an intermediary in the transformation of energy. This is an unusually difficult subject to write about since it involves bits and pieces of so many other disciplines—a list would include plasma physics, thermodynamics, economics, chemistry, pollution control, nuclear energy, etc. The author, by exercising considerable care in deciding what topics to include and in what depth to go into them, has overcome what is a failing in certain otherwise excellent books on MHD. They are either too simplistic for an engineer or applied physicist trying to design an experiment or write or evaluate a proposal, or else, at the other extreme, present what seems almost like a compulsive repetition of all the mathematics, physics, etc., that possibly bear on the subject, complete with obscure notation and derivations best left to specialized texts.

Dr. Rosa, at present a research scientist at Avco Everett Research Laboratory, is in an excellent position to make this sound editorial judgement, being one of that enthusiastic band of former students of Dr. Arthur Kantrowitz.

This group, first at Cornell University and more recently at Avco, has contributed perhaps more than any other to the technical aspects of plasma dynamics and its various aerodynamic, space, and other applications. Dr. Rosa has been involved in many of the significant experiments in MHD, and has authored numerous key reports and papers in the field.

Thus, the book is not only authoritative but also is clearly and simply written. References from the literature are extensive and well chosen to illustrate points made in the text. Derivations of some results are outlined to an extent necessary to make a critical reader feel at ease with the subject, but never with such detail and pedagogical rigor that the trees obscure the forest. Derivations that are too involved or difficult to present in detail are outlined or adequately referenced. The implications and limitations of formulas are commented upon and there is, interleaved throughout, a discussion of economic points as applicable; both of these lend an air of reality to the discussion as do the many photos and drawings of actual experiments. Much useful design data, equations, and methods are included. Often left out of MHD discussions is the design and construction of the field magnet; this book covers the subject well. As is only appropriate, most attention is given to stationary power plants but other applications are mentioned as well. Readers of this journal will wish for more detail on nuclear-MHD for commercial power than is given. On the other hand, perhaps this is just a reflection of the poor support by the USAEC for such work! (Actually federal support in the US for MHD lags far behind that given in many of the technologically advanced countries, so no particular blame need go to the USAEC.)

The only complaint we have about this book is its price—$17.50 for a 234-page book seems hard to justify.

Martin S. Zucker earned his doctorate in nuclear physics from the University of Wisconsin after graduating in engineering physics from Cornell University. At Brookhaven National Laboratory, where he has been (first in the Physics Department and now in Nuclear Engineering) for a total of more than ten years, he has engaged in accelerator development and construction, fast neutron physics, editorial work for the Physical Review, *trying to apply nuclear energy to MHD, plasma physics, and calculations on energy deposition in matter.*

ALGORITHMS IN AN LP ALBUM

Title Advanced Linear-Programming Computing Techniques

Author William Orchard-Hays

Publisher McGraw-Hill Book Company, 1968

Pages xi + 355

Price $12.50

Reviewer Margaret Butler

In the Preface the author delineates his three objectives for the book. The first is to establish a consistent notation and nomenclature for the field; the second, to impart necessary background information for the use of today's computerized mathematical programming systems; and the third, to provide a course text. The book suffers thereby, like other multifunction items such as sofabeds, which while uncomfortable as either sofa or bed do permit one to either sit or lie, as desired.

The author has pioneered in the computer implementation of linear programming systems from the development of the RAND simplex code, for the IBM CPC in 1953, to his contributions in today's General Electric 625/635 LP/600 system and the OPTIMA mathematical programming system for Control Data's 6000 series machines. A more readable and more valuable volume could well have resulted if the author had concentrated on his first two objectives leaving the third to be satisfied by already existing texts, such as that by Saul Gass entitled *Linear Programming Methods and Applications* issued by the same publisher in both a 1958 and a 1964 edition, and the reference books of Dantzig, *Linear Programming and Extensions*, and published symposia papers. With this restricted intent, the organization of the book could have been better structured to convey to the practitioner the advanced linear-programming computing techniques of its title.

Orchard-Hays and his colleagues have been responsible for devising, developing, and/or implementing many algorithms and computing techniques for the solution of operations research problems minimizing computing time and memory allocation requirements. The value of this book lies in that substantial portion describing such algorithms and techniques. These descriptions present step-by-step explanations of the procedures to be followed and are often accompanied by numerical examples.

Throughout, the familiar though unaesthetic uppercase computer mnemonics are used to reference standard procedures. For example, PARRHS is the symbol employed to designate the algorithm parameterizing the right-hand side of the linear equation system. This practice, together with the italicizing of the definitions of models, concepts, and variables on their initial appearance, is designed to promote the objective of a consistent notation and nomenclature for the field.

