RADIONUCLIDE IMAGING TECHNIQUES.
P.F. Sharp, P.P. Dendy, W.I. Keyes, Orlando, Academic Press, 1985, 271 pp, $63.50

The stated purpose of this book is to examine the current body of knowledge and prospects for the future of radionuclide imaging techniques from the physicist's point of view. The audience is meant to be physicists and student physicists in nuclear medicine, as well as technologists and physicians interested in the underlying physical principles of imaging. It is my feeling that the book does not succeed in being the physicists' physics book about imaging, nor the clinicians' book about the physics of imaging. It is not the book for physicists because it does not begin with first principles nor explain all the physical reasons for the phenomena and topics discussed. It is not a good book to turn to for research ideas, because the discussions of design aims and shortcomings of current systems and how they might be remedied are incomplete. It is not the book for physicians because it assumes a knowledge of calculus and physics beyond the first level courses, so that there are just enough equations to scare away the wary physician without there being enough to satisfy the physicist.

I would like to mention some specific points. It is misleading to discuss signal:noise ratios even in arbitrary units with a scale with a maximum of 1.0; it would be more to the point to leave the Y-axis devoid of a number scale. The discussion seems too readily to aim at a tumor detection, rather than correctly depicting radionuclide distribution. The discussion of the practical problems of NaI(Tl) detectors begin from the first principles, denying the reader insight into the problems; a graph of the response of the NaI(Tl) crystal as a function of energy would help. The discussion of other detectors is very sketchy; there are no reasons given about why Si or Ge semiconductors are not much used in nuclear medicine. The initial discussion of resolution in terms of modulation transfer functions is not indexed; also, although the physicist can be expected to be somewhat familiar with alternating current, there are better systems to use to compare input and output signals. The discussion of radionuclide production should include the fact that neutron bombardment in a reactor most often leads to products which decay by beta-minus-gamma transitions, while cyclotron-produced materials will most often exhibit beta-plus or electron-capture reactions. There is more to blood-pool imaging than the cardiac applications. It is not to the point to discuss blood–brain barrier penetration as a failure of the compartmental localization method; passive diffusion is an acceptable explanation. There should be a more direct comparison of the rectilinear scanner and the camera, with an attempt made to discuss and illustrate the same points for each. There is no graph illustrating the depth response of the camera; this is a serious point and deserves discussion. After stating that fundamental design changes for photomultiplier tubes are needed, no guidelines for those changes are given. The discussion of delay lines in camera signal processing could be much better illustrated than discussed in the language most often used by engineers in equipment manuals.

Chapter 5 on performance measurements does not seem to build on the previous chapters which describe the imaging problem and physical principles of imaging systems. The subject of performance measures and measurements should be extremely thorough and detailed in a physicist's physics book. The choices made in the IEC and NEMA methods are not discussed. There is no basis for a physicist to create a personal series of tests for use in practice.

The discussion could continue in this vein, but the above comments illustrate my problems with this book. I would have preferred more emphasis on the Anger camera. The authors feel that the profile scanner has been sadly neglected; material about it is acceptable, but not to the exclusion of Anger camera material. There are a number of directions for future research which might have been emphasized, such as different algorithms for placement of Anger camera scintillations, basic imaging needs and how these might be fulfilled using gamma emitters, and the implications of radiation dose limitations and of paralyzable detectors. The book is well edited and published.

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MAGNETIC RESONANCE IMAGING AND SPECTROSCOPY.
F.A. Mettler Jr., L.R. Muroff, M.V. Kulkarni, Eds. New York, Churchill Livingstone, Inc., 1986, 319 pp, $59.00

This book is a compilation of chapters principally dealing with magnetic resonance imaging (MRI) but also reviewing the potential of spectroscopy of stable elements in in vivo medical assessment. A diverse authorship of workers in the field provides breadth in review of this emerging new clinical modality as well as input from a number of institutions. In some instances this approach yields duplication of information and redundant subject evaluation between chapters.

Basic principles are dealt with succinctly providing an overview with reasonable depth of presentation to give the reader an understanding of the basic science of this modality. The survey of clinical applications uses both an organ-system and a disease oriented approach to present a review of contemporary medical utilization. It is weighed heavily and appropriately toward the central nervous system with individual chapters on neoplastic, nonneoplastic, and demyelinating disease with copious illustrations of a spectrum of pathology. The image reproduction is of good quality, although the contrast between illustrations varies considerably. Other organ systems and diseases are dealt with in a "futures" mode with primarily anecdotal information suggesting promise for evolution into efficacious clinical applications. The breadth and depth of reference material supporting the individual chapters

varies widely. Although this is an emerging technology, available literature might well have added measurably to the support of the individual chapters authorship. It is not clear whether this seeming exclusion of existing reference material was purposeful in an attempt to provide the reader with the benefit of the authors' critical triage or an expedient publication timing. For example the cardiovascular chapter offered 87 references as well as additional suggested reading resources numbering 52 citations. In contrast, the chapter on respiratory gating provided only two references while the consideration of pitfalls and artifacts yielded seven citations.

