BOOK REVIEWS

Selection of books for review is based on the editors' opinions regarding possible reader interest and on the availability of the book to the editors. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.

TAKE HEART AND CONTINUE

Title Computational Techniques for Chemical Engineers

Authors H. H. Rosenbrock, C. Storey

Publisher Pergamon, 1966

Pages xv + 328

Price $13.50

Reviewer Lowell B. Koppel

One would do well to read beyond the first chapter of this book, particularly ignoring the section "Mathematics and Engineering." The opinion expressed in this section is that the axiomatic approach to modern mathematics has somehow obliterated a previous symbiosis between mathematics and engineering. It is argued that the engineer must be concerned with "truth" rather than "mere consistency;" truth is forthrightly indicated to be "correspondence between a statement and the observed facts;" the section closes with the intimidation "if any young reader disagrees strongly with our point of view he should consider with himself whether he ought not to work in pure mathematics rather than engineering." I would advise readers young and old to take heart and continue reading; the remainder of the book contains valuable information, well presented, and is replete with detailed examples.

Curiously, this implied attitude does not affect the mathematical treatment of the subject matter. Modern mathematical results such as the maximum principle are not omitted. Appropriate qualifications and limitations are presented with the results. In fact, the authors betray acquaintance with, and some regard for, modern mathematics, citing such venerable works as Dieudonne's *Foundations of Modern Analysis* for more complete treatments of the subject matter. I believe the essence of their argument to be that one can often be more successful in mathematical applications by judicious combination of mathematical and physical insight. This point is illustrated in several examples, such as choice of appropriate finite-difference representations of partial differential equations, and probably cannot be disputed. Professor Rosenbrock's impressive contributions to the literature are further support. One is simply left to wonder why the authors chose to begin on so negative a note, and to hope that this is not a manifestation of a pervading sense of inferiority among "engineering mathematicians" or "mathematical engineers."

The emphasis of the book lies heavily on hill-climbing methods and numerical solution of partial differential equations, these topics occupying almost one-half the total pages. In the Preface, the authors state their intent to limit treatment to problems on which they have worked, and this presumably has dictated the choice of subject matter. It is certainly unfair to criticize a book on what the authors have chosen to omit, and I shall refrain from doing this save to say that a more appropriate title would begin with the word "Selected." There will, however, be serious disagreement among readers with the comment in the Preface that "we have not seriously misrepresented the relative importance of the different parts of numerical analysis to the chemical engineer."

A most serious misrepresentation of relative importance occurs in the final 19-page chapter entitled "Process Control" for which the list of References includes seven citations to Rosenbrock and two to Storey, while giving only one or two citations to workers such as Bellman, Kalman, Pontryagin, and Rozonoer, and omitting any mention of the contributions of Merriam and Aris which would seem to be particularly important in a computationally oriented treatment.

For the practicing engineer interested in the particular choice of subject matter, the book will be a worthwhile library addition because of its clear, physically oriented presentation, and its basis in the actual experience of the authors. Since this is implied by the authors to be the major objective, one must conclude that Professors Rosenbrock and Storey have been successful in their writing endeavor.

Lowell B. Koppel is Associate Professor of Chemical Engineering at Purdue University. He received a BS from Northwestern in 1957, MSE from Michigan in 1958, and PhD from Northwestern in 1960, all in chemical engineering. He has published over 20 papers on process control and transport phenomena, and is coauthor of a textbook on process control. Since 1962 he has been a consultant to the Atomic Energy Commission at Argonne National Laboratory.