tional units, such as distillation equipment, and this value adjusted to account for those process equipment items thought to be "nontraditional," such as membrane processes. Annual operating costs were then estimated by taking into account the annual cost of capital and other expenses. A comparison of the estimated cost of the alternate processes with current process technology was then made to establish economic viability.

REPORTING

The design report from the current study was a confidential document wherein both students and faculty signed a "limited term" secrecy agreement with DuPont. Secrecy was necessary so the students could have access to proprietary information and thus develop as useful a study as possible. The final report was reviewed first by the university advisors, and after their comments were addressed, it was reviewed a second time by both university and DuPont project advisors. Oral reports by the students design team at the midpoint of the activity provided an opportunity for mid-course corrections. The midpoint meeting is very important in focusing the study to meet the needs of the sponsor. A final oral report by the student design team was made at the conclusion of the project.

CONCLUSIONS

The type of activity described in this paper provides for student and faculty involvement in significant and challenging projects involving pollution prevention. The expected benefits to the students are:

- *Developing solutions to existing chemical engineering problems under realistic industrial considerations and tight time constraints.*
- *Experiencing group problem-solving where they establish their own group structure and assign their own responsibilities for the results.*
- *Learning to develop flowsheets and material balances when they have incomplete process information.*
- *The studies emphasize pollution prevention through basic process flowsheet and equipment modifications rather than through conventional waste effluent treatment applications.*

The successful completion of projects such as this one supplements corporate design activities, particularly when emerging technologies are involved. This project and similar activities have been well received by the students. Their enthusiasm, perseverance, and overall quality of work is sincerely appreciated by their advisors and sponsors. Participants in these activities typically begin industrial careers soon after project completion, while a small number of them go to graduate school.

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ChE *book review*

NETWORKING: How to Enrich Your Life and Get Things Done

by Donald R. Woods, Shirley D. Ormerod

Pfeiffer & Company, International Publishers, 8517 Production Avenue, San Diego, CA; (1993)

Reviewed by
Eugene R. Seeloff
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This book, coauthored by a professor of chemical engineering and a program assistant at McMaster University in Hamilton, Ontario, is an excellent tool for students, alumni, and faculty, as well as for career planning and placement professionals. Because NETWORKING skills have become increasingly important to anyone trying to develop and realize professional or personal goals, this book will greatly assist, and motivate, the reader to understand what NETWORKING really is and to learn how to NETWORK effectively.

In addition to their own ideas and experiences, the authors have drawn on other published materials to create an easy-to-read workbook complete with interesting and thought-provoking exercises for the reader to complete. They have

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expands his or her understanding of the subject. "Simulation Graphics" does both. Not only are the tedious details of manual graphic design eliminated, but also the scope of assignable problems is greatly increased, even to include open-ended examples where students must search through many solutions to satisfy a constraint or find some optimum.

An advantage also arises from exposing students to computer-based visualization. Chemical engineering has moved less rapidly than other engineering fields to capitalize on the enormous conceptual boost offered by visual thinking—particularly in the classroom.[15] Visualization models abound in thermodynamics, in transport phenomena, in reactor design, and in other core areas of the discipline.[16-18] This application to graphical models of staged processes is a natural and significant step toward accelerating that movement.

A CLOSING NOTE

Over seventy years ago, Marcel Ponchon[1] described his graphical method for binary distillation design. His introductory remarks, translated in part below, are as valid today as they were then. The efforts reported here and by those working before us have attempted to make those ideas more accessible through modern computer graphics.

> *The theory of distillation columns is rather complex, requiring long and difficult calculations. But it is possible, without going into the theory, to replace those calculations with graphical constructions that permit the solution of a rather large number of problems.*

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BOOK REVIEW: Networking

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presented conceptual frameworks that help the reader to grasp *why* NETWORKING is so vital in today's rapidly changing and diverse environment, *what* needs to be done to be an effective NETWORKER, and *how* to develop their own NETWORKING prowess.

Many of the NETWORKING principles can come fairly easily to gregarious, highly self-motivated and self-confident people. However, for the other (~) 95% of us, the idea of initiating contact with friends, neighbors, friends of friends—*perfect strangers!*—can be intimidating to the point of paralysis! This book can help anyone muster the courage and conviction to become an effective NETWORKER.

Some people will prefer to work through this book on their own. Others will realize greater benefit by working with a partner or in groups (*e.g.,* AIChE). The reader should have time to contemplate many of the ideas presented and to complete the recommended assignments in order to maximize full learning potential. Dialog, discussion, and sharing ideas with others should also prove beneficial.

In summary, NETWORKING is an important life skill for all of us. This book will prove very valuable to everyone who reads it. It should be required by those responsible for educating young people who are preparing to enter the professional world. ❐