The editors of the volume are to be congratulated on their superb job of editing.

Arthur F. Scott, past chairman of the Department of Chemistry of Reed College, has been teaching chemistry for 42 years. He received his BS degree at Colby College and his PhD at Harvard University. Scott spent a sabbatical leave in 1958-59 at MIT working with graduate students in the Nuclear Engineering Department and the summer of 1959 in the Hot Laboratory at Brookhaven National Laboratory. For two years, 1962-64, he was head of the Special Projects in Science Education of the National Science Foundation. He is currently editor of a serial publication, Survey of Progress in Chemistry. *Scott continues to teach at Reed; his research interests involve neutron activation analysis.*

A FORMIDABLE ARRAY

Title Biological Effects of Radiation

Author Daniel S. Grosch

Publisher Blaisdell Publishing Co.

Pages 294

Price $3.50

Reviewer H. M. Parker

This book was written for the author's use in the classroom and is primarily directed at the "undergraduate research participant" with a knowledge of biology.

It is reviewed here in the very different context of its relevance to the general ANS membership. With some reservations, the book can be recommended as an excellent instrument for providing understanding in radiobiology.

The principal reservation is that it is not for those who want to learn radiobiology some Friday afternoon. Nor is it for those who do not have some grounding in the terms of the trade of both biology and biochemistry from standard texts at about the College Outline level.

These two classes of reader are not likely to get past Chapter 4, where on one open page they will be confronted by the formidable array of "pyknotic; karyorrhexic; vacuolated; deoxyribose nucleic acid (DNA); thymonucleohistone and sodium thymonucleate; streaming birefringence; erythrocytes; and one purine base per tetranucleotide," and will perhaps be comfortable only with DNA from the fine coverage in weekly magazines.

For the more persistent reader, there is a sound buildup of the subject from an introduction to the basic physics and physical chemistry through effects at the "Cellular Level" (Part I), to "Tissues and Organs" (Part II), to the "Whole Organism" (Part III), and finally to "Pure and Applied Ecology" (Part IV).

Part I is by far the toughest reading, because the author has struggled to condense a voluminous literature into manageable length. The result is a choppiness of topic combined with the aforementioned concentration of relatively unfamiliar terms. Close study of the text is worth the effort; many will be stimulated to read more extensively in the useful references with each chapter.

The most outstanding and unusual feature of this part is the author's rejection of dogma. Where there is controversy in a topic, the author states both sides clearly and fairly; where possible, he defines what additional data are needed to achieve resolution. The warnings provided are invaluable to the non-biologist who has neither time nor competence to evaluate controversial results for himself.

Parts II and III are readable and rewarding. Part IV deals with radiation effects on life in contaminated areas, and the beneficial effects in pest control and food treatment. Portions of this seem less well-selected than the rest, especially in dealing with atomic waste disposal. In any case, from the viewpoint of our postulated audience, the story builds to its climax in Part III. Both author and publisher are to be congratulated on making so much available for so little in a paperback.

Herbert M. Parker is presently Consultant to the Director of Battelle Memorial Institute's Pacific Northwest Laboratories in Richland, Washington. Prior to that he was Manager of the Hanford Laboratories for nine years. His academic background was in Physics in England (MSc, F. Inst. P.). After ten years as a radiological physicist, he joined the Manhattan Project in Chicago in 1942, and subsequently headed the radiological sciences program at Oak Ridge and at the Hanford Works, Richland. He has just completed a term as a member of the Board of Directors of the American Nuclear Society.

A DO-IT-YOURSELF REFERENCE?

Title Handbooks of High-Temperature Materials

No. 1 - Materials Index
Author Peter T. B. Shaffer
Pages xx + 740
Price $17.50

No. 2 - Properties Index
Author G. V. Samsonov
Pages xii + 418
Price $22.50

No. 3 - Thermal Radiative Properties
Authors W. D. Wood, H. W. Deem, and C. F. Lucks
Pages 470
Price $17.50

Publisher Plenum Press, 1964

Reviewer W. E. Roake

This set of handbooks is hawked as ". . . the most comprehensive and flexible guide to the properties and materials of refractory compounds available anywhere." The

publisher further states that the ". . . series will undoubtedly become the standard reference to the materials and properties of refractory compounds." (Quod erit demonstrandum!)

One receives such a set as this, for review, with trepidation. With the exception of the usual forewords, prefaces, introductions, and author's apologies, it is all data tables and graphs. One hefts the largest volume, marvels at the price, and riffles through the pages for familiar data.

