

absorbed dose." The concept of exposure is covered almost as an afterthought, with little more than a definition, a welcome demerit; but the absence of any discussion of factors or absorption coefficients and the basic interactions that control these factors is a weakness that limits the usefulness of the book even as an introductory text for radiation science students. Several of these basic concepts missing from the section on principles of radiation protection are used and defined briefly as needed for later chapters on specific applications. For example, the absorption coefficient is used in an example to show the origins of the dose rate constant, but its properties are not discussed. A great deal of confusion then arises between exposure rate constant and dose rate constant; for example, the symbol R is used for both rads and roentgens. A footnote states that for radiation protection purposes dose equals exposure. One hopes, therefore, that this book will not be used to train radiation safety officers in the intricacies of radiation interactions. Microdosimetry is mentioned only as it relates to the anatomic distribution of I-125 absorbed dose in thyroid tissues, and the Compton effect is briefly mentioned in a figure caption describing a scintillation counter spectrum. These concepts are fundamental to an understanding of radiation dosimetry and shielding.

I realize that I take some risk in criticizing the lack of rigor in a book intended for the occasional radiation user and the lay public, but there is also a risk that this very attractive book will be used for introductory courses in radiation safety programs where a more rigorous development of basic principles is imperative. This danger arises in fact because the book is not only well written, but because it covers some subjects with a clarity and breadth not found in other available textbooks for the beginning radiation scientist.

The author is careful to refer to the book in the preface as a manual for individuals to become qualified in radiation protection as an adjunct to working with sources of radiation in medicine. The book deals more extensively with radionuclide use than with the use of radiation-producing machines, whose users are more likely to be trained in radiation physics. In general, this approach is quite successful, with many examples worked out in the text for specific radionuclides, both in shielding and dosimetry. The material on survey procedures, however, is not covered as clearly. Many detector systems are described in the section on radiation measurement, but as a manual for radiation users it would be helpful to include an indexed section on survey and emergency procedures for specific radionuclides. This material, which could be added after the discussion of detectors, would also help the reader to understand better the differences in performance of different detector types.

When viewed as a reference book for users of radionuclides, the reservations expressed above are cancelled and one sees the advantages of introducing certain concepts only as they are needed, staying close to relevant topics instead of following the custom of filling the first half of such books with material that to many is dry, basic physics. It indeed addresses the expanding, untrained army of radioisotope users in a format that is likely to be well received. As the author indicates in a series of interesting quotations, the education of the lay public is our best chance for making profound changes in the uses of radiation in our society.

Finally, this is a very human book. From its cosmic opening to the personal statement at the end, one is aware that there is a great deal of concern for the reader both as a radiation user and as a member of the larger worlds of human interests. Dr. Shapiro has seized the opportunity to raise the consciousness of a very select and influential segment of our society regarding the real and perceived hazards of radiation. I enjoyed the book immensely and recommend it to anyone interested in a good reference book and some stimulating reading about the role of radiation in medicine and society.

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ADVANCES IN DIGITAL IMAGE PROCESSING: THEORY, APPLICATION, IMPLEMENTATION. IBM RESEARCH SYMPOSIA SERIES. P. Stucki, Ed. New York, Plenum Press, 1979, 332 pp, \$37.50

This book contains the proceedings of an international symposium on advances in digital image processing, sponsored by IBM, Germany, and held at Bad Neuenahr, Federal Republic of Germany, on September 26-28, 1978. The proceedings are unusual in that such a broad range of topics are considered, including digital signal processing theory, digital television, satellite imagery, industrial automation, and biomedical image processing. For readers in the USA, the volume is valuable in presenting English language reports of work by European and especially by German authors. The book is divided into 15 chapters, each written by one author, and each covering a single topic. The level of the presentations is highly variable, as might be expected with so many authors. Some prior knowledge of digital signal and image processing is needed to understand the material, although it appears that the book was intended as a general subject review and little information is presented that has not already been published elsewhere.

The major value of this book to medical readers is to introduce the variety of image-processing applications used outside the area of medicine, especially from a European perspective.

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IMAGE RECONSTRUCTION FROM PROJECTIONS, THE FUNDAMENTALS OF COMPUTERIZED TOMOGRAPHY. G. T. Herman. New York, Academic Press, 1980, 316 pp, \$29.50

This book introduces image reconstruction from projections, the mathematical basis of computed tomography. It was originally developed for a two-semester graduate course in computer science taught by the author when he was at the State University of New York at Buffalo. It is definitely not a dry analytical text reporting one author's overview of work largely done by others. Instead, the reader will find that this book is a practical account of many years of development by a well-known researcher and teacher whose insights are presented in a remarkably clear form. The chapter on algebraic reconstruction techniques (ART) is a good example. The chapter is divided into five subsections: (1) What is ART?, (2) Relaxation Methods, (3) Additive ART, (4) Tricks, and (5) Efficacy of ART. The amount of essential practical information included in the text is an important feature. Since the author and his associates played a significant role in the development of mathematical techniques for reconstruction from projections, they have a great deal of practical experience in putting the formulas to work. The style of the text emphasizes the practical rather than the theoretical implications of these methods. A particularly attractive feature of this book is the inclusion of a section entitled "Notes and References" at the end of each chapter. It is here that the author reviews the literature and puts the methods being considered into perspective. I found these sections to be particularly illuminating and interesting. The text is accompanied with appropriate references, and both subject and author indexes are provided.

