"cation" in a glossary of less than two pages, while mentioning such considerations as the "avoidance of exothermic ortho-para hydrogen transformation" in the body of the text without explanation.

The book would be most useful to a person having some chemical or chemical engineering background and an elementary knowledge of nuclear and reactor theory. It would give him a bird's-eye view of chemical processing in the atomic energy industry and a general idea of the technical and economic considerations involved in the use of reactor materials. Since the majority of journal references are to summary-type articles, neither the book nor the references are likely to provide answers to specific technical problems. Other references are to standard texts, handbooks, and progress reviews which would serve a more extensive interest in a particular subject.

A drawback for American readers is the fact that all but one of the journal references are to British publications, 60% of these to NUCLEAR ENGINEERING and 25% to NUCLEAR POWER. However, the articles in these journals are not exclusively devoted to British experience.

Although the book shows a few signs of hasty preparation, it does serve its stated purpose reasonably well and can be recommended within that framework.

Walter O. Haas, Jr., is Supervising Chemist for Isotopic Analysis at the Knolls Atomic Power Laboratory, General Electric Co., Schenectady, N. Y. From 1947 to 1957 he was a member of the KAPL Separations Chemistry Group, serving as Chairman of the Planning Committee for the separations pilot plant in 1952-1953. At that time he was chiefly concerned with solvent-extraction flowsheet design and contributed a chapter on principles of solvent extraction to Chemical Processing of Reactor Fuels *(J. F. Flagg, Ed., Academic Press, 1961). He received his AB degree from Kalamazoo College in 1937 and his PhD degree in Inorganic Chemistry from the University of Chicago in 1941. From 1941 to 1947 he was at the Hawthorne Plant of the Western Electric Co., associated with the development of insulation, dielectrics, and synthetic piezo-electric crystals.*

AGED SOW'S EAR STILL NO SILK PURSE

Title Handbook of Radiochemical Exercises

Authors An. N. Nesmeyanov, V. I. Baranov, K. B. Zaborenko, N. P. Rudenko, and Yu. A. Priselkov

Publishers Pergamon Press and MacMillan Co., 1965

Translator E. Kloczko (translation edited by R. W. Clarke)

Pages xii + 448

Price $12.00

Reviewer John W. Irvine, Jr.

This is a translation of a Russian book which, from internal evidence, must have been published in late 1955 or in 1956. As a consequence, it is necessary to examine the question of the quality of the Russian publication and the justification for this belated translation.

According to the preface, the book "has been designed for students of advanced courses in chemical departments and for scientific workers beginning investigations involving radioactive isotopes". It is divided into an introduction and five chapters. The last four chapters are subdivided into expository material and laboratory exercises. The chapter contents can be briefly summarized as: I. Laboratories, equipment, and procedure, II. Properties and measurement of radiation, III. Growth and decay, IV. Production and chemical properties, and V. Tracers.

Chapter I is a queer mixture of the reasonable, the unreasonable, and the irrelevant. Approximately one half of the material covered in this chapter falls into this last category, since it is devoted to equipment for relatively high level operation and to micromanipulation. Neither topic is treated significantly in the rest of the book.

In Chapter II the properties of nuclear radiation and its interaction with matter are treated fairly thoroughly and reasonably well. Instrumentation, however, is completely unsatisfactory. Approximately 25 pages are devoted to electroscopes and electrometers of the types used in the '20's and early '30's. I doubt if there are a dozen radiochemists in this country who have ever used a string or a Hoffman electrometer, and I am sure there are even fewer who are interested in four methods of finding the electrical capacity of such instruments. The same amount of space, one-half page, is devoted to the scintillation counter as to the spinthariscope (I wonder how many readers know what that instrument is?). The experiments on absoulte activity measurements are inadequate. No mention is made of 4π counting or coincidence techniques. One whole page is devoted to the order of switch throwing and knob twiddling on an alpha counter, but the stoichiometry of the ignited and weighed uranium oxide which is used as a standard for the instrument is not indicated.

Chapter III briefly treats elementary growth and decay equations and then plunges into (but does not name) the Bateman equations. Matrix methods of solving these equations are introduced. In this chapter and the previous one, nearly all of the 31 exercises are based on natural radioactive species.

