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.

Proceedings of the Atoms for Peace Award, 1957-1969

Editor	James R. Killian, Jr.
Publisher	The MIT Press (1979)
Pages	327
Price	$15.00
Reviewer	D. A. Bromley

The establishment of the Atoms for Peace Award was announced at the First World Conference on the Peaceful Uses of Atomic Energy held in Geneva, Switzerland, on August 8, 1955, by Admiral Lewis L. Strauss, chairman of the U.S. Atomic Energy Commission, and head of the American delegation to the Conference. The awards and this Conference grew from the presentation of President Dwight D. Eisenhower to the United Nations in New York, on December 8, 1953, in which he pledged the determination of the United States "to help solve the fearful atomic dilemma—to devote its entire heart and mind to find the way by which the miraculous inventiveness of Man shall not be dedicated to his death, but consecrated to his life."

On July 20, 1955, President Eisenhower, at the dedication of the Research Reactor Building in the Palace of Nations in Geneva, Switzerland, again turned to this topic: "I hope that private business and professional men throughout the world will take an interest and provide an incentive in finding new ways that this new science can be used—for the benefit of mankind, and not destruction."

Responding to this challenge, Henry Ford II and his fellow-grandsons of Henry Ford—Benson Ford and William Clay Ford—proposed to the directors of the Ford Motor Company that an appropriation of $1 million be authorized, at a level of $100 000 annually for each of ten years, to foster the advancement of the science of atomic energy for peaceful purposes. The directors responded favorably to this initiative and a non-profit corporation was created to receive and administer the funds, and was given the name, "Atoms for Peace Awards," a memorial to Henry Ford and Edsel Ford, on August 12, 1955. James R. Killian, Jr., then president of the Massachusetts Institute of Technology, accepted Henry Ford II's invitation to serve as chairman of an Organization and Planning Committee and, subsequently, chairman of the Board of Trustees of the Atoms for Peace Awards. The directors of the Ford Motor Company fund suggested that, in each of the ten years, Atoms for Peace Awards be made to selected individuals recognized as having made outstanding contributions to the peaceful uses of the atom, and that the annual award carry, in addition to a suitable medal to be designed and cast for the purpose, an honorarium of perhaps $75 000. Over the period of 12 years, from 1957 to 1969, 22 persons received these awards, and the present volume records the tributes, the citations, the responses, and the addresses that were given at the ceremonies in which these awards were conferred.

Reading this book in 1979 is a startling and nostalgic experience for anyone involved with the nucleus and nuclear energy. It is difficult to recognize what a profound change the decade of the seventies has produced in public opinion, particularly in the United States. When these awards were given, they were given in recognition of advancement in the nuclear arts, then recognized as a major contribution to the long-term well-being of mankind. What was true in the 1950's remains true for the 1980's. The chaining of nuclear energies for peaceful uses, the production of radioisotopes, without which nuclear medicine would have been completely unable to make its giant strides toward the alleviation of human suffering, still represent tremendous contributions to human well-being. What has changed in the intervening quarter century is public perception of the role of the peaceful atom.

In part, responsibility for this change must rest with those of us in nuclear science and engineering who have not devoted sufficient time to making readily available to an interested public the advantages and disadvantages presented by the remarkable developments in our field. Lacking authoritative, clear, incisive statements, the field has been left open for a broad spectrum of misinformation and, often, emotional rhetoric.

Reading this volume provides a welcome sense of perspective. In his Preface to the volume, Killian says, "As I read through these Proceedings with the perspective of the years that have elapsed since the awards were made, I am impressed by the historical value of the material and the importance of its being brought together in accessible form. Ideas, insights, and information not easy to come by

are to be found in this material, and it is interesting to compare the views expressed when the awards were made with current views about nuclear technology and policies."

The typical format of the awards ceremonies involved a presentation of the accomplishments of the recipient presented by an outstanding colleague also of worldwide renown. This was followed by the reading of the citation and a response from the recipient, and the ceremony closed with remarks by one or two distinguished speakers, who, typically, spoke on matters of national policy and human need.

