BOOKS

Material and Energy Balance Computations, E. J. Henley and E. M. Rosen, John Wiley, New York. 577 pages.

Most introductory chemical engineering textbooks include material on ideal and nonideal gases and at least the first law of thermodynamics in some form. Some reach more deeply into thermodynamics, present equilibrium and staged processes, emphasize graphical or digital computational techniques, and some treat process layout and design.

Henley and Rosen's **Material and Energy Balance Computations** is probably the most ambitious of all. According to its preface it is designed "for a one-year stoichiometry-thermodynamics course from the viewpoint that students are entitled to know how material and energy balances are made integral components of the computer-aided design systems that are assuming an increasingly large part of our professional existence." It differs from most of the other material-energy balance texts in that it is designed for a two-term rather than a one-term course, although it does contain far more than can be covered in two terms with real comprehension.

After an excellent introduction on the history and evolution of chemical engineering the authors present a highly condensed version of the basic material of stoichiometry. This is followed by an 80-page "course" in basic thermodynamics which includes both first and second laws. The next section digresses into the mathematics of the solution of equations—matrix manipulations and strategies for solution of nonlinear equations. From there the student moves into stoichiometry of a more advanced nature involving interrelated units of a process, bypass, recycle, cascade, and combined mass and energy balances for processes. The following section treats phase equilibrium and the graphical calculations of multistage processes. The final section presents process calculations using machine methods, ending with the integration of these unit calculations as blocks into an overall process model.

Emphasis throughout is on calculation methods suitable for integration into overall machine models. Individual calculations are often suitable as subroutines for executive programs such as would be encountered in PACER, CHESS, or their modifications.

The chief problem in adopting this book as a text is that it represents a major curriculum commitment. By agreeing with the authors that the

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INFORMATION RETRIEVAL*

Prediction of the first normal stress difference in polymer solutions, Meister, Bernard J., and R. Dale Biggs, **AIChE Journal, 15,** No. 5, p. 643 (September, 1969).

Key Words: A. Shear Stress-8, Stresses-8, Rheology-8, Polymers-9, Solutions-9, Molecular Model-10, Viscoelastic-0, Liquids-9.

Abstract: Shear stress and first normal stress difference data are presented for several polymer solutions undergoing steady shear rates from 1.0 to 100,000 $sec.^{-1}$. The steady shear response is divided into three regions as a function of increasing shear rate. These are diffusion controlled linear regioning, a moderate shear rate regioning where shear controls the entanglement-disentanglement process and a high shear rate region where aggregation of polymer molecules occurs. A molecular model is derived for the shear controlled region that allows prediction of the first normal stress difference from the viscosity function and one additional constant that depends only on the molecular species.

Effect of liquid-packing surface interaction on gas absorption and flooding in a packed column, Coughlin, Robert W., **AIChE Journal, 15,** No. 5, p. 654 (September, 1969).

Key Words: A. Gas Absorption-8, Packing Material-6, 8, Contact Angle-6, 8, Oxygen-9, 5, Mass Transfer-2, 7, 9, Liquid Loading-7, 9, Packed Column-10, Liquid Rate-6, Gas Rate-6, Sodium Sulfite Solution-1, 5, Air-1, Loading Behavior-2.

Abstract: Gas absorption, pressure drop, liquid holdup and loading behavior in a packed column have been investigated using packing materials almost geometrically identical but fabricated from three different materials (ceramics, Saran, and polyethylene). For the absorption of oxygen into sodium sulfite solution, observed values of the liquid-side, composite, overall mass transfer coefficient, K_La, were about 25% larger for ceramic packing than for the polymeric packings. It was also observed that liquid loading occurs more readily in the case of the polymeric packing materials and it appears that the usual type of correlation is inadequate for predicting loading when polymeric packings are employed. In the case of liquid operating holdup no differences were observed from packing to packing. These observations are discussed in terms of the nature of the interaction between liquid and packing surface and it is pointed out how these phenomena may be fundamentally different from those of previous investigations which relied upon surface-active agents added to the liquid.

Model simulation of adiabatic continuous-flow-stirred-tank reactors, Keairns, D. L., and F. S. Manning, **AIChE Journal, 15,** No. 5, p. 660 (September, 1969).

Key Word: A. Yields-7, 8, 9, Stirred Tank Reactors-9, Prediction-8, Model Simulation-10, Residence Time-6, Impeller Size-9, Impeller Shape-9, Temperature-7, Outlet Stream-9, Mixing-8, Comparison-8, Experimental-0, Theoretical-0, Water-5, Hydrogen Peroxide-5, Sodium Thiosulphate-5, Rate-6.

Abstract: Manning, Wolf, and Keairns' model for continuous-flow-stirred-tank reactors has been extended to include adiabatic as well as isothermal operation. The adiabatic, steady state yield of a continuous-flow-stirred-tank reactor was measured experimentally using the second-order, homogeneous, exothermic reaction between sodium thiosulfate and hydrogen peroxide. Model predictions of overall tank yield agreed closely with the data thus verifying the applicability of this model to explain the effects of operating variables such as impeller size, impeller type, agitator speed, feed location, feed concentration, and flow rates.

Free tear sheets of the information retrieval entries in this issue may be obtained by writing to the New York Office.

* For details on the use of these Key Words and the AIChE Information Retrieval Program, see **Chem. Eng. Progr.,** Vol. 60, No. 8, p. 88 (August, 1964). A free copy of this article may be obtained by sending a post card, with the words "Key Word Article" and your name and address (please print) to Publications Department, AIChE, 345 East 47 St., N. Y., N. Y., 10017. Price quotations for volume quantities on request.

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student's first exposure to material and energy balances and thermodynamics should emphasize calculational techniques, then one must be willing to accept a rapid introduction to principles and leave for some other course a deeper understanding of thermodynamics.

The difficulty in adapting multi-purpose books to individual curricula is one reason why so many such introductory books are becoming available. Although the authors suggest how their book may be used in conventional one-term courses, it is not likely that **Material and Energy Balance Computations** will find much use of that type. For really satisfactory use of this book the adopting school should be prepared to make a major modification of the traditional curriculum.

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How to Manage Your Information, Bart E. Holm, Reinhold, New York (1968). 292 pages.

How to Manage Your Information by Bart E. Holm is not an easy book to read. It is not a subject for the casual reader but rather will receive attention from those who *must* know. The subject is not a popular one since the reader cannot take a passive part, he must do it himself. Although the preface claims, "simple—steps for the individual—to help manage his information," the approach is so broad as to discourage the neophyte. Much of the subject matter is an outgrowth of contributions of the Du Pont Company to the engineering professions, and this aspect of the book deserves especially favorable comment.

The information crisis is dealt with only briefly and one can obtain a feeling of despair that we are heading towards an impenetrable morass, and indeed we may be. The author has offered simplified term lists for a number of sciences. Coincidence or concept coordination by any of several mechanical means suggested by the author can provide the individual with a powerful method of retrieving relevant material and rejecting extraneous information for his pre-existing file. Mr. Holm does not emphasize strongly enough, however, that no system is better than its input—it cannot retrieve information not stored. The diligent individual will benefit by these ideas.

Considerable space is devoted to the mechanized or computerized systems of the future. No engineer can afford

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