by long association with others who have good taste. That does not mean, of course, that good books have not been written on the appreciation of painting and music. This book is certainly recommended reading for anyone who has a taste for that sort of thing, and while it may not make a good designer out of a poor one, it certainly will help a good designer to teach good design to others.

J. RABINOW

Control Data Corporation,
1455 Research Boulevard,
Rockville, Maryland

Lectures in Physics

Nuclear and Particle Physics. Proceedings of an institute, Montreal, 1967. B. MARGOLIS and C. S. LAM, Eds. Benjamin, New York, 1968. viii + 552 pp., illus. $12.50.

Summer institutes (and spring, fall, and, more rarely, even winter institutes), seldom lasting beyond a month or two, have frequently had a lasting impact on the development of theoretical physics. These schools, some of which have become annual events (the subject matter shifting from year to year) are organized ostensibly to provide pedagogically accessible lectures on recent developments to (a relatively small number of) advanced graduate and fresh postgraduate students. Their most cogent justification, however, resides in the written proceedings, which often develop into the *loci classici* of their subjects, much more used and useful than the original literature. Though it is notorious that the audience may have heard only a fraction of the material that ultimately appears as proceedings, the fact that these papers were prepared, in principle, to be delivered orally often results in an attractive informality and freshness of style absent from more formally commissioned or intended review articles.

The proceedings under discussion, issuing from a one-shot affair organized with the Montreal Exposition as backdrop, have several uncommon features. Nuclear and particle physics have parted company for over two decades, though important bridges (such as nuclear forces and weak interactions) remain connecting them and at least one major bridge is being extended (in the use of high energy beams to study nuclear structure). Tempting as it is to ascribe the juxtaposition of subjects in this volume to the modest size of the institute, it is nevertheless true that four of the nine articles contain some bridge material: "Collision and decay phenomena" by K. Gottfried, "Radiative corrections to weak interactions" by G. Källén, "Muon-capture in nuclei and Migdal theory" by M. Rho, and "High energy scattering from nuclei" by C. Wilkin. Of the remaining articles, those by B. W. Lee on "Chiral algebra and dynamics" and by J. Schwinger on "Theory of sources" belong exclusively to the second part of the title, whereas those by S. Kahana on "Effective interactions in finite nuclei," by D. Kurath on "Nuclear deformations in the shell model," and by B. Margolis on "Selected topics in nuclear reactions" will be of interest to nuclear physicists only.

The range of subjects covered is thus so broad as to be beyond the gamut of practice of most physicists. The reviewer, currently a nuclear theorist, feels no disloyalty in nominating the articles on particle theory by Källén, Lee, and Schwinger as prime (and outstanding) candidates for tenure of interest. Except for the long article by Rho, which is still not long enough to be self-contained throughout, the contributions are all of exceptional clarity and can be utilized as entrées into the topics covered. From the standpoint of today's specialization, however, one must view these proceedings as almost frivolous and light-hearted (not that any of the specific contents of the volume are) compared to the monolithic volumes resulting more characteristically from such institutes.

ABRAHAM KLEIN

Department of Physics,
University of Pennsylvania,
Philadelphia

Radiation Biology

Radioisotopes in the Human Body. Physical and Biological Aspects. F. W. SPIERS. Academic Press, New York, 1968. xiv + 346 pp., illus. $15. American Institute of Biological Sciences and U.S. Atomic Energy Commission Monograph Series on Radiation Biology.

Radioisotopes in the Human Body is a treatise for scientists working in radiation research and protection. It describes dose calculations for ionizing radiations in the human body and succeeds in providing a unified treatment of the physical calculations, biological factors, and radiobiological effects.

Although its scope is not as wide as its title would indicate, this carefully prepared work deserves great praise. It is clearly written and well edited and provides the first comprehensive treatment of its subject by a single author. Spiers discusses the details of radioactive decay and isotope metabolism, and the mathematical models are described and applied with skill to biological events. There is an excellent review of the dosimetry of radionuclides in soft tissues. The nonuniform distribution of radiation dose in soft tissues is explored, but not as thoroughly as the distribution in bone. This reflects the state of the field. For example, the development of lung cancers in uranium miners in the western United States calls attention to the need for better information with respect to alpha particles in the lung. Chapter 4 is a most valuable and unique chapter which describes the macroscopic and microscopic structure of bone in a manner suitable for a physicist whose aim is to make radiation dose calculations. The next two subjects relate to dose calculations and measurements in bone; it is in this area that the author is most at home.

Insufficient credit seems to have been given to the pioneering work of Robley Evans in establishing the biophysical basis of radium poisoning in watch-dial painters. With this exception the book seems to be accurate in its historical account of the development of internal dose calculations.

It will be difficult for biologists without facility in calculus and some familiarity with the mathematical basis of radiation dose calculations to follow these chapters, for intermediate steps between the formulation and the solution of the problems are omitted. However, for physicists these formulations are distinctly and clearly illustrated and constitute one of the strong points of the work. In the last three chapters the author treats the effects of internal doses of radiation, natural and man-made radioisotopes in the human body, and the manner in which maximum permissible burdens of radionuclides in the body are determined. His presentations are precise and in some cases clearer than the reports of the International Commission on Radiological Protection, upon which a chapter of the book is based.

This book is suitable and valuable for the libraries of researchers. For students, it is unfortunate that the book does not contain problems. However, the suggested reading material at the