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Energy and the Future

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Book Reviews

Energy and the Future

by A. L. Hammond, W. D. Metz and T. J. Maugh.
American Association for the Advancement of Science, 184 p., 1973.
$7.95 for hard cover, $3.95 for soft cover.

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Encased in a black cover with the word "Energy" diminishing in prospective, the first impression is one of foreboding. *Energy And The Future* is a summary of all present and future expectancy of energy forms available to mankind. In the present storm over shortages, the writers even make the novel suggestion that "Energy conservation seems destined to become as popular as protection of the environment."

Energy And The Future is a six part treatise of the energy problem considering in turn, Energy From Fossil Fuels; Nuclear Energy; Alternative Energy Sources; Energy Transmission; Energy Conservation; and Energy Policy. Each subject is treated with a minimum of text and a maximum of imput leaving the reader with a reasonable grasp of the alternatives for the hydrocarbon era and their respective social and economic costs. In the more technically exacting energy forms, the reader cannot help but conclude substantial research, involving time and funding, will yet be required before man truly conquers the energy problem through either fusion or solar energy, or possibly both. In the section "Energy From Fossil Fuels", the authors conclude "sheer inertia alone would enable petroleum to maintain its dominance of the energy market for as long as available." Price increase of crude oil since the book was written would satisfy the stated minimum price for shale oil extraction but there is little evidence this value would serve as a price ceiling on imports. "For all practical purposes then, a shift away from petroleum will mean a shift toward coal."

The book describes in some length the coal supplies available in the United States and the principal thrust of research. To date these have been directed to coal gasification, pyrolysis and solvent or hydrorefining. All systems are described in some detail but the authors leave little doubt, "Gasification thus stands by far the best chance of being the first commercial coal conversion technology". To further emphasize the expectancy for coal the presently known technology on gasification, power gas, and combined cycles, and magnetohydrodynamic power, is reviewed.

Part II of *Energy And The Future* presents the current and expected role for nuclear energy. The introductory quote of Alvin Weinberg, Director, Oak Ridge National Laboratory, "We nuclear people have made a Faustian compact with society: we offer . . . an inexhaustible energy source . . . tainted with potential side effects that, if uncontrolled, could spell disaster," can only leave the reader somewhat apprehensive. It is obvious there remains extensive and expensive research necessary to solve outstanding problems. Present fusion systems embracing the light water reactors (LWR) and the liquid metal-cooled fast breeder reactor (LMFBR) are described. "The LMFBR program consumes almost half of all federal research expenditures of energy technology and is accorded the highest priority by President Nixon." Breeder reactors, the hope for the future, are described and of the systems considered it would appear the liquid metal fast breeder reactor (LMFBR) has the inside track, however, there is little doubt the authors would prefer examination of other alternatives and systems.

Alternative energy sources embrace solar, geothermal, photovoltaic cells and fuel from waste material. Although these possibilities are not new, they are now treated with a little more respect, if not credible urgency. The reader could not escape the feeling that science attacks the most difficult solution to the energy problem whereas the safest, although not the most glamorous, could be the omnipresent systems provided by natural sources, particularly solar. Magnetic containment fusion, laser fusion, energy transmission, fuel cells, and hydrogen, are each covered in turn and offer an insight to each subject.

Energy And The Future offers a concise review of energy problems and the expectancies for their resolution, both in time and research. It was stated by Dr. I. C. White in an address to the Conference of Governors in the White House, May 13 to 15, 1908, "For just as sure as the sun shines, and the sum of two and two is four, unless this insane riot of destruction and waste of our fuel resources which has characterized the past century shall be speedily ended, our industrial power and supremacy will, after a meteor-like existence, revert before the close of the century to those Nations that conserve and prize at their proper value their priceless treasures of carbon." Messrs. Hammond, Metz and Maugh propose other alternatives to coal but the reader of *Energy And The Future* closes the book with the same resolution that energy, in whatever form, must be utilized with greater respect and concern.

MS received, December 7, 1973.