BOOK REVIEWS

The Sequestration of Metals. Theoretical Considerations and Practical Applications. By ROBERT L. SMITH, B.Sc., Ph.D., F.R.I.C. The Macmillan Co., 60 Fifth Avenue, New York 11, N. Y. 1959. vii + 256 pp. 16 × 25.5 cm. Price, $8.50.

According to the author's definition which I quote in part, "Sequestration is the suppression of a property of reaction of a metal without removal of the metal from the system or phase by any process, etc." If in this definition, "metallic compound or ion in solution" is substituted for "metal," then it follows that the major portion of this book is concerned with the phenomenon of chelation.

The first half of this book contains a discussion of chelation and lists in table the formulas of various chelates with comprehensive bibliographies. The second part discusses the applications of these "sequestering agents" to various chemical industries, to analytical chemistry and biology.

The value of this work resides in the extensive tables and bibliography rather than in the theoretical treatment of the subject.

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Introductory Nuclear Theory. By L. R. B. ELTON, Ph.D., F. Inst. P., Head of the Physics Department, Battersea College of Technology, London. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. xi + 286 pp. 14.5 × 22.5 cm. Price, $6.40.

This book on nuclear theory has grown out of a lecture course given by Dr. Elton to final honours physics students at King's College in London. Although the material has been extended somewhat beyond the course outline, the main use for this book will be as a text for a course in nuclear physics for advanced seniors and graduate students. In some respects, it can be a very useful reference book on nuclear theory, but it probably will not replace the standard reference in the field, Blatt and Weisskopf's "Theoretical Nuclear Physics."

In general, the contents of the ten chapters in this book are quite conventional for a book on nuclear theory. Also, in general, the various subjects are treated quite thoroughly. The following is a summary of the subjects of the various chapters along with some comments on the strong and weak points. The first two chapters summarize adequately the general experimental information that is known about particles and nuclei. Chapter three covers the two nucleon systems at low energies in a conventional but thorough manner. A particularly strong point about this chapter is that many attempts are made to tie in experimental data with the theoretical discussions. The fourth chapter adequately summarizes what is known about nuclear forces. Nuclear models are considered in Chapter 5. One shortcoming in this chapter is the section on the collective model which is only a very qualitative introduction to it. The discussion of the shell model, on the other hand, is much more complete. The chapter on nuclear reactions (Chapter 6) surveys this immense area quite well. However, more discussion on the decay of the compound nucleus and on direct reaction mechanisms could probably have been profitably included. This chapter does include a short treatment of the optical model which is receiving much attention at this time. Chapter 7 on nuclear disintegration deals mostly with barrier penetration in α-decay. Chapter 8 covers thoroughly the interaction of nuclei with the electromagnetic field, particularly as it applies to the emission of radiation and the photodisintegration of the deuteron. The chapter on β-decay (Chapter 9) presents an up-to-date discussion of β-decay theory including the recent conclusions arising since the parity non-conservation experiments. The last chapter gives a short mathematical discussion of the meson theory of nuclear forces. There is also a short table of nuclear constants in the appendix which includes mostly ground state properties, giving very little information on decay properties.

As one can see from the contents, the choice of topics is quite conventional and involves no radical changes in emphasis. One aspect of the contents on which the book can be strongly recommended is that recent advances in many areas have been included to bring the book up to date.

There are several features about "Introductory Nuclear Theory" that will make it a useful text book. Although a rudimentary knowledge of quantum mechanics is assumed by the author, he includes in the text discussions of the quantum mechanics and mathematics that are needed as they are used. He has refrained from putting the mathematical discussions in appendices and footnotes where they are often ignored by students. His approach may be somewhat annoying to advanced students possessing a strong background in mathematical physics, but it will be very helpful to those who are just getting a feel for these principles. Dr. Elton has also included several problems at the end of each chapter which enhances the book's value as a textbook. Another aspect that is particularly helpful is the effort made to tie in experimental details with the theoretical discussions. In general, the book is well written, giving a clear progression of information. In summary, it deserves serious consideration as a textbook for courses in nuclear theory.

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Quantum Particle Dynamics. By J. MCCONNELL, Professor of Mathematical Physics, St. Patricks' College, Maynooth. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. xi + 252 pp. 16 × 23 cm. Price, $6.00.

This book covers quantum mechanics and quantum field theory in an elementary way, with application to particle physics, presupposing no previous acquaintance with relativity or quantum mechanics. It is directed toward students and to experimental workers in high energy physics, to serve as an introduction to the theoretical background.

This is a lot to attempt in 250 pages of which 145 are devoted to special relativity and particle quantum mechanics, 60 to quantum electrodynamics and 40 to strongly interacting particles. The treatment is quite traditional, somewhat abbreviated. It is a little disturbing that in general the foundations are laid for a calculation, the result is presented, but the 'mouldy details' in between are omitted; thus the book does not teach "to do." Whereas on the other hand, the available space is so taken up with details, that there is little or no comment on the significance of each result or on its relation to others.

In the latter part, on strongly interacting particles, the treatment is far too traditional, in a parochial manner. I am referring to its emphasis on lowest order perturbation theory calculations. In quantum electrodynamics this is all right, but in the strongly elementary particle interactions it is virtually useless. Further, there is no discussion of symmetries and conservation laws; and this is a part of the present theory which is almost sure to have lasting value. Not only is there no general discussion of the general subject, but as important a conserved quantity as isotopic spin has only a brief mention.

As an example of the hopelessly misoriented, obsolete, and sketchy treatment of topics in strong elementary particle interactions, consider the treatment of pion nucleon scattering. Six of the eight pages are devoted to a sketch of the derivation of the scattering cross section in lowest perturbation order; the resulting formulas are written out exactly. In the remaining two pages, these results are compared with experiment (which, by the way, is misdescribed); there is little resemblance of course, as is usual in the strong interactions. The result of the Heitler damping