

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.



Title Nuclear Power Plant Design
Author Harry A. Kiljian
Publisher A. S. Barnes and Co.
Price \$30.00
Reviewer T. V. Sheehan

Nuclear Power Plant Design seems to this reviewer to be a strange mixture of a small amount of very good general nuclear information for the engineer together with a large amount of rather pedestrian calculations on the components of nuclear plants. In addition, there is a section on fossil-fueled plants which seems out of place in a nuclear text. There are drawings of pumps, cranes, tanks, heat exchangers, boilers, air compressors, etc., which are no doubt all right but the practicing engineer generally relies on preliminary copies of all these drawings from the manufacturers with whom he is dealing. This information in the textbook would be useful for only the sketchiest approach to a design. There is a 30-page section of appendices of material which is generally available in standard specialized places.

If, as the author claims, he wishes to review with the reader design features of several different types of plants and the ancillary operations of fuel processing and preparation, I think he could have done a great job with fewer pages by using only his excellent descriptive type of writing and by leaving out calculations, tables, drawings, etc.

Mr. Sheehan is a mechanical engineer (graduate of the University of Illinois, 1929) and for 40 years has practiced engineering; 18 years in the manufacture of petroleum products and 22 years in nuclear engineering. He is a fellow of the ASME, a senior scientist at Brookhaven National Laboratory, and has held highly responsible positions in the design of both the Brookhaven Graphite Reactor and the High Flux Beam Reactor. In addition, he is head of the engineering division of the Applied Science Department.

Title Engineering Compendium on Radiation Shielding
Editors R. G. Jaeger, Editor-in-Chief; E. P. Blizard; A. B. Chilton; M. Grotenhuis; A. Hönig; Th. A. Jaeger; H. H. Eisenlohr, Coordinating Editor.
Publisher Springer-Verlag, New-York Inc.
Pages XII + 537
Price \$60.00
Reviewer W. E. Kreger

That the field of shielding is populated with productive people is clearly evident in this first compilation of their work to come along in many years. However, if this first volume (of two) is any indication of

what the total is to be, then the first part of the definition of compendium, "a brief, comprehensive summary" is considerably exceeded.

The editors "have aimed at a complete presentation of the subject, covering and linking both the technology and the science of shielding." The first volume covers more of the latter—and thoroughly so. It is a very desirable addition to the library of every research establishment which deals in any way with radiation, for the coverage of radiation sources and radiation attenuation is quite complete and extensive. Unfortunately the price will surely prevent an even wider distribution that this work may very well deserve.

It is difficult for this reviewer to judge whether this work will achieve its potentially greatest value, namely to create a useful design tool for the practicing engineer, since it is the second volume which purports to deal fully with practical design problems. The first volume is, in general, too lengthy and detailed to be used by a designer who is looking for the quickest and most effective way to his goal. Some subjects are actually treated at several different places and in different ways in this volume, with no assistance provided to the reader regarding which method will best suit his needs. However, most of the subjects are covered so well that if one is willing to search for a particular piece of data, or method of solving his problem he will certainly have a good chance of finding what he needs.

This volume suffers from what must be a common problem in books having many authors. The editors were not able to get a uniform message to their authors. Some of the

authors go into agonizing detail on their subject and others are unfortunately brief—although there are more of the former than the latter. Furthermore, the organization of the material allows for considerable overlap of subjects and a certain amount of redundancy. There is even what appears to this reviewer to be a disorder of the presentation. The section on Radiation Attenuation Methods, which starts with an extensive treatment of the Monte Carlo Method, comes before the individual treatment of Photon Attenuation and Neutron Attenuation. Radiation Sources are treated in Chap. 2 for the radiation aspects and in Chap. 6 for the geometrical aspects.

One does not find editorial guidance about where he should look to find the most appropriate solution to his particular problem. I believe this work might well have benefited from a very carefully written Introduction which would have served to direct the reader's attention to the most effective way to use the book, as a function of the kind of problem the reader has to treat. To use the book effectively, a reader should familiarize himself thoroughly with the entire volume.

