the lecturers in this symposium, will provide the reader with a survey of respected scientific studies in the area of radiation protection.

While on the staff of the University of Missouri Research Reactor, Dr. Schlapper was involved with the Operational Health Physics Program. He also served as a research fellow in the Nuclear Medicine Department of the Harry S Truman Veterans Administration Hospital. In January 1981, Dr. Schlapper joined the faculty of the Radiological Health Engineering Program of the Nuclear Engineering Department at Texas A&M University. He also serves on the consulting faculty of the Nuclear, Biological and Chemical Protection Branch of the U.S. Army Academy of Health Sciences. Dr. Schlapper has several publications to his credit that include articles on the development of neutron beam computed tomography.

Handling Radioactivity (A Practical Approach for Scientists and Engineers)

Author	Donald C. Stewart
Publisher	John Wiley & Sons, Inc., Somerset, New Jersey (1981)
Pages	282
Price	$39.50
Reviewer	Stephen T. Slack

The author's stated intention is to give an overall view of "the practicalities of handling radioactivity," and scattered throughout are phrases like "bench scale operations," claims that he is "not concerned with kilogram-quantities," and "many of the techniques are those of microchemistry." The actual contents, however, have a very different emphasis. In some places the book seems more like a refresher for architects and engineers engaged in designing new radioisotope facilities than an introduction for those who would use them. Indeed, even its title is something of a misnomer, since far more attention is given to the means of avoiding the handling of radionuclides, such as mechanical manipulators and transfer devices, than to the details of how to conduct operations with due respect for the radioactivity involved.

This does not mean that the book is valueless, but rather that it is apt to be purchased by people looking for something entirely different. Donald Stewart was, until his retirement, associate director of the Chemistry Division at Argonne National Laboratory. He seems here to have distilled this experience and put it in an easily accessible form. After two brief introductory chapters, he presents the focus of the book and almost half of its contents--two chapters on laboratory design. Specific consideration is given to layout, heating, ventilating and air conditioning systems, utilities, shielding, viewing and lighting, remote manipulation and materials transfer. The number of references brought together here is staggering. Chapter 4 alone lists 143 references, some with multiple publication. If budgets ever again permit construction of the sort of facility he has in mind, the designers will be well advised to have a copy of this book at hand. One would wish, however, that more attention had been paid to the problems of renovation.

The chapter on operations deals chiefly with monitoring and decontamination; some attention is paid to protective clothing. The chapter on radiation effects is short but comprehensive. Having a chapter on nuclear criticality seems to once again belie the stated purpose of the book, but it is certainly both informative and entertaining. Another chapter summarizes the various regulations concerning the transportation of radioactive material, chiefly those for high specific activity.

The final chapter on radioactive wastes is better left unread. This topic has been of prime concern to radionuclide users for several years. Regulations, attitudes, and practices have changed several times for some types of waste. The material presented is good in principle, but contains enough misinformation to get the uninformed reader into trouble--with the burial site if he tries to bury free-standing liquids, or with the Environmental Protection Agency if he tries to evaporate them.

The book contains the usual number of typographical errors and several gross errors of fact. [Perhaps the most glaring is the statement that many semiconductors can be transmuted into new elements by the (n,γ) "capture reaction" on p. 207.] It should, however, be purchased by the libraries of most institutions dealing with radionuclides, if only for its value in bringing together the references on so many facets of design and protection. It might even be considered as required reading for members of radiation safety committees and some of the administrators of institutions involved with moderate to high activity radionuclides.

Stephen T. Slack (PhD, physics, The Pennsylvania State University, 1974) did graduate work in nuclear physics, has worked in medical physics, and currently is chief of the Medical Physics and Radiation Safety Division and radiation safety officer for West Virginia University. He regularly teaches a course on radiation safety and radionuclide use.

Heat and Mass Transfer in Metallurgical Systems

Authors	D. Brian Spalding and N. H. Afgan
Publisher	Hemisphere Publishing Corporation Washington, D.C. (1981)
Pages	610
Price	$85.50
Reviewer	Ozer A. Arnas

This book is a compendium of papers presented at the 1979 Seminar of the International Centre for Heat and Mass Transfer, Dubrovnik, Yugoslavia. As in the publications of previous seminars, the papers are grouped together to give greater coherence to the various topics covered.

