The principles of data acquisition, signal processing, and display are clearly explained, and remain applicable in current systems.

This monograph will be useful as an introduction to computer processing of ultrasonic data for medical applications. It cannot be used as a guide to the current literature.

MICHAEL W. VANNIER
Mallinckrodt Institute of Radiology
St. Louis, Missouri

COMPUTERS IN MEDICINE: AN INTRODUCTION. Derek Enlander. St. Louis, Toronto, London, C. V. Mosby Co., 1980, 124 pp, illustrated, $12.85

Computers as generic instruments exist only in engineering and computer sciences departments; elsewhere, computers are tools to perform a given task. Recently we have seen a massive invasion of diagnostic radiology by computers, which are, however, called CAT scanners, whole-body scanners, etc. One can, and one does, use these machines without even the perception that they are a core surrounding a CPU, or for that matter that the logic is totally based on a binary system. There is nothing very special about this circumstance, since teenagers use telephones, children use color television sets with automatic tuning, and almost everyone plays electronic games. None of these applications requires a knowledge of computers as generic tools. The author, however, assumes that the user of a computer in medicine will gain something by learning about I/O, CPU, analog versus digital, binary arithmetic, eligible names, etc.

The book probably succeeds in explaining the very basic concepts point by point, but it is not clear to me what is gained or by whom. The short section on binary arithmetic will be helpful to some. The section on programming is not original, nor could it serve as a reference text. The twelve pages of (very elementary) BASIC programming are not meant to prepare someone for a career in programming, since this type of material is readily found in hundreds of manuals, which have the advantage that they include the more advanced information. Nor is it immediately clear what information is transferred by the inclusion of multiple photographs of antiquated systems or their components from the outside. The section on data files is somewhat helpful, since one feels that there is some use for the tool. A section on how to buy a computer should be disregarded. Nuclear medicine is not discussed, and correctly so, since the jump from bits and bytes to clinical applications requires more muscle than offered here.

These comments may fail to give a true view of the book since it really seems to be directed at an audience for elementary encyclopedias. After reading the book, one will have gained a vocabulary and conversational knowledge, but no technical knowledge. On reflection, the major value of the book may be a demystifying one: the book should be recommended to those who are afraid of the subject, with a proviso: Do not stop after reading this book.

MICHAEL L. GORIS
Stanford University School of Medicine
Stanford, California

OPTIMIZATION OF RADIOTHERAPY. REPORT OF A WHO MEETING OF INVESTIGATORS. WORLD HEALTH ORGANIZATION TECHNICAL REPORT SERIES NO. 644. Geneva, World Health Organization, 1980, 89 pp, Sw. fr. 6

This report is a publication of the proceedings of the World Health Organization (WHO) meeting of investigators held in Cambridge, England, in September of 1978. It provides general guidelines for planning and implementing radiotherapy services, particularly in developing countries. The report consists of three main sections: general considerations for radiotherapy care of the cancer patient; equipment acquisition, physics, and dosimetry planning; and ongoing clinical studies for the optimization of biological response to radiotherapy.

The WHO committee acknowledges some of the general problems of cancer care in developing countries: no viable tumor registries, differences in the age distributions of cancer patients, late diagnoses and referrals, and lack of transportation and patient accommodations. The most serious problem, however, is the severe limitation of treatment capacity. The committee recommends that a multidisciplinary approach must be initiated and that the establishment of radiotherapy centers are a necessity for those countries whenever cancer programs are envisioned. Another major need is the recruitment of trained and competent radiotherapists, nurses, physicists, and technologists, and the concomitant problem of establishing radiotherapy and clinical oncology training programs in area medical schools. A final need is an area-wide public educational awareness program concerning cancer and cancer therapy.

With the goal of providing quantity radiotherapy care, the investigators make specific recommendations concerning equipment acquisition and dosimetry planning. They recommend that for at least the next 5-10 years, radiotherapy in developing countires should rely principally on cobalt-60 teletherapy machines (one vertical and one isocentric unit). They estimate that a cobalt-60 therapy beam is satisfactory for the treatment of 85-90% of patients. Only in certain circumstances can accelerators be recommended for developing countries. Accelerators of various types (linear accelerators, betatrons, and microtrons) entail considerably higher capital cost and annual expenditures than do cobalt-60 units, and they are more difficult to repair and maintain. The committee did recommend brachytherapy (cobalt-60 or cesium-137) as a tool when used in conjunction with external beam therapy. In recognition of the need for ±7% accuracy of prescribed radiation dose, it emphasizes the major role of physics and clinical dosimetry in radiotherapy centers—machine output and calibration parameters, assessment of patient dosimetry, including in vivo dosimetry, and dose computations. In conjunction with the IAEA, the committee also recognizes the need for and recommends the institution of more standardization and calibration laboratories for dosimetry. For treatment planning and optimal use of available radiotherapy equipment, it suggests the following: use of as few treatment fields as necessary, awareness of differences in normal and tumor tissue, and knowledge of the total three-dimensional irradiation volume. For improvements in radiotherapy quality in developing countries, the members at present suggest acquisition of a treatment planning computer over the purchase of more sophisticated teletherapy units.

The final section addresses approaches to optimal radiotherapy using the available accepted clinical methods including combination radiotherapy and chemotherapy, time-dose fractionation effects, and radiosensitizers. However, for developing countries time-dose relationships (nominal standard dose system, the cumulative radiation effect system, and cell population kinetic models) may be the only option available. Thus, the committee acknowledges a need for the correlation of clinical data for various fractionation regimes, especially the nonstandard ones. It suggests a program study be initiated for the world-wide collection and evaluation of clinical radiotherapy data. The data gathered would also provide the clinical background for deviations from conventional treatment regimes necessary to cope with the social, economic, and other constraints encountered in developing countries.

Although the report provides suggestions for developing countries, the adopted guidelines could well be followed in developed countries in the interest of cancer patients. This report is a recommended background reference for those institutions considering the establishment of a cancer center with a viable radiotherapy department. The report provides supplemental background