BOOKS

Momentum, Heat, and Mass Transfer, C. O. Bennett and J. E. Myers, McGraw-Hill Book Company, Incorporated, New York (1962). 709 pages. $13.50.

This book is primarily intended to be a text for undergraduate students, probably those in their junior year, and is suitable for a first course in fluid systems. While practicing engineers will find it interesting as a comparison with elementary unit operation texts and may find that it offers a modified review of elementary topics, it is primarily of interest to those planning the content of engineering courses.

With the assumption that the students have basic knowledge of ordinary differential equations and thermodynamics, the authors solve ordinary differential equations freely, develop several partial differential equations although presenting only a few classical solutions, but do not use vector or tensor notation.

Most of the authors of recent texts in this field have felt that development of the three modes of transport phenomena, in an analogous way, is essential in a first course in the study of fluid systems. Most have also felt that some of the unit operation or engineering approach of examining applications, design, and overall systems should follow, either in introductory or higher level courses. One point on which they differ, however, is how much of this engineering approach should be presented concurrently with the transport approach.

This text by Bennett and Myers contains a substantial amount of the engineering approach in addition to the transport approach. Some, in fact, may describe it as a modified unit operations book. However, it is actually an attempt to integrate elementary transport phenomena and unit operations topics. This attempt succeeds insofar as it provides, within the same book, a better transport concept base for the unit operations applications than some earlier texts. Due to many factors, however, such as the varied nature of some topics and the present state of the art in areas such as turbulence, the integration is not completely successful.

Of the three major divisions of the book, fluid dynamics, heat transfer, and mass transfer, the first represents the greatest change with respect to unit operations texts. Descriptions which have appeared in more advanced texts are reflected in the section on fluid dynamics which contains more on fundamentals of differential elements and seems to be better integrated than the other two sections. With overall balances for homogeneous fluids, a discussion on flow measurement, and fluid behavior in immersed flow, as a start, the balances on differential elements, such as the Navier-Stokes, are derived and discussed. Chapters on applications include dimensional analysis, filtration, fluidization, and high-speed flow.

In heat transfer, as well as mass transfer, the engineering concept of the transfer coefficients is introduced even before any laminar systems are discussed. The only discussion of nonfluid systems in the

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text appears in the heat transfer sections on conduction and radiation. The treatment of conduction includes solution by numerical relaxation methods and mention of graphical and analog methods.

Although multicomponent diffusion is not discussed, a brief, twelve-page discussion of multicomponent absorption and distillation is included after the chapters on the equilibrium stage, extraction, and binary distillation.

In summary, this text offers a better integration of the operations and transport approaches for fluid systems. Properly used, it is also suitable for courses for other (nonchemical) engineering students. However, to those who wish to teach transport and operations in a more separated fashion or to those who prefer to start with staged operations before rate processes, the Bennett and Myers text may not be as attractive.

JOHN TALLMADGE
YALE UNIVERSITY

ERRATUM

The ordinate in Figure 3 of Part II of "Transient and Steady State, Free and Natural Convection, Numerical Solutions," by J. D. Hellums and S. W. Churchill, which appeared in the *A.I.Ch.E. Journal*, 8, No. 5, p. 690 (November, 1962), should read

$$\left(\frac{ur_o}{\nu}\right)(N_{Pr}/N_{gr})^{1/2} \text{ and } \phi$$