and persuasive in his attack on their often puerile anti-technological bias. He rejects their portrait of man as empirically insupportable, though he argues that engineering has a positive role to play in the future development of society. The argument is based on contradictory views of human nature. The most extreme opponents of contemporary technology appear to imagine man without those natural attributes which lead engineers to delight in the products of technology, rather than examining ways of using these talents more constructively than they may have been in the past.

However, this is not the central point in understanding contemporary society's evaluation of the engineering profession. Florman comments on the large body of literature antagonistic to the products of technology:

> Poems and stories that are hostile to the machine are either antiquated or foolish, or else express a message that the engineer has already heard a thousand times.

The hostile authors who wrote them are the forerunners of contemporary countercultural writers. Florman deals sharply with this earlier tradition, but underplays a new component in the recent critics' popularity. Both approaches find favor with a relatively small group of intellectuals (or their close relatives, the anti-intellectuals), but it is presumably the mass following of contemporary critics that has raised Florman's ire. The counterculturalists champion nature, which suddenly appears to be taking its revenge on the engineering profession's earlier bravado. Much earlier anti-technology literature is devoted to the defense of nature, helpless in the face of human inventiveness (and destructiveness). The reversal of this situation has been coupled with a "revolution in rising expectations" in society's appraisal of engineering, a phenomenon inherent in Florman's definition of contemporary man as "not content because he *wants* more than he can ever have." Society has come to expect solutions from engineering. When a "Can't do" flag shows, bitterness results. Engineers should be aware that the public expects them to find an *easy* solution to the energy crisis and will be sorely disillusioned if this does not occur—and soon. Obviously, society has developed the false idea that engineers are automatic problem solvers, and has lost sight of the creative, and therefore unpredictable, nature of technological progress.

The final section of the book relates to its title. Florman wishes to refute the counterculturalists' charge that the engineer and his works are dull and uncreative. Defining existentialism as involving a "rejection of dogma" and a "reliance on the passions, impulses, urges, and intuitions" (though we wonder why, in his admittedly selective definition, Florman avoided a discussion of "responsibility," which Sartre made an integral part of his understanding of existentialism, and which is central to Florman's view of the position of engineers in society), Florman presents an excess of carefully collected literary fragments as proof of the existence of existentialism in engineering.

Perhaps these quotes obscure the engineer's best answer to the counterculturalists, embodied in Jerome Weisner's comment, "Technical and scientific work is usually fun." Could this idea be carried further—isn't engineering a development of forms of "play" inherent in children's games? Described in these terms, engineering and its products may appear more acceptable even to radical counterculturalists.

DON REID
Department of History
Stanford University
ROBERT C. REID
Department of Chemical Engineering
Massachusetts Institute of Technology

Applied Optimal Control, Revised Printing, Arthur E. Bryson, Jr. and Yu-Chi Ho, Halsted Press, Division of John Wiley & Sons, Inc., New York (1975), 481 pages.

This classic book on optimization, estimation, and control is essentially the same as the original version published by Ginn and Company in 1969. Most of the rather large number of typographical errors and misprints present in the original printing have been corrected in this revised printing. Except for these changes, the text appears to be identical to the original.

The book is concerned with the analysis and design of dynamic systems. It presents the applied mathematics needed by engineers who are attempting to apply optimal control to the solution of engineering control problems. The first three chapters cover optimization of dynamic systems. The next five chapters deal with optimal feedback control, including linear systems with quadratic criteria, numerical solutions of optimal programming and control problems, and singular solutions of optimization and control problems. One chapter is devoted to differential games. The final five chapters are concerned with the effect of uncertainty and include the concepts of probability and random processes, optimal filtering, prediction, and smoothing, and optimal feedback control in the presence of uncertainty.

Most of the examples are drawn from the aerospace field, but should be understandable to chemical engineers. The book is designed for self-study. Students of control will welcome the reprinting of this book. It was an excellent text in 1969 and is still an important work in the field.

LAWRENCE B. EVANS
Massachusetts Institute of Technology

Design and Control of Chemical Process Systems, J. R. Borer, McGraw-Hill Book Co. (U.K.) Limited, 153 pages, $12.50.

This book is a brief sketch of the tools of process control system design, written by an experienced process control engineer. The selection of topics and the emphasis provide a rare opportunity for gaining an "insider's" view of the problems of controller design. As such, the book will be of particular interest to teachers of the subject, and they should examine it with care. Some of the examples are instructive, and the overall point of view provides some of the practitioner's input which our control courses and research badly need.

The topics include an elementary discussion of process dynamics, conventional single loop design procedures, and topics in multivariable control including multivariable compensation, system identification, and computer control. A satisfactory treatment of each of these topics within 153 pages is, of course, an impossible task, and the result is a book that can be read and appreciated only by someone who is already familiar with the important concepts. The level of mathematics required of the reader is surprisingly uneven; page 34 contains a detailed exposition of the solution of the equation $dy/dt+ky=0$, for example, while the author freely uses properties of matrix differential equations and matrix decomposition in the later chapters.

Readers should be warned that this is a difficult book to get through, but not because of the technical level of the material. The writing style is often awkward, the intermingling of equations and text is confusing, and the book contains errors in grammar and punctuation; portions of the text appear to me to be transcriptions of dictation. I would not have thought it possible to produce so poorly edited a manuscript, and I feel that the publisher has done the author and his readers a great disservice by failing to provide the expected editorial services.

MORTON M. DENN
University of Delaware