by Brachet, Meiron, Orszag, Nickel, Morf, and Frisch (*Journal of Fluid Mechanics*, Vol. 130, 1983, pp. 411-451) is mentioned frequently. Thermal convection is still a favorite flow in which to study transition to chaos, but the concepts are spreading. Readers of this journal will want to consult the papers dealing with chaos in free shear flows and boundary layers. Saric and Thomas discuss "the subharmonic route to turbulence in boundary layers," Gaster and Sreenivasan and Strykowski pursue the difference between "traditional" applications of chaotic dynamics to "closed systems," such as Taylor-Couette flow, and potential, new applications to "open systems" such as boundary layers, jets and wakes.

The volume includes a list (and group photograph) of the participants, and a memorial tribute by Hans Liepmann to Janos Laufer, member of the Scientific Committee of the Symposium, who passed away suddenly, unexpectedly and prematurely in the summer of 1983.

Apart from the grouping of related papers, the introductory survey by the editor (Irregularity, Regularity and Singularity of Turbulence), and the list of participants indicating contributors, the volume is simply a collection of papers produced from camera-ready copy. In a field with few textbooks or monographs, the individual may have little choice but to acquire several conference volumes of this kind. Libraries will certainly want to consider the book as a useful reference for researchers and students interested in this rapidly developing area of fluid mechanics.

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Structure of Turbulence in Heat and Mass Transfer, by Zoran P. Zaric, Hemisphere Publishing Corporation, New York, 1982, 585 pp., list price $75.00.

The book consists of the proceedings of an IUTAM Symposium on Heat and Mass Transfer and the Structure of Turbulence held October 6-10, 1980, in Dubrovnik, Yugoslavia. This symposium was one in a recent series of meetings on the structure of turbulence (i.e., Washington, DC, 1976 (IUTAM), Berlin 1977 (DFVLR), Lehigh 1978 (AFOSR), Michigan State University 1979 (AFOSR), Madrid 1980 (IBM), and Marseilles 1982 (IUTAM). The volume therefore constitutes a progress report on a very rapidly evolving portion of turbulence studies, the identification, characterization and control of discrete (but random in space-time) structures in turbulent shear flows. The specific aim of the Dubrovnik meeting was the clarification of heat and mass transfer processes by the results achieved in the turbulence structure research. The volume is organized into five chapters: a) coherent structure research for isothermal laboratory flows (both free and bounded), b) flows with heat and mass transfer, c) environmental flows, d) turbulence modeling, and e) flow visualization. Most of the groups recognized to be deeply involved in coherent structure research were represented in the meeting. Of particular interest are two papers on the Reynolds number dependence of turbulent boundary-layer structures. Typically the IUTAM meetings provide unique forums for *international* contributions and this volume is an outstanding example with 46 participants from 12 countries. This book (along with the proceedings of previous and subsequent conferences on the same subject) is a "must read" for engineers and research scientists interested in the understanding, modeling and control of turbulent shear flows. The near term contribution of the research into coherent structures of turbulence appears to be occurring in the control area, including progress on such technologically significant goals as drag and noise reduction, increased cooling effectiveness, and more efficient combustion. Progress is also beginning to occur in the incorporation of coherent structure concepts and measurements into the modeling of turbulent flows. Indeed, the need for zonal models recognized at the recent Stanford-AFOSR meetings on "Complex Turbulent Flows" may be a result of the experimentally observed diversity of the "coherent structures."

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