

BOOK REVIEWS

Selection of books for review is based on the editors' opinions regarding possible reader interest and on the availability of the book to the editors. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.



OF QUESTIONABLE VALUE

Title Chemical Analysis of Radioactive Materials*

Authors A. K. Lavrukhina, T. V. Malysheva, and F. I. Pavlotskaya

Publisher Chemical Rubber Co. Press, 1967

Pages v + 386

Price \$13.25

Reviewer Harmon L. Finston

The authors have attempted, in the words of the publisher, to summarize and generalize the known facts of the subject based on their 15 years of personal experience in this field. To one with almost 25 years in this field of radiochemical analysis, it would seem that the subject is much too large to be adequately covered by even the cumulative experience of all three authors, expert though they are. The authors, in the preface, are much more modest, implying only that this present work is the most comprehensive heretofore published. They have indeed ranged widely, but unfortunately the treatment of the various topics is too often inadequate.

Chapter 1, "State and Behaviour of Radioelements in Solution," is a good reminder to the experienced radiochemist of the importance of taking into account all the possible

*A translation by Scripta Technica of "Radiokhimicheskii analiz" originally published by the U.S.S.R. Academy of Sciences, Moscow.

valence states of an element that can result from nuclear reactions and/or radiation effects. However, the discussion of the theory of ion exchange does not seem particularly pertinent since it is not a subject unique to radiochemistry and is well described in the many references cited. A thorough discussion of radiation effects on ion exchange materials and of the greater resistance to radiation damage exhibited by inorganic ion exchangers would have been more valuable. Reference to the pioneering work of Schwab and his co-workers would have been appropriate in the subsequent discussion of inorganic ion exchangers in Chapter 2.

Solvent extraction processes and their classification, and precipitation from homogeneous solution, inter alia, are discussed in Chapter 2 with too much brevity and ambiguity. It is more than likely that much of the difficulty is due to the translation which is perfectly good English, but does not correspond to the familiar chemical usage. This is a general criticism of the book. A few typical examples include the alternation between "disintegration of uranium with thermal neutrons" and "fission," the use of the expression "fragments of the fission of uranium" instead of the more familiar and euphonious "fission fragments," and the reference to the "impoverishment of the solution" instead of the "depletion in concentration of a reagent." The statements made in Chapter 2 regarding the greater solubility of certain hydroxides when exposed to radiation and the apparent formation of solid solutions of certain sulfides are not explained, and the meager references are unfamiliar.

A general comment about Chapter 3, "Methods of Identifying Isotopes," is that it is insufficient for the neophyte, superfluous for the expert, and awkward at best. The attempt to compress the whole theory of beta decay into approximately four pages is hardly successful. A more logical order of presentation would have discussed half lives before decay schemes. The discussion of the resolution of complex mixture implies an unfamiliarity with the capabilities of multichannel analyzers and Li drifted germanium detectors. The use of solid state devices for gamma detection is described only for dosimetry.

Chapter 4, "The Isolation and Concentration of the Radioelements," very briefly (to be exact, in 22 pages of which 8 are taken up by diagrams), outlines general methods for the concentration of radioelements from natural materials, and methods for analysis of mixtures of the radioelements. The chemical procedures for the separation of the individual radioelements, described in Chapter 5, are, in general, mere recipes, with no explanation of the nuclear reaction products and radioactive daughter products to be expected or even of the chemical reactions involved.

The book suffers greatly from a lack of proofreading, editing, and the prevalence of almost illegible figures, all of which one would have expected the publisher to correct. Considering the availability of the generally competent monographs of the National Research Council Nuclear Science Series, the contribution that this work makes is questionable.

Professor Finston has been engaged in radio-nuclear and analytical chemistry since 1943 when he joined the Manhattan Project at the University of Chicago. During 1945-1950 he was Research Assistant in the Departments of Chemistry and Physics at Ohio State University and was responsible for the separations of cyclotron-produced radioisotopes. From 1950 to 1963 he worked at Brookhaven National Laboratory, becoming Head of the Radiochemical Analysis Section of the Hot Laboratory Division. In 1963 he was appointed Professor of Chemistry, Graduate Division, Brooklyn College of The City University of New York.

