stated without derivation as "due to the usual simplifying assumptions ... originated by Prandtl." The discussion of similarity is very good. Integral methods are discussed briefly and stated to be "now only of historical interest." Boundary layer series solutions are discussed, but no numerical methods are presented.

The fourth section devotes 83 pages to dispersed solids, including porous media, sedimentation, fluidized beds, and bubbles in emulsions. These two chapters present a great deal of interesting data. Finally, there is a one-page appendix and both an author and a subject index.

The printing is sharp and excellent. Although figures have been borrowed from many sources, often without redrawing, they are bright and clear. The reviewer found only two misprints, in Equation 8.8 and Figure 13.13.

Although the book covers only certain types of laminar flows, it is well written and should be especially useful to chemical engineers. The author intends it to join his three companion books on inertial flows, multi-dimensional laminar flows, and turbulent flows.

Frank M. White

Practical Thermodynamic Tools for Heat Exchanger Design Engineers
H. Soumerai
John Wiley & Sons, Inc., 1987

The stated purpose of this book is to encourage engineers and researchers to consider the application of equilibrium and nonequilibrium thermodynamics tools that are available today in the solution of heat exchanger engineering problems. This book is a new look at our understanding of heat transfer and pressure drop and relates both to thermodynamic concepts, some long forgotten by the practicing engineer. Relevant fundamental concepts, definitions and theoretical concepts, and theoretical assumptions are formulated into 29 guidelines that identify the significant thermodynamic characteristics of the heat exchangers used in the air conditioning and refrigeration industries (low thermal-lift heat exchangers). However, the author also describes the use of these tools for high thermal-lift heat exchangers and for heat exchangers used in the power industry (feedwater heaters and surface condensers) and in ocean thermal energy conversion systems.

The guidelines apply to both laminar and turbulent single-phase flow in smooth and roughened channels and to two-phase flow in condensers and evaporators. Both counter and parallel flow exchangers are considered. The thermodynamic concepts of reduced properties and the second law driving force—the entropy difference—are refreshing and new concepts proposed for the arsenal of tools for the heat exchanger engineer. The methods developed for problem solutions are also applied to practical design cases.

The book is aimed at practicing heat transfer engineers and for teachers and researchers of thermal sciences. The practicing heat exchanger engineer will benefit because of the return to basic concepts and generous use of numerical analyses that reveal the magnitude and significance of quantities such as the Reynolds number that are lost when using typical heat exchanger rating computer software. The many references to the historical basis for the fundamental laws and the empirical relations make it valuable material for all persons dealing with thermal sciences. This book would also be a suitable undergraduate text for a course dedicated to heat exchanger design because of the interdisciplinary approach of a unified thermodynamic treatment of momentum and heat transfer.

The book is very well organized, free of errors, and very easy to read. The writer does not overwhelm the reader with profound mathematics and uses both U.S. customary and SI units. Unfortunately, practicing engineers today must use both unit types and the writer was fully aware of this real-world situation. Noteworthy is the very logical organization of the material and how each chapter is a self-contained unit so the reader can select the material sequence consistent with his individual needs and/or interests.

This book is a must for the libraries at universities, government laboratories, and at companies involved with the use and/or design of heat transfer equipment. In addition, this book is well worth purchasing, reading, and having in a personal library because many thermodynamic concepts, germane to heat exchanger design have been forgotten by most practicing engineers, myself included.

T. Rabas

Fluid Mechanics, second English edition (Vol. 6 of the *Course of Theoretical Physics* by the same authors.)
L. D. Landau and E. M. Lifshitz
Pergamon Press, 1987

The *Course of Theoretical Physics* by Landau and Lifshitz is a ten-volume classic, a remarkable memorial to the confidence and breadth of its authors, and the time in which they lived.

Both Landau and Lifshitz are now dead; Landau, the senior author, died in 1968 at the age of 60 and Lifshitz, his student, died in 1985 at the age of 68. The second English translation of the volume on fluid mechanics, volume 6, was published in 1987, nearly 30 years after the first English edition of 1959.

We in fluid mechanics know of Landau and Lifshitz possibly from first hand study, and certainly through references by others to its basic equations, its examples of analytical solutions or its unusual topics and lines of reasoning. Has the later English edition added much to what we already had in the 1959 version?

The answer is no. If one is particularly interested in stability mechanisms, then the three new sections on frequency locking, strange attractors and period doubling may be worth noting. But they will not provide an adequate view of these subjects since they omit most of the results of computer solutions for model equations which illustrate these phenomena. A few other new sections have been added, usually amplifications of material treated in the earlier version. A chapter on "Fluctuations in Fluid Mechanics" added to the first English edition when it was translated from Russian, has been dropped from the second English edition. Little of interest has been lost or added, and the new volume is much the same as its predecessor.

Landau and Lifshitz is more of a reference book than a textbook, despite the formally worked problems throughout the text. These problems form a convenient source of examination questions for certain graduate courses in fluid mechanics, perhaps a good reason for having the book accessible to both graduate students and professors!

But the book is unusual, representing a view of fluid mechanics from a theoretical physics standpoint. Consider for example the discussion, partly in footnote form, of a possible diffusion of mass resulting solely from a density gradient. What would be the implications of such a mass diffusion coefficient? And how many of us have ever thought about the implications?

Who would expect to see the Zhukovskii (Joukowski) theorem discussed in a chapter on turbulence, or induced drag described in a chapter on boundary layers? And what other fluids book would have "Relativistic Fluid Dynamics" or "Dynamics of Superfluids" among its topics?

The references scattered in footnotes and in the main body of the text are quite