BOOK REVIEWS

CARDIOVASCULAR NUCLEAR MEDICINE. 2nd ed. H. William Strauss and Bertram Pitt, Eds. St. Louis-Toronto-London, C.V. Mosby Company, 1979, 429 pp, illustrated, $47.50

Like its predecessor, the second edition of *Cardiovascular Nuclear Medicine* continues to provide a comprehensive exposition of the most rapidly growing area in nuclear medicine. Since the first edition of this book, we have witnessed the development of practical techniques for performing multiple-gated blood pool imaging, the widespread application of thallium-201 myocardial imaging, and an increasing clinical acceptance of the results of nuclear medicine imaging methods in the care of cardiac patients. To address these advances, more than 90% of the material in the first edition has been rewritten by 43 distinguished contributors to the second edition.

The text is divided into six sections, three of which represent closely related clinical subjects. The first section introduces basic concepts in nuclear physics and instrumentation, describes currently utilized approaches to emission tomography, reviews the pharmacology of cardiovascular tracers, and explains the use of computers in the storage and analysis of complex cardiovascular data. All of these sections are well written and informative. Unfortunately, the limited space that can be devoted to physics and instrumentation precludes comprehensive coverage. Not surprisingly, therefore, these reviews are incomplete, uneven in emphasis, and, sometimes, not utilitarian. Liquid scintillation counting receives more coverage than gamma camera imaging, whereas a discussion of detector geometry has little use without a related discussion of collimator characteristics, particularly as they apply to gamma cameras.

Sections two, three, and four covering Clinical Application in Vivo, Infarct-avid Imaging, and Cardiomyopathies belong together as a single clinical topic. The majority of the chapters in these sections are well written and extremely informative. The attentive reader will be rewarded with a clear understanding of the strengths and limitations of various currently used methodologies together with a realistic appraisal of the clinical efficacy of these procedures.

Section five on peripheral vascular disease provides a crisp, clear exposition of the clinical utility of radioiodinated fibrinogen studies, but waxes anecdotal in the much longer review of radioactive tracer studies used for the evaluation of peripheral arterial disease. Several misstatements regarding the kinetics and classification of tracers need revision. Section six on Radioimmunoassays and Displacement Assays presents a good review of this important clinical tool. The bulk of this section addresses principles and methodology with only a passing view of clinical applications.

As with most multiauthored books, many chapters contain a moderate amount of duplication; in most instances, this is not detrimental, since the subject matter is sufficiently complex to bear repetition from more than one point of view. The high quality of the clinical discussions, however, is occasionally interrupted by chapters that painstakingly review old methodology devoid of clinical revelance.

Overall this book provides an important and exhaustive review of the state-of-the-art in cardiovascular nuclear medicine. Its weaknesses in organization and editing are minor compared with the wealth of information with which it will reward the serious and dedicated reader. The strength of the book lies in the clinical portions, which should prove equally valuable to the cardiologist and to the nuclear medicine physician. The basic science and instrumentation sections provide only a glimpse of what should be mastered by a physician who wants to assume responsibility for conducting cardiovascular nuclear medicine studies.

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PHYSICS IN NUCLEAR MEDICINE. James A. Sorenson and Michael E. Phelps. New York, Grune & Stratton, 1980, 404 pp, illustrated, $39.50

This textbook explains the basic physics required to practice nuclear medicine. The 19 chapters are supplemented with five appendices, plentiful tables, clear diagrams, and helpful references. The text is cogent, and Sorenson and Phelps show their concern for the reader by even including pronunciations for such names as "Anger" and "Cerenkov." The organization is well suited to a reference work, with short sections on specific topics. This format occasionally appears choppy, such as in the noncontiguous sections dealing with collimator design, but the complete index allows the interested reader to find the information he requires. In general, more examples of intricate concepts may have been useful.

The subjects covered are timely, e.g., semiconductor detectors and accelerators. The historical settings of some of these are described to give the reader a deeper understanding of developments than a mere rendition of facts would provide. Sections on laboratory space design and regulations relating to radioisotopes are especially well handled. Although S I units are defined, they are not well integrated within the work. The sections on the molybdenum-99→technetium-99m generator are clear but lack a discussion of breakthrough elements other than molybdenum-99, a deficiency in light of the regulatory limits on such materials as aluminum. The section on tomography does not include coded aperture or Fresnel zone plate techniques. In view of their potentially important role in such areas as nuclear cardiology, these omissions are regrettable. Nevertheless, the textbook ably achieves its goal of covering nuclear medicine physics in a clear manner. The authors are to be congratulated for making difficult phenomena easy to understand.

