

references to such areas are contained in bibliographies at the end of the chapters.

This text is applicable to all branches of engineering. Division of the text into nineteen chapters permits flexibility in selection of topics for groups at various academic levels and with varied disciplines.

The first four chapters deal with basic concepts and definitions, and this is followed by two chapters on the thermodynamic behavior of fluids and solids. Chapters 7 and 8 introduce the first two laws of thermodynamics and a quantitative approach to irreversibility. The various thermodynamic functions and potentials are treated in the next two chapters. The subject of open and closed systems including various types of flow processes is very clearly presented in Chapter 11. Nonideal, as well as ideal, behavior of solutions is presented in Chapter 12. The next three chapters are of particular interest to chemical engineers, since they deal with phase and chemical equilibria. In general the treatment of these topics is adequate for chemical engineering students. However little or no reference is made to the third law and the use of absolute entropies in calculating free energy and equilibrium constants. Chapters 16 and 17 deal with fluid flow and heat transfer, and the remaining chapters are concerned with various work-producing and work-absorbing systems. These chapters are very well written and include practically all cycles of engineering interest.

This book should serve as a valuable reference text for thermodynamics in addition to being a good classroom text and is recommended for both purposes.

RANDOLPH H. BRETTON
YALE UNIVERSITY

Radioactive Wastes—Their Treatment and Disposal, John C. Collins, editor, John Wiley & Sons, New York (1961). 239 pages. \$8.00.

This discussion of ten aspects of radioactivity and radioactive wastes by eight authors seems to be directed toward public health and government officials and toward technical people who have knowledge of one or two of the aspects or who are laymen with respect to the science of radioactivity. For these people and for the novice in this waste field this book is recommended as a useful introduction to most aspects of the problems which arise.

The first half of the book is introductory. It concerns the nature of these wastes, including sources, hazards, measurement, and some relevant English law. (Perhaps the book itself might be called "Radioactive Wastes—Their Nature and Disposal.") The quantitative chapters in this first half, on atomic physics, the effect of radiation on man, and methods of detection, are succinct well-written surveys. The concise organization of these chapters reflects the beneficial effect of having a different specialist write each chapter, as these topics can easily be discussed separately.

The second half of the book is divided into two treatment chapters, physicochemical and biological, and three disposal chapters, liquid, solid, and gas. Except for gas disposal this half is primarily a qualitative description of methods and cases. Whereas having different authors was beneficial for describing the nature of wastes, it detracts from logical arrangement in the second half, for treatment and disposal are closely interrelated. Partly for this reason and partly because the distinction between treatment and disposal is not clearly defined (one is concentration-reaction and the other is storage-dispersal) or consistently followed, needless repetition results. Lack of reference to the introductory part of the book also results in repetition.

Most material seems to be quite valid, although chemical engineers may be wary of the following by the author of liquid effluent disposal: "application of Fick's Law of Molecular Diffusion to the case of eddy diffusion would imply that the rate of eddy diffusion is directly proportional to the concentration gradients..."

For the engineer the discussion of treatment and disposal is most useful for specific applications with known techniques but not as useful for creation of novel designs. Most engineers and scientists having some knowledge of radioactivity should find this book easy to read in a relatively short time.

JOHN A. TALLMADGE
YALE UNIVERSITY