KILOWATTS BY THE GALLON

Title Water Desalting and Nuclear Energy

Author Michel d'Orival

Publisher Verlag Karl Thiemig KG, 1967

Pages v + 197

Price DM 14.80

Reviewer Barnett F. Dodge

This small pocket-sized (4- × 7-in.), paper-covered book packs a surprising amount of useful information. It is divided into four parts. The first deals with the water demand and supply around the world and includes some discussion of the economics of supplying fresh water. The second part, which comprises somewhat more than one-third of the book, is concerned with saline water conversion. It contains a discussion of the theoretical minimum energy requirement for conversion and reasons for the much larger practical requirements, a review of the main desalting processes and evaluation of them from the standpoint of energy consumption, scale, corrosion, heat transfer, materials of construction, fluid circulation and mass transfer, and a discussion of the present status of desalting plants around the world.

The review of processes is an excellent concise description of the

principles, illustrated by simplified flowsheets, of 13 processes classified under the general heads of distillation, crystallization, solvent extraction, membrane and ion exchange. Only processes showing economic promise are included. Table 18 summarizes the salient facts about the processes, and Table 19 provides information on 52 plants having capacities of 250 000 US gallons or more per day in actual operation. A number of other tables in this section summarize much useful information on the three processes that have reached the industrial stage.

Part three discusses the potential role of nuclear energy in desalting. It includes technical and economic data on various proved reactor types, a discussion of nuclear fuel cycles, various concepts for coupling desalting plants to nuclear reactors, a discussion of dual-purpose installations, i.e., those that produce both electric power and fresh water, and a comparison between nuclear and conventional desalination processes.

The fourth part is concerned with various practical aspects of nuclear dual-purpose installations. Methods of allocating cost between power and water are examined in some detail. A typical schedule for the development of a nuclear dual-purpose project is presented in graphical form and discussed with relation to the decisions that have to be made in the promotion of such a project. Various programs and specific projects for the use of nuclear energy are discussed, and, finally, a table summarizes technical and economic data on six proposed plants. An Appendix shows photos taken at five operating plants and of a projected plant for Israel.

The book is well organized and well written and this reviewer could find no errors of significance. Naturally, much of the treatment has to be superficial, but for anyone who wishes to get a good picture of the current situation on desalination, and especially the relation of nuclear energy to it, should consult this book.

Dr. Barnett F. Dodge, distinguished educator, scientist, and engineer, is Emeritus Professor of Chemical Engineering at Yale University. In addition to his ScD from Harvard (1925), he holds honorary

degrees from Yale, Worcester Polytechnic Institute, and Toulouse University. He has lectured extensively, here and abroad as a US State Department and Fulbright lecturer, and as the Reilly lecturer, University of Notre Dame. Interested in the treatment of saline water and industrial waste water, among many other things, he has been consultant to the Office of Saline Water, US Department of the Interior, since 1954.

IMPROVING YOUR WRITING

Title Communicating Technical Information

Author Robert R. Rathbone

Publisher Addison-Wesley Publishing Company, 1966

Pages vii + 104

Price \$1.95

Reviewer Jules B. Godel

What would you do if, just after accepting the Assistant Editorship of *Nuclear Applications* and submitting your first paper to that journal, your "editor-boss," with pained expression, asked you to review this book? Feigning self-confidence, I took on the task.

The book, according to the author, "has a modest function: to serve as an inexpensive self-improvement guide for engineers and scientists whether on the job or in the classroom." Coverage includes improving the writing of abstracts, titles, technical descriptions, conclusions, and recommendations. The text also details how to eliminate mechanical noise,^a edit someone else's writing, and organize subject matter effectively.

The chapter on semantic and mechanical noise, written from the reader's viewpoint, was particularly useful, and my complaint is that the author didn't expand this important section. Semantic noise covers choice of correct words, clarity, avoidance of roundabout expressions

^aDefined as factors which alter the intended message.