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Book Reviews

Nuclear Chemistry and Its Applications. By M. Haïssinsky, translated by D. G. Tuck, Addison-Wesley, Reading, Mass. (1964). 834 + xiii pages; $22.50.

The phrase 'nuclear chemistry' can have several meanings. In this title it is used in the most comprehensive sense possible, and the book covers fields as diverse as nuclear physics and radiation chemistry. Its main divisions are as follows, with the number of pages devoted to each: historical introduction and basic nuclear physics, including nuclear reactors (177); natural radioelements and transuranics (64); isotope chemistry (34); applications of radioactivity in geology, and related topics (28); physics and chemistry of absorption of ionizing radiation by matter (173); hot-atom chemistry (33); radioactive tracers and the knowledge obtained from their use in chemical equilibria and kinetics, and in the development of analytical methods (150); some representative biological applications of tracers (21); and technological applications of radioactivity, mostly as tracers (20). In addition there are 20 pages of problems, prepared by Mlle. C. Ferradini, Glen E. Gordon and Charles D. Coryell; a 56-page Table of Nuclides and the usual indices.

This book is an impressive achievement, and the more so in that the main text is the work of one man. Dr. Haïssinsky has tackled a Herculean task single-handed and performed it well. Few men are as well qualified by previous research experience as he for writing such a book. The subjects of his numerous publications include the chemistry of polonium, actinium, palladium and uranium; the radiation chemistry of aqueous solutions; Szilard-Chalmers effects; the use of tracers in a variety of chemical systems. Fortunately, he has a talent for exposition as well as for research. He has made a painstaking survey of the literature and gives no less than 2874 references.

That this volume is intended for use as a textbook is implied by the inclusion of problems and by the method of presentation of material, at least in the first half of the book. The second half, covering radiation chemistry and the use of tracers, has more the character of a reference book. Many sections in this part deal with rapidly changing fields of research which do not lend themselves readily to generalizations, and the text often consists of series of brief summaries of journal articles.

Much more space is devoted throughout to results than to experimental methods, which are mentioned only in passing. There is, for example, no chapter on the measurement of radioactivity. Gas-filled counters are discussed briefly in the chapter on the radiation chemistry of gases; scintillation counters, under "Fluorescence and Coloration Produced by Radiation." Even counting statistics are omitted.

The only serious reservation this reviewer has is that the book is not up to date. Most of the text is identical with that of the French edition of 1957. A few pages have been rewritten and a few added, but a thorough revision was not attempted and many recent developments are omitted. There is no mention, for example, of the following: Mössbauer effect, high-resolution semiconductor detectors, the role of ion-molecule reactions in radiation chemistry, bubble chambers, accelerators later than the proton synchrotron, or power reactors since the 1955 Geneva Conference; yet the scope of the book is such that all of these would have been suitable topics, and their absence is conspicuous. All but a few of the references carry dates prior to 1957. Chapter 10, for example, on "The Geochemical, Geological and Astrophysical Applications of Radioactivity" has 171 references; one is of 1959, two of 1958, one of 1957 and the rest are earlier.

To balance this defect—which will, we may hope, be corrected in a second edition—there are many strong points which deserve mention. Outright errors of fact, as opposed to omissions, are few and unimportant. In the author's search of the literature up to 1956 there are no conspicuous omissions, at least in those fields that the reviewer knows well. Russian and French work has been better covered than in most British and American books. The proofreading, though not perfect, is adequate. The translation is excellent—faithful, clear and idiomatic.

To summarize, Dr. Haïssinsky deserves respect and gratitude for assimilating a huge mass of raw facts and reducing them to order. His book should

be useful as a text in advanced courses, where the instructor can supplement it with lectures on current developments. It can be recommended to older chemists in other fields who would like to enlarge their horizons.

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About the Reviewer: Richard H. Wiswall, Jr. is a group leader in the Nuclear Engineering Department of the Brookhaven National Laboratory, where he has been since 1949. He received the Ph.D. in chemistry from Princeton in 1941, and first entered the nuclear field in 1943, at the S.A.M. Laboratory of Columbia University.

Russian-English Physics Dictionary. By Irving Emin. John Wiley & Sons, Inc., New York and London, (1963). 554 pp., $14.00.

The increase in communications between American scientists and Soviet scientists has been one of the wholesome characteristics of the late fifties and sixties of this century. The evidence presented to the world that citizens of two different ideologies can find in science something they agree on, something that they can discuss, something that they can argue about without emotional political overtones is an inspiration to others who are working in more difficult, controversial political relationships between the United States and the Soviet Union. To carry out this dialogue between physicists requires many aids, not the least of which is a good dictionary.

Dr. Irving Emin and the staff of physicist-translators associated with the Consultants Bureau have produced a fine "Russian-English Physics Dictionary." It took them seven years to compile it. It is based on practical experience of translating over 10,000 pages of Soviet physics journals published from 1955 to 1962. There can be no question that this dictionary is unique in that it is compiled not by academic scholars but by professional translators. The dictionary contains many useful features. Aside from the main body of physics terms in Russian and their English counterparts, it contains Russian abbreviations, Russian transliterations, basic vocabulary on chemistry, electronics, astronomy and geophysics, a grammatical reference section, and conveniently at the end of the book, a standard transliteration scheme. Dr. Emin and his colleagues are to be thanked for a useful aid and congratulated on producing a fine dictionary. Theirs should be the satisfaction of helping to keep up the dialogue between the English reading scientists and Russian writing scientists.

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About the Reviewer: John Turkevich received his Ph.D. degree in Chemistry from Princeton University in 1934 where he has taught since 1936 and where he is now the Eugene Higgins Professor of Chemistry. His service, in 1958, as Chairman of a U. S. Delegation of Educators to the USSR and as Acting Science Attache in the U. S. Embassy, Moscow in 1960-61 makes him exceptionally well qualified as the reviewer of Dr. Emin's dictionary.

The Nuclear Reactor. By Alan Salmon. John Wiley, N. Y. City. 144 pp., $3.00.

Reorganized and rewritten, this pocket-sized reference could become an indispensable guide for the young engineer and executive. Unfortunately, misplaced emphasis and simple error render this little British book worthless and misleading. A few random examples bring out its deficiencies:

(a) Though British practice should be highlighted, this statement on page 12 came as a surprise:

> "-a fission reactor first operated on December 2nd, 1942, in Chicago. The next step was also aided by military requirements, in 1956 the first large nuclear power station operated at Calder Hall."

(b) The uranium prices on page 31 appear to be a composite of two AEC schedules, issued at different times. Evidently the old (1955) figure of $40 per kg. was used for natural uranium along with the 1962 price of $12 per gram of U^{235} content in highly-enriched fuel.

(c) Down to earth concepts and simple numerical problems should have enlivened this book. For instance, I could find no discussion of critical mass or approach to critical loading, nor are these topics included in the brief index. Numerical calculations are needed to elucidate such formulae as for mean free paths in mixtures, buckling, and criticality.

(d) Discussion of heat transfer is largely limited to conduction, and scant space is given to heat-transfer coefficients. Many monographs become engrossed in elaborate