involving, for example, crystallization of chips, deposition of thin films, natural convection in solar cells, etc.?

will be addressed in Part 2 of this paper, to be published in the fall 1988 issue of *CEE*. □

REFERENCES

1. Sandler, S. I., and B. A. Finlayson, Eds., *Chemical Engineering in a Changing Environment*, AIChE, in press, 1988.
2. Krieger, J. H., "Report on Chemical Engineering Reflects a Profession in Flux," *Chem. Eng. News*, Nov. 30, 1987.
3. Crowe, C. M., A. E. Hamielec, T. W. Hoffman, A. I. Johnson, D. W. Woods, and P. T. Shannon, *Chemical Plant Simulation*, Prentice-Hall, 1971.
4. Motard, R. L., *et al.*, *CHESS, Chemical Engineering Simulation System*, Technical Publishing Co., Houston, 1968.
5. Seader, J. D., W. D. Seider, and A. C. Pauls, *FLOWTRAN Simulation—An Intoduction*, Third Edition, CACHE, Ulrich's Bookstore, Ann Arbor, 1987.
6. Brannock, N. F., V. S. Verneuil, and Y. L. Wang, "PROCESS Simulation Program. A Comprehensive Flowsheeting Tool for Chemical Engineers," *Comp. & Chem. Eng.*, **3**, 329 (1979).
7. *DESIGN II User's Guide*, ChemShare Corp., P.O. Box 1885, Houston, 1985.
8. *ASPEN PLUS Introductory Manual*, Aspen Tech., Inc., 251 Vassar St., Cambridge, 1985.
9. *CHEMCAD: Process Simulation and 2D CAD*, COADE, 952 Echo Lane, Suite 450, Houston, 1986.
10. *HYSIM User's Guide and Reference Manual*, Hyprotech Ltd., 1700 Varsity Estates Dr. N.W., Calgary, 1986.
11. *ASPEN/SP-PC*, JSD Simulation Services Co., 600 E. Evans Ave., Bldg. 1, Denver, CO, 1986.
12. *CHEMCOST/User Guide*, COADE, 952 Echo Lane, Suite 450, Houston, 1983.
13. Linnhoff, B., and J. R. Flower, "Synthesis of Heat Exchanger Networks. I: Systematic Generation of Energy Optimal Networks," *AIChE J.*, **24**, 633 (1978).
14. Dixon, A. G., "Teaching Heat Exchanger Network Synthesis Using Interactive Microcomputer Graphics," *Chem. Eng. Educ.*, Summer, 1987.
15. Challand, T. B., and M. G. O'Reilly, "New Engineering Software for Energy-conservation Projects," presented at CHEMCOMP 1982 Symposium, Antwerp, Belgium, 1982.
16. Saboo, A. K., M. Morari, and R. D. Colberg, "RESHEX: An Interactive Software Package for the Synthesis and Analysis of Resilient Heat-Exchanger Networks-1 and II," *Comp. Chem. Eng.*, **10**, 6, 577 (1986).
17. Grossmann, I. E.,"MAGNETS. Interactive Program for Heat Exchanger Network Synthesis," Chem. Eng. Dept., Carnegie-Mellon Univ., 1986.
18. Koppel, L. B., and G. R. Sullivan, "Using IBM's Advanced Control System," *Chem. Eng. Educ.*, Spring, 1986.
19. Joseph, B., and D. Elliot, "A Microcomputer Based Laboratory for Teaching Computer Process Control," *Chem. Eng. Educ.*, Summer, 1984.
20. Thompson, P. M., *User's Guide—Program CC—Version 3.0*, Systems Tech., Inc., Hawthorne, CA, May, 1985.
21. Holt, B. R., *et al.*, "CONSYD—Integrated Software for Computer Aided Control System Design and Analysis," *Comp. Chem. Eng.*, **11**, 2, 87 (1987).
22. Lewin, D. R., "ProCosp—A Process Control Synthesis Program," Technion, Israel Inst. of Tech., 1986.
23. Perkins, J. D., and R. W. H. Sargent, "SPEEDUP: A Computer Program for Steady-State and Dynamic Simulation and Design of Chemical Processes," in *Selected Topics in Computer-aided Process Design and Analysis*, eds. R. S. H. Mah and G. V. Reklaitis, *AIChE Symp. Ser.*, **78**, 1, 1982.
24. Foss, A. S., "UC ONLINE," *Chem. Eng. Sci.*, Summer, 1987.
25. Chang, H.-C., and L.-H. Chen, "Bifurcation Characteristics of Nonlinear Systems Under Conventional PID Control," *Chem. Eng. Sci.*, **39**, 7/8, 1127 (1984).
26. Doedel, E. J., *AUTO: Software for Continuation and Bifurcation Problems in Ordinary Differential Equations*, Comp. Sci. Dept., Concordia Univ., Montreal, 1986.
27. Shinskey, F. G., "An Expert System for the Design of Distillation Controls," in Proceedings of CPC III Conference, eds. T. J. McAvoy and M. Morari, Elsevier, 1986.
28. Rich, S.H., and V. Venkatasubramanian, "Model-based Reasoning in Diagnostic Expert Systems for Chemical Process Plants," *Comp. Chem. Eng.*, **11**, 2, 111 (1987).
29. Banares-Alcantara, R., A. W. Westerberg, and M. D. Rychener, "Development of an Expert System for Physical Property Predictions," *Comp. Chem. Eng.*, **9**, 127 (1985).
30. *The Advent System*, Union Carbide Corp., Proc. Sys. & Serv., P. O. Box 8361, So. Charleston, WV, 1985.
31. *TARGET II User's Guide*, distributed by CACHE Corp., P. O. Box 7939, Austin, TX 78713-7939, 1987.

