cumulus convection, while two further studies employ the vortex method for oscillating bodies and mean-flow/acoustic interactions in a duct which is partially blocked by baffles.

Transonic flows with embedded shocks are resolved in a total of five contributions, the most spectacular one, by Baum and Eidelman, presenting a time-dependent simulation of the interaction between a high-M-stream and a circular wall-recess. The renewed interest in hypersonic aerodynamics is reflected by three papers considering reactive flows in the context of very high-M-number shocked flows. One study employs a spectral, multidomain NS solution to identify the possible role of false diffusion in hypersonic flow schemes.

A total of seven papers focus on extensions or the application of FE and BE methods. Topics considered include oscillating bodies near a free surface, viscous non-Newtonian fluid flow with and without separation (three papers), a Petrov–Galerkin approach to highly advective separated flow, and the use of a domain-decomposed, pseudo-spectral (Chebishev) method for elliptic flows.

Numerical issues, related primarily to economy and efficiency of solution, are addressed in eight papers. Consideration is given to gains resulting from marching or repeated-marching approaches to the parabolized NS equations, from the use of the method of characteristics for the 3-D Euler set, from the application of a group-explicit solution to recirculating flow, from multigrid acceleration in cavity and diffuser flows, and from the application of efficient vectorizable formulations to the 3-D Euler equations. Only one contribution considers grid-generation issues within the FE context.

On the whole, this book differs little from many others emerging in the wake of symposia and conferences, in that it offers a diffuse and rather inaccurate snapshot of some CFD work at a particular time (here, 1987). The book is likely to be of some interest to those wishing to "indulge" in general reading, but is unlikely to be of great benefit to those seeking to acquire a significant amount of highly specialized information on any one narrow segment.

M. A. Leschziner

Industrial Energy Management and Utilization

Larry C. Witte, Philip S. Schmidt and David R. Brown

This book grew out of short courses given by the authors at University of Houston and University of Texas at Austin, and is at least partially aimed at senior academic students. Despite this, it is also thoroughly practical in approach and well deserves study by the "practicing engineers" which form its other target.

It seeks to cover the field of industrial energy conservation and auditing, which is a subject that is not well supplied with such reference texts. Many practicing engineers have accumulated knowledge haphazardly over years of experience, but would be hard-pushed to set it down to instruct others. In this book, that knowledge has been put into an accessible form.

After an introductory chapter skimming the world energy scene, the book starts in with a good basic guide to energy audit methods, including those all-too-common situations where available data and installed metering are in scant supply. A comprehensive chapter on economic analysis follows, and sets the pattern for the book, which packs a surprising amount of information into each chapter. An important chapter on dealing with people and getting them to act in favor of energy management is followed by one of thermodynamics, heat transfer, and fluid mechanics—all treated amazingly well in only 42 pages!

Specific areas of industrial equipment —combustion systems; steam and condensate; heat exchangers; heat recovery; insulation; industrial buildings; cogeneration; power circuits and machinery; and electrical energy—are dealt with in successive chapters. The coverage is again very thorough, except that the newer technologies get little or no mention. For example, fluidized bed boilers seem not to exist, and no information is given on other pollution-control items such as low-NO_x burners. The book as a whole is very biased towards *process* industry, rather than industrial premises in general. This shows up most in the disappointing chapter on industrial buildings which has very little on space heating (or cooling), regarding buildings mainly as receptacles for the process equipment. The reader is referred to the ASHRAE guides (for UK, see IHVE guides). Cogeneration is covered mainly in terms of steam turbines, with, for example, gas turbines dismissed as of too low efficiency in comparison. This sounds very much like a rule-of-thumb that is beginning to show its age.

Mention of ASHRAE brings me to the broadest criticism of the book, as addressed to the European reader. US units and reference organizations are used throughout, which at best, will make it harder to use by those brought up on SI units; and at worse make acronyms unfamiliar, not understandable, or just plain inaccessible in Europe. As examples, heat transfer fluids are quoted under their US trade names, while it is not clear whether there are European equivalents. At the other extreme, in the economic analysis chapter, does anybody here actually use the "sum-of-the-year's-digits" depreciation method? (Luckily, several more familiar methods are also described.)

The book concludes with a very dense chapter on the characteristics of particular selected process industries that are highly energy-intensive. Again an amazing amount of information is supplied in a short space, though it is not, in this case, clear whether it would be particularly useful in practice. A good set of appendices give tables and graphs of thermodynamic, heat transfer, and electrical data that will be of constant value.

All in all, this is a book which sets out to cover a vast field, and achieves it remarkably well. It is highly recommended as a reference book for anyone concerned with industrial energy, despite the need for technical translation from US practice.

Pete Lilley

The Mathematical Theory of Turbulence, Second Edition

M. M. Stanisic
Springer-Verlag, 1985, 1988, 501 pp.

It has always been a pleasure to see Professor Stanisic at professional meetings. He is courtly and scholarly, an ambassador from another place and another era, when a professor was educated, a gentleman and a scholar, taking seriously his duty to preserve, transmit, and comment on the work in his field. It was an honorable calling, differing in many subtle ways from being a professor here and now, at least in the sciences.

This book is the lecture notes that Professor Stanisic prepared for his graduate course in turbulence at Purdue. The book has, in many respects, the simplicity, charm and lack of sophistication of something like Prandtl-Tietjens *Fundamentals of Hydro- and Aeromechanics*. This flavor probably represented the best of the books from which Professor Stanisic himself learned, and was, I suspect, what he was aiming for. Unfortunately, it is nearly impossible to achieve also the intellectual distinction of these timeless works.

Internal evidence suggests that the bulk of the manuscript may date from the sixties. I say this because of the inclusion of mixing lengths, Heisenberg, Hopf and magnetohydrodynamics. Not