

BOOK REVIEWS

THERAPY IN NUCLEAR MEDICINE. Richard P. Spencer, Ed. New York, Grune & Stratton, 1978, 404 pp, illustrated, \$40.75

This book brings together the contributions of 33 authors from a symposium held at Hartford, Connecticut, March 17-19, 1977. The purpose of the symposium was to probe the past history and the extent of present information as an early step in exploring the clinical radiation biology of therapeutic radionuclides and labeled compounds. The book has certainly fulfilled its purpose, and brings to light the realization of the steady progress being made in nuclear medical therapeutic applications, which frequently tends to be overwhelmed by the many excellent and rapid advances in diagnostic techniques.

One is also impressed with the currentness of the references supplied at the end of each chapter. The authors have documented their contributions with a total of 833 references, 245 (over 29%) of which are 1975 or later publications. The book also consolidates many aspects of radionuclide therapy frequently difficult to find assembled in one text. Section I, Background, is particularly useful in this respect. Here one finds excellent chapters on beta ray emitters and potential nuclide generator systems for their production, the relationship of external radiation doses to internal dosimetry, the selection of radionuclides for therapy, chromosomal alterations after therapeutic radionuclide use, and the effects of therapy on major organ function and imaging. The latter is the subject of the last chapter in this section and should be read by every practitioner of nuclear medicine.

Section II of this book is devoted to thyroid therapy with chapters covering the treatment of hyperthyroidism with I-131 and I-125, the radioiodine treatment of thyroid carcinoma, the role of lithium in radioiodine therapy, attempts to reduce whole body radiation, avoidance of inadvertent fetal radiation resulting from I-131 therapy, and the possible use of the cyclotron-produced heavy halogen, radioastatine, At-211, an alpha emitter with half-life of 7.2 hr and no long-lived radioactive decay products. Again, unusual information is presented in the chapters on the use of lithium in therapy, inadvertent fetal radiation, and the potential of the alpha-emitting, short-lived, heavy halogen, astatine-211.

Section III contains three chapters on the use of radioactive substances in nonmalignant disease, including the use of radiocolloids for intra-articular therapy for synovitis, the therapeutic implications of adrenal scanning agents, and radionuclide irradiation of the choroid plexus and central nervous system.

The longest section of the volume, Section IV, is devoted to systemic therapy. It consists of 13 chapters, four of which are devoted to the use of P-32. Some of the early therapeutic attempts, i.e., boron neutron capture therapy, are reviewed. A number of new concepts are presented as possibilities, and among the latter may be listed the therapeutic implications of radiolabeled vesicles, the use of ^3H - and ^{14}C -labeled compounds in therapy of specific metabolic pathways, and the possible therapeutic use of radiolabeled antibodies.

Section V is devoted to the "limited access" use of radionuclides—those therapy agents administered to or within a certain anatomical compartment or organ with the hope they will remain. Among the techniques reviewed are intracavity therapy with beta emitters, lymphography and the endolymphatic administration of radionuclides, and the intra-arterial administration of radioactive substances.

This book should be in the library of every nuclear medicine unit. It offers good historical and background information valuable to residents and students seeking to develop a broad background in nuclear medicine and consolidates much information the experienced practitioners of nuclear medicine need and frequently cannot find. After reading it, one realizes that therapy is an interesting and important aspect of nuclear medicine.

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ATLAS OF COMPUTERIZED EMISSION TOMOGRAPHY. P. J. Eil, J. M. Deacon, and P. H. Jarritt. Edinburgh, London, New York, Churchill Livingstone, 1980, 225 pp, illustrated, \$115.00

Tomographic imaging has revolutionized pictorial diagnostic procedures, has provided information previously impossible to obtain by noninvasive techniques, and has contributed significantly to patient care. Emission computerized tomography (ECT) from internal gamma photons of radiotracers is just beginning the transition from being a research tool to becoming an instrument for clinical use. This book is one of the first to present a relatively broad experience in this area.

Following an introduction on the several approaches to emission tomography, the authors present 80 patient studies in the case history format, which includes images of the brain, bone, liver-spleen, and lung. The cases are well selected to demonstrate an overall approach to a variety of diseases. In a number of the studies supportive and/or complementary modalities are illustrated. The authors aptly demonstrate the potential of emission tomography for demonstrating lesions not detectable by other imaging modes. Formatting of the illustrations is excellent; however, the quality of the images is very inconsistent, with the intensities varying from very light to dark. Since these emission tomograms will not be familiar to many readers, indicators for landmarks would have been helpful. A number of the tomograms contain artifacts that can be minimized with improved algorithms.

A short chapter summarizes the authors' experience in comparing the results of emission and transmission computed tomography (TCT) in 208 patients. Their findings indicate a promising future for ECT, particularly since the studies were obtained with a first generation ECT unit and third generation TCT unit.

The last two chapters present technical details concerning the two tomographic imaging instruments. The information includes the principles of operation, gantry calibration, data processing, and imaging manipulation. Finally, a good bibliography is included for those who want to pursue this important diagnostic modality. This text should be in every nuclear physician's library.

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RADIATION QUANTITIES AND UNITS. ICRU Report 33. Washington, DC, International Commission on Radiation Units and Measurements, 1980, 25 pp, \$8.50

In 1948 the International Committee for Weights and Measures was instructed to develop a set of rules for the units of measurement. From this charge came the International System of Units (SI) that was accepted in the 1970s by most countries, including the United States. Some units now used in nuclear medicine, such as the roentgen, rad, and curie, are not coherent with the new SI system and are to be eliminated entirely by 1985. Most scientific journals have taken the initiative to ensure an orderly transition to the new SI units.

This ICRU report, *Radiation Quantities and Units*, is welcomed, for it carefully defines most of the new SI fundamental quantities and units used in nuclear medicine. As one might expect, the report provides carefully worded descriptions of the quantities and defines them with mathematical precision. It also specifies the units to be used for each quantity. Because of the formal format of this report, it will serve more as a reference text than as a learning text. The report also includes the definition of many quantities that are not generally used in nuclear medicine, such as *lineal energy* and *specific energy imparted* as well as defining the distinction between *stochastic* and *nonstochastic quantities*.

As I read this report, I realized that for the next few years I will frequently refer to this document to ensure that I am using the various quantities and units properly. I hope that others will also do so, for in scientific communications it is important that all use the proper quantity and unit.

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RADIOACTIVITY AND ITS MEASUREMENT. W. B. Mann, R. L. Ayers, S. B. Garfinkel. Oxford, U.K. Pergamon Press, 1980, 282 pp. \$12.50

This book, consisting of eight chapters, is a revised and expanded edition of a book by the same title published in 1966 by W. B. Mann and S. B. Garfinkel.

The first five chapters deal with the discovery and historical development of radioactivity and early experiments into its nature; radioactive change and the theory of successive radioactive transformations; the interaction of alpha, beta, and gamma rays with matter; a description of the neutrino and the neutron; and the energetics of nuclear change. These chapters cover both the historical and technological development of radioactivity between its discovery in 1896 to the time just prior to World War II. In general, these first five chapters are essentially the same as in the 1966 edition with some corrections and revisions based on new knowledge and the replacement of old units by those of the *Systems International (SI)*.

Chapters 6, 7, and 8, which were written by the late S. B. Garfinkel for the 1966 edition, have been extensively revised to include recent advances in radiation detectors and associated electronic instrumentation.

The authors state that their purpose in writing this book is to introduce chronologically and historically the concepts of radioactivity in an elementary way for those who have no extensive education in nuclear physics, but who nevertheless must make radioactive measurements in the practice of nuclear medicine. This book seems to fulfill this purpose. Furthermore, this book would also be useful to those engaged in any radioanalytical experiments in which a basic knowledge of radioactivity and its measurement is necessary.

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ARTHROGRAPHY. Murray K. Dalinka, Ed. New York, Heidelberg, Berlin, Springer-Verlag, 1980, 324 pp, illustrated, \$29.50

The reader interested in joint disease and joint injury will profit from this attractive book. The indications, pitfalls, and findings of arthrography throughout the body are included. Dr. Murray K. Dalinka of the University of Pennsylvania has written superb chapters on knee and shoulder arthrography and makes helpful, direct comments stating his opinion in areas of controversy. For example, in discussing osteonecrosis and the consideration of joint injury and meniscal stress as predisposing factors he states, "I believe that the lesion is primarily osseous." In the discussion of the use of arthrography for the study of injury to the cruciate ligaments, he adds that, "I personally feel that arthrography is much more sensitive in the diagnosis of meniscal and articular cartilage abnormalities."

The author has assembled a talented group to cover the issues of arthrography after total joint replacement—arthrography of the hip in children, ankle, elbow, and wrist arthrography, arthrography of the temporomandibular joints, and the evaluation of bursae and miscellaneous para-articular diseases.

The subject matter is complementary to the use of radionuclides in bone and joint scanning. Periodically, there is a direct point regarding the use of radionuclides, e.g., as in the need for isotopic methods in evaluating the femoral component for possible loosening of a painful total knee replacement. Arthrography after total knee replacement has been shown to be useful predominantly in showing loosening of the tibial component of the total knee prosthesis.

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