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ICEBERG UTILIZATION

A. A. HUSSEINY, Ed.

New York: Pergamon Press, 1977. Pp. 759. \$35.00 s.c.

The concept of utilizing icebergs as a fresh water resource has been evolving from the idle curiosity of a few academics to the more pragmatic "how to" concerns of water-short countries such as Saudi Arabia. For the reader interested in a comprehensive treatment of the current physical, engineering, economic, environmental, political and legal thoughts on the concept, there is no better reference source than this compilation of 54 papers formally presented at the First International Conference and Workshops on Iceberg Utilization for Fresh Water Production, Weather Modification and Other Applications (Iowa State University; Ames, Iowa; October 2-6, 1977). The Iceberg Conference gathered an international, multi-disciplinary group of participants to discuss the merits of iceberg exploitation.

The physical and engineering aspects of iceberg utilization rightfully constitute the bulk of this conference proceedings book, as the extent of knowledge in these disciplines is the limiting factor in early research and development efforts. The papers by Bader and Weeks sound a healthy note of pessimism on problems involving iceberg melting and fracturing during transit, stressing the need for properly sized icebergs, a secure means of towing and insulation. The offerings on iceberg tracking and selection appear to reach a consensus that airplane sensing is the most feasible means of selecting properly sized icebergs. Various means of towing are discussed, including conventional towing by tugboat, a 20th century version of the paddle-wheel riverboat, turbines relying on osmotic and thermal gradients, and sea floor-mounted winches, without a clearly superior technology being identified. Foamed plastic insulation was recommended over plastic wraps to protect against in-transit iceberg melting/fracturing and to reduce drag.

The papers also reveal a variety of methods for processing an iceberg into liquid water. Single use suggestions include electro-thermal cutting, blasting, mechanical cutting and crushing. Alternatively, icebergs could be used as a heat sink for energy production by photovoltaic cells, turbines or nuclear power, thereby enhancing iceberg melting. The need for a stable supply of iceberg water was stressed.

Due to the early stage of development in these diverse iceberg utilization technologies, economic cost projections and environmental impacts are not extensively documented. Rough estimates suggest that iceberg water may be economically viable for some in-

dustrial and municipal users in accessible arid areas, but further research and pilot projects would be necessary to define more completely the economic feasibility of iceberg water. Aside from some localized environmental impacts at the iceberg processing and receiving sites resulting from thermal and salinity variations, the environmental consequences of iceberg utilization do not appear to be severe at this stage.

The book provides three articles on the legal aspects of iceberg utilization. William W. Bishop, Jr., Professor Emeritus at the University of Michigan Law School, offers a succinct analysis of the international law problems. Bishop describes the conflicting, uncertain national claims to Antarctic sectors and the "deep freeze" placed on these claims by the Antarctic Treaty of 1959. The confusing issues of the geographical extent of the Antarctic Treaty regime and the application of territorial sea/exclusive economic zones to Antarctica are highlighted. He hesitantly concludes that a non-Treaty State, such as Saudi Arabia, could harvest calved icebergs at the limit of the Antarctic ice shelves, though prudence might suggest obtaining the permission of the claiming State. The articles by Chamoux and Burton are more emphatic on securing iceberg harvesting permission or harvesting on the high seas. Bishop and Chamoux are in accord that iceberg transit could be accommodated with other ocean uses. While the three articles adequately summarize the legal issues facing iceberg exploitation, those interested solely in the legal aspects of icebergs might choose to consult a recent *Natural Resources Journal* article instead.¹

In conclusion, *Iceberg Utilization* is recommended for the reader interested in a multi-disciplinary treatment of the subject, focusing primarily on physical and engineering studies. The Iceberg Conference proceedings reveal an emerging, untested set of technologies which may provide a limited answer to fresh water shortages.

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1. Lundquist, Thomas R., "The Iceberg Cometh?: International Law Relating to Antarctic Iceberg Exploitation," 17 Nat. Res. J. 1 (1977).