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# Book Reviews

**1960 Nuclear Data Tables; Part 4, Short Tables.** Compiled by: K. WAY, J. B. MARION, S. M. SHAFROTH, K. W. FORD, A. M. KAUFMAN, G. H. FULLER, L. J. LIDOFSKY, E. DE MATEOSIAN, AND M. McKEOWN. Superintendent of Documents, U.S. Goverment Printing Office, Washington, D.C. $1.50.

This volume constitutes the fourth part of the 1960 Nuclear Data Tables. It has as its objective the distribution of tabular material of interest to the low energy nuclear physicist. The first of the six sections of the volume is a supplement to the well known Directory to Nuclear Data Tabulations.[1] It extends the coverage to the period December 1958 to June 1961. The notation and classification is the same as that used in the parent volume. No significant omissions to this supplement were noted but some of the listings were felt to be outdated chronologically and technically. In some instances, a tabulation was cited under more than a single heading. It is not the fault of the directory that the coverage of the low energy physics field is remarkably spotty. Any such directory is at the mercy of the fashions of the time. Interestingly, some of the tabulations listed make certain of the succeeding portions of this particular volume redundant.

The second part of the Short Tables consists of a tabular summary of theoretical and experimental studies of elastic and inelastic scattering of charged particles. In reality, this section is a bibliography containing too little information to constitute a summary. Judged as a bibliography, it is accurate and inclusive.

The third and fourth sections are short tables dealing respectively with nuclear charge distributions (theoretical and experimental) and nuclear moments. To the reviewer these are relatively foreign fields, but when these tables were used as sources in the treatment of problems that have recently faced the author, they proved satisfyingly quick and accurate. This was particularly true of the tabulation of the theoretical distribution of nuclear charge within the nucleus.

The last two sections of the Short Tables pertain to beta and gamma disintegrations. The beta decay processes are listed by mass number. Only beta groups having the highest energy or greatest intensity in a given decay are tabulated. This method of selection can lead to a certain ambiguity in some instances. Fortunately, a complete referencing enables the reader to rapidly resolve such questions and to acquire more detailed information. The characteristics of the beta processes including energies, lifetimes, ln *ft* values, etc. are given. In conjunction with a given beta decay, the energies of the gamma rays leading to the product nucleus are given. Thus, it is possible to readily determine the respective mass differences. The numerical values listed are averages determined by the compiler. The discretion shown in ascertaining these averages from the profusion of material available is judged to be good. Gamma rays are tabulated by energy and by $Z$ and $A$. Lifetimes, intensities, and modes of decay are stated. Unfortunately the gamma-ray tables compress a very great deal of information into so restricted a space that much detail is omitted. This compactness could serve a useful purpose if references to the basic literature were given. They are apparently totally lacking.

It is the custom of the reviewer, when examining volumes such as this, to lay a copy upon the console of an accelerator used in low energy nuclear physics work. The amount of interest shown in a volume so placed is at least a provincial measure of its usefulness. This test has been applied to several parts of the 1960 Nuclear Data Tables. Particularly notable interest was shown in Part 3. Part 4, the subject of this review, was little used. It is felt that this volume will be most valuable to those who are interested in only cursory insight into strange fields. The serious worker will be familiar with and tend to refer to more detailed well known reviews he will normally have close at hand.

A. B. SMITH
*Argonne National Laboratory*
*Argonne, Illinois*

(*About the Reviewer: Dr. A. B. Smith is a senior physicist at the Argonne National Laboratory where he is the head of the Applied Nuclear Physics Section of the Reactor Division.*)

**The Collected Papers of Enrico Fermi, Volume 1, Italy 1921–1938.** Edited by: E. AMALDI, H. L. ANDERSON, E. PERSICO, F. ROSETTI, C. S. SMITH, A. WATTENBERG, AND E. SEGRÈ (Editor-in-chief). The University of Chicago Press, Chicago, and Accademia Nazionale Del Lincei-Roma. 1043 pp. $15.00.

The first volume of the collected papers of Enrico Fermi, carefully and no doubt lovingly prepared by Amaldi, Persico, Rasetti and Segrè, comes as a very welcome tribute to the memory of Fermi. Leafing through the volume filled this reviewer with a sense of pleasure and nostalgia. Pleasure, because the next best thing to conversing with Fermi is to follow his brilliant reasoning in these papers. Nostalgia, because one is reminded of the magnificent period in the development of nuclear physics when modest experiments could give such interesting results and when the theory was, by modern standards, so directly related to the experiments at hand.