I shall not attempt to list the contents of this remarkable volume; the flavor can be gained from the ceremony at which the first Atoms for Peace Award was conferred on Niels Henrik David Bohr. Here the presentation of the recipient's accomplishments was made by John Archibald Wheeler, and the remarks following the award were made by President Eisenhower and Arhur Hawley Compton. Wheeler's remarks were entitled, "No Fugitive and Cloistered Virtue," and Compton's, "Nuclear Energy and the Growth of Man." The last award, in 1969, was given to President Eisenhower, and his tribute presented by Killian.

It would be difficult to quarrel with any of the selections made by the Board of Trustees. The recipients' contributions speak for themselves, and their gracious responses to the Award speak directly to the breadth of interest, the deep sense of responsibility that characterizes these 22 outstanding men.

This volume, edited by James R. Killian and published by the MIT Press, is indeed a fitting tribute to Henry and Edsel Ford, as well as to the 22 recipients. It is a volume that will be read with great enjoyment and profit by anyone involved in nuclear science or nuclear engineering. Killian and the MIT Press are to be congratulated for making this remarkable cross section of the beginning of the era of the peaceful atom available to a wide public.

D. A. Bromley is the Henry Ford II Professor of Physics and the director of the Wright Nuclear Structure Laboratory at Yale University. He is a director of UNC Resources, Inc., of the United Illuminating Co., and of several other organizations; he is currently vice-president of the International Union of Pure and Applied Physics and president-elect of the American Association for the Advancement of Science.

Energy Conversion Engineering

Author	Richard C. Bailie
Publisher	Addison-Wesley Publishing Company (1978)
Pages	537
Price	$19.50
Reviewer	Alfred Schneider

The intensive preoccupation with energy problems during the past decade has spawned many new courses in energy conversion engineering at most institutions of higher learning. Unfortunately, there has been a dearth of suitable textbooks, notwithstanding the continuing proliferation of books, studies, and reports devoted to many aspects of energy conversion. This book is intended as a textbook for senior level students in engineering or the physical sciences. As stated by the author, the emphasis on coal is due to his familiarity with this energy source as well as to the widely held belief that coal will be the major fuel for the next century. The chemical engineer's point of view of energy matters prevails throughout the book.

A concise historical review and an introduction of simple energy conversion calculations are followed by a brief presentation of the energy demand and supply situation. The treatment of thermodynamics, chemical equilibrium, and chemical reaction kinetics is quite thorough. Most engineering seniors will have covered the laws of thermodynamics in earlier courses, for which several excellent texts are available, and the two other topics will be of limited interest to nonchemical or petroleum engineering students.

By contrast, the chapter on the combustion of fossil fuels is quite cursory; only a few pages are devoted to the conversion of heat to power and magnetohydrodynamics (MHD) generators and fuel cells are only briefly described. An excellent survey is given of coal gasification and liquefaction systems, including descriptions of equipment, operation practices, and a review of their current status. The chapter on nuclear energy provides a good introduction to the subject with a proper balance of theory, engineering, and operational and safety aspects. The author avoids any partisanship in the "nuclear controversy" by presenting those facts that can be quantified as well as identifying the issues that are a matter of debate.

The principles of solar energy are briefly introduced and several collector types (flat plate, focusing, and satellite) are analyzed. Only superficial treatment is given to energy storage, photovoltaic, and biomass conversions. The chapter devoted to environmental considerations, though limited to fossil fuel combustion, is probably the most useful in this text. Pollution sources, dispersion mechanisms, abatement equipment, and cost-benefit tradeoffs are thoroughly treated and numerous calculational examples are provided.

Only three pages are devoted to economics, politics, and social implications. The author believes that a discussion of economics should be avoided because of rapid changes and that only a "simplistic approach" would thus be provided, in contrast with "the laws of conservation of mass and thermodynamics, which will remain invariant, whatever future policies may be." The text contains many calculational examples, with the solutions presented in tabular form. Each chapter also provides many generally good problems for student assignments. The text is largely devoid of bibliographic references. Omitted from the text are important modes of energy conversion, such as hydroelectric power, internal combustion engines, electric storage batteries, thermoelectric generators, etc.

The book is a photoreproduction of a typed copy, the figures are simple line drawings, both British and SI units are used, and the style is frequently succinct. Thermodynamic data, a primer on material balances, and conversion factors are provided in the Appendix.

Energy Conversion Engineering is one of the better texts to have appeared in recent years. As a textbook it will be useful to chemical engineers, but coverage of several important topics may require supplemental texts.