

REACTION TO GRISKEY RANKING

Sir:

I found the article by R. G. Griskey, "Ranking Chemical Engineering Departments" in the Summer 1976 issue of *CEE* to be very interesting. No doubt he will attract both praise and brickbats for his approach.

With his method a department may fluctuate rapidly in the standing as fortunes go up or down. If a professor lands a million dollar grant, the departmental rating will soar suddenly. If the number of Ph.D.'s produced drops from 15 to 5 in one year (entirely possible) the rating will take a nosedive. I am sure he is quite aware of the short-time fluctuations.

I would like to see ratings compiled every year, by Griskey's scheme. Let me urge him to consider being the author of a yearly ranking for *CEE* or some other journal. To many people it would be as valuable as the annual reviews of special areas of research which were formerly published, for example, by *Ind. Eng. Chem.*

J. W. Westwater
University of Illinois, Urbana

Editor's Reply:

CEE would be interested in receiving another paper from Prof. Griskey on departmental ratings next year, in order to see what, if any, changes have occurred. However, since the results one obtains depend upon the weighting one gives to the various parameters as well as upon the input data, others may want to try a different approach and, in the interest of fairness and diversity, are invited to do so. *CEE* would not want to be thought of as endorsers of any particular rating system or to be more or less committed to publishing the "Griskey Ratings" annually to the exclusion of others.

Other letters will appear in the next issue.

ChE book reviews**HEAT AND MASS TRANSFER DATA BOOK,
2ND EDITION**

by C. P. Kothandaraman and S. Subramanyan
John Wiley & Sons, 1975. \$5.95.

Reviewed by F. J. Lockhart, University of
Southern California

Reference materials, both data and equations, are presented for heat and mass transfer in MKS and SI units.

This book is a compilation of data intended for use with a text-book. There are essentially no discussions of the various tables, graphs and formulae, and at times insufficient definitions of

symbols. References are not given for specific data items, but a list of 16 books is given at the end. So this book is a tertiary reference which does not identify the specific secondary references.

There is no subject index and the table of contents is too brief to be of help in locating specific items of interest. A user will have to prepare his own index. (Perhaps this is a good thing!)

Coverage of heat transfer, physical properties, and fluid flow is thorough. Mass transfer receives scant attention: 2 pages for equation of molecular diffusion, 2 pages for convective mass transfer coefficients, and 3½ pages for humidification equations. □

**MULTIVARIABLE COMPUTER CONTROL
A CASE STUDY**

by D. Grant Fisher and Dale E. Seborg
North Holland Publishing Co. (1976) 205 Pages.

Reviewed by W. Harmon Ray,
University of Wisconsin, Madison

In order to understand the value of this book, one must become familiar with its genesis. Approximately 10 years ago, the Department of Chemical Engineering at the University of Alberta acquired an IBM 1800 process control computer and began interfacing it with equipment in their unit operations laboratory. One of the first units to be put under computer control was a double effect evaporator. In the ensuing years, the authors have used this slightly nonlinear, multivariable evaporator as a model process for testing a wide range of both traditional and modern process control techniques. As their research projects were completed, the results were published in great variety of ways including meeting proceedings, chemical engineering journals, control journals, trade journals, etc. In many instances their work represented the first real time experimental implementation of the techniques applied. After several years of testing and comparing on-line identification, state estimation, and control algorithms applied to this evaporator, quite a number of conclusions could be drawn about the relative merits of the techniques considered. Thus after some urging from their colleagues in the field, the authors were persuaded to compile a case study of process control algorithms applied to the evaporator and to

Continued on page 178.

stadard pH measurement.

Radioactive waste disposal was handled by Westinghouse and a representative of United States Steel Corporation gave an excellent treatment of the steel industries problems and programs. The municipal waste and their ability and willingness to handle industrial discharge was presented by the county's municipal disposal facility, ALCOSAN. Jones and Laughlin Steel Corporation presented the coal mining waste problem and treatment. Effective treatment can be inacted on new mines; but old abandoned ones are the areas most difficult to clean-up.

THERMAL POLLUTION

DURING THE LAST WEEK of the course, the thermal pollution area was treated with consideration from power plants both coal fired and atomic. Much of the atomic power plant material tied in with the radioactive waste treatment lecture.

BOOK REVIEW: Multivariable Computer Control

Continued from page 154

publish these together in a single volume. The result is the present book.

The authors have been able to present a coherent view of their work by appending introductory discussion to previously published papers and organizing this by topic. It may be useful to summarize briefly the scope of the material. Section 1 presents an overall view of the book, while Section 2 treats several different approaches to modelling the process. Of particular interest is a comparison of model reduction procedures and a study of several approximate low order models of the process. Section 3 demonstrates the dynamic performance to be expected under conventional control while Sections 4-6 discuss more modern computer control techniques. These sections present a detailed comparative study of techniques such as multivariable feedback control, combined feedforward-feedback control, time optimal control, optimal linear-quadratic feedback control, model reference adaptive control, etc. Section 7 presents experimental testing of on-line state estimation (using Kalman Filters) and the incorporation of the state estimator into a stochastic feedback control scheme. Finally Section 8 describes the overall educational aspects of such computer control facilities.

In short, reliance on industry for up-to-date information and a special viewpoint was very successful both in the atmospheric and industrial wastes courses offered. Our area indeed is rich in capable, knowledgeable engineers willing to assist in the preparation of meaningful courses on the environment for the students of our engineering schools. □

REFERENCES

1. Mc Cormac, B. M., *Introduction to the Scientific Study of Atmospheric Pollution*, D. Reidel Publishing Co., Dordrecht-Holland (1971).
2. Strauss, W., *Industrial Gas Cleaning*, Pergamon Press, London, (1966).
3. Ledbetter, J. E., *Air Pollution Part A: Analysis*, Marcel Dekker, Inc., New York (1972).
4. National Air Pollution Control Administration Publications AP-49, 50, 51, 52, 62, 63, 66, 67, 68, 84.
5. Nemerow, N. L., *Liquid Waste of Industry*, Addison-Wesley Publishing Co., Reading, Mass. (1971).
6. Eckenfelder, W. W., *Industrial Water Pollution Control*, McGraw-Hill Book Co., New York (1966).

The case study would be of interest to anyone wanting to evaluate the experimental performance of a number of modern process control techniques. However, as one who has used this case study (in manuscript form) with good results in a graduate process control course, this writer feels the greatest value of the book is as a supplementary text in such a graduate course. The availability of a single process from which to draw experimental examples of model linearization, model reduction, single loop feedback control, multivariable feedback control, multivariable optimal feedback control, state estimation, etc., allows the student to study a new method on an already familiar process and to compare with methods already discussed. As a supplement to lectures over the fundamental mathematical methods, we found the case study extraordinarily helpful.

BOOK RECEIVED

Organic Electronic Spectral Data. Vol. II, 1969.

Edited by J. P. Phillips, H. Feuer, P. M. Laughton and B. S. Thyagarajan.

John Wiley & Sons, Inc. New York, 1975.
1075 pages.

This is volume II in a continuing compilation of ultraviolet-visible spectra of organic compounds presented in the journal literature.