The book is considerably more than just a convenient collection of papers which after all exist separately in the literature. In the first place, Segrè has written a most

[1] Directory to Nuclear Data Tabulations, R. D. GIBBS AND K. WAY. U. S. Government Printing Office, 1958.

charming and informative biographical introduction. This introduction when read together with Laura Fermi's "Atoms in the Family" gives a fairly complete picture of Fermi. Good though the introduction may be, it is brief, about 25 pages, and one is left with the impression that Segrè has much more to say. How tantalizing it is to have him raise an interesting subject and then have to leave it before it is exhausted. It is clear that the introduction could easily be filled out to a complete biographical volume, and it is hoped that such will eventually be forthcoming. In the second place, the editors have written introductions to nearly every paper explaining the setting of the particular paper, something about how it came to be written, perhaps a few critical remarks, or whatever just seems to be relevant to the paper. This reviewer was fascinated by these remarks. I learned no end of details that either enlightened or amused me. For example, Amaldi, in one of his comments on the papers dealing with the absorption of slow neutrons, informs us how the expression "age," used by Fermi and later by all of us to represent the quantity $\overline{r^2}/6$ of the diffusion of neutrons, came about. It stemmed from the joke that as the captain's age can be determined from the length of the ship's mast so the energy of the neutron group can be determined by the distance it travels as it slows down. It is exciting to find the expression "età del capitano" actually used in a facsimile of a page of one of Fermi's notebooks that is used as an illustration. Also we learn in a letter from Rutherford to Fermi that in 1936 Dirac was actually experimenting! Segrè informs us in another note that Fermi had made calculations in 1935 of the behavior of neutrons in hydrogenous material using what we call today the Monte Carlo Method, invented nearly 10 years later. The notes of the editors are so vivid in places that one has a feeling of almost participating in the remarkable developments in Rome in those exciting years in which the properties of slow neutrons were discovered.

With the exception of Fermi's books and articles for the Italian Encyclopedia, all of his writings up to his departure from Italy in 1938 are contained in Volume 1. Although most of the papers are in Italian, it is still very worthwhile for a physicist without Italian to browse through the book. The introduction and most of the comments are in English. English is used in about one-fifth of the articles including nearly all of the work referring to neutron physics. A few of the papers are in German. Even one such as this reviewer, whose knowledge of Italian is rather elementary, found little difficulty in reading Fermi's pellucid style.

Although the book will be invaluable to the historian of science, it can also be strongly recommended to any nuclear physicist who would know something of the origins and traditions of nuclear physics. Perhaps in the "Great Books" tradition a student might refer to this work in order actually to learn physics. He could do worse; for example, I am not familiar with a better exposition of statistics than given by Fermi in one of his review articles, and there are many other examples. However, this method is not the style of physics, and it is rather for pleasure or inspiration that I would advise a student to delve into this treasury of physics.

We owe a debt of gratitude to the editors for having turned out such an excellent volume. It is a fitting tribute to an inspired and inspiring man so beloved and respected for what he brought to and gave to the world of physics.

ROBERT R. WILSON
*Cornell University*
*Laboratory of Nuclear Studies*
*Ithaca, New York*

*(About the Reviewer: Robert Rathbun Wilson received his Ph.D. at the University of California; became Instructor at Princeton University in 1940; Head of Experimental Nuclear Physics Division at Los Alamos during World War 2; Director of Laboratory of Nuclear Studies at Cornell University since 1947.)*

**Radiation Chemistry of Polymeric Systems.** By ADOLPHE CHAPIRO. Interscience, Wiley, New York, and London, England, 1962. 712 pp., $21.00.

This book is Volume XV of "High Polymers," a series of monographs on the chemistry, physics, and technology of high polymeric substances, published under the guidance of an editorial board consisting of H. Mark, Brooklyn, New York; C. S. Marvel, Urbana, Illinois; and H. W. Melville, Birmingham, England. The author of this particular volume is associated with the Physical Chemistry Laboratory of the Faculty of Sciences of Paris, Paris, France, and with the Radiation Chemistry Laboratory of the National Center of Scientific Research, Bellevue, France.

The expressed objective of this book is to attempt to correlate the various results available in the radiation chemistry field of polymeric systems and to present their various aspects in a logical framework. To achieve this objective, the author has divided his work into twelve chapters. The first two chapters consist of an elementary survey of the interaction of radiation with matter while the third chapter is devoted more specifically to the development of the radiation chemistry of hydrocarbons. Using these three chapters as a basis, polymerization processes which are initiated by radiation are treated in Chapters IV through VII. Chapters VIII through X discuss the effects of radiation on solid polymers in considerable detail, and Chapter XI describes the irradiation of polymer solutions. In the final chapter, Chapter XII, the preparation of graft copolymers by radiation-chemical techniques is described in detail.

Each of the twelve chapters is quite well referenced, and a total of 1,187 references have been cited by the author in writing this book. Although there are some errors in literture citation, an unusually fine job has been done in documenting this work. The detailed nature of the references and the fact that they are international in scope should make this book a very handy reference volume for anyone interested in any phase of the radiation chemistry of polymer systems.

One aspect of this book will undoubtedly cause comment and some areas of disagreement. Due to the paucity of our basic knowledge of the mechanisms of chemical reactions induced by radiation, the author has been forced by necessity to judge, select, and even reinterpret data from numerous experimental results, some of which frequently appeared to be conflicting. The author recognizes this potential area of disagreement, and in the preface of his book, he states