The groups and the number of papers in each are:

Blast Furnaces (7), Other Iron and Steel Processes (6), Nonferrous Processes (5), Metallurgical and Fluid Dynamic Processes (6), Heat and Mass Transfer During Crystallization (9), Heat and Diffusion Treatment (7), Nuclear Reactors (4), Turbines and Combustors (4), Corrosion (4). Among these papers are some reviews of the state of the art, as well as original studies. The shortcoming of such a volume is the incoherence of nomenclature, symbols, and styles. In seminars, unfortunately, this is always the case. The expert and the novice will find interesting, informative, and useful information in this volume. Mathematical and computer modeling of various metallurgical systems and reviews of vertical two-phase countercurrent flooding and high-temperature technology in gas turbines are examples of these.

Ozer A. Arnas (BS, MS, and PhD, mechanical engineering) has been on the faculty of Louisiana State University since 1962. His areas of interest in teaching and research are thermodynamics, heat transfer, and energy conversion. He has authored about 40 publications nationally and internationally and has been a visiting professor in Costa Rica, Turkey, Belgium, the Netherlands, and various places in the United States. He has received a number of teaching awards for excellence and has been named a professor for life in the university system of Turkey.

Physical Properties of Liquid Crystalline Materials (Vol. 1)

Author	W. H. de Jeu
Publisher	Gordon and Breach Science Publishers, Inc., New York (1980)
Pages	144
Price	$39.00
Reviewer	Krishna Seshan

The author, de Jeu, gives an in-depth survey of the physical properties of the nematic liquid crystalline phase aimed at the professional scientist. He states in the preface that the nematic phase is phenomenologically well understood and that the book is about the nematic phase. The author draws heavily on his own research and has contributed his results to almost all the chapters. A brief summary of the various chapters follows.

In his introduction, de Jeu discusses the differences among the chiral, nematic, and smectic phases. The Maier and Saupe molecular statistical theory of the nematic phase with one order parameter S, he claims, is a good approximation.

Chapter 2 on sample preparation gives some practical examples of how the materials are to be handled including an elaborate procedure for cleaning glass substrates. Such procedures, de Jeu explains, are important to obtain special boundary conditions required in the study of the nematic phase. Presumably this is aimed at investigators who are new to the field.

Chapter 3 on magnetic susceptibility shows how the anisotropy in that property can be measured. de Jeu describes the Faraday-Curie method by which the susceptibility may be measured and discusses a molecular statistical model for explaining the anisotropy in magnetic susceptibility. The anisotropies of some dozen compounds are discussed.

Chapter 4 on refractive index discusses how this property can be measured using the Abbe double prism method. The author develops the connection between the refractive index and the polarizability. The refractive indexes of several nematogenic compounds are discussed.

Chapters 5, 6 and 7 deal with the dielectric permittivity, elastic constants, and viscosity coefficients of the nematic phase. Each chapter first reviews the theory and then presents experimental evidence on several common nematics such as PAA and MBBA. The references cited at the end are up to date and comprehensive.

The author does not specifically state who his audience is but treats the subject at an advanced level and assumes some reader familiarity with the topics discussed. The theoretical treatment is rigorous, even though the author claims that he presents a "poor experimentalist's theory." The conclusion from this is that his audience is the interested researcher desiring a review in this field.

It is a pity that the author does not discuss what is known or unknown about the other two phases, the smectic and the cholesteric phases of liquid crystals, and how the nematic phase properties may or may not extend to those phases. With the author's expertise in the field, one would expect that he could make such a generalization. From the reader's point of view, this is a serious omission. Another omission is that the author does not volunteer information on areas of prospective research and does not point to unsolved problems. Thus the novice researcher will find in this book strictly a review of the experimental facts about the physical properties of the nematic phase of liquid crystals, with special reference to the work done by the author at the Philips Research Laboratory in Eindhoven.

It appears that this book is the first volume in a series entitled *Liquid Crystal Monographs* edited by G. Gray of the University of Hull. However, there is no information about the other volumes in this series.

K. Seshan is an assistant professor specializing in electronic materials at the Department of Metallurgical Engineering at the University of Arizona. His research interests include the optical, electrical, and magnetic properties of semiconductors as well as thin films.