Chapter IV covers the production, the isolation, and the decay properties of selected radioactive species. Great emphasis is placed on (n,γ) production with a Ra-Be neutron source. Szilard-Chalmers reactions are utilized frequently but never referred to by name. Lack of familiarity with cyclotron production is indicated by the statement "(d,p) reactions are most frequently used in the production of radioactive isotopes with the cyclotron". If this book is a true indicator of the state-of-the-art in Russia in the mid '50's, one must conclude that the radioisotope production and distribution in that country had not progressed to the point that it benefited the general research and student population. Moreover,

nuclear instrumentation, as available to the potential users of this book, was neither very extensive nor sophisticated.

Separation procedures are discussed in this chapter at a rather elementary level, and by far the greatest emphasis is placed on all of the phenomena associated with precipitation. In most of the 37 exercises in this chapter isotopic carriers are used when available.

Chapter V contains 19 exercies using tracer techniques. For the most part they are sound but certainly not original.

Thirteen appendices (38 pages) pad the end of the book. These include lists of reagents, apparatus, and clothing, numerical tables for growth and decay calculations, a whole page of numbers on the growth of radon, and six pages of tables for multiplication by 16 and by 64! Beta-ray absorption coefficients and a selected list of capture cross sections for thermal neutrons are also given.

The translation of this book is fairly good. There are many places where awkward words and phrases are used but usually the meaning is clear. However, there are a number of sentences and even paragraphs that are utterly meaningless. It is not possible to tell whether this is due to poor translation or poor text. I am inclined to favor the latter. There are certainly a substantial number of errors in statement of fact in the text and an even larger number of half-truths that are misleading.

A very sparing use of references is made in this book, and a large majority of these are to other Russian books of the period, 1946-1954. My favorite reference, cited 10 or 12 times, is: "Curie, M., *Radioactivity,* Moscow 1947 (In Russian)". For those of us old enough to remember, this was a fine book in 1935 (in French) but is today of more interest to the historian of science than to the practitioner.

It should be obvious by now that I would not have considered this book a very good one when it was first published and a translation ten years later has not improved the situation a bit. It is unsuitable as a laboratory manual for an American radiochemistry course either for "students of advanced courses . . . or for scientific workers". The publisher must have had bad advice to bring out this translation or must have been motivated by something other than a service to science.

John W. Irvine, Jr. is Professor of Chemistry at Massachusetts Institute of Technology, Cambridge, Mass., having been a member of the MIT staff and faculty since 1937 and receiving his PhD degree there in 1939. Radiochemistry has been his field since 1935, and essentially all of his 60 publications deal with some phase of the production or use of radionuclides. In 1946 he spent six months in Oak Ridge helping to organize the isotopes production program and subsequently has maintained an active interest in that program as a consultant. Since then, he and two colleagues at MIT have given lecture and laboratory courses in radiochemistry for seniors and graduate students. During 1957-1958 he served as Scientific Liaison Officer with the Office of Naval Research in London, visiting most of the West European laboratories involved in radiochemical work. Several of his published separation procedures and some of his published cyclotron yield data are clearly recognizable in the book he reviews here, even though proper acknowledgment was absent.

ORIGINAL AND THOUGHT PROVOKING

Title The Special Theory of Relativity

Author David Bohm

Publisher W. A. Benjamin, Inc., 1965

Pages xiv + 236

Price $3.95 (paper); $7.00 (cloth)

Reviewer Irving Kaplan

In the 60 years since the publication of Einstein's first paper on relativity, thousands of papers and hundreds of books have been written on the subject. While it was once said—in the public press—that only 12 people in the whole world could understand relativity, some of us now argue about the extent to which the subject should be treated in textbooks of high school physics. The theory of relativity has deepened the physicist's understanding of the universe; it has provided puzzles for philosophers, problems for engineers, and headaches for politicians. It is easy to see why books are written about relativity but hard to see why another new one should be bought and read.

Professor Bohm's book is worth buying and reading, because the author has thought deeply and carefully about modern physics, and the results deserve serious consideration. His earlier book, *Quantum Theory,* published in 1951 and one of the finest textbooks on quantum mechanics, is notable for its treatment of the physical and philosophical foundations of quantum mechanics. Bohm has devoted many years to the analysis of the interpretation of quantum mechanics, and, although he advocates what is now a minority view, his work has raised some important questions and even opened some minds. I therefore expected that his discussion of special relativity would be original and provocative, and I have not been disappointed.

Bohm reminds us that the physics of any period in history has it presuppositions, its underlying axioms, its metaphysical basis. He traces some of these presuppositions, those concerning space and time, from Aristotle through Newton and then through nineteenth century physics to Einstein. He emphasizes that Einstein's basically new step was the adoption of a *relational* approach to physics and the derivation of the invariant relationships which constitute physical laws. He examines Einstein's conceptions of space and time and