There are some drawbacks to the text for workers in nuclear medicine, however. This book is based on x-ray computed tomography, especially transaxial. The large variety of nuclear medicine tomography systems, including positron emission,

seven-pin-hole, rotating slant-hole systems, and many others, are not described. Essential components of nuclear medicine tomographic reconstruction methods, including attenuation corrections and incomplete projection sets, are not included. In addition, the book includes many references to the SNARK 77 software system for reconstruction by projections that was developed by the author and his associates for research and teaching. It is not likely that the reader will have access to this system, or anyone that is personally familiar with it.

Despite these limitations, the book is an excellent introduction to the subject and is well written, thoughtfully organized, and a pleasure to read. This book is essential reading for anyone concerned with computed tomographic reconstruction methods.

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DORLAND'S ILLUSTRATED MEDICAL DICTIONARY, 26TH ED. Philadelphia, W. B. Saunders Co., 1981, 1485 pp, \$32.50 (indexed \$37.50)

This new edition of a standard in medical dictionaries has been published seven years after the previous one. The approximately 8,000 new terms that have been added reflect the rapid advances in medicine during these years. Fortunately, however, this new edition has only a 13% increase in the number of pages, because the size of the pages has been enlarged. In addition, the paper is now a blue-white, which makes reading much easier.

Besides the new definitions, about 15% of the others have been modified to convey the newer meanings that the terms have assumed with advancing knowledge. Greater emphasis has been placed on the fields of pharmacology, genetics, immunology, and biochemistry, all of which are undergoing expansion. Cognizance of the rapid changes in the sciences related to medicine indicates the progressive attitude of the editors.

Although not as fundamental as the appreciation of the current status of medical sciences, the continued use of phonetic spelling with appropriate diacritics provides a most practical approach to pronunciation. Perhaps this point may not be considered significantly important by some; however, communication at its best is frequently difficult, and without standards, miscommunication is inevitable. For those interested in the study of words, there is a brief but comprehensive introductory section on medical etymology.

Dorland's dictionary has always been noted for its excellent illustrations, and this edition contains nearly 70 additional ones. A splendid example of a new illustration that represents the state of contemporary medicine is the three-dimensional pictorial of cell organelles and cell membranes. The combination of the different paper and improved printing has produced striking illustrations that appear sharper and more legible.

The 26th edition of *Dorland's Medical Dictionary* continues to maintain the quality expected of this series of publications. Undoubtedly, it will remain a standard for physicians and other scientists.

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RADIONUCLIDES IN NEPHROLOGY—PROCEEDINGS OF THE 4TH INTERNATIONAL SYMPOSIUM IN BOSTON. N. K. Hollenberg, S. Lange, Eds. Stuttgart/New York, Georg Thieme Verlag, 1980, 280 pp, \$58.00

Papers presented in the *Proceedings of the 4th International Symposium on Radionuclides in Nephrology* are divided into four parts: Renal Clearance and Imaging, Renal Hemodynamics and Hypertension, Kinetics, and Chronic Renal Failure and Transplantation.

Part One is interesting to the clinician in nuclear medicine for it deals primarily with attempts to simplify the standard and classic clearance techniques requiring urinary and plasma collection for the evaluation of total- and split-renal function. Curve analysis and computer-assisted methods using iodohippurate tagged with I-131 or I-123 are favored by most authors. Isomers of dimercaptosuccinic acid and other chelates, such as monomercaptosuccinic acid, are evaluated for the efficacy of renal cortical fixation, ease of preparation, and stability of the renal cortical radiopharmaceutical. In comments to the panel session on clearance determination from a single plasma sample, M.D. Blafox points out that the biggest current problem is that although many new and simplified techniques for measuring renal function have been introduced, very few have been applied adequately and studied in physiologic and clinical pathological states.

Just as the section on renal clearance and imaging is directed primarily toward the clinician in nuclear medicine, Part Two is of most interest to the basic researcher in nuclear nephrology. Techniques for studying intrarenal hemodynamics and their control by the renin angiotensin system are presented that utilize various markers such as recording of plasma and red cell transit times, inert gas washout, microspheres, and the use of autoradiography of iodohippurate (I-131) to study adrenergic receptor sites in the juxtaglomerular apparatus.

Part Three on kinetics includes miscellaneous papers on specific nephron tracer localization and the nephrotoxic effects of aminoglycoside antibiotics. An interesting paper dealing with the determination of bone calcium density using local bone neutron activation in the uremic patient treated by hemodialysis is included in this section. Of particular clinical value is a paper on the use of the "stress" diuresis renogram indicated in patients with equivocal pelvo-ureteric obstruction.

The fourth and last part is dedicated to chronic renal failure and transplantation. Radionuclide assessment of complications of chronic hemodialysis and renal failure affecting the skeletal system, myocardial function, and certain pharmacodynamics are discussed. The section on renal transplants deals primarily with iodohippurate tagged with I-131 and xenon-133 techniques for the evaluation of the ischemic or acutely rejecting transplant and the transplant with urinary tract obstruction.

In general, the papers are excellent in quality, of interest to both the nephrology-minded clinician and the research-oriented nuclear physician, and may well serve as a stimulus for future clinical and basic investigatory activities.

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