Noble-Gas Compounds. Edited by Herbert H. Hyman. The University of Chicago Press, Chicago. (December 17, 1963). 404 pp. $12.50.

The most exciting recent event in the world of chemistry was the discovery that several noble gases would combine to form simple chemical compounds with fluorine and oxygen. This information toppled the concept of the non-reactivity of the inert gases and restored the faith of chemical experimentalists. The initial announcement of the preparation of xenon hexafluoroplatinate by Bartlett at the University of British Columbia appeared in May 1962, and was followed in September 1962 by the report by Claassen, Selig, and Malm of the direct synthesis of xenon tetrafluoride at Argonne National Laboratory. By April 1963, a number of notes and papers had appeared, and a conference of scientists working on noble-gas chemistry was organized at Argonne National Laboratory.

The papers presented at this conference have been assembled by Herbert Hyman of Argonne, with brief introductory remarks, to form the present volume. Fifty-eight papers are presented, divided into the following categories: historical and introductory, 4; preparation and properties of noble-gas fluorides, 16; practical considerations, 2; thermochemistry, 4; aqueous chemistry, 6; diffraction and structure studies, 8; studies of ESR, NMR, Mössbauer, IR, and Raman spectra, 10; physiological properties, 1; theoretical studies, 7. The largest number (18) are authored by the scientists of Argonne National Laboratory, whose enthusiasm largely sparked the rapid progress in the field. Other Atomic Energy Commission sponsored laboratories, university groups and industrial laboratories furnished the remainder of the papers. Reports of work from Canada, England, Yugoslavia and Germany are included.

The organization of the book seems to be quite satisfactory. It is well printed and appears to contain astonishingly few typographical errors. It contains thorough subject and author indexes which are extremely useful. Most of the papers were revised and annotated subsequent to the conference and consequently the material is up-to-date. Many of the articles present considerably more details than are usually contained in published articles. These details will be valuable to anyone working with noble-gas compounds. A number of challenging experimental and theoretical questions, as yet unanswered concerning these compounds, are posed by the authors.

On the debit side, the criticisms are largely ones that should be leveled at most symposium proceedings. Some of the papers should simply be deleted as trivial, quite a lot of material is redundant and overlapping, and some of the contributions would benefit by an elimination of excess wordage. Some of the data and assertions will, undoubtedly, be superseded or proven erroneous. The question arises: "Should this material be published in book form since nearly all the worth-while sections have been or will be published in more concise form in the journal literature?" I think the answer here is yes—because of the rapid and good editing job, the historical significance, and the widespread interest in this exciting new field of research.

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About the Reviewer: G. M. Begun is a chemist in the Chemistry Division of Oak Ridge National Laboratory. During World War II he worked as a chemist at the electromagnetic separation plant at Oak Ridge. He obtained his Ph.D. in physical chemistry at Ohio State University in 1950. He has published work on isotopic-exchange reactions, mass spectrometry, and infrared and Raman spectra of various molecules.

Reactor Physics Constants. ANL-5800, Second Edition, United States Atomic Energy Commission, Washington, D.C., (July, 1963), 850 pages, $6.00.

Users of the earlier *Reactor Physics Constants*, ANL-5800, will recognize in the volume under review an old friend rejuvenated and enlarged. This second edition has 850 pages instead of 529 and each contains 30% more type. Although the title may suggest a collection of tables and graphs, this is almost a treatise on reactor physics.

The authors and editors have clearly made an effort to produce a pleasing format with a well-written text, and they have succeeded. There is no crowding of the tables or figures, the typography is excellent, the layout makes for easy reading, and the references are adequate. Another praiseworthy feature, especially welcome in the descriptions of computer programs, is the use of English instead of jargon.

The book has been completely revised for the second edition. Even where the text might have been copied verbatim, small changes have been made for clarity. Errors have been corrected and an already good presentation has been improved. Only in a few places was a change for the worse noticed - for example, in the labelling of ordinates on Fig. 5-32. Some evaluation was made in choosing the data. It is to be hoped that even more will be possible in future editions.

The compilation is based on data available March 15, 1961, and the time until publication (July 1963) is unfortunately long for these days of

rapid change. Because the index gives sub-section numbers instead of pages, these numbers should have been printed at the top of each page.

There are ten sections.

1. *Fission Properties* is "limited to those characteristics of the fission process most often utilized in reactor design," and is not "a definitive review of the fission process."

2. *Selected Cross Section Data* includes related quantities such as η, α, average logarithmic energy loss and transport scattering factor. There is a long review of theoretical formulae and experiments on energy transfer between neutrons and moderators, twenty pages of angular-distribution coefficients for fast-neutron scattering, and all the standard information on capture and fission cross sections.

3. *Constants For Thermal Homogeneous Reactors* opens with the calculation of thermal-neutron spectra and then gives some experimental results and effective cross sections. This is followed by lattice parameters and criticality data. The judgment implied in the claim that "theory has been included to the extent considered necessary for the exposition of the data" is justified here and throughout the book.

4. *Lattice Constants for Thermal Heterogeneous Systems.* The various methods of calculation of individual parameters, e.g., diffusion, spherical hermonic method, and P_N approximation, transport theory, are outlined. Many experimental results are presented on a wide variety of lattices.

5. *Control and Dynamics of Thermal Reactors* includes discussion of control-rod theory (extrapolation distance at surface of rod) and many aspects of control-rod worths in reactors: long term changes, covering xenon poisoning, accumulation of gross fission products, accumulation and destruction of fissile nuclides, burnable poisons, and measured reactivities; reactor kinetics, periods, noise and correlations, transfer functions and stability. and reactor excursions.

6. *Intermediate Reactors,* appropriately shorter than the previous two sections, contains the fullest discussion of age-diffusion equations.

7. *Fast Reactors* opens with multigroup equations and constants. The tables of multigroup constants occupy about 20 pages. The remainder of this section contains criticality information and dynamic considerations.

8. *Shielding Constants.* The suggestion in the Preface that this section might be omitted from future editions is regrettable. Most shielding calculations are now done with sophisticated computer programs, but the information in the 35 pages of Section 8 is useful for many purposes and is in keeping with the rest of the book.

9. *Constants Related to Interpretation of Experimental Data.* Some of the material here could well be dropped for example, the characteristics of photomultiplier tubes and possibly of scintillators. The information on foil activation, self-shielding, range-energy relations and neutron sources is useful.

10. *Digital Computer Codes,* summarizes over 75 selected reactor physics computer programs grouped according to subject.

This book should be on the shelf of every reactor physicist, and the low price puts it within his reach.

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Engineering Heat Transfer. By S. T. Hsu. D. Van Nostrand Co., New York (1963). $14.50.

A check of library card files reveals that from 1957 to 1963, English textbooks suitable for senior under-graduate to first-year graduate-level introductory courses in heat transfer have been published at a nearly uniform rate of more than two new books per year. This might be considered an unusually high publication rate, especially when it is noted that, with a few exceptions, the recent texts cover almost exactly the same material in almost exactly the same style. But previous to this period, similar texts, which emphasized basic principles and analysis rather than engineering method, were not generally available in this country. (The book by Eckert[1], *Introduction to the Transfer of Heat and Mass,* was an exception to this, but was not often used as an undergraduate text.) With the rapid growth of heat transfer as an important branch of basic engineering science, the need for such texts as aides to instruction became apparent relatively suddenly. The recognition of this need by many potential authors prompted them to start work almost simultaneously, and partly

[1]E. R. G. ECKERT, *Introduction to the Transfer of Heat and Mass,* McGraw-Hill, New York (1950).