BOOK REVIEWS

RADIATION THERAPY IN THE MANAGEMENT OF CANCERS OF THE ORAL CAVITY AND OROPHARYNX. By Gilbert Fletcher, William MacComb and Robert Shalek. Charles C. Thomas, Springfield Illinois, 1962. Price: 16 dollars and 50 cents.

Carcinoma of the oral cavity and oropharynx constitutes less than five per cent of the overall cancer incidence. The principles of treatment of this group of tumours vary considerably according to the site of growth, and owing to their relative rarity some radiotherapists have found it difficult to gain sufficient experience in treating them. Satisfactory guidance from the literature has also proved difficult, despite the enormous number of publications. What is usually offered is statistical information about the results from some particular method and an account of the technique used, whereas an exhaustive description of the treatment in individual cases seldom appears. Little attention has been paid to the complications that may arise or to the risks that may be taken regarding necrosis when radical radiation therapy is applied.

The monograph by FLETCHER, MACCOMB and SHALEK meets the deficiency; in this the majority of problems encountered in the treatment of carcinoma of the oral cavity and oropharynx are discussed.

The material upon which the investigation is based is from the period between 1948 and 1959. In the case of oral tumours, the primary growths were mainly treated by radium implantation; where this was not possible, external radiation therapy with cobalt 60, or a combination of ^{60}Co and radium implantation was employed. Gland metastases were for the most part treated by surgery in accordance with accepted principles. FLETCHER expresses a warning, however, against the primary use of surgery for metastases larger than 3 cm in diameter; in such cases he prefers concentrated external ^{60}Co therapy over small fields.

External irradiation therapy with ^{60}Co, and use of the wedge-filter technique, are discussed in considerable detail. This section of the book is of great value to radiotherapists, as FLETCHER may be said to be among those who have had most experience with this procedure. There are a number of case histories containing details of super-voltage therapy in the chapter dealing with the oropharynx.

Considerable space has been given to the implantation technique. The drawings and photographs in this section are excellent and an entire chapter is devoted to dosage calculations.

The good results reported provide a further illustration of what can be achieved with a well-established, individualized method and close co-operation between an experienced radiotherapist and a surgeon skilled in the handling of neoplastic conditions.

The surgical aspect of the treatment has intentionally not been given much space; for this the reader is referred to textbooks on head and neck surgery. It would appear to the reviewer that the value of the book would have been increased if the surgical principles at MACCOMB's clinic had been discussed in more detail. Generally speaking, however, this is an excellent monograph on modern treatment methods in carcinoma of these regions.

Folke Jacobsson

THE TREATMENT OF MALIGNANT DISEASE BY RADIOTHERAPY. 2nd edition. Editor: Ralston Paterson. Edw. Arnold Ltd, London 1963. 556 pages, 161 illustrations. Price: 90 sh.

The book falls into three parts. The first is devoted to a general account of the principles of radiotherapy, methods and apparatus. The second, and largest, details the radiotherapy for tumours in various organs, as practised at the Manchester Clinics. Full descriptions are given of the methods for the curative therapy and treatment of incurable tumours, recurrences and complications. The results obtained are mentioned only incidentally, if at all. The last part of the book deals briefly with chemotherapy, and there is also an extensive and valuable section on the organization of departments of radiotherapy; this is treated in the same wealth of detail as the radiotherapeutic methods.

The introduction of the million-volt technique and radioactive isotopes has changed the face of radiotherapy in the space of a few years. It is natural that the principles and practice of treatment should be less standardized in these than in most other specialities of medicine, and thus that the methods should differ from one clinic to another. Dr Paterson's object has been to provide an account of the application of radiotherapy at a particular hospital, namely the Manchester Clinic.

The principles applied at this school are being followed at many of the leading hospitals, especially elsewhere in Great Britain as well as in North America, where the work is indispensable and may serve as a handbook. The principles of radiotherapy in Scandinavian countries often diverge from those of the Manchester school. Cases in point are the mould technique and the local implantation of radioactive substances; these are described in full and recommended as methods of choice for treatment of many types of tumours, but which are much less widely used in the Scandinavian countries. Reflecting a large fund of experience in radiotherapy, the book is of great value to all radiotherapists and radiation physicists although for other specialists, requiring only an outline of the subject, others may be preferred.

Jerzy Einhorn

PROVING GROUND — An account of the Radiobiological Studies in the Pacific, 1946—1961. By Neal O. Hines. University of Washington Press, Seattle 1962. 366 pp. Price: 6.75 dollars.

