

of training are ignored. Similarly, a plural interpretation of memory is implied, but is not followed up.

This book, with its detailed account of methods and findings, will be of interest to workers experimenting in special branches of social and educational psychology; but the scope of the book is far too narrow for its title.

S. A. BARNETT

PHYSICS OF RADIOLOGY

Fundamental Physics of Radiology

By W. J. Meredith and J. B. Massey. Pp. viii + 599. (Wright: Bristol, 1968.) 90s.

THIS book sets down the basic physics of radiology in a straightforward and lucid way for the primary benefit of radiologists and radiographers. It is intended to educate those with limited physics training in the understanding of the properties of ionizing radiations and their applications to medicine. In expounding their subject for this purpose, the authors have succeeded admirably, and without doubt the book is one which will be widely used alike by students and their teachers.

The material of the book is presented in four sections dealing respectively with general physics, diagnostic radiology, radiotherapy and radiation protection. The first section begins at once with the concepts of matter and energy, atomic and nuclear structure and radioactivity. Elementary electricity and magnetism, with which nearly all books on radiology begin, are not included but left, sensibly in my view, to other available texts. The interaction of radiation with matter, the measurement of radiation and the concepts of absorbed dose and of dose units are all thoroughly and lucidly expounded in this section.

An outstanding feature is undoubtedly the section on diagnostic radiology, a subject which radiation physicists have rather tended to neglect. The treatment here is deeper and more extensive than in any other book of this kind that I know of and the relevance of the physical factors to diagnostic practice is kept clearly before the reader. Every step, from the passage of the X-ray beam through the body to the recording and processing of the image on the film, is carefully expounded. The factors affecting image quality (geometric factors, absorption and scattering of X-rays, and so on) are discussed in turn and chapters on the practical operation of X-ray apparatus and on special techniques conclude the section, which is the longest and one of the most valuable parts of the book.

Equal thoroughness and breadth are evident in the third section on radiotherapy, which gives the physical principles underlying the radiation treatment of disease and deals most thoroughly with practical methods of physical dosimetry, treatment planning and its execution. A large part of this section concerns the use of high energy radiation—from linear accelerators and cobalt-60 sources—since these forms of apparatus have now almost superseded the lower voltage machines used hitherto. This change to the high energy machine is further reflected in the comparatively limited space given by the authors to the use of radium and radon sources.

If one could fairly ask for more of a book which already gives so much, it would be that the section on radiation protection could be longer, not only in respect of the operator, but also with regard to the patient. Although other books specifically on the use of radioactive isotopes are available, some readers will, I think, wish that the single chapter on this subject could have been longer.

The style of the book is lucid and it is easy to read, with an abundance of helpful diagrams. It is impossible in a short review to call attention to all the important facets of this book, but it is one to be highly recommended, not only to radiographers and postgraduate radiologist students, but to physicists in radiological work, irrespective of their involvement in teaching.

F. W. SPIERS

USING RADIOISOTOPES

Radioisotopes in the Human Body

Physical and Biological Aspects. By F. W. Spiers. (American Institute of Biological Sciences and US Atomic Energy Commission.) Pp. xiv + 346. (Academic Press: New York and London, May 1968.) 140s.

THE possible hazards arising from the absorption of radioactive material in the human body is an emotive subject in the popular imagination and at the same time the source of a wide range of fascinating scientific problems. The publicity given to radioactive fallout from nuclear explosions, to rare leaks of radioactivity into the atmosphere and to the occasional loss of a radioactive source, together with the extensive use of radioisotopes in medicine, industry and increasingly in everyday life, have all tended to arouse somewhat irrational fears among the general public and even in many scientists. The commonest reactions to the word "radioactive" are a step backward and an apprehensive smile.

There are still many unsolved problems in this field, but a generation of biologists and physicists, of whom Professor Spiers is an undoubted leader, have brought the situation into rational perspective and provided quantitative and satisfying answers to many of the major questions concerning the hazards of radioactivity. It should be made clear, however, that this book is not primarily concerned with the assessment of hazards nor with human reactions to them. The monograph is a comprehensive and scholarly presentation of the problems of the deposition of radioisotopes in the human body and of methods by which the consequent radiation dosimetry may be achieved. This involves dealing with both the physical and biological aspects of the subject, and the author has achieved a most satisfying synthesis. Although the problems are treated as rigorously as possible, the book should be well within the grasp of any interested physicist or biologist. Two introductory chapters cover the physical properties of radioisotopes and their radiations and isotope metabolism in the human. The core of the book is concerned with the dosimetry of radioisotopes in soft tissue and in bone and is both comprehensive and authoritative. Not unnaturally, in view of Spiers's own outstanding work in this field, and also of its importance from the point of view of isotope deposition, bone is studied in considerable detail. This study is a most valuable contribution to a complex and difficult problem.

One chapter is devoted to the quantitative determination of both natural and man-made radioactive materials in the human body. Only in the final chapter is the question of hazard, as such, raised. This chapter summarizes the present position on the determination of maximum permissible levels of radioisotopes in the body and of recommended maximum concentrations of radioisotopes in water and air.

This book will undoubtedly become a standard work in this field, of constant value to medical men, physicists and biologists using radioisotopes in medicine and biology, and to all who are concerned with radiological protection.

J. E. ROBERTS

PAINFUL STIMULI

Pain

Edited by A. Soulaireac, J. Cahn and J. Charpentier. (Proceedings of the International Symposium on Pain organized by the Laboratory of Psychophysiology, Faculty of Sciences, Paris, April 11-13, 1967.) Pp. xii + 562. (Academic Press: London and New York, 1968.) 126s.

THIS symposium, dedicated to the memory of René Leriche, had two avowed aims: first, to review recent important progress in the physiology, pharmacology