Of particular interest to this reviewer were Appendix B and Chapter 13. Appendix B, "Design Criteria for a Complete Mathematical Pro-

gramming System," provides a summary of the essential components and characteristics of today's mathematical programming systems. It includes a discussion of desirable control language facilities, input-output processor capabilities, and algorithm library contents, as well as consideration of linear programming problem size, program maintenance and debugging requirements, and the effects of multiprogramming and multiprocessing using current computer systems. Chapter 13 deals with solution strategy and the use of auxiliary controls. Here, as in Appendix B, the material presented is a distillation of the author's extensive experience in the field.

In conclusion, this book should find its place in the library of the analyst or user of today's mathematical programming systems and the computer scientist engaged or interested in the construction and development of such systems. It is not recommended as a course text or introduction to the field.

Margaret Butler is a mathematician in the Applied Mathematics Division of Argonne National Laboratory, where she has been since 1948, except for two years as a statistician with the US Bureau of Labor Statistics. She is currently program chairman of the Mathematics and Computation Division of ANS and served as chairman of that Division in 1966-67.

MEDICAL ISOTOPES TABULATED

Title Radioatoms in Nuclear Medicine

Author P. H. Blichert-Toft

Publishers Rigmor Nilsson, 1968

Pages 78

Price Sw. Kr. 25:-

Reviewer Paul Fields

Radioatoms in Nuclear Medicine by P. H. Blichert-Toft is a 78-page paper-bound book describing the nuclear properties of 53 radioactive nuclides. One or more pages are devoted to each nuclide, depending on the amount of nuclear information available. A decay scheme is given for each nuclide described in the book, but only the well-defined states with their spins, parities, and energies are included in the decay diagrams. The half-lives of excited state are indicated, and Q-values for the decay are given, and, if more than one mode of radioactive disintegration is known, then the corresponding Q-values are also listed. The absolute intensities of β^-, β^+, and electron capture groups are given as percentages of the total parent disintegrations. The absolute intensities and energies of gamma transitions are listed below the decay schemes.

Of great value to medical users of this compilation is a class rating system that indicates the degree of accuracy to which dose calculations can be made, based on the given absolute intensities. Also listed are the half-life and the standard deviation adopted by the author, based on published values. The author made an attempt to evaluate the data, and, in cases where several accurate determinations were available, he averaged the results and listed the error in the average. Finally, the most probable method of producing the nuclide and the isotopic abundance of the suggested target is given. The literature sources for most of the nuclear properties are listed adjacent to the values quoted. One of the most important sections for each isotope is the general discussion, which includes a description of how the parent half-life, Q-values, and absolute intensities were obtained and also lists the references containing the most definitive work.

In my opinion, this tabulation is an excellent and concise summary of the radioactive properties of certain nuclides and should be quite useful to medical researchers and others interested in calculating dose rates from these substances. The information is presented in a very convenient manner so that pertinent information can be obtained at a glance. Unfortunately, the pamphlet probably will not find a broad application in nuclear chemistry and physics because of the limited number of isotopes reviewed.

Paul Fields, a senior chemist at Argonne National Laboratory, received his BS in chemistry in 1941 from the University of Chicago. After three years with the Tennessee Valley Authority, he joined Seaborg's group at the Metallurgical Laboratory, University of Chicago. He left for one year, after the war, to work at Standard Oil Company (Indiana) and then returned. In 1946 he became a group leader in heavy element chemistry at the newly organized Argonne National Laboratory. His main research interests have been the nuclear and chemical properties of the transuranium elements, the electronic structure of lanthanide and actinide elements, nuclear reaction mechanisms, geochemistry, and applications of nuclear techniques to archaeology. He is a member of the AEC Transplutonium Element Advisory Commission and of the Editorial Advisory Board of Nuclear Applications.

THORIUM FUEL--A USEFUL REFERENCE

Title Fabrication of Thorium Fuel Elements

Authors L. R. Weissert and G. Schileo

Publisher American Nuclear Society, 1968

Pages ix + 208

Price $10.00 ANS and ASM members; $11.10 others

Reviewer Arthur A. Bauer

The book, *Fabrication of Thorium Fuel Elements*, will serve as a useful reference for persons interested in obtaining, under one cover, broad coverage of the various facets of the thorium fuel cycle along with detailed descriptions of thorium fuel-element fabrication experience. It is not intended as a source for new ideas and relies almost exclusively on published information for its content. Emphasis is placed on providing an account of fabrication methods which have been successfully applied in the manufacture of thorium-fueled cores or experimental fuel-element assemblies rather than on principles involved in their fabrication. As such,