letter of our Latin alphabet looms simple compared to its Cyrillic counterpart. The "biscuits," "derbies," etc. of the lexical digression create little stir. More provocative, for example, is the substitution of "hydrometallurgical" for the usual "aqueous" (fuel reprocessing) and the perpetuation of the incorrect "slagging" where "drossing" is implied.

Confirming the warning of the second preface, the volumes are riddled with errors. These will be taken up directly with the author. Some of the responsibility for this must be shared by the assistants mentioned in the vague acknowledgement, usually so meaningless, but here conveniently offering the protection of anonymity. Equally puzzling is the apparent equanimity of the publisher. Is this another manifestation of post-war complacency? Where is the pride of craftsmanship? In view of the availability of competent assistance, this is inexcusable. Paradoxically, some of the most difficult sections are freest from error; these apparently are the author's specialties which, incidentally, will have the smallest audience.

Volume I covers its field very thoroughly in six chapters: ore processing, reduction and purification, fabrication, powder metallurgy, fuel reprocessing, and safe practices.

Volume II consists of but two chapters: about 100 pages on uranium corrosion plus a whopping chapter on alloys. The latter accentuates the problem of the technical book living in the shadow of the novel. Breakdown into specific subtopics is minimized. Important generalizations lie inconspicuously within the pattern of the smooth-reading typographical monotone: no rude intrusion by boldface type or italics for emphasis of important generalizations.

The two volumes are essentially independent and could have been issued separately, with a few phase diagrams added to Volume I. In view of the rapid progress and concomitant obsolescence in various technological areas (added to rising publication costs) further breakdown into individual monographs would have advantages.

The writing is generally competent and as one reads along it becomes apparent that the author presumes in the reader the same broad background he happens to possess. The reader without metallurgical training in particular will face many problems. A strong glossary would be especially valuable for this large group.

The texts are well-provided with tables and figures and appropriate appendixes. Some of the tabulated data would be much more informative if plotted; for example, Table 103 on page 1306. The indexes could stand considerable reinforcement. Some page cross-referencing is used in the texts but a lot more would be a lot better. The print is quite legible even in the lower case of the superscripts, despite frequent type or ink defects.

A study of these volumes reveals something about the author as well as the topics covered. The handling of theoretical metallurgy, specifically structures, is outstanding. Again, one notes an added sparkle in areas in which the author has participated. In contrast, many sections cover a deluge of facts presented in an acceptable though hardly inspired fashion. The a-to-z reader is sure to experience many periods of "combat" fatigue.

Conspicuous to the reviewer in this regard (and for subjective reasons) is the chapter on fuel reprocessing. Here unfolds a challenging new area in separations via molten metals. The author achieves an orderly cookbook presentation of facts but the philosophy of reprocessing remains largely elusive.

Such, then, are the trials and tribulations of a courageous individual tackling the problem of documenting an important segment of a technological revolution in the steep portion of its growth curve. Perhaps uranium has outgrown the domain of the general expert and can be better handled in its documentation, as in its development, by selected specialists.

In view of the magnitude of the challenge, we might be inclined toward temperance in our criticism and generosity in our praises. After all, the corrected volumes can constitute a useful summary of our uranium technology as of this time. As the author intended, there is something there for everyone, even for those who would include the uranium tenor of page 2 in the category of pitch-blenders.

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(About the Reviewer: Except for a four-year teaching interlude, Frank Kerze of the AEC's Division of Reactor Development has worked in the nuclear field since 1940 on the development of processes, materials, and components.)

Nuclear Graphite. Edited by Dr. R. E. Nightingale, Academic Press, 1962. 547 pp., $15.80.

During the past twenty years, much research and development work in graphite technology has been undertaken to meet the special requirements that have arisen from the use of graphite in nuclear reactors. Well established methods have been adapted to produce the large quantities of very pure material that are required for the moderators of nuclear reactors and much information has been obtained on the effects of nuclear radiations on graphite and on the reactions between graphite and various gas coolants. Recently, there has been interest in graphite as a high temperature material for use in advanced nuclear reactors and also for aeronautical and space applications. Various aspects of the work are described in this book by 21 authors.

Their contributions are coordinated by an editor with long experience of graphite work. He has, himself, contributed several chapters. The book describes, very fully, the state of the subject at the end of 1961, with some references to later work. This is probably a good point at which to take stock, as it marks the end of a period in which the successful construction and operation of a large nuclear reactor could be regarded as a noteworthy achievement in itself. The future objective will be the economic production of electrical energy; some of the steps towards it are described in the latter part of the book.

