

Books

Radiations and Living Cells. By F. G. Spear. 222 pp. John Wiley and Sons, Inc., New York, 1953. \$3.50.

Although based upon lecture material for medical students, the presentation makes this book recommendable to the general reader in science. Timely topics centering about the effects of radiation on human beings are discussed against their historical background. It is clear to the reader that the atomic age did not begin in 1945. The topics that have become of urgent concern as regards survival in the atomic age are shown to have been in the minds of scientists since the beginning of the century. Yet there is much knowledge typical of a rapidly growing subject which is well organized in ten chapters with a bibliography.

It is safe to guess that Spear's discussion of whole-body irradiation effects would not have been written previous to 1945. He points out that the atomic bomb brought into prominence the importance of whole-body exposure of humans. In Chapter 8 he gives a nice description of the manifold reactions of the whole body along with a noteworthy graph showing the radiation survival curve for humans. According to the graph one half of all people receiving a gamma-ray dose of 500 roentgens will survive. Data like this will occupy the minds of scientists, physicians, civilians, and soldiers for some time to come. This sigmoid mortality curve rather than the pretty mushroom cloud seems to be the vivid symbol of today's atomic age.

It would be misleading, however, to give the impression that this book is dominated by The Bomb and its effects. Actually it is a well-written account of the effects of radiations on living cells by one whose interests lie in the biological and medical fields rather than in physics. There are no chemical or mathematical equations shown. The style is leisurely and discursive. For example, in Chapter 2 on "Living Cells" there is an excellent account of tissue cells and their mode of life beginning with the simplest description possible. Or, in Chapter 9, dealing with radiation and cancer, the cancer-producing properties of ionizing radiation lead into an excursion on the causes and nature of cancer. Having discoursed upon some aspects of modern cancer research, the author returns again to radiation and its therapeutic uses.

The medical background of the book is seen especially in the chapters which systematically treat the responses to radiation of the various tissues. Titles of some chapters are as follows: "Irradiation of the Skin and Alimentary Canal" and "Irradiation of the Blood

and of the Circulatory System." Another chapter deals with the generative system, which digresses into the subject of genes and mutations. And here again the author starts out by carefully describing spermatogenesis and ovogenesis with aid of diagrams.

Chapter 10 is devoted to theories of the mechanism by which penetrating radiations influence cells. This is a brief treatment of a difficult subject. Beginning with the earliest theory—such as that embodied, for example, in the "Law" of Bergonié and Tribondeau who started their work in 1904—the reader is given a bird's-eye view of complex terrain. The discussion covers the target theory, chromosome breaks, and the radiation effects on enzymes in solution. The many difficulties of accounting for the reactions elicited by radiations prompt the author to remark: "There is much to be said for the comprehensive French term '*réactions obscures*' which is eloquently descriptive of the present situation."

This is a good book. Not only will the general reader find it instructive; the specialist will find here assembled many historical items and useful facts which will enable him to see as a whole the subject of *human* radiobiology. It is generously illustrated with sixty figures, and is well indexed.

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Pile Neutron Research. By Donald J. Hughes. 386 pp. Addison-Wesley Publishing Co., Inc., Cambridge, Massachusetts, 1953. \$8.50.

The present book is virtually the only presentation in book form of the expanding field of neutron physics. While neutron research is not exclusively reactor research, it is largely so. The discussion is not confined strictly to reactor studies, but covers other fields only incidentally for completeness of presentation.

The presentation is directed to the level of a first year graduate student, and for the most part achieves its objective. Material is presented in a straightforward form with an adequate set of references to supplement the text.

Topics covered would fill several volumes if completely presented. The choice of illustration by example is therefore appropriate. It is neither exhaustive nor definitive, being confined primarily to work conducted by the author.

The organization is experimental in form, giving research techniques of general utility, then discussing techniques used in studies with neutrons in the various energy regions: fast (10^5 – 10^7 ev), resonance (0.1– 10^5 ev), thermal (0.01–0.1 ev), and cold (< 0.01 ev).

The nature of the chain reaction is briefly presented in a form easily understood by experimenters. It is therefore possible for the uninitiated to develop sufficient appreciation of the virtues and limitations of reactors to permit him to design effective experiments before having contact with an operating unit. A valuable auxiliary for this purpose is the presentation