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BIOLOGICAL EFFECTS OF RADIATIONS. 2nd ed. Daniel S. Grosch and Larry E. Hopwood. New York, Academic Press, 1979, 338 pp, $27.50

The authors indicate that the goal of this book was that it be "helpful to specialists and researchers in other fields who require a knowledge of the essentials involved in the biological response to radiation." In other words, it presents a survey of radiation

biology and covers all aspects from the interaction of a photon with an atom to the ecological effects of radiation. For undergraduates and laymen, it reveals the broad spectrum of events that occur in all types of organisms from viruses to plants and man, and it notes the useful applications of radiation for society as well as the potentially detrimental effects that have received so much attention in the media. Needless to say, the radiologist and nuclear medicine specialist will find this text too thin on details pertinent to the biological effects arising from the medical uses of radiation. In fact, the limited discussion may juxtapose thoughts in such a way as to lead to misinterpretation. For example, on page 185, two sentences point out that diagnostic radiation exposure to pregnant women should be avoided when possible, and these are followed by: "If an irradiated human embryo or fetus is not aborted, the baby could be abnormal. Figure 10.6 shows a case of severe developmental damage." The unwary reader may conclude falsely that diagnostic radiation always causes gross developmental abnormalities, irrespective of the dose or gestational age. Fortunately, such instances of juxtaposition are few in the book. The reviewer feels that too much space is devoted to very high dose radiation effects, which were much studied in the past but which are now thought to have little biological relevance, e.g., depolymerization of DNA, spindle disorganization, and changes in protoplasmic viscosity. Notwithstanding these criticisms, the authors have admirably surveyed for the intended audience the many and complex phenomena of radiation biology and their impact on society. There is indeed a place for such a book today.

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COMPUTER TECHNIQUES IN RADIATION TRANSPORT AND DOSIMETRY. Walter R. Nelson and Theodore M. Jenkins, Eds. New York, Plenum Press, 1980, 521 pp, $55.00

This book is a compilation of papers presented at the Second Course of the International School of Radiation Damage and Protection held in October 1978, at the Ettore Majorana Center in Erice, Sicily. It contains 28 lectures and three invited student papers dealing with computer applications in the areas of low- and medium-energy neutron and gamma-ray transport, electromagnetic cascade showers, hadronic cascades, unfolding methods, and spectrum analysis. The school was attended by 41 scientists from 14 countries, and its intent was to present background and state-of-the-art information in these areas in a form appropriate to the users and potential users of such programs. In this effort, the resultant book is very successful.

Each section of the book, covering one of the areas mentioned above, has a concise and well-illustrated introductory lecture describing the general theoretical background necessary to that particular specialty. These introductory lectures and the more detailed developments that follow are presented at a level that is readily comprehended by graduate and upper level undergraduate students in the fields of radiation physics, health physics, or medical physics as well as by the program users to which the school was directed. Mathematical background at the level of integro-differential equations and physics background, including the details of radiation interactions and some experience with radiation detectors, is required. In keeping with the user orientation, the programming aspects of this work are minimized except as it pertains to user understanding of the power and limitations of the various codes. The codes are well referenced, however, so that further details are readily accessible.

Applications of a large variety of long-used and recently synthesized codes to radiation dosimetry and shielding needs in medical physics and health physics are amply covered, including discussions of solid, gaseous, and liquid dosimeter design, high-energy accelerator design, and shielding, electron dosimetry, spectrum unfolding, activation analysis, synchrotron radiation, brewstrablung production, and the general requirements and limitations of computer simulation in these areas. In general, these lectures reflect the strong drift toward the use of Monte Carlo techniques with the continued development and improvement of faster computers with larger memories, but the material on Boltzman transport theory, its discrete ordinate and iterative solutions, as well as a section on approximate solutions based on slowly varying buildup factors are given careful and detailed exposition. The introductory lecture on the transport equation is, in fact, one of the better presentations for teaching that this reviewer has found.

The sections on hadronic cascades will be of special interest to those studying fundamental physics at high energies, medical physicists, and health physicists associated with high-energy accelerators producing fast neutron, pion, and heavy-charged particles, and to those who are interested in cosmic ray showers or reactor shielding, and fusion containment. Here, too, the introductory material is very readable and informative to one whose knowledge in this area is limited or dated, and the material would be useful also as a secondary teaching reference to supplement basic material in high-energy nuclear interactions. Both this section and the section on spectrum unfolding are long on general theoretical approach and short on specific applications, although the more important applications are illustrated and generally well referenced.

Finally, there are three appropriately brief commercials for centralized radiation shielding and computation centers available to users: The ESIS (European Shielding Information Center) in Ispra, Italy, and the RSIC (Radiation Shielding Information Center) and BCTIC (Biomedical Computing Technology Information Center) at Oak Ridge National Laboratories, in the United States.

The editors and individual authors are to be commended for this text, which is clear and to the point, well organized and even in style. The care taken in presenting introductory material and the applications and limitations of existing computer codes for radiation transport and dosimetry calculations from a practical prospective make the book very valuable for teachers, students, users, and potential users.

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RADIONUCLIDE TECHNIQUES IN MEDICINE. Joan M. McAlister, New York, Cambridge, London, Cambridge University Press, 1980, 229 pages, $39.50 hard cover; $10.95, paperback

This book is a balanced presentation of information on the detection and measurement techniques used in nuclear medicine. The author covers in eleven well-organized chapters the principles of imaging, data measurement, radiopharmaceuticals, radiation biology, and computer technology.

In the first portion of the book, the basics of nuclear medicine are discussed, covering the properties of radionuclides and the principles of radiation detection and counting. The chapter on radiopharmaceuticals describes radionuclide production, general preparation methods, and tracer techniques. Quality control measures and the importance of purity factors in the isotopically labeled compounds that affect radionuclide distribution are discussed.

The instrumentation chapter is very thorough, covering all current imaging instruments. The author describes the features and complexity of each instrument in detail and with clear explanations. The concepts that determine the importance of performing metabolic studies with a positron camera and the study