

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.



Nuclear Criticality Safety

<i>Editor</i>	R. Douglas O'Dell
<i>Publisher</i>	Technical Information Center, Office of Information Services, United States Atomic Energy Commission, Oak Ridge, Tennessee 37830
<i>Pages</i>	181
<i>Price</i>	\$7.60
<i>Reviewer</i>	G. Ronald Dalton

There are two separate parts to his book. The first is a series of technical presentations concerning nuclear criticality safety. The second part consists of edited transcripts of panel discussions concerning philosophy, licensing, management, etc. of facilities where criticality may be a problem.

The technical articles include a survey of historical criticality accidents, concepts of criticality in conventional and exotic isotopic systems, with considerable useful data. There is a presentation of the concept of criticality calculations, calculation of repeating arrays (with many examples), and bias uncertainty in applications of calculations. The final papers concern the roles of management and operating personnel in accident analysis, prevention, and control. Evaluation of multiple sources of risk and the interaction of internal reporting and review with governmental inspection and regulation are also presented.

The panel/work discussions cover a wide range of topics: interpretation of Monte Carlo calculations, procedures and practices, operator training process management, mixed oxides and actinides, shielded facilities, fire protection, and transportation. The final two papers on licensing nuclear fuel facilities and promulgation of nuclear standards, like the discussions, give the broad perspective without being troubled with the technical details.

This publication should certainly be in the library of every nuclear facility and on the bookshelf of those working in the field of nuclear criticality and safety.

G. R. Dalton has a BS and PhD from the University of Michigan and graduated from the Oak Ridge School of Reactor Technology. He has taught nuclear engineering at the University of Florida since 1960. Since 1966, Dalton has been teaching undergraduate nuclear engineering courses, and has a continuing interest in graduate education in the fields of reactor analysis, transport theory calculations, and fuel management.

Power Plants with Air-Cooled Condensing Systems

<i>Author</i>	E. S. Miliaras
<i>Publisher</i>	MIT Press
<i>Pages</i>	237
<i>Price</i>	\$12.95
<i>Reviewer</i>	J. F. Bregar

In this country, there has been little interest in air-cooled condensing systems for power plants except for a few special cases. (The SL-1 Reactor at the National Reactor Testing Station, Idaho Falls, Idaho, had an air-cooled condenser). In the last decade heavy pressure to restrict the discharge of heated water from power plant condensers has stirred considerable interest in air-cooled condensing systems. This timely volume should prove useful to those who wish to know the state of the art.

After a brief introduction, the author describes the principal air-cooled condensing systems: the direct system and the indirect or Heller system. These descriptions are based on plants that have been designed and placed in operation in Europe during the past 30 years.

Also included are chapters on extended surface heat exchangers, cooling towers, spray condensers, and feedwater treatment. Nearly half of the book is devoted to plant performance data and operating characteristics.

An extensive bibliography is included at the end of each chapter. However, the text is not keyed to these references, so that the reader may have some difficulty relating text material to the appropriate reference.

To shorten the gap between manuscript preparation and publication, the plates have been prepared directly from photographs of the author's manuscript. As a consequence, right-hand margins are not justified and many of the illustrations are copied directly from the original articles. The reader will

thus find an interesting assortment of units and scale designations. The text is remarkably free from typographical errors.

All in all, this is an interesting volume and should prove most useful to those who have a need for a general understanding of air-cooled condensing systems but who will not be directly involved in detailed system design.

John F. Bregar, who received his PhD in nuclear engineering at the University of Arizona in 1966, has been a professor of engineering on the faculty of mechanical engineering at Arizona State University since 1965. He has considerable experience in the Naval Reactors Program for the Newport News Shipbuilding and Dry Dock Company and participated in the construction and operational testing of the Shippingport Nuclear Power Station, the prototype for reactor plant for aircraft carriers at Idaho Falls, and on a number of nuclear submarines. His current interests are in nuclear power plant systems.

Annual Review of Nuclear Science

Editor Emilio Segre
Associate Editors J. Robb Grover
 H. Pierre Noyes
Publisher Annual Reviews, Incorporated (1974)
Pages 612
Price \$17.50
Reviewer Joseph G. Gratton

As usual, the editors of the 1974 *Annual Review of Nuclear Science* have put together a group of very fine papers of importance to the nuclear physics community.

Each article meets the series' requirements that the work contain enough original material to justify its presentation. I would be remiss not to note that some articles are very marginal in this regard. The liberal use of references in the articles is excellent for those who wish to seek out a deeper understanding of the areas discussed.

The "Post-Fission Phenomena" review appeared to me to be an especially good summation of the work. In a lighter technical vein, but of no less interest, was Guinn's review of "Applications of Nuclear Science in Crime Investigation." The approach taken by the author was of special interest to this reviewer.

The articles presented in this 1974 Review were all well written and should be of considerable interest to its readers.

Joseph G. Gratton (MS, nuclear chemistry; BS, nuclear physics) is in a management position at the U.S. Energy Research and Development Administration (ERDA) and has been associated with the nuclear science community in both government and industry for 27 years. He has been a major contributor to the publication programs of both the U.S. Atomic Energy Commission/ERDA and the American Nuclear Society.

Science Policy Making in the United States and the Batavia Accelerator

Author Anton G. Jachim
Publisher Southern Illinois University Press at Carbondale and Edwardsville
Pages 208
Price \$8.95
Reviewer V. Lawrence Parsegian

The 1976 fiscal year budget of the U.S. Energy Research and Development Administration (ERDA), which assumed the development responsibilities of what had been the U.S. Atomic Energy Commission (AEC), includes \$17 900 000—for the support of high-energy physics. The interesting aspect is that of this total, \$10 200 000 is earmarked for the Fermi National Accelerator Laboratory (FERMILAB) located in Batavia, Illinois. The money will go toward increasing the accelerator capabilities beyond the 200-GeV (or BeV) particle energies for which it was designed to energies of 400 GeV or higher. How this midwestern region

became the site for a facility that was regarded as "the scientific prize of the century" is the theme of the volume by Anton G. Jachim. It is a case study that carries large implications for the scientific enterprise in the nation's other activities.

The story begins in the 1960's, following two decades of rapid growth of the scientific enterprise through government support. During that period physics and physicists rode the crest. The success of the atomic energy programs had given unusual credibility to the values that derive from basic research. High-energy physicists were especially favored, both through professional prestige and through financial support for one powerful accelerator facility after another, most of which were located on the east and west coasts. The next step was an accelerator facility estimated to cost \$350 million. By then the mood of the nation had changed to become somewhat critical of large annual increases in funds for basic research, and especially critical of grants that seemed always to go to the same established laboratories. (Of course, there was no thought of reducing the support given to the Vietnam war.)

Competition for research funds brought focus on the procedures by which government agency funds were allotted. Clearly the procedures were consonant with the "Matthew Effect," which Robert Merton had derived from the gospel according to Matthew ("For whosoever hath, to him shall be given . . ."). The practice of depending on specialists to review research proposals assured that only those who were recognized as specialists would be supported, thereby tending to limit others to the leavings.

The large state universities of the midwest had achieved considerable reputation for the quality of their graduates, but they were not regarded as research centers. The Midwest Universities Research Association was organized in 1953 to improve that reputation. Now, a decade later, the Association felt ready to make claim to this newest most powerful accelerator and national laboratory that was under consideration. But there was the question of how that claim could be given validity against the claims of powerful universities of California