nathaniel F. Barr

In large part, the effects produced as a result of the interaction of ionizing radiation with matter are consequences of the absorption and degradation of energy, and the amount of energy absorbed in irradiated material is a quantity frequently sought in the interpretation of physical, biological, and chemical effects produced by ionizing radiation. The amount of energy absorbed may be obtained, in principle, either by the application of known laws of interaction between the radiation field and matter, or by direct experimental determination. However, it is frequently difficult to characterize the radiation field, and direct measurement of energy absorbed in the irradiated sample is always difficult and usually impossible. Since the turn of the century, numerous techniques for measuring absorbed dose indirectly have been developed by groups studying a variety of radiation effects. A number of these are now highly developed and include complex instrumentation, elaborate physical theory, and highly specialized jargon. New techniques are constantly being developed.