

various texts on thermodynamics). I like the Davis text because it is comprehensive, the material is well documented, and it is written in a readable, interesting way. Also, each chapter has case studies for use in class, and there is an excellent collection of cases which comprise the appendix to the book.

In addition, the students are given a reading list (see Table III) and are encouraged to read on their own. To keep them honest, they are quizzed on certain specific reading assignments during the term. The reading list is liberally supplemented by reprints of articles from journals such as the Harvard Business Review.

### THE STUDENTS

**O**NLY GRADUATE STUDENTS may take this course. Many are part-time students who are currently employed by local industry. By offering the course in the early evening, we make it easy for such students to attend after work. This is an ideal group of students. Having experienced some of the vicissitudes of industrial organizational life, they readily recognize the reality of the case studies. They are eager to participate in the discussions, for they feel that the material is directly relevant to their day-to-day work. The students learn from each other, and the instructor learns from them, too. Most of the full-time students have usually had at least summer employment in industry, and they, too, take an active part. On the other hand, it is somewhat more difficult for a totally inexperienced student to participate in and thereby benefit from the course.

My own feeling is that **undergraduates** could benefit by some exposure to this subject matter.

TABLE III

#### Excerpts from Reading List

- Drucker, P.—The Practice of Management  
The Concept of the Corporation  
McGregor, D.—The Human Side of the Enterprise  
Greenewalt, C.—The Uncommon Man  
Argyris, C.—Personality and Organization  
Likert, R.—New Patterns in Management  
The Human Organization  
Whyte, W. H.—The Organization Man  
The Harvard Business Review  
Publications of the American Management Association

However, for undergraduates, I would recommend a different course design—one which would thrust the student into an experiential situation. Some sort of simulation of a real work problem would, I think, be necessary for the student to really appreciate the feelings which are engendered in such situations.

### SUMMARY

In summary, the major challenges facing the engineer of tomorrow are as much nontechnical as technical. This course introduces the engineering graduate student to the body of knowledge which exists in the management and human relations field and hopefully provides him with some insight into dealing with problems in these important areas. People have a tremendous potential for achievement, and the modern corporation is a remarkable device for accomplishment of high purposes. Progressive managers concentrate on helping people to fulfill their own aims and to achieve a greater proportion of their potential. In this way, organizational achievement can be maximized. □

## ChE book reviews

### Fundamentals and Modeling of Separation Processes, Absorption, Distillation, Evaporation, and Extraction.

By Charles D. Holland  
Prentice-Hall. 430 pages.

Reviewed by Verle N. Schrod, Monsanto Agricultural Products Company.

When asked to review this book I agreed to do so without remembering that I had reviewed another of Dr. Holland's books some 11 or 12 years ago. This previous work, "Unsteady State Processes with Applications in Multicomponent Distillation" was quite good but had a somewhat misleading title since it was only concerned with distillation. I thought perhaps this one would be equally good and would really cover other processes and would be fun to read so I went ahead with the review.

The book was a pleasure to read. It covers the fundamentals of the four named basic separations

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linearized systems [15, 16]; [2] perturbation theory; [3] the Aisermann conjecture [17]; [4] the Lur's transformation and algorithm for obtaining a global Lyapunov function [18]; and [5] computer simulations of the nonlinear differential equations [19, 20]. The analysis of the control properties is carried out by comparing the sensitivity of metabolic levels of the components in the models to parameter variations. The last two sections are about applications of the theory of enzyme kinetics and control to chemical reactor processes. Section E deals with situations where diffusion is not important, and Section F with examples where the effects of diffusion must be included in the differential equations describing the enzyme-catalyzed reactions in the reactor.

#### IV. Immobilized Enzymes and Enzyme Systems

The purpose of the last part of the course is to acquaint students with heterogeneous enzyme catalysis and its role in problems in biochemical engineering.

The first two sections review the various types of supports and covalent coupling methods used to bind enzymes. Section C is about the effects of immobilization methods on enzyme structure, and especially on those aspects of structure changes which effect enzyme activity via modification of the active site and/or control sites. This section introduces the student to possible effects of these structural modifications on the overall kinetics of the immobilized enzymes. The next section compares the kinetics of homogeneous and heterogeneous enzymes or enzyme systems. The last section examines the physical and diffusional constraints imposed on enzymes or multi-enzyme systems by immobilization. □

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#### BOOK REVIEW

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processes and the treatment is thorough and complete and certainly not elementary. The fundamentals are covered in 5 chapters in Section I and then in Section II two chapters are devoted to modeling and rate process fundamentals followed by 5 chapters on adsorption, distillation and extraction. In these chapters several different models are proposed and then selected ones are used to model actual field results for industrial columns. For example a packed distillation column 34 ft. high and containing 9260 lbs. of Pall Rings is modeled in detail as is a packed extractor 72 ft. high and 5 ft. in diameter handling 12,000 barrels of kerosene per day. There are other examples for plate towers. The results appear to be uniformly good. Calculated and experimental product compositions agree well over wide variations in the input parameters.

The book should be useful in a senior or graduate level design course. There are numerous problems and plenty of references. If very much use was to be made of the techniques, access to a computer would be needed for solving sets of equations for separations involving many components and many plates. The book should also be useful to industrial designers although I would think that most would already be familiar with the methods in this book since the techniques have been published in various journals and theses. □