As one who has spent a good portion of his career in what is generally called weapon effects shielding problems, I was quite surprised to find that the chapter on Radiation Sources does not treat the rather special problems of the characteristic "fallout source." It is a technology that has received enough attention and research effort to deserve special description at an earlier point than Chap. 4.

Similarly, I found the omission of AVF cyclotrons in the section on Particle Accelerator Radiation Sources somewhat disturbing, since the potential beam power and energy of these machines makes them a significant radiation hazard.

All in all, the *Engineering Compendium on Radiation Shielding* deserves to be widely distributed and extensively used. It should effectively serve the shielding community for many years. Since its existence will probably prevent another such work for a long while, it is unfortunate that the editors did not use their own expertise to provide a sort of teaching or guidance section for the benefit of the less experienced reader.

W. E. Kreger has been active in the radiation shielding field since receiving his PhD in physics at the University of Illinois in 1952. His professional career has been spent at the Naval Radiological Defense Laboratory where he is currently head of the Physical Sciences Division. In 1963 he served as chairman of the Shielding Division of ANS.

Title Introduction to Modern Physics 2-E

Authors C. H. Blanchard, C. R. Burnett, R. G. Stoner, and R. L. Weber

Publisher Prentice-Hall, Inc., 1969

Pages v + 498

Price \$9.95

Reviewer Rocco A. Fazzolare

The physics of the atom and the microscopic structure of matter represent an important segment of man's contemporary knowledge of the physical world. The basic concepts of the atom, quantum theory, and relativity are reliable enough to be not only compatible with observation but to predict phenomena. The rapid technological progress of the past few decades is, for the most part, due to the evolution of this area of physics. The applications of atomic physics is so widespread today that it is no longer the cherished domain of the physicists alone. It is hardly conceivable that any student of science and engineering would be adequately prepared today without some familiarity with what is called "modern physics."

The second edition of *Introduction to Modern Physics* by C. H. Blanchard, C. R. Burnett, R. G. Stoner, and R. L. Weber fulfills the need for a well written textbook, appealing to the general science and engineering student. Therein is presented the fundamental concepts of the atom, its nucleus, electrons, and aggregate behavior. It is addressed to the un-

dergraduate with one year of preparation in mathematics and general physics.

The contents of a good course textbook should be compatible with the student's prior preparation as well as with the objectives of the course. The mathematical treatment should not be so rigorous that it obscures comprehension. Too descriptive a presentation, on the other hand, can create the illusion of understanding. At this level, books must be pedagogically oriented. Too often in some texts the material is sketchy, poorly linked together, or illogically sequenced. Scope and balance in the subject matter presented may also be lacking. According to these criteria, this book is excellent; it fulfills its intended purpose and should be well received by students and teachers.

The topics developed are not too different from those generally found in similar texts. The book's uniqueness stems primarily from the subject sequence, emphasis, and presentation. The book begins with an outline of some helpful fundamentals of Newtonian mechanics and electrical and magnetic forces. After skimming over the kinetic theory of gases and the historical evidence for atoms and electrons, the real substance of the book begins with a chapter on electromagnetic radiation. The Rutherford scattering experiment and the Bohr atom are then described in the conventional manner. Schrodinger's equation is introduced and applied to the harmonic oscillator and the hydrogen atom. The wave solution for the transmission and reflection of particles by a potential barrier is lacking; its inclusion would have been appropriate and would have added to the completeness of the discussion. The uncertainty principle merits further discussion.

The mathematical approach is generally mature, including the application of vector analysis and partial differential equations. Analytical methods are explained in accordance with the presumed preparation of the student. However, quantitative descriptions are judiciously utilized and the transmission of ideas is not compromised.

After discussing the electron structure of the atom, a few concepts related to molecular structure and the solid state are exposed. Aside