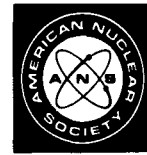


BOOK REVIEWS

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



The Health Hazards of Not Going Nuclear

Author Petr Beckmann
Publisher The Golem Press (1976)
Pages 186
Price \$10.95 hardbound; \$5.95 softbound
Reviewer Hugh F. Henry

This is a *must-read* book for anyone who, preferring an adequate and reliable energy supply to its opposite, needs a source of factually accurate information to counter the all too often lurid scare stories provided by those to whom the book is dedicated—"To Ralph Nader and all who worship the water he walks on." Furthermore, it should be required reading for legislators, especially at the national level, and for communications media leaders, including newspaper and magazine editors and TV producers, as well as their feature writers. No longer, then, could anti-nuclear attacks be justified by a lack of information.

Fortunately, the book is refreshingly understandable and easily read. In place of the low-key understatement of the usual nuclear plant advocate, the author bluntly and forcefully exposes many of the fanciful statements of the anti-nuke fanatics to the cold facts as gathered from reliable sources, which are clearly referenced and easily comprehended. For example, it is a dolt indeed who cannot understand the relative transportation "hazards" involved in moving six truckloads of fuel to a nuclear plant as compared to the 34 000 railcars of coal for equivalent power outputs—or that disposal space is less for the one-aspirin-sized amount of waste from a nuclear plant than for the 320 lb from a coal-fired-plant, both 1 person/yr requirements—or an overall estimate that some 20 to 100 lives per year per 1000 MW of power generation will be saved by using nuclear fuel rather than coal because of the resultant reduction in air pollution; such an estimate comes, of course, from the type of statistical analysis so beloved of the anti-nuke protagonists.

The principal thrust of the author's arguments is that *no* method of energy production is, or can be, completely safe, although none of those in use is excessively hazardous. However, nuclearly generated energy "is far safer than any other form of large-scale energy conversion yet invented."

Furthermore, despite the many years of successful operation of nuclear plants, there has been so vanishingly little untoward experience that the hazard allegations of the nuclear opponents might be described as problematical "What if . . . ?" fantasies. On the other hand, the same is not true for the very real damage and injury experience associated with other energy-production methods or even facets of living. Similarly, the results of the hypothetical worst accidents foreseen for nuclear plants (under conditions proposed by their opponents) pale by comparison with the very real hazards posed by some current practices and installations involved with other energy fuels—and one hopes the horrendous possibilities foreseen for the latter will not be realized, even though there have been some close shaves.

The author "covers the waterfront" of the subject, describing the basics of nuclear power, reviewing hazard allegations up to terrorism, and even including economy and reliability, the latter of which has been so strikingly shown for nuclear power during the past two extraordinarily cold winters. To us midwesterners burdened with a coal strike, nuclear power generation cannot come too soon!

Quoted at the beginning of each chapter is some particularly inane comment from a nuclear opponent, and other similar quotes are included in the text. These, along with the illustrations (generally reproductions of the silly placards and other propaganda of various anti-nuclear groups), would provide moments of comic relief for the reader and thus be laughable were it not for their rather tragic implications.

In the opening chapter on the "Nuclear Monologue" (which should be a dialog!), the interesting fact is noted that, although nuclear opponents claim that scientists are "split down the middle" on the subject of nuclear safety, the fact is that "it is a division between those who know what they are talking about and those who don't." Nuclear scientists, particularly the physicists and engineers and especially those who are members of the principal professional organizations dealing directly with nuclear energy (among them, the Health Physics Society and the American Nuclear Society), are overwhelmingly pro-nuclear. Their opponents, the anti-nukes, are generally *ad hoc* groups that may include some scientists, principally from non-nuclear fields, but also have large representations of ". . . sociologists, politicians, journalists, and housewives," whose claim to scientific expertise is often tenuous at best.

Similarly, the author answers his own question of "Why?" the attacks by observing that their originators seem

to belong to a "new class" of elitist and leftist well-heeled "thinkers" (a "Penthouse Proletariat") who really oppose growth in any form provided they are not themselves inconvenienced. This reviewer notes that such individuals and groups have come under increasing attack recently, whether it be by the NAACP declaring its support for nuclear power or by a recent magazine article analyzing the opposition to more electrical power for the Hudson River valley.

All the pro-nuclear arguments are well-supported by references that seem fully applicable, and this reviewer noted no scientific inaccuracies in the presentation, although the figures for radiation backgrounds superposed on a map of the U.S. (p. 56) seem low.

Repeating, this is a *must-read* book for the mass of information, in readily usable form, packed between its covers. The author's style is much harder hitting than is usual for pro-nuclear authors and thus may not appeal to some, although others will find it most appealing. Now, if only the news media would reprint this book, or some excerpts therefrom, in some of that space that is so regularly wasted by some hack writer of the "news" services, or some columnist, in rehashing the same tired old inaccuracies and worse, then . . .

