SKELETAL IMAGING.

L. Rosenthall, R. Lisbona. Norwalk, Appleton-Century-Crofts, 1984, 322 pp, $55.00

This is an outstanding book—perhaps an exceptional one—and one that should be on the shelf of every nuclear medicine physician. It is a text, a reference work, a mini-atlas, a guide through the tortuous pathways of applied research, a discussion of the recent clinical literature, and a summary of state-of-the-art bone and joint scanning. Above all, it is co-authored by one of the leading investigators in the field, Dr. Rosenthall, and is another example of the high standards we have come to expect of his work.

An introductory chapter on skeletal radiopharmaceuticals, which includes an extensive discussion of mechanisms of bone tracer uptake in health and disease, is followed by chapters on primary bone tumors, metastatic cancer, marrow imaging, noninfectious arthritis, bone and joint infection, trauma, osteonecrosis, metabolic bone disease, Paget's disease, extraskeletal uptake, and proliferative bone disorders. Each chapter includes many sections. For example, the chapter on noninfectious arthritis includes sections on synovitis, juvenile rheumatoid arthritis, sacroiliitis, ankylosing spondylitis, osteoarthritis, transient synovitis, reflex sympathetic dystrophy syndrome, regional migratory osteoporosis, trochanteric bursitis, and plantar fasciitis, as well as a thorough discussion of radionuclide diagnosis in these disorders, a comparison of blood-pool and bone-seeking radiopharmaceutical images, the radionuclide response to therapy, and quantitative joint imaging.

Each section contains a review of the basic etiology, pathogenesis, and pathology of the disorder, as well as an excellent summary of the pathophysiology, pertinent clinical findings, roentgen appearance, and therapy, all referenced in detail (there are more than 600 references, most since 1980). This material serves as background for a discussion of the relevant scintigraphic findings. Pertinent articles (both basic and clinical) are summarized, some in great detail, with comments by the authors on the significance of the results. There are many figures and tables illustrating each section, taken both from the authors' extensive files and from publications by other investigators. The roentgen and scintigraphic images are well reproduced, and the index is excellent.

The only quibble I have with the book—and it is a minor one—is that it lacks a description of the normal bone scan, and a discussion of the finer points of imaging findings. That is, the book is written from the standpoint of the disease state rather than that from the nuclear physician examining a set of images, although, in many examples, detailed imaging information is to be found within the section discussion. This situation could be rectified by a chapter on the differential diagnosis of various scintigraphic findings, such as a solitary rib lesion that is elliptical and expansile, etc., and a "gamut" to aid the interpreter. Hopefully, the authors will include such a chapter in a revised edition.

This book is bound to aid both the neophyte and the experienced nuclear physician. It deserves reading and rereading by everyone engaged in bone scan interpretation.

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COMPARTMENTAL ANALYSIS. MEDICAL APPLICATIONS AND THEORETICAL BACKGROUND.

F. Kajiya, S. Kodama, H. Abe, Eds. New York, S. Karger, 1984, 190 pp, $79.25

Compartmental analysis is familiar to nuclear medicine practitioners because radioisotopes are frequently used as convenient and sensitive tracers. The preface and introductory remarks of this small (190 pages) volume define compartmental systems and their analysis, provide a brief historical perspective, suggest applications, and explore the limitations and problems encountered.

The remainder of this book is a collection of papers by 29 authors, nearly all Japanese. The English is, however, excellent throughout and most essays are organized as scientific papers, addressing and illustrating specific problems. Two parts follow the introductory remarks. The first is a series of four chapters outlining theoretical considerations relating to compartmental analysis. This section is technical, requiring a level of mathematical sophistication that few nuclear medicine practitioners possess. Investigators with solid grounding in differential equations and specific interest might find this review interesting because it systematically explores the modeling which forms the basis of compartmental analysis. This superficial review will, however, provide little new information for persons already experienced in compartmental modeling.

The last part of the book consists of 12 chapters presenting specific examples of medical applications of compartmental analysis. Whereas fewer than half of the studies reported involve radiotracers, the systems modeled would, nevertheless, be of interest to physicians. Unfortunately, the chapters are brief and do not review the system studied, and often report techniques of little or no clinical usefulness. Radiocardiography models blood transit through the heart measuring with a single precordial probe activity from injected iodine-131 labeled albumin. Myocardial blood flow is estimated in animals measuring the hydrogen gas concentration recorded by platinum electrodes imbedded in the myocardium. Hippuran renoscintigraphy revisits the analysis of renogram curves generated from regions-of-interest drawn over the kidneys and bladder. The authors attempt to correlate renal maximum counting rate (C_{max}), time to C_{max}, up-slope, and down-slope with clinical problems. Essays that examine the uneven distribution of gas in diseased lungs (measuring ex-

pired nitrogen), splenic hemodynamics, a multi-compartmental study using radioiodinated albumin, chromium labeled red blood cells, and gold-198 phagocytosis were of greatest interest to me. The other chapters are too narrowly focused to be of great use to nuclear medicine practitioners. The chapter on water and electrolytes is particularly disappointing because little information, either by way of review or new, is offered. Although this book was published in 1984, very few references to literature published after 1980 are cited. Physicians interested in the specific problems addressed in the last section of this book will do better to review the scientific literature.

