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.

Tritium in the Environment

Publisher National Council on Radiation Protection and Measurements (1979)

Pages 125

Price $5.00

Reviewer Geoffrey G. Eichholz

This monograph is a recent addition to the well-known series of the National Council of Radiation Protection and Measurements (NCRP) reports and was prepared by an authoritative committee. It represents a welcome update on Jacobs' 1968 monograph and is a useful summary of the status of the field. Because of its format as a summary report, its coverage is rather too concise in many places and the reader has to refer to the extensive bibliography for a more detailed exposition. This is particularly true for such subjects of current interest as tritium generation in reactors, the control of tritium in reactor coolants and effluents, and its ultimate disposal.

There is a useful discussion on the physical transport of tritium in the environment, environmental models, and the biology of tritium exposures. For sampling and measurement techniques, the reader needs to refer to NCRP Report No. 47, which supplements this volume.

As it stands, this booklet is a valuable summary of the state-of-the-art in an area that is receiving increasing public attention, and is a worthy addition to the NCRP series.

Geoffrey G. Eichholz is Regents' professor of nuclear engineering at the Georgia Institute of Technology, which he joined in 1963. He obtained his PhD in physics at the University of Leeds, England, and was awarded the DSc degree in 1979. Dr. Eichholz is a fellow of the American Nuclear Society and a past chairman of its Isotopes and Radiation Division. He has edited the book Radioisotopes Engineering *and is the author of* Environmental Aspects of Nuclear Power *and* Principles of Nuclear Radiation Detection, *both published by Ann Arbor Science Publishers. His research interests include the migration of radioactive wastes, environmental surveillance problems, radiation detector development, industrial radiation application, nuclear materials technology, and the health physics of nonionizing radiations.*

Proceedings of the Workshop on Low-Flow, Low-Permeability Measurements in Largely Impermeable Rocks

Publisher Organization for Economic Cooperation and Development (1979)

Pages 306

Price £7.80

Reviewer G. G. Eichholz

The safe disposal of high-level radioactive wastes is seen by many as one of the key factors needed to obtain easier public acceptance of nuclear power. While it can be argued that the technology for immobilization of concentrated wastes and their emplacement in deep geologic sites has been at hand for many years and that the outstanding problems have been primarily political and economic in nature, the need to choose acceptable geologic media and sites has drawn attention to the limited knowledge available regarding the characteristics of deep groundwater and the properties of the rocks through which it is moving. Many geochemists will maintain that there is no such thing as a "representative" rock and mining engineers have difficulty characterizing an undisturbed, yet fractured, rock body. Yet, any attempt to predict a long-range movement of radioactive waste materials from a glassy matrix in an initially dry repository has to assume some invasive water and to chart its subsequent movement through the surrounding rock strata. The need to obtain such information on a previously rather obscure branch of groundwater geology and rock mechanics stimulated research work of the type reported at the Paris workshop. It is gratifying that the proceedings have been published so promptly in an unpretentious format.

The book contains the full text of some 16 papers and extensive discussions. The authors come from Canada, Finland, France, Italy, Sweden, the U.K., and the U.S., including several papers with multinational authorship. The results are impressive. There are some detailed accounts of the groundwater flow tests in granite at the Stripa mine in Sweden, which are among the most extensive *in situ* tests anywhere. I. W. Marine reviews geohydrologic measurements on deep water near the Savannah River Plant in South Carolina. A group from Waterloo, Ontario, describes groundwater regimes in six widely dispersed locations in

southeastern and central Canada. Models for fractured rock flow and heat transfer in slow-flow modes are discussed in a joint Canada-U.S.-Swedish paper and flow profiles are described for solute transport through finely fractured media in another Canadian paper. A British paper discusses thermally induced water movement around a repository. Several papers deal with the effects of jointing of different crystalline masses; it is evident that it is difficult to generalize regarding the type of flow to be expected, though one group suggests treating fractures in deep, hard rock as an equivalent effectively porous permeable medium.

The papers as a whole present a good overview over the state-of-the-art; however, together with the roundtable discussion, which is reproduced in full, they also indicate how many gaps there still are in our understanding of fractured rocks and their permeability to water.

This is a valuable contribution to the present literature on waste disposal. It is more technical and less self-serving than many other conference proceedings that are appearing on the subject at present and can be highly recommended to all specialists in the field.

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Radiostrontium Movement in Soils and Uptake in Plants

Author C. W. Francis

Publisher Technical Information Center, U.S. Department of Energy (1979)

Pages 131

Price $4.75

Reviewer Gregory R. Choppin

This review of the ecology of radiostrontium is directed primarily to soil scientists and plant physiologists and does not cover radiostrontium in food chains of man. Within this limitation, the author provides a comprehensive and well-organized evaluation of the studies reported over the last two decades. A considerable effort was devoted to inclusion of Russian literature, which certainly adds to the comprehensive and authoritative value of this review.

The book is divided into six chapters covering the distribution, movement, and mechanism of sorption of radiostrontium in various soils and plants. The author is to be congratulated on an outstanding job of collating the mass of studies—often only fragmented measurements on particular samples—into rather reasonable patterns of the radioecology of strontium. Each chapter concludes with a brief summary in which a more subjective evaluation is given compared to the fairly straightforward reporting in the body of each chapter. In fact, these brief evaluations show so much insight that the reader may wish that the author had practiced his subjectivity more often as he describes the many studies. However, the carefully organized presentation often leads the reader to an implicit evaluation.

This book is worth many times its price and should become familiar not only to workers in radiostrontium studies but equally well to those concerned with the geochemical and ecological behavior of the actinide elements, since many of the strontium results can be related to analogous systems of these elements.

Gregory R. Choppin received his PhD from the University of Texas and after a post-doctoral period at the Lawrence Radiation Laboratory, Berkeley, joined the faculty of Florida State University, where he is professor of inorganic and nuclear chemistry. He has spent a year at the Center of Nuclear Research, Mol, Belgium, and recently returned from sabbatical leave at the Institute for Transuranium Elements, Karlsruhe, Federal Republic of Germany. He is the author of approximately 100 articles in nuclear and radiochemistry and of 3 books. At present he is a member of the Technical Review Committee for the Chemistry Technology Division of Oak Ridge National Laboratory. He has served as chairman of the Division of Nuclear Chemistry and Technology of the American Chemical Society and is chairman of the Subcommittee on Radiochemistry of the National Research Council.