The book opens with a chapter on the use of graphite in the nuclear industry, in which a description of the construction of the first nuclear reactor in 1942 is of particular interest. Three chapters, which deal with the manufacture, machining, and nuclear properties of graphite, provide well established background information which is necessary for an understanding of the physical and chemical problems involved in the use of graphite in nuclear reactors. These are followed by chapters on the structure and properties of graphite which contain much information of general interest. The remaining, and larger, part of the book is concerned with topics specifically related to the material problems of graphite in nuclear reactors. The structural and dimensional changes which occur when graphite is irradiated and the effect of irradiation on the electrical, thermal, and mechanical properties of graphite are all discussed very fully from an experimental point of view. A special chapter is devoted to stored energy and the problems of reactor safety rising from it. There is a very good treatment of the theory of the displacement of atoms and, arising from this, a discussion of the relation between various scales of dose measurement. The timing of the book has permitted only preliminary references to the new insight into radiation damage which is now being obtained as a result of electron microscope studies. A single chapter on gas–graphite systems deals with a wide range of topics on the thermal and radiation induced reactions between graphite and various gases, in particular oxygen, carbon dioxide, hydrogen, and steam. Some of the problems associated with the applications of graphite to advanced reactor systems are covered in a chapter on graphite–molten salt and graphite–metal systems and on the use of graphite as a fuel matrix. A final chapter discusses moderator designs.

No single book could be a complete guide to a subject which is developing so rapidly but all concerned with the development and use of graphite will find this book a valuable reference to the well established parts of the subject. Newcomers to the field will be spared much tedious searching in a voluminous report literature.

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(About the Reviewer: The reviewer is a physicist working in the Metallurgy Division of the Atomic Energy Research Establishment, Harwell. He joined the Harwell staff in 1946 after a period of war-time work on radar. At Harwell he has been associated with research into the effect of irradiation on graphite. This work has led to the development of a model for the dimensional changes of graphite, which has had important practical applications, and to advances in the theory of radiation damage, notably in the study of the nucleation and growth of radiation defects.)

Computer Code Abstracts

ADJUST

1. Name of code: ADJUST
2. Computer for which code is designed: IBM 7090
   Programming system: FORTRAN
3. Nature of problem solved: The code performs a numerical redistribution of pulse-height spectra for the correction of gain and/or zero shifts occurring between spectral measurements. The code will operate on and redistribute a pulse-height spectrum as if it had been measured at virtually any desired gain and zero setting.

   Internally the code generates a table of quadratic least-squares fits to the contents of consecutive and overlapping groups of three channels of the original pulse-height spectrum. These are stored as a function of the invariant relating the gain curves of the original and redistributed spectra; that is, if the gain were in channels/volt, the curves would be stored as a function of volts. A new channel width is computed based on the desired new gain and zero. The contents of the new channel is then determined by selecting a curve from the stored table as a function of a value of the invariant, e.g., voltage, corresponding to the location of a new channel and integrating it over the new channel width.

   It should be noted that this code assumes that the original spectrum has been assigned the correct gain and zero parameters. The redistributed spectrum will have no greater accuracy in this respect than the original. The area of the original pulse-height spectrum is conserved in the redistributed spectrum to within ~0.1% unless a large zero shift is encountered. The code also generates a set of pseudo count-rate statistics based on the channel contents of the redistributed spectrum.
4. Restrictions on the complexity of the problem: maximum number of channels, 400; code assumes a linear gain curve; gain shift of no greate than a factor of two (2).
5. Typical running times: less than 1 min for most problems.
6. Availability: in production at Oak Ridge National Laboratory. Copies of this program may be obtained from Mr. John D. Jarrard, Neutron Physics Division, Oak Ridge National Laboratory, P. O. Box X, Oak Ridge, Tennessee.

J. D. Jarrard
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Oak Ridge, Tennessee

* Operated by Union Carbide Corporation for the U. S. Atomic Energy Commission.

XITE

1. Name of code: XITE
2. Computer for which code is designed: 32K Philco 2000 with two tape units
   Programming system: modified ALTAC
3. Nature of the problem solved: Transient, two-dimensional hydrodynamic equations (*1*, *2*) representing the conservation of mass, energy, and momentum are solved for flow of water and steam in a vertical rectangular channel of high aspect ratio (width to thickness). The distribution of heat generation in the two plates bounding the channel may be nonuniform in both the axial and transverse directions but must be the same in each plate. Flow redistribution within the channel caused by nonuniform heat input to the fluid (e.g., where boiling is nonuniformly distributed) or by nonuniform surface characteristics is determined by the program. Fluid expansion effects are represented during transients such that, in general, the mass rate of flow leaving the channel is not equal to the mass rate of flow entering the channel. Transient driving functions specified by the