junct to their educational programs. Plans call for making this video-tape available on a minimal rental fee basis with an accompanying survey of all viewers of the tape. From comments of the viewers, the Committee should be able to determine whether a series of video-tape presentations should be developed of the more popular programs in the Today Series.

Because of the gradually increasing need for continuing education by all chemical engineers, the Committee has formulated a ten-point program to guide it in its future operations. These are:

- Constantly upgrade both present and future continuing education programs.
- Increase the quantity of published material from various continuing education programs.
- Develop better techniques for determining the continuing education needs of AIChE members.
- Develop new programs which fill these continuing education needs of AIChE members.
- Assist local AIChE sections with development of their own continuing education programs.
- Increase acceptance of the continuing education concept by industry.
- Further the cooperation with continuing education programs of educational institutions.
- Develop closer working relationships with other professional societies having continuing education programs of interest to AIChE members.
- Continue the exploration of new media to provide continuing programs in a more convenient and usable form for AIChE members.
- Extend the publicity coverage of both AIChE and non AIChE continuing education programs of interest to AIChE members.

Available manpower in the New York AIChE Office is directly related to the number of continuing education programs that the Committee sponsors. This number, during the past two years, has been established at approximately fifty. The Committee is, therefore, planning no more than this number on a national level for both 1971 and 1972. Greater emphasis will be placed on having the local AIChE sections develop their own continuing education programs with assistance from the Committee. The nucleus of available programs is now sufficient to give the local AIChE sections a wide variety of choices to satisfy their continuing education needs. However, as noted above, the Committee will continue to develop additional quality programs to meet the ever changing needs of the AIChE membership.

The Education Projects Committee carries on projects oriented toward chemical engineering education. Suggestions for projects come from various sources. The new activities are initiated only if an interested person can be found to serve as chairman of a new subcommittee. The projects develop at various rates and subcommittees disappear when projects are completed and no further work is proposed.

ChE book reviews

Material and Energy Balance Computations.
E. J. Henley and E. M. Rosen. John Wiley & Sons, Inc. (1969), pp xxx + 577, $14.95.

Henley and Rosen have undertaken a major task in this book, that of combining the "new stoichiometry" with the presentation of those chemical and physical principles and manual calculation methods usually taught in a beginning chemical engineering course. The "new stoichiometry" consists of linear algebra, numerical methods and machine computations plus some changes in the traditional ways of formulating the approaches to problem solutions.

A major judgment is that, to quote from the Preface, "We recognize that there is more material in this book than can be successfully incorporated in even a one-year course." It is this reviewer's opinion that critical deletion of material would have better served the authors' aim of a text emphasizing the new stoichiometry. To cite only one example, the longest chapter in the book is that on thermodynamics. Most of this chapter deals with the second law and related functions, material not essential to most material and energy balances.

The authors' correctly point out that by selecting six of the nine chapters an instructor may use the text as a classical stoichiometry book. In this regard, the treatment of some topics is judged to be less successful than that of some other basic texts. One example is that major bugaboo of the beginning course, units and dimensions. The section on units and dimensions dwells more upon what units are not than what they are, tending to obscure rather than clarify their nature and use. Another example is that the presentations and applications of the laws of conservation of mass and energy do not emphasize the value of a general (i.e. a word) statement of these equations as a framework for setting up the specific equations for a particular problem. Still another example is that there is only a very brief treatment of the unsteady-state.

The book is very inclusive in the treatment of the chemical and physical principles that determine the behavior of substances in chemical processes. There is much material on phase equilibrium and material and energy balances in staged systems. The book is liberally supplied with examples, problems and data tables.

The more likely reason for selecting this book would be the desire to emphasize the new stoichiometry. The three unique chapters, then, are of special interest. Of these, Chapter 5 deals with "The Solution of Equations." In this chapter, methods for solving sets of linear and non-linear equations are presented. The methods are applied to given equations, not to process problems in this chapter. Especially worthy of note is that an appendix includes complete FORTRAN IV program listings for four of the methods discussed. They are: GMST, Gram-Schmidt method of constructing orthogonal vectors for sets of linear equations; GELG, Gaussian elimination method for solving a set of linear equations; ROOT, finds the root of a one-dimensional, nonlinear equation; and, BSOLVE, Marquardt's method to solve a set of non-linear equations. Each program includes the solution to an example problem from the text. This chapter could be useful in many contexts for it presents in a reasonably clear and concise form several useful algebraic-equation-solving techniques.

Chapter 8 emphasizes developing solution algorithms for certain process calculations, namely flash vaporization and equilibrium-extent-of-reaction in both homogeneous and heterogeneous systems. This chapter requires a rather thorough understanding of the principles of phase-and chemical-equilibria. A number of excellent examples of problem formulation and algorithm development are included.

Chapter 9 emphasizes process material and energy balances by computer process simulation. The building-block approach is clearly presented. The contents of the building-blocks tend to be somewhat obscure. Indeed an example illustrating the individual block calculations includes a reactor where conversion is kinetically determined. The equations cannot be very meaningful to a student, for nothing in the book has prepared him for a non-equilibrium chemical reactor.

Chapter 9 presents and compares direct substitution, the quasi-Newton method and an extension of Nagiev's method of split-fractions for handling recycle loops. It represents a reasonably good introduction to the rapidly developing field of computer process simulation and design. The level of chapters 8 and 9 would seem to be above that of a first course, but they contain valuable material for chemical engineering curriculum.

In summary, this book could be used as a traditional stoichiometry book. It offers a very thorough treatment of the physical and chemical bases of material and energy balances, though in this reviewer's opinion the treatment of some topics lacks clarity. It offers material unique in this type of book in the way of the mathematics and the use of a digital computer for solving sets of equations, the development of algorithms for certain complex process operations, and an introduction to computer simulation of chemical processes. This new material is welcome in textbook form, though much of it appears to be above the level of the typical first course.

This book is sufficiently important that all teachers of chemical engineering undergraduate courses should examine it. They might choose to use portions of it in several courses.

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ChE problems for teachers

Simplified Approach to POLYTROPIC PROCESSES

FRANK M. TILLER AND FRED LOWRY
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Q. Derive expressions for polytropic processes.

A. Little attention is given to developing new techniques for teaching elementary concepts in thermodynamics in comparison to emphasis on advanced research. When new methods can be found which simplify and afford clearer presentation of basic principles, the student can proceed more rapidly and confidently to advanced aspects of the subject. The authors believe that one of the surest methods for providing more time and better understanding of advanced topics arises from improving approaches to the simpler topics of thermodynamics.

We have explored a new way of deriving the well-known expression pV^n = constant, which is straight forward in approach and appealing to the student. The proposed method can be restricted to processes, or it may be broadened to include irreversible effects. The instructor can take up the simpler reversible case or go into more depth by treating lost work. While more explanation is required when friction effects are included, a broader understanding is produced; and an introduction to irreversibility is commenced.

In the simpler reversible case, the method consists of assuming that the polytropic specific heat for an ideal gas is constant and then deriving the expression pV^n = constant. This procedure is the reverse of that which is usually encountered in textbooks, where it is first assumed that the expression pV^n = constant is valid; and then the polytropic specific heat is shown to be constant. In many texts, derivation of pV^k = constant for a reversible adiabatic process is the first step toward the more general expression. In the proposed method, the