Hugh F. Henry has been head of the Physics Department of DePauw University since 1961. Prior to that, his responsibilities at the Oak Ridge Gaseous Diffusion Plant included those of criticality safety and health physics. His publications in these general fields include the book, Fundamentals of Radiation Protection, which was published by Wiley-Interscience in 1969. He spent a sabbatical leave during 1968-1969 at the National Reactor Testing Station in Idaho Falls, and spent a similar leave during 1975-1976, with his time divided between the National Radiological Protection Board and the U.K. Atomic Energy Research Establishment, both at Harwell, England. He is a member of the U.S.A. Standards Institute (USASI) Committee on Radiation Protection and has been a U.S. delegate to meetings of the International Standards Organization (ISO) in this field.

Two-Phase Flows and Heat Transfer

(Proceedings of a NATO Advanced Study Institute, August 16-27, 1976, Istanbul, Turkey)

<i>Editors</i>	S. Kakac and F. Maylinger
<i>Publisher</i>	Hemisphere Publishing Corp.
<i>Pages</i>	Vol. I, 547; Vol. II, 542; Vol. III, 374
<i>Price</i>	\$118.00 for three volumes
<i>Reviewer</i>	Pasquale M. Sforza

This collection of papers is essentially the Proceedings of an Advanced Study Institute on Two-Phase Flows and Heat Transfer sponsored by the NATO Scientific Affairs Division, the Scientific and Technical Research Council of

Turkey, the Turkish Atomic Energy Commission, and the Middle East Technical University. This meeting, planned as a forum for advanced instruction on two-phase flows, particularly involving heat and mass transfer, was held at the University of the Bosphorus, Istanbul, during the period August 16-27, 1976. The format of the meeting included in-depth invited lectures as well as a number of contributed papers. The meeting was described as an international forum, with 140 participants from 22 countries listed as in attendance. It is interesting to note that fewer than 10% of the attendees were from the U.S., and among these only five universities were represented.

These three volumes present 54 papers in 1453 pages, an impressive quantity of material. The editors offer two formats for consideration of the areas covered in the meeting. The first is that which gives chapter headings to the three volumes: Generalities and Two-Phase Flow Instabilities in Vol. I; Two-Phase Flow Heat Transfer, Burnout, Transient and Film Boiling, Augmentation of Heat Transfer, Industrial Applications of Two-Phase Flow, and Nuclear Reactor Safety in Vol. II; Boiling Phenomena, Modeling Studies, Heat Transfer and Pressure Studies, and Unsteady Flows and Reactor Applications in Vol. III. Also included at the end of Vol. III is a chapter entitled "Research Recommendations," in which a group of researchers present suggestions for further research and describe urgent problems in two-phase heat and mass transfer. A second topical guide is offered by the editors under the following headings: Equipment and Applications, Instabilities, Measurements and Instrumentation, Models and Scaling, Nuclear Reactors and Power Plants, Patterns and Regimes, Reactor Safety, Theory and Correlations, and Thermophysical Properties. Those papers dealing with a given topic are listed alongside the heading.

The first portion of Vol. I begins with two papers dealing with general features of two-phase flow, description of the different regimes of flow, and effects of two-phase flow on heat transfer. Various measurement techniques useful for two-phase gas-liquid flows and derivations of the equations that describe such flows are the subjects of the six following papers. Scaling criteria for two-phase flows are covered next, followed by papers on constitutive relations. Two extensive papers, one on "Momentum Exchange and Pressure Drop in Two-Phase Flow" by L. Friedel describing extensive correlations, and another, "Single-Phase and Two-Phase Flow Behavior in Primary Circuit Components" by J. G. Collier, describing the performance of such components as bends, tees, manifolds, etc., in two-phase flow situations, are included. The final portion of Vol. I concerns two-phase flow instabilities and begins with a detailed "Review of Instabilities in Two Phase Systems," by A. E. Bergles. Three papers on particular cases of two-phase flow oscillations and instabilities follow.

Volume II begins with a section on two-phase flow heat transfer, which is concerned primarily with boiling phenomena. Experimental results are extensively quoted, including interesting photographs of boiling regions immersed within thermal boundary layers in "Two-Phase Boundary Layers in Subcooled Boiling" by M. Cumo. This is followed by a section devoted to problems of burnout, which includes a two-part review on pool boiling systems and on subcooled and low quality forced convection systems by A. E. Bergles. Next are two extensive reviews, one on post-dryout heat transfer by J. G. Collier and one on augmentation of two-phase heat transfer by A. E. Bergles. Also reviewed are