This is a monograph for laymen and relates the story of a group of laboratory biologists that formed part of a giant organisation during a period of atomic bomb tests in the Pacific. The author is mainly concerned with the task of the group, a detailed survey of the fall-out radioactivity and its distribution in the water around the test area and in all biologic objects. The aspect is however widened since the broad features of the planning of the many enterprises are described. Unexpected changes in atmospheric conditions gave rise to heavy fall-out in some of the tests and human beings, notably on Rongelap Island and a Japanese vessel, were irradiated. These incidents, which at that time provoked much controversy and animated discussions, are now seen in retrospect. Several pictures and graphs are included in the book.

Arne Forssberg

CELLULAR BASIS AND AETIOLOGY OF LATE SOMATIC EFFECTS OF IONIZING RADIATION. SYMPOSIUM SPONSORED BY UNESCO AND IAEA. Edit. R. J. C. Harris. 360 pages, 86 illustrations and 60 tables. Academic Press, London 1963. Price: 80 sh.

This, the third in a series of symposia on radiation biology, covers the effects that appear late in exposed animals and man. A considerable part of the program dealt with the leukemogenic radiation effects, a field in which experimental work has considerably changed the simplified view on the mechanism held earlier. The complexity is well borne out from the lecture of leading experts. BERENBLUM produced further detailed evidence that irradiation may be an initiating agent which causes a certain degree of leukemia in mice, whereas chemical treatment following the exposure, e. g. with urethane, produces an additional increase. Even if radiation alone be considered, the relationship between the dose and the incidence is not always linear. It appears from experience in mice that the frequency of induced leukemia is a complex function of dose rate and/or fractionation. MOLE reported that continuous irradiation may even decrease the incidence and that peak values of leukemia induction may occur at certain doses, depending on the mode of the exposure.

The second important subject was the equally difficult problem of the shortening of the life span of animals that are held under continuous irradiation for a considerable part of their lives. The two opposed opinions are that radiation-induced shortening of the life span closely resembles, or is identical with, the natural senescense process although, because of the exposure, it sets in somewhat earlier. Others maintain, however, that radiation produces more specific effects. H. J. MULLER presented acceptable evidence for his conception that the effect may be due to point-wise losses of cells that have been genetically changed.

Many other interesting papers were read and MAISIN in one of these reported that it appeared that radiation influences the haematopoiesis even after such low doses as 0.1 to 1 r.

The discussions following each paper are instructive and add considerably to the value of a book as excellent and on the same high level as the two earlier ones in this series.

Arne Forssberg

STRAHLENSCHUTZ IN FORSCHUNG UND PRAXIS. BAND 2. JAHRBUCH DER VEREINIGUNG DEUTSCHER STRAHLENSCHUTZÄRZTE. Herausgegeben von H. J. Melching, H. R. Beck, H. A. Ladner und E. Scherer. 374 Seiten und 116 Abbildungen. Rombach, Freiburg i. Br. 1963.

The book contains a number of lectures given by German and other specialists at a course organised in 1962 by the German Association of Radiation Protection Physicians. A few contributions to the discussions are also included.

The two first papers cover the foundations of radiobiology, while the one that follows describes radiation effects on the mouse ovary. Four papers deal with various aspects of chronic radiation effects in human subjects (mutation and selection, premature ageing, leukemia, and thorotrast injuries). In others the effects of radio-sensitizing and radioprotective drugs and of bone-marrow cell injections are discussed. The successful medical treatment of a severe local radiation injury is reported.

A group of papers appear under the heading of practical radiation protection in the medical and industrial uses of radiation. While this adequately describes the content of some of these papers, others in the same group are more concerned with legal questions and the difficulties that German legislation may cause in practical work. In the final chapter psychologic problems and possible panic reactions in case of nuclear war are discussed.

The text is in the main well written and informative, and the book should be of considerable use to all interested in the problems treated. While some statements appear rather questionable to the reviewer (e. g. the low estimate of the dose-saving possible with image intensifiers and roentgen television, or the advice to use radiotherapy in most cases of hemangioma), these do not detract from the general value of the book.

Sven Benner

Advances in Biological and Medical Physics. Volume VIII. Edited by C. A. Tobias and J. H. Lawrence. 457 pages. Academic Press, New York and London 1962. Price: 15 dollars.

The present volume continues the earlier policy in the same series of detailed review articles on selected topics of current interest, often incorporating new research results by the various authors.