The spectroscopy aspect of the text was presented in two chapters conveying an overview of experimental and operational aspects and a glimpse of potential applications in the future through contemporary modeling in experimental animal subjects as well as initial assessment of techniques in humans. Muscle metabolism in energy production, using phosphorus-31 NMR/MRI spectroscopy, portends the mind-boggling potential depth of the field, while application of fluorine-19, sodium-23 and carbon-13 stable isotope spectroscopy demonstrates the breadth of this modality's potential. This reviewer found the chapters on equipment, economic considerations, facility planning and site development a valuable addition to the overall utility of the text. Tabular and graphic summations yield instant "nuggets" for those involved in the planning, development, and implementation of this modality.

This book is designed for those readers desiring a readable overview directed toward facilities planning and modality marketing. As with any text, the writing and publication time results in a degree of lag with contemporary literature, however the unevenness of reference documentation among the several chapters detracted from the completeness of the material presented. In general the book achieves the editors' goal of providing a practical text written for the physicians viewing the evolving Nuclear Magnetic Resonance Technology and its clinical applications.

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PROGRESS IN RADIOPHARMACY.
P.H. Cox, S.J. Mather, C.B. Sampson, C.R. Lazarus, Eds.
Dordrecht, Martin Nijhoff Publishers, 1986, 615 pp, $155.00

This volume is based on proceedings of the Second European Symposium on Radiopharmacy and Radiopharmaceuticals held in Cambridge, England in March 1985, and is intended, as stated in the foreword, to give an ongoing picture of the practice of radiopharmacy and the state of the art in Europe.

The book is made up of seven sections containing a total of 35 contributed papers of which at least half are review articles.

The first section, four papers dealing with the current status, limitations, and potential of generator systems for ultra-short-lived radionuclides, is generally well written and informative. Though well written, Section 2 with two review articles on positron emitting radiopharmaceuticals, and Section 7 with three papers on radiopharmaceutical aerosols, add nothing new to the literature already available and could have been easily omitted.

In the section on radiochemistry, there are some very interesting papers on radiolabeling techniques and biodistribution studies, particularly an excellent paper on radioiodination by Mertens and a review article on radiohalogenation by Coenen. The section entitled "Recent Developments in Radiopharmacy Practice" is mainly intended for European readers, as the majority of papers deal with the development, training and education, information and reporting systems used in Europe. Of interest to the reader in the United States is an excellent paper by Theobald on computers in radiopharmacy that includes 25 pages describing computer programs for routine recording, dispensing, quality control, biodistribution studies and other topics. Another notable paper is the review by Pfeiffer on quality control techniques useful in radiopharmacy practice. With some modifications, purely editorial in nature, this article would have been a valuable contribution.

Section 5 on the biologic fate of radiopharmaceuticals, describes mainly the in vivo behavior of various imaging agents such as those used for renal, bone and myocardial studies; may have some usefulness for students of radiopharmacy.

Section 6, entitled "Radionuclides in Drug Formulation Studies" has a comprehensive, well-written review article with the same title by Davis. Four of the seven articles in this section discuss recent studies using monoclonal antibodies.

The major deficiency in this volume is the lack of adequate editing. The editors have unfortunately neglected to edit the papers for substance, style, uniformity, language, and typographical errors.

The editorial errors are abundantly evident and in fact quite irritating in some chapters. Papers range from two pages to 50 pages in length, references range from one in one chapter to as many as 122 in another. One 30-page paper has 32 tables. The text has been typed for camera-ready copies, but the tables and figures are severely nonuniform in appearance. In the same chapter, and in several instances—even on the same page—tables and figures have been printed using varying sizes of lettering and color intensities. Several tables in the text are almost illegible, due to the small print used.

With some careful editing for content, the quality of some of the papers would have been greatly enhanced. Also disappointing is the absence of papers on radiolabeled cells and brain flow agents which were topics of great interest in 1985 as they still are today.

The book may be of more interest to readers in Europe since it may serve as a teaching aid for students of radiopharmacy or as an addition to larger medical libraries. It would be remiss to recommend that readers in the United States purchase this book, because it is highly overpriced for what it offers. There are without question several well-written and interesting papers in this volume that will most probably find their way shortly to peer-reviewed journals elsewhere.

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