Book Reviews

Annual Review of Energy: Volume 2. Jack M. Hollander, Editor; Melvin K. Simmons and David O. Wood, Associate Editors. Annual Reviews, Inc., Palo Alto, California (1977). 521 pp. $17.00.

This is the second in a series of annual reviews devoted to a continuing review and discussion of significant issues related to energy. Volume 1 was devoted to a review of energy technologies and policy issues related to the production and use of energy in the U.S. This second volume is devoted to the global energy situation and the complex of international and national issues arising from the diversity of production, trade, and demand for energy. The book is well planned and executed and constitutes a valuable reference volume and data source for world energy concerns.

The book opens with an overview section on global energy resources and the complex global energy system based on them, with a separate chapter devoted to the history and current dimensions of international energy trade. This is followed by three chapters devoted to economic and political issues growing out of the policy alternatives for the major energy importing nations, the role of multinational oil companies, and a survey of computer models of the global and international energy system.

These two sections are followed by chapters on the intimate dependence of food on energy, the potential effect on world climate of CO_2 from the burning of fossil fuels, the problem of international safeguards of nuclear fuels, and the potential for conservation of energy.

The last half of the book is made up of a group of well-informed and excellent papers on energy problems and issues of particular regions. The regions covered are Central America, the People's Republic of China, Western Europe, India, Japan, the OPEC countries, Sweden, and the USSR. Each is written by an expert or experts in the industrial, economic, social, and political structures of the region they cover. They reveal as no other approach could the great diversity of energy issues among different sections of the world, as well as the diversity of attitudes and approaches for their resolution. Such a collection could not aspire to be comprehensive, but it is somewhat unfortunate that it did not also include Brazil. The same type of treatment for North America has previously been included in Vol. 1.

This is an authoritative, well-planned, and carefully executed contribution to the important field of global energy policy analysis. Within the immense volume of published material in this field, this book should be given a very high priority for the libraries of individuals and institutions working in this field.

William G. Pollard

Oak Ridge Associated Universities
Institute for Energy Analysis
Oak Ridge, Tennessee 37830

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About the Reviewer: W. G. Pollard, now retired from the executive directorship of Oak Ridge Associated Universities (originally ORINS), was instrumental in forming that conglomerate, which has been influential in furthering the sciences in the southeast. That service followed contribution, during the war years, to the development of the gaseous-diffusion separation process of the uranium isotopes. Dr. Pollard's graduate training in physics was at Rice, which was followed by a professorship at the University of Tennessee.

Isotope Separation. By Stelio Villani. American Nuclear Society, La Grange Park, Illinois (1976). 416 pp. $29.80.

The publication of American Nuclear Society monographs has the goal of "providing to the nuclear community and related fields authoritative information in monograph form." This goal is well served by the publication of *Isotope Separation*, authored by Stelio Villani. This monograph brings together a wealth of information about isotope separation drawn from many sources. It provides the reader with material relating to the scientific, engineering, and economic aspects of several important techniques for isotope separation. The major processes currently in use for large-scale isotope separation are presented in a reasonably complete fashion as they existed in the early 1970's. In many areas, the author is hampered by security classification and thus is limited to material available in the published scientific and technical literature. Nevertheless, within this limitation, Villani succeeds in transmitting to the reader the nature and magnitude of a relatively new industry that is currently an important part of our society.

The monograph begins with three introductory chapters describing the isotopic makeup of the elements, methods of isotopic analysis, and the physical principles of isotope separation. In the third chapter, some basic nomenclature is introduced, and the physics and chemistry of a group of isotope separation processes are briefly discussed. This chapter is not one of the better chapters in the book. As often happens, an attempt to oversimplify the physics of some phenomenon can lead to statements that are misleading or incorrect. For example, on p. 35 the author states that in a gas mixture in thermal equilibrium, the square of the mean velocity of the various molecules is inversely proportional to the square root of the mass, while on p. 69 we find a statement that the flow rate for Poiseuille flow through a capillary is proportional to the square of the pressure drop. These are incorrect and probably represent an oversight in proof reading. A more serious error appears in the discussion of thermal diffusion on p. 75. Here, the author's "simplistic view" of the physics of thermal diffusion presents instead the mechanism of thermal transpiration (a transport induced by a temperature difference under free molecule conditions), which bears no relation to the process of thermal diffusion in a gas mixture under continuum conditions. Fortunately, these errors do not propagate into the remainder of the monograph, and ultimately the reader can find the correct equations for the analysis of the