

Book Reviews

Advances in Fluid Mechanics Measurements

M. Gad-el-Hak (ed.), Springer-Verlag, New York, 1989, 606 pp., \$84.50.

Technological advances, principally in computers but also in data acquisition, lasers, optics, and micro-fabrication, have led to the development of many new and powerful techniques for the experimental study of fluid flow. This book is a collection of 12 independent review articles, some covering very specific techniques, and others covering a broad range of techniques as applied to a specific class of flows. All of the articles are written by authorities who are at the leading edge of their topics. Five of the chapters deal with new methods of measuring velocity fields: titanium tetrachloride flow visualization by P. Freymuth, three-dimensional flow marking by R. Miles and D. Nosenchuck, particle tracing by M. Gharib and C. Willert, particle image velocimetry by L. Lourenco, A. Krothapalli, and C. Smith, and scanning laser Doppler velocimetry by R. Simpson. The state of the art in vorticity measurement is reviewed by J. Foss and J. Wallace, who present many results from recent studies. Techniques for measuring unsteady fluid flow properties on surfaces are described by P. Leehey (dynamic wall pressure), J. Haritonidis (wall shear stress), and T. Diller and D. Telonis (unsteady heat

transfer and skin friction). P. Weidman describes exhaustively the numerous methods used in studies of laboratory scale rotating flows, and E. Hendricks et al. review some of the fundamental types of experiments performed with drag-reducing polymers. (The first two pages of this article were missing from the specimen copy of the book.) Lastly, P. Dunn, V. Novick, and B. Schlenger discuss the measurement of aerosol properties, principally in the context of nuclear reactor test facilities.

Each of the articles is well written. The level of detail and thoroughness varies, but generally the chapters give good perspectives, sometimes contain new ideas that are not published elsewhere, and certainly include adequate references to lead the reader to more detailed treatments. In short, they are excellent starting places for investigators who are new to a field, and they also contain enough new information to make good reading for the well initiated.

R. J. Adrian
University of Illinois

Heat Transfer Reviews 1976-1986

E. R. G. Eckert, R. J. Goldstein, T. F. Irvine Jr., and J. P. Hartnett (eds.), Wiley, New York, 1990, 681 pp., \$125.00.

The faculty associated with the Heat Transfer Laboratory at the University of Minnesota has prepared annual reviews of the heat transfer literature since 1954, and these reviews have appeared in the *International Journal of Heat and Mass Transfer* for many years. Eleven of these annual reviews, from 1976 through 1986, have been collected and published as a single volume. *Heat Transfer Reviews 1976-1986* provides a very useful reference and an excellent summary of the literature over that period of time. The annual reviews for the period 1953 through 1975 have been collected and published by Pergamon Press as two volumes in the series *Progress in Heat and Mass Transfer*.

Two useful features of the reference are the comprehensive author and subject indices, which are consolidated for the 11-year period. The subject index permits the reader to trace the development of a particular heat transfer topic area. The author index is useful in following the work of individual researchers. It is interesting to note that over the period, the number of publications included

in the review has increased from 639 in 1976 to 1485 in 1986, more than doubling.

Each of the 11 annual reviews is extremely well organized, summarizing the major heat transfer conferences held during the year as well as other conferences that may have included some papers pertaining to heat transfer or related areas. Recipients of the Max Jakob and Donald Q. Kern Awards are identified, including the titles of their associated lectures. The titles of other invited lectures at these conferences are also noted. International workshops, research reviews, and seminars are discussed, and areas of specific emphasis are identified. In addition, heat transfer books published during the year are noted.

Trends and developments in heat transfer research occurring during the year are highlighted, with emphasis on growth areas in which there have been an increased number of publications. In each of the trend areas, there is a brief discussion of the theoretical, numerical, or experimental developments. The reference provides a

wealth of information for those interested in exploring new or related heat transfer areas.

In order to facilitate the use of each annual review, the heat transfer literature is categorized by general topic areas, using the same topic areas every year. These topics include conduction; channel flow; boundary-layer and external flows; flow with separated regions; heat transfer in porous media; experimental techniques and instrumentation; natural convection, external flows; convection from rotating surfaces; combined heat and mass transfer; change of phase, boiling; change of phase, combustion; change of phase, freezing and melting; radiation in participating media and surface radiation; numerical methods; transport properties; heat transfer applications, heat pipes and heat exchangers; heat transfer applications, general; solar energy; plasma heat transfer; and magnetohydrodynamics.

Each of the general topic areas is subdivided into specific subjects. For each of the publications in the subject area, the key technical contributions are identified, providing the reader with a brief overview of the research conducted during the year. At the end of each annual review, a bibliography by topic area is provided, giving a complete citation for each publication.

In summary, this volume will serve the heat transfer community as an excellent reference for both beginning and experienced heat transfer researchers. Readers will appreciate the authors' efforts in maintaining a consistent style for categorizing the literature and in developing the associated subject and author indices. This volume is recommended as an essential reference for the serious heat transfer researcher.

L. S. Fletcher
Texas A&M University

*Recommended Reading from the AIAA
Progress in Astronautics and Aeronautics Series . . .* 

Dynamics of Explosions and Dynamics of Reactive Systems, I and II

J. R. Bowen, J. C. Leyer, and R. I. Soloukhin, editors

Companion volumes, *Dynamics of Explosions* and *Dynamics of Reactive Systems, I and II*, cover new findings in the gasdynamics of flows associated with exothermic processing—the essential feature of detonation waves—and other, associated phenomena.

Dynamics of Explosions (volume 106) primarily concerns the interrelationship between the rate processes of energy deposition in a compressible medium and the concurrent nonsteady flow as it typically occurs in explosion phenomena. *Dynamics of Reactive Systems* (Volume 105, parts I and II) spans a broader area, encompassing the processes coupling the dynamics of fluid flow and molecular transformations in reactive media, occurring in any combustion system. The two volumes, in addition to embracing the usual topics of explosions, detonations, shock phenomena, and reactive flow, treat gasdynamic aspects of nonsteady flow in combustion, and the effects of turbulence and diagnostic techniques used to study combustion phenomena.

Dynamics of Explosions
1986 664 pp. illus., Hardback
ISBN 0-930403-15-0
AIAA Members \$54.95
Nonmembers \$92.95
Order Number V-106

Dynamics of Reactive Systems I and II
1986 900 pp. (2 vols.), illus. Hardback
ISBN 0-930403-14-2
AIAA Members \$86.95
Nonmembers \$135.00
Order Number V-105

TO ORDER: Write, Phone or FAX: AIAA c/o TASC0,
9 Jay Gould Ct., P.O. Box 753, Waldorf, MD 20604
Phone (301) 645-5643, Dept. 415 • FAX (301) 843-0159

Sales Tax: CA residents, 7%; DC, 6%. Add \$4.75 for shipping and handling of 1 to 4 books (Call for rates on higher quantities). Orders under \$50.00 must be prepaid. Foreign orders must be prepaid. Please allow 4 weeks for delivery. Prices are subject to change without notice. Returns will be accepted within 15 days.