Materials Index (Volume 1) treats borides, carbides, mixed carbides, elements (mercury, gallium, indium, lead, and aluminum are oddly included as high-temperature materials), nitrides, oxides, mixed oxides, and silicides. Data are tabulated for each element or compound as: general, chemical, electrical, mechanical,nuclear, optical, structural, or thermal properties. Few of the tabulations include data in a majority of these classes. Many pages are nearly blank. For example, the entire entry for tetrapraseodymium heptoxide consists of "675.68 g/mole, face-centered cubic"; for mercury silicide, "no compounds of interest even at elevated temperature"; and for scandium mononitride, "melting point: 2050°C." The author states that "Each compound was placed (started) on a separate page to permit the reader to add data as it became available. . . ." Plenum may have been the first to publish a do-it-yourself reference work!

The book is as notable for its omissions as for its inclusions. For example, plutonium nitrides and carbides are referenced, but not plutonium oxides. Uranium dioxide occupies four pages, with some inconsistencies, such as "easily oxidized to U_3O_8" and "resistant to air to 1400° C" (the most recent included reference is to O. Whittemore's 1959 paper in *J. Can. Ceram. Soc.*, and J. Belle's treatise on uranium oxide is not even mentioned). Of particular interest to the nuclear fraternity is the description of "diuranium trioxide (U_2O_3)," reported to be an hexagonal crystal melting at 1977° C and having a density of only 4.87 g/cm^3 (same as V_2O_3!).

Of the 698 listed references, 20 or more are repeated; many are not readily obtainable, such as an unidentified Fansteel Data Sheet, Carborundum Research Notebook 5843, and several European theses identified only by author, university, and year. Although the author eschews use of secondary references (summaries), at least 70 are recognizable as general compilations. Reference format is inconsistent. Frequent reference is made to Lange's *Handbook of Chemistry*, vintage 1946. Anyone who requests a copy of P. Pallmer's paper, "Thermal Expansion of Plutonium Carbides," by the given reference number is warned that he may receive a conformed copy of the contract under which General Electric Company operated Hanford Works for the US Atomic Energy Commission for 18 years instead of the desired paper.

In fairness to Shaffer, I should note that he specifically claims incompleteness for the book. It comprises ". . . only those data which were at the author's disposal and did not involve any specific literature searches for the sake of this data compilation." However, one wonders why Plenum Press exposes itself to censure by publishing an admittedly uncritical compilation.

Materials Index is not likely to be very useful to the expert (viz., one previously burned for neglecting the most recent papers). It is a snare to one too pressed for time to review the original literature and a delusion to the neophyte. Nonstoichiometry and composition range at high temperatures are not even mentioned.

Properties Index (Volume 2) is an author-approved translation from the Russian. I like it. It expedites selection of a material to meet specific criteria. It comparatively cross indexes approximately 600 refractory compounds by property under the following chapter headings: "General Information, Stoichiometry, and Crystal-Chemical Properties" (*including* composition and homogeneity range); "Thermal and Thermodynamic Properties"; "Electrical and Magnetic Properties"; "Optical Properties"; "Mechanical Properties"; "Chemical Properties" (including corrosion resistance); "Refractory Properties"; and a chapter on "Examples of the Application of Refractory Compounds." An appendix includes 70 binary system phase diagrams. The introduction includes descriptions of experimental and calculational methods by which the data were obtained, with appropriate comments about their reliability, and most tables include useful remarks about compound purity, preparation method, data source, experimental difficulties, etc. necessary for evaluation of the data but so often not reported.

Borides, carbides, nitrides, silicides, phosphides, sulfides, and some oxysulfides are included, as well as boron and pyrographite. The book is poorer for the author's election to defer oxides and graphites to other recent special treatises.

References (1336) are consistently presented. They include approximately 500 that are comparatively unknown outside the USSR.

Thermal Radiative Properties (Volume 3) is aimed at a narrow group of specialists in radiant heat transfer who will recognize it as a republication of critically evaluated data originally published in two volumes by the Defense Materials Information Center, Battelle Memorial Institute, Columbus, Ohio, under the title "Thermal Radiative Properties of Selected Materials" (DMIC Report 177).

Infrared Radiation From Hot Bodies (Volume 4) is promised in 1966. From the title, it seems aimed at the same group as Volume 3.

William E. Roake is Manager, Fuels Development Section of Battelle-Northwest. Earlier he was Manager, Ceramics Research Unit. Prior to the January 4, 1965 transfer of the USAEC operating contract from General Electric Company to Battelle, he was associated with GE for 17 years. He received his PhD in physical chemistry in 1949 from Northwestern University. For several years, his principal interest has been uranium-plutonium ceramic fuels for power reactors, an area in which he holds several patents. He has been active in IAEA functions and played an important role in implementing information exchange programs between the USAEC and its counterparts in Japan and in the United Kingdom.