BOOKS

Schaum's Outline of Theory and Problems of Thermodynamics, Michael M. Abbott and Hendrick C. Van Ness, McGraw-Hill, New York (1972). 346 pages. $4.95.

The fundamental principles of classical thermodynamics are presented in a clear concise fashion in this outline. By means of numerous examples and problems which are worked out in detail, the authors illustrate the applications of thermodynamics to problems of engineering interest. The book is restricted to the classical areas of thermodynamics, and no treatment of statistical concepts or irreversible thermodynamics is attempted.

The strength of the book lies in the detailed solutions to the examples and problems. One of the most effective instructional procedures for engineering students is to demonstrate how one works a particular problem and then to extend the technique to a general class of problems by assigning appropriate examples. Consequently, the book should be useful to undergraduates as a supplement to their text, to graduate students or practicing engineers who desire to refresh their knowledge of thermodynamics, and to educators in search of new problems or perhaps a different way of approaching a particular problem. With the 90 examples and the 150 problems for which detailed analyses are presented and 137 problems for which answers only are provided, the book can serve as a device for measuring one's progress in a self-study program.

The treatment is not of sufficient depth for me to use the book as the sole text in a classroom situation. Nonetheless the treatment of key topics of particular interest to chemical engineers (open systems, real gases, phase equilibria, and the fugacity concept) is adequate to permit the book to be used to supplement one of the better textbooks written with the chemist in mind (for example, Denbigh or Wall). Because of its orientation and the minimal treatments of power and refrigeration cycles, the book is probably of more interest to chemical engineers than to mechanical engineers.

While the book in general is quite well done, I found a few omissions somewhat disturbing. Since data from the steam tables are required as input in many of the problems, it would have been appropriate to include an abridged version of the tables as an appendix or else a Mollier diagram for steam which would have provided the necessary data. Similarly it would have been helpful if a corresponding states compressibility chart and fugacity coefficient chart had been included.

The book certainly is one with which all chemical engineering professors involved in teaching undergraduate thermodynamics should be familiar and it should find a much wider audience among those who like to learn by seeing how someone else tackles a particular problem.

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Staged Cascades in Chemical Processing, P. L. Thibaut Brian, Prentice-Hall, Englewood Cliffs, N. J. (1972). 275 pages.

The stated purpose of this text is to introduce the idea of staged cascades in chemical processing. Specifically it is intended to be used to expose students at the freshman or beginning sophomore level to professional type problems in chemical engineering.

The text begins by discussing the idea of cascades and some of the possible uses of cascade systems. The author bravely resists the use of the classic "halibut livers" problem and turns to a mudwashing problem instead. Single and multistage operations are analyzed for the mudwashing problem using steady state balances and a simple equilibrium expression. The Kremser equation is presented and the idea of optimum flow rates is introduced.

The subject then changes to liquid-liquid extraction. Single stage and multistage countercurrent extraction are discussed along with graphical techniques for solution. Multiple feeds, fractional extraction with reflux, unsymmetrical cascades, and solute buildup in a cascade are given prominent discussion. The final chapters treat our old favorites, binary and multicomponent distillation. Discussion of partial and total condensers, reflux ratios, feed condition and locations, products, enthalpy-concentration diagrams, vapor-liquid equilibrium, and most of the other popular quiz questions are included.

The book makes an interesting attempt at introducing this subject to freshmen and sophomores. It includes many example problems and some unsolved problems for study. Phase equilibrium is described phenomenologically and does not require a background in thermodynamics. Computer use is encouraged for problem solution but is not strongly emphasized. Economic considerations are introduced early, and the student should get some feel for the engineers role in the design process.

The material selected for the book is somewhat unusual in a text for beginning chemical engineers; about two-thirds of the book is devoted to distillation and all of its subtleties. Mudwashing and extraction are the only other operations treated here. The detail is such that the author's intent to study cascade systems gets lost. The student would get so involved with the details that he would lose sight of the real goals. Fewer side topics (that is, extraction reflux, multicomponent distillation, side products, partial condensers, etc.) and a broader overall goal would be most helpful.

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Education and Research in the Nuclear Fuel Cycle, David M. Elliott and Lynn E. Weaver (eds.), University of Oklahoma Press, Norman (1972). 334 pages. $9.95.

This book, consisting of 18 papers presented at the symposium at Norman in October, 1970, reviews the economics and characteristics of fuels used in present day reactors with projections for advanced breeder models. Although projected data are reported to agree quite well with fuel performance experienced in the first cycle in light water reactors, one wonders if the costs predicted by various study groups may be as much in error as the Bolsa Island desalting plant estimate of $440 million which became uneconomic when construction costs escalated to $765 million. Predictions of decreasing energy costs in designs progressing from the HTGR and the LMFBR fixed fuel reactors to molten salt fuel (MSBR) are attributed mostly to de-