For $79.25, this book will not find its way into many personal libraries, and its content does not justify institutional purchase either. Whereas, compartmental analysis remains of interest to both physiologists and nuclear medicine practitioners, this book, unfortunately, offers little of value to either.

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TECHNETIUM IN CHEMISTRY AND NUCLEAR MEDICINE.

E. Deutsch, M. Nicolini, H.N. Wagner, Jr., Eds. New York, Cortina International-Verona, 1984, 246 pp, $45.50

This book is the proceedings of an international symposium held in Padova, Italy, September 7–9, 1982, 45 years after the discovery of element number 43 by Perrier and Segrè. It is divided into three sections: 1) Technetium Chemistry (12 papers); 2) Production of Radiopharmaceuticals Labelled with ^{99m}Tc (11 papers); and 3) Use of Technetium Radiopharmaceuticals in Nuclear Medicine (17 papers). The 40 papers were authored by 105 contributors from eight countries.

The aims of the symposium were to have users of technetium-99m (^{99m}Tc) radiopharmaceuticals become aware of the capabilities of synthetic inorganic chemists, and to make inorganic chemists aware of the specific requirements of nuclear medicine.

Each section has two general background papers that are excellent. Section I contains "The Coordination Chemistry of Technetium" by A. Davison, and "Applications of Technetium Chemistry to the Practice of Nuclear Medicine" by E. Deutsch and K. Kibson. Section II contains "Design of Technetium Radiopharmaceuticals" by L. G. Marzilli, A. V. Kramer, H. D. Burns, and L. A. Epps, and "^{99m}Tc-Radiopharmaceuticals: Development, Production, and Quality Controls at Industrial Level" by F. Lunghi. The papers in Section III are as follows: "The Impact of Technetium-99m on the Development of Nuclear Medicine" by G. Mariani, and "The Present and Future of Technetium-99m" by H. N. Wagner, Jr. and A. V. Kramer. Each section is completed by papers covering specific research relating to the general topic of the section.

The quality of the papers differ to a large degree from that of the lengthy well constructed paper to one-page abstracts. The same is true as to the number of references listed for each paper. The longest list of references for one paper is 140; five papers list no references at all. Many readers rapidly scan the table of contents in their initial evaluation of a book. In this book, the table of contents gives a misleading impression because the word technetium is misspelled twice and the word derivative is misspelled once. These errors are not indicative because the remainder of the book contains amazingly few errors even though many of the presentations are complicated.

One of the more interesting questions approached in this volume is whether or not chemical studies using macroscopic amounts of ^{99m}Tc ("carrier added," 10^{-4}–$10^{-3}M$ in concentration) give results that can be applied to ^{99m}Tc studies ("no carrier added," 10^{-8}–$10^{-6}M$ in concentration). The major thesis of Dr. Deutsch's paper, "Applications of Technetium Chemistry to the Practice of Nuclear Medicine," is that studies of technetium chemistry using macroscopic amounts of ^{99m}Tc have and will continue to: 1) help in the modification and improvement of existing radiopharmaceuticals, as well as in the delineation of the mechanisms of actions of these agents, and 2) help in the development of entirely new classes of ^{99m}Tc radiopharmaceuticals. The author then shows that first order chemical reactions, which are not a function of concentration, should not be noticeably different because of the great differences in technetium concentrations. Second order chemical reactions which are dependent on concentration would be different and are affected. Differences in chemistry based on differences in concentrations are noted or are strongly inferred in at least four of the papers presented in the book.

This reviewer was pleased with the way in which technetium chemistry was presented. I think an excellent effort was made and success was achieved in fulfilling the first goal of the symposium—making the users of ^{99m}Tc radiopharmaceuticals, largely nuclear medical physicians, aware of the capabilities of synthetic inorganic chemists. I do not think that the second goal of making inorganic chemists aware of the specific requirements of nuclear medicine was achieved to an equal degree. The papers relating to clinical applications are spotty in nature and make no attempt to cover the entire use of technetium in nuclear medicine.

From a historical standpoint, the most interesting presentation in the book is that of Emilio Segrè, which describes his early work, and that of Carlo Perrier which led to the discovery of element 43—later named technetium. This presentation should be read by all interested in nuclear medicine.

This is a book written largely by chemists. As such, it should be read by chemists and related nuclear medical scientists. However, it may be more complex than the average nuclear medical physician would want or need.

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1985 YEAR BOOK OF NUCLEAR MEDICINE.

P.B. Hoffer. Chicago, Year Book Medical Publishers, Inc., 424 pp, $44.95

For the fifth year, Drs. Hoffer, Gottschalk, and Zaret have successfully fulfilled their commitment in assembling this