

BOOK REVIEWS

Combustion Measurements, R. GOULARD. Hemisphere, New York (1976).

CONTRARY to outward appearances such as its title, index, form of the hard-back cover and inscription on its spine, etc., this volume is not a text book reviewing the subject but the proceedings—complete with discussions after papers—of a meeting in the Project SQUID series. The contents include, *inter alia*, contributions on: Combustion modelling; Measurement of combustion reaction kinetics; Combustor design; Optical measurements such as laser velocimetry, absorption-emission resonance techniques, scattering including Raman and Rayleigh measurements, interferometry including holography and two wave-length methods; Probe measurements in laminar and turbulent flows, Measurements on the size, concentration and velocity of particulates; and Reviews of the state of the art with recommendations for the future.

The editor ably discharged the unenviable task of collating some very heterogeneous material. The contributions vary in length from over 20 to under 2 pages and in presentation from the excellent to the droll. I thought the final "Review and Suggested Experiments", by Goulard, Miller and Bilger, a masterly and successful attempt at bringing forth order from chaos. There are several good accounts of novel diagnostic methods which one would have wished to see greatly expanded. The session on laser scattering measurements, for example, provides a very useful summary of the state of the art.

To discharge the reviewer's task honestly, one must comment on the other end of the spectrum also. There is one sad little article reviewing interferometry which never rises beyond the Mach-Zender interferometer or the six references, all due to the author and his students. The supposition that it must be intended as a review—and one for the totally uninitiated—is based on passages such as "Electromagnetic light travels in the form of wave trains. The change from bright to dark to bright is said to result in a *fringe shift* of one. Two fringe shifts occur when the path lengths differ by two λ ..." etc. Somewhat less entertaining are statements such as "The only early work known using interferometry was by Ross and El Wakil." The definition of "early" here is 1960 and it is a little saddening to anyone with a smattering of optical background to recollect Schardin's publication of Mach-Zender interferograms of flames in 1933. Even as regards his discovery of the limitations of two wave-length interferometry, the author was anticipated by well over a decade by L. H. Olsen in the Third Combustion Symposium.

However, parts of the discussion leave one in no doubt that the book is not intended for the reader with a background in optics. In support of this, I cannot resist quoting verbatim the following passage, concerning the use of laser velocimetry, from the spontaneously rendered and in places highly entertaining discussion: "But a person who has a good education, is intelligent and knows how to make measurements, can learn certainly within one year how to use this instrument". Could the training period be reduced somewhat, one wonders, if a small electric shock were administered whenever an error was made?

This is a collection of papers very diverse as regards presentation, length and quality, but all dealing with a subject of vital importance. That alone would motivate your reviewer to spread what light and happiness he could. If the outcome appears to lack a little in charity, it is due, in no small measure, to the price of the volume. Unlike earlier proceedings of the

Project Squid Workshops this one is on sale by Academic Press at £21.05! Far be it from me to suggest any such thing, but my electronic pocket calculator (which constantly compels me to invent problems for it to solve) informs me that the contents of the entire volume could be xeroxed for only 0.32072 times that amount.

FELIX WEINBERG

BHALCHANDRA V. KARLEKAR and ROBERT M. DESMOND, Engineering Heat Transfer. West, St. Paul, MN. 580 pp. Price \$19.95 (1977).

THIS text book, written primarily for use in undergraduate level courses, comprises eleven chapters, thirteen appendices on units and dimensions, conversion factors and property values, and finally an index. In addition, there is a separate manual of hand-written solutions to the problems found at the end of each chapter in the book.

Following an introduction to heat transfer, conduction, radiation and convection are dealt with in detail and in an orthodox manner. A comprehensive chapter on numerical methods in heat conduction follows the conduction section while a useful chapter entitled "Fluid flow background for convection heat transfer" precedes the sections on forced convection and natural convection. The last two chapters are concerned with fins and heat exchangers and heat transfer with change of phase.

I find this book of particular value for teaching purposes. The authors are clearly aware of the students' (and the teachers'!) needs, and the provision of worked sample problems and the complementary solutions manual in both the English engineering system of units and SI units must surely result in the book being widely used particularly in the academic field. (The tables of property values and other parameters using both systems of units will be helpful during the transition period from one system to the other.)

The "physical interpretation" aspect and the frequent reference to common experiences and real situations will assist the beginner before he encounters the mathematical analyses which are themselves very clearly presented.

On the whole there is a good balance in the academic content although I would like to have seen more on the Reynolds analogy and its extensions. The authors have made good use of the electrical analogue in this edition; they might also consider the inclusion of the similarity of heat transfer with mass transfer in future versions of their book.

"Engineering Heat Transfer" is a very worthwhile addition to the literature in this area of study. The publication is excellent and I shall have no hesitation in recommending the book to both students and professional colleagues.

H. BARROW
March, 1977.

JUI SHENG HSIEH, Principles of Thermodynamics, McGraw Hill, New