Book Reviews

NMR IN MEDICINE: THE INSTRUMENTATION AND CLINICAL APPLICATIONS. AAPM Monograph No. 14.

S.R. Thomas, R.L. Dixon, Eds. New York, American Institute of Physics, 1986, 595 pp, $60.00

This book is a collection of lectures presented at the American Association of Physicists in Medicine Summer School held at the University of Portland, Portland, Oregon, August 4–9, 1985. The lectures are divided into two categories: (a) instrumentation, engineering and scientific principles; and (b) clinical applications. The book presents an "intermediate level" survey of the concepts and techniques pertinent to NMR in the medical field. However, since the lectures were presented to AAPM members some sections dealing with instrumentation, engineering or scientific principles may appear to be "high level."

The first two lectures "Physical Foundations of Proton NMR: Part I & II" provide a physical and mathematical description of NMR from a classical (Part I) and a quantum mechanical (Part II) point-of-view. The next seven lectures present, in a much less mathematical way, information dealing with the methods and equipment used for NMR imaging and spectrometry. Topics such as magnet design, gradient coil technology, RF coils, and data acquisition/computer requirements are covered in great detail. These first nine lectures cover approximately 200 pages.

The next 12 lectures are primarily concerned with clinical implications of NMR. Topics include, chemical shift imaging, fluorine imaging, in vivo spectroscopy, paramagnetic pharmaceuticals, flow effects, signal-to-noise ratio and contrast, and NMR relaxation in tissue. Lectures are included on imaging methods specific to anatomic locations such as brain, spine, heart, abdomen, pelvis, chest, and breast. The final lecture in this group of 12 deals with relationships between magnetic resonance imaging and three major conventional forms of diagnostic imaging: nuclear medicine, ultrasound, and x-ray computed tomography. These clinical papers comprise approximately 170 pages.

The next four lectures cover site planning, quality assurance, acceptance testing, and economic considerations involved with magnetic resonance imaging. For the neophyte, this section of the book is a jewel. The information presented in these articles is timely and should be very useful to those contemplating purchase, monitoring, and managing of a magnetic resonance imager.

The last lecture presents the current state of knowledge concerning the mechanisms of interactions of static and time-varying fields associated with NMR devices. Included is a summary of the general conclusions which can be made regarding biologic effects of these fields.

The book has two appendices. Appendix A is a review of the basic concepts of electricity and magnetism. This appendix may be very helpful for those desiring to delve into the more mathematical sections of the book. Appendix B is the American College of Radiology Glossary of NMR Terms which is included here for completeness.

Because these lectures were prepared for a target audience of physicists in medicine, much of the material might be overwelming for a first time venturer into NMR as applied to imaging and spectroscopy. We feel, however, that this book is an excellent reference for those seeking to learn more about the theory, engineering, and instrumentation associated with NMR. Authors with diverse backgrounds and experiences ranging from research scientist for major manufacturing companies to clinicians in University Hospitals provide a broad scope approach to many of the topics presented.

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MAGNETIC RESONANCE IMAGING OF THE CENTRAL NERVOUS SYSTEM.

M. Brant-Zawadzki, D. Norman, Eds. New York, Raven Press, 1986, 416 pp, $89.50

The editors envisioned this text as an introduction to clinical magnetic resonance imaging of the central nervous system. The physician about to use this modality will find the book contains a wealth of images that illustrate a broad array of anatomic, pathologic and technical points. These are often accompanied by roentgenograms or pictures of cadaveric sections to clarify the points under discussion.

This text is more than an atlas, however. Chapters explaining nuclear magnetic resonance and its role in identifying pathophysiology are clear and well illustrated. This aspect of the book would also interest a clinician who may be confused about how he might best use this modality in his practice. Practical considerations of imaging strategies are provided as is a broad consideration of resulting technical limitations. Technical artifacts are discussed along with the potential interpretive problems that might result. Diagnostics algorithms are considered and multiple references to computed tomography, but not nuclear medicine, are provided.

The material presented is quite timely with topical diagnostic situations, such as AIDS, well covered. Recent insights into both acquisition strategies and the diagnostic limitations of some patterns are included. A general, introductory text must, however, limit its scope, a fact recognized by the authors who made good use of references to direct the interested reader toward more complete information. The editors also acknowledged this limitation and appropriately warned the reader that this text provided a pragmatic rather than comprehensive approach. Some specialized terms such as "T2" are not defined and many controversial points are either avoided or left unresolved for the reader. Nevertheless, the material presented is accurate within the scope of the book.

This handsome text is well made with good quality materials, clearly legible type and appropriate diagrams. Labeling of structures within the illustrations was particularly well done in most of this book. The authors' various styles are evident in the chapters, detracting somewhat from the evenness of the presentation, however, the material was fairly uniform in scope. Overall, the editors succeeded in producing an excellent