has therefore incorporated in this handbook not only results that have been thoroughly verified in laboratories, but also those provided by less rigorous experimental investigations and those predicted or obtained by approximate calculations based on separate experiment studies. In some cases tentative data are shown and are so noted in the text. We think this approach is justifed because the facilities used under industrial conditions, and consequently the conditions of flow passages in them, can greatly differ among themselves and differ from laboratory conditions, under which the majority of hydraulic resistance coefficients have been obtained. In many complex elements of pipelines, these coefficients, cannot be constant due to the nature of the phenomena occurring in them; thus, they can vary over wide ranges.

I. E. Idelchik
(from Author's Preface)

Aerothermodynamics of Low Pressure Steam Turbines and Condensers, eds., M. J. Moore and C. H. Sieverding, Hemisphere Publishing Corp., New York, 1987.

In the field of large-scale power generation, the steam turbine occupies a central position whether the energy source is a fossil-fueled boiler, a gas-cooled nuclear reactor, a light or heavy water reactor, a fast reactor, or, looking ahead, even a nuclear fusion reactor. The high cost of fossil fuels, however, and the high capital cost of nuclear systems makes it increasingly important to convert the liberated heat-energy to mechanical power as efficiently as possible. This volume describes key developments in the quest for higher turbine efficiency.

The 1970s saw the expansion of turbine size, reaching unit outputs of up to 1300 MW. In contrast, the downturn in world economic growth in the 1980s has resulted in a sharp reduction in orders for new machines and many utilities are taking steps to extend the operating life of older turbines. An essential element of the life extension exercise is the retrofitting of new components, using the lastest design theories, to improve efficiency. Such schemes have been found highly cost-beneficial.

Prime candidates for retrofitting are the low-pressure turbine and condenser where, as unit sizes have increased, the aerothermodynamic design problems have been more difficult than in other parts of the machine. For these reasons the von Karman Institute has brought together experts in the field of low-pressure turbine and condenser research to provide advanced Lecture Series in these subjects. This volume is a selection of edited lectures from these Series. The lecturers, from Europe and the U.S.A., are specialists in their particular fields of research and development and this book is intended to provide students, researchers, and turbine plant designers with a view of the improvements in knowledge and techniques in recent years. Particularly significant, for example, are the emergence of theories for viscous compressible flow and the capability to measure steam wetness fraction, as described in Chapters 3 and 6, respectively, which must lead to further advances in turbine performance in the future.

By including the fluid mechanics of the turbine and condenser, this publication complements the previous von Karman Institute book "Two Phase Steam Flow in Turbines and Separators" edited by M. J. Moore and C. H. Sieverding (Hemisphere, 1976) and adds significantly to the treatment of wet steam flow in turbines.

M. J. Moore
C. H. Sieverding
(from Editor's Preface)

The Chemical Engineering Guide to Heat Transfer—Volume I: *Plant Principles*, Volume II: *Equipment*, eds., K. J. McNaughton and the Staff of *Chemical Engineering*, Hemisphere Publishing Corp., New York, 1986.

When I was studying chemical engineering at college, I loved heat transfer. It was neat. $Q = CAT$. That's all I needed to know. And heat-in equals heat-out. Boy! If only the rest of life was so simple!

Some people say that engineers are drawn to science because they lack the skills to deal with people. That scientific types take comfort in being able to handle a field that responds according to inviolate laws, unlike their lawless and unpredictable fellow beings. Other observers, perhaps more charitable, suggest that those who inherit the skills to deal with a scientific universe may not give themselves the time to come to grips with the more elusive rules that attempt to explain human behavior.

I think both are fascinating fields worth pursuing. And who can say that the two won't come together? What with all the exciting developments in our understanding of molecular biology, surely we are overdue for some breakthroughs in phychology as well.

As it turns out, heat transfer isn't so simple anyway. But it is neat. And we are very fortunate to have developed our communications skills so well. In this book, for instance, we have accumulated ten years of practical wisdom from the pages of *Chemical Engineering*, on the subject of heat transfer—basic plant principles.

Here, assembled in one volume, are the writings of fellow chemical engineers who also graduated with the basic understanding that $Q = CAT$ and that heat-in equals heat-out. But they went on to specialize, and now they share with us their knowledge about how the theory is applied in the plants of today's chemical process industries.

All the different types of heat exchangers and how to select the right one. Shell-and-tube equipment, how it works. Design—calculator programs and modeling. Heat recovery—optimizing, conserving, saving, networks, efficiency. Steam—the conveyor of heat. And of course, cost—the bottom line.

Life may not be so simple, but this book is going to make your life easier when it comes to heat transfer applications in the plant. And so will the companion volume, which covers all the different sorts of heat transfer equipment.

K. J. McNaughton
(from Editor's Preface)

Mechanical Design of Process Systems, Volume 2: *Shell-and-Tube Heat Exchangers, Rotating Equipment, Bins, Silos, Stacks*, by A. K. Escoe, Gulf Publishing Co., Houston, 1986.

This book's purpose is to show how to apply mechanical engineering concepts to process system design. Process systems are common to a wide variety of industries including petrochemical process, food processing and pharmaceuticals, power generation (including cogeneration), ship building, and the aerospace industry. The book is based on years of proven, successful practice, and almost all of the examples described are from process systems now in operation.

While practicality is probably its key asset, this second volume contains a unique collection of valuable information, such as practical approach to bin and silo design as well as practical methods of controlling wind vibrations of stacks using vortex strakes; new information on nozzle loadings on compressors and turbines; comprehensive discussions and ex-