ChE book reviews

HANDBOOK OF SEPARATION PROCESS TECHNOLOGY

Edited by R. W. Rousseau
John Wiley & Sons, Inc., 1530 S. Redwood Rd., Salt Lake City, UT 84104; $69.95 (1987)

Reviewed by
R. N. Maddox
Oklahoma State University

Webster's *Third New International Dictionary* defines "Handbook" as

1. A book capable of being conveniently carried as a ready reference.
2. A concise reference book covering a particular subject or field of knowledge.

For an engineering handbook, this writer would add: For the engineer facing a plant problem, a handbook

1. Provides sufficient information on theory and application to enable equipment selection.
2. Details the information required for equipment sizing.
3. Provides infomation necessary for estimating equipment and operating costs.

This handbook meets the dictionary definition of a handbook, though the print is a little small for long-time, continuous reading. The handbook also meets rather well requirements 1 and 2 of the personal definition. Equipment and operating costs are generally not covered, so presumably were outside the definition or scope of the work.

Of the thirty-six authors, twenty-two are from academia and fourteen are from industry or research institutes—a reasonable balance. Of the twenty-two chapters, four are devoted to "general principles," and eighteen discuss specific separation processes and their applications.

If I were facing the problem of selecting a separation process to be used for an unfamiliar industrial application, I would go through the following steps:

1. Select a process.
2. Collect necessary properties and data for design.
3. Size the separation equipment and estimate costs.

In Chapters 4 and 22 there is some discussion of the applicability of given processes to various types of separations. In some discussions of the individual processes there is indication of the range of applicability of the process. Unfortunately, in several there is no indication of the type of separation for which the process should be considered. Is the process equally applicable to mixtures of gases and liquids, and liquids and solids? Will the process work equally well with feed concentrations of 0.1% and 90%. Are the process elements subject to contamination by trace components, including "dirt"? These and similar questions sometimes are not addressed. The uninformed engineer needs this type of information.

All the treatments deal quite well with the sizing of equipment. Efficiency of operation is addressed in most cases. The requisite component properties and other data required for design are indicated, if not explicitly, by example.

There is a natural tendency of the authors to dwell at length on things known and particularly on those that can be satisfactorily dealt with from currently known and accepted theory. There is much less discussion and presentation of information that is not known. In the treatment of Phase Segregation (separations not involving equilibrium considerations or phase changes) there is an excellent and extensive discussion of separation of particles of a given size, in a number of different environments. There is, however, no discussion of the most perplexing and difficult problem: how to determine the size distribution in the stream which must be segregated into two or more distinct phases. This subject cannot be easily presented in a simple equation, but there is certainly some satisfaction for the inexperienced reader in learning that he is not the only person unable to make this size distribution determination.

In the discussion on distillation there is no treatment of a common approach to the determination of the products that can be achieved—using a batch or continuous laboratory column, performing the distillation of the feed mixture, varying operating conditions until the desired products are achieved. The problem then becomes how to perform the same separation in full-scale equipment. This, also, is not easily quantified, but it is a technique that is used rather often, and therefore it is worth mentioning.

Presenting a detailed critique of twenty-two different subjects in any field is all but impossible for a single individual, and separation processes is no exception. The areas with which this reviewer is most familiar are treated suitably in scope and in depth.

The book represents a valuable compilation of information and material. In all probability, it will prove more valuable to the student or recent graduate than to the experienced engineer, though the theory of some of the newer separation processes is well covered. The handbook represents a compilation of a number of significant pieces of effort by experts in the given processes in collecting and presenting information of value. For that reason alone it represents a valuable contribution to the literature on separation. □

ChE books received

Fluidization V: Proceedings of the Fifth Engineering Foundation Conference on Fluidization. K. Ostergaard and A. Sorensen, Eds.; AIChE, 345 East 47th St., New York, NY 10017; 683 pages

Annual Review of Numerical Fluid Mechanics and Heat Transfer: Vol. 1, edited by T. C. Chawla. Hemisphere Publishing Corp., 79 Madison Ave., New York, NY 10016 (1987); 454 pages, $149.95

Dynamics of Proteins and Nucleic Acids, by J.A. McCammon and S.C. Harvey. Cambridge University Press, 32 East 57th St., New York, NY 10022 (1987); 234 pages, $39.50

Handbook of Multiphase Systems, by Gad Hetsroni. Hemisphere Publishing Corp., 1025 Vermont Ave. NW, Washington, DC 20005 (1982); $64.50

Corrosion Mechanisms, edited by Florian Mansfeld. Marcel Dekker Inc., 270 Madison Ave., New York, NY 10016 (1987); 472 pages, $89.75