The final section discusses the value of TCT in clinical dosimetry for the determination of radiation dose. Excellent reviews of current methods and algorithms for radiation absorbed-dose calculations and inhomogeneity corrections are presented. The theoretical bases and use of TCT-derived density values for radiotherapy treatment planning in areas of inhomogeneities are given. The consensus is that TCT-derived values will play a potential role in radiotherapy treatment planning for improved dose estimations in areas of inhomogeneities for photon beams, electron beams, and high LET beams.

In conclusion, the volume is a reference text for those institutions presently utilizing TCT in radiotherapy and for those planning to do so. It is a necessary reference for diagnosticians and radiotherapists who are working collaboratively in the clinical care of radiotherapy patients. The text will be extremely helpful for those medical physicists who have or who are purchasing a TCT-assisted treatment planning computer.

CHARLES COFFEY
University of Kentucky
Lexington, Kentucky


As the title implies, this book is intended to be a comprehensive clinical atlas of radionuclide imaging of the vascular system. It is divided into ten sections: (1) Disorders of the Vascular System; (2) Radionuclide Venography; (3) Radionuclide Aortography; (4) Radionuclide Arteriography; (5) Radionuclide Angiography; (6) Radionuclide Lymphangiography; (7) Nuclear Cardiology—Myocardial Ischemia; (9) Nuclear Cardiology—Ventricular Function, and (10) Radiopharmaceuticals and Instrumentation.

There are obvious overlaps with such finely divided sections, but each deals with a clinical topic in a clearly independent manner, complete with a discussion of radiopharmaceuticals, techniques, interpretation, and comments followed by illustrative cases. (There are, unfortunately, too few cases illustrating cerebrovascular disorders.) The quality of the illustrations of radionuclide images is generally excellent, but the reproduction of some of the radiographs could be better. In addition, the readers may wish to see better correlation of representative cases with other modalities, particularly with those perceived to be more definitive. Because of this relative deficiency, there may be disagreement on the interpretation of some of the illustrative cases.

In spite of some obvious redundancies and the foregoing criticism, the atlas is a good handy reference for vascular nuclear medicine, more so for those who do not often perform all of these procedures.

DONALD E. TOW
VA Medical Center
West Roxbury, Massachusetts


This NCRP report provides recommendations and criteria for the development and implementation of radiation safety programs for employees working in or near radiation environments. It is not a book to be used by employees or students in these programs, nor does it focus on specific program content. Rather, it is a concise summary regarding organizational and instructional concepts for those who must develop and present these programs. Recommendations are offered regarding the identification of personnel categories requiring training, the design and development of a training program, the use of various instructional methods and training aids, methods for evaluating training requirements, methods for evaluating training programs, and a variety of other instructional concepts. Particular emphasis is given to two points: (a) that it is the responsibility of management to develop and implement appropriate training programs, and (b) that skilled and dedicated instructors are needed to make these programs effective.

Appendices are provided listing suggested topics for radiation safety training, step-by-step examples of the development and implementation of training programs for two selected categories of employees (a secretary in the medical facility and a welder in a nuclear reactor), a list of specific needs for adult learning to be considered in preparing a training program, and a list of selected sources of training materials. The book is interesting, informative, and easily read in a single sitting. All laboratories involved with radiation are required to provide some level of radiation safety training, and a copy of this book should be available for organizers of such programs.

JAMES A. SORENSON
University of Utah
Salt Lake City, Utah


Mammography, Thermography and Ultrasound in Breast Cancer Detection is a very readable compilation of the state of the art in cancer identification by available imaging techniques. The editors have elicited expert opinion about all phases of breast imaging and included discussion of the associated controversies, benefits, and risks. In addition to the commonly used screen-film mammography and xeromammography ten clinical chapters provide detailed coverage of magnification mammography, TCT mammography, ultrasound mammography, thermography, needle localization techniques, ductography, and electron radiography (XERG).

The major portion of the book, devoted to x-ray mammography, begins and ends with the controversies surrounding the art and science of breast imaging, and clearly defines the relative benefits and risks of breast imaging with ionizing radiation. In the final chapter, the author admits that the benefits of early detection or exclusion of cancer are difficult to quantify as the risk of induced neoplasia from breast irradiation. Nevertheless, he does identify benefit/risk ratios for women of various ages. He also presents information from a mathematical model, which correlates well with clinical experience. It estimates a 2-mo average increase in life expectancy for annually screened women over age 50, and 3-mo increase for annually screened women over the age of 35 (if screening includes both physical examination and mammography). A brief review of cost-benefit analyses is also provided as "food for thought" in this era of prospective reimbursement.

While the details of modern breast imaging may seem abstruse to most nuclear medicine physicians, despite the excellence of the illustrations, each chapter also identifies the obstacles to achieving maximum sensitivity and specificity in breast cancer diagnosis, obstacles of which all physicians involved in cancer management should be aware. The comparative advantages of xeromammography and film-screen mammography are noted: xerography results in higher visibility of calcifications, spiculations, and of the deeper portions of the breast, but reduced visibility of poorly de-
ined masses while delivering one and one half to two times the mean breast dose produced by the film-screen technique. Thermography is characterized as an investigational tool with severe limitations in the detection of breast cancer, not the least of which is its lack of reliability in detection of the minimal lesions, those most amenable to successful therapy. Diagnostic ultrasound, its primary attribute being the absence of ionizing radiation, is also shown to be limited by both low spatial resolution and nondetectability of microcalcifications; however, it is the only modality capable of separating fluid-filled from solid masses.

The information on XERG electron breast radiography is primarily of technical interest. TCT mammography appears to be useful in evaluation of dense or dysplastic breast tissue, but its high cost and high radiation dose render it inappropriate for screening. The future direction and necessary improvement of each current imaging modality are addressed by the editors as well as the author(s) of each chapter. Nuclear magnetic resonance imaging is not referenced.

**JON SHOOP**
Geisinger Medical Center
Danville, Pennsylvania

**X-RAY FLUORESCENCE (XRF AND PIXE) IN MEDICINE.** R. Cesaro, Ed. Rome, Field Educational Italia, 1982, 239 pp, 18,000 lira

This book is comprised of the 16 papers presented at a workshop on x-ray fluorescence (XRF) along with a round table discussion by the participants from Italy, Germany, Sweden, and the United States. It opens with an extensive, detailed, and well-written review of the instrumentation and techniques for XRF with thin biological samples, concluding that nanogram amounts are readily detectable in almost any element of $Z \geq 20$. Several advanced techniques for in vitro excitation analysis, including polarized photon excitation and recent improvements in nuclear counting systems, are discussed in the second paper. Papers on in vivo analysis of bone, blood, kidney, and thyroid are included as well as are papers on particle-induced x-ray emission (PIXE), a technique for simultaneous trace element analysis at high efficiency for all elements with $Z > 15$.

This is a fine reference book on the general subjects of XRF and trace-element analysis in medicine, because it contains good references, and it was published quickly. The papers, reproduced from camera-ready copy, were published as submitted, but the clarity and continuity indicate that extensive efforts were made before the meeting in preparation and coordination of the work. It should be of interest to the general medical community as well as to specialists in XRF because of the importance of trace elements in the functioning and malfunctioning of our bodies. It also contains interesting papers on environmental, industrial, and forensic analysis and plans for future developments in the use of XRF in many areas. Although these plans are specifically related to the needs of Italian scientists and physicians, the necessity for centralized instrument development laboratories, coordinated expansion, use of large-scale accelerator facilities, and the development of more dedicated systems to be used on site are of interest to a universal audience.

**LAWRENCE BEACH**
University of Kentucky
Lexington, Kentucky

### BOOKS RECEIVED