The title of the series seems, at least to a physicist, a little misleading, as he finds very little physics in some of the papers which he would class as being based upon pure physiology, pharmacology or other medical subjects. Nevertheless, most of the papers in the present volume are of considerable interest to all physicists connected with medical or biologic research, and several of them will be much appreciated by radiotherapists and those engaged in, e. g. cancer research.

The first paper, by J. H. Gofman, deals with the methods and results of roentgen spectrochemical studies of the blood serum content of a number of elements from atomic number 15 (phosphorus) to 92 (uranium). K. Hsu reviews neutron activation analysis as applied in medicine and biology and presents an extensive collation of published results, stating the methods used, the sensitivity attained, etc, for a number of elements.

A paper by L. D. Marinelli, C. E. Miller, H. A. May & J. E. Rose on low level gamma scintillation spectrometry gives a most useful review of the methods and apparatus for measuring weak gamma activities, especially in the human body. Sources of error are discussed in detail, and many practical hints for avoiding them are included. The paper is mainly concerned with NaI(Tl) scintillators, and the use of liquid and plastic scintillators is only lightly touched upon.

T. Brustad writes on the biologic effects of heavy ions produced in a linear accelerator and gives a thorough theoretical and experimental study of their linear energy transfer (LET). Modern hit theory, oxygen effect etc are discussed. The paper by P. Blanquet on the hypothalamus and thyroid is an example of the type mentioned above with very little physics content but still interesting to physicists engaged in thyroid function studies — and of course to endocrinologists and many others. The complex humoral and nervous relations between the organs mentioned in the title, as well as the pituitary, the gonads and other organs, are studied by means of strictly localized lesions or stimulation of the hypothalamus as well as by other methods.

M. Calvin has written from a chemist's point of view on the origin of life on earth and elsewhere, a paper of great general interest, while R. Wallace reviews the physics of space radiation and discusses the radiation hazards to space travellers, which seem to be somewhat less than was believed a few years ago. Finally, N. Arley and R. Eker consider the difficult problem of carcinogenesis mechanisms. A comparison of theoretical predictions from various mathematical models with experimental results indicates that cancer induction may be due to a single energy transfer from a carcinogenic agent to a DNA molecule in the genetic apparatus of a somatic cell. Indirect energy transfer via free radicals may also sometimes come into play. The lines on which experimental work is needed to resolve still open questions are indicated.

Sven Benner

BASES PHYSIQUES DE LA RADIOTHÉRAPIE ET DE LA RADIOBIOLOGIE. Par M. Tubiana, J. Dutreix, A. Dutreix, et P. Jockey. 812 pages, 346 figures. Masson et Cie, Paris 1963. Prix: 140 F.

This book on the physical foundations of radiotherapy and radiobiology is written by a well-organized team of radiologists and physicists (three of them, according to Dr Desgrez in the preface, are actually both). This happy combination has enabled the matter to be presented in a way that is simultaneously scientifically stringent and of practical usefulness in clinical work.

The aim was not to present ready-made solutions to current problems in physics and dosimetry, but first to elucidate the methods of solution, and so to improve the reader's understanding of the matter and his ability to apply basic information to the solution of new problems as they arise. Where a physically-minded reader might desire a detailed exposition of a certain subject, this is given in small print and may be skipped by those seeking only a general idea of the line of thought.

After an introductory chapter on matter and radiation, the bulk of the book is divided into four approximately equally large sections treating, respectively: 'Laws of interaction between radiation and matter', 'Theoretical dosimetry', 'Clinical dosimetry', and 'Biologic aspects'. Appendices containing formulas, constants, tables, diagrams, and a bibliography, appear at the end.

The vast subject matter is treated lucidly and completely, and the book contains a wealth of material seldom found within the same cover. While it has been impossible for the reviewer to check more than a small fraction of the matter he has gained an impression of reliability in detail and of thoroughness, even if a few points seem to be open to criticism. The chapter on radiation protection satisfactorily presents the foundations and the international recommendations but gives relatively little information on practical protection measures, especially against internal irradiation, which are treated but briefly and in general terms. In the bibliography, an earlier edition of a book instead of the last one is often listed, and the few halftone figures are not well printed. These, however, are details that do not detract from the great value of the book for radiophysicists, radiotherapists, and radiobiologists. The authors are to be congratulated in having produced this fine work, one that must have cost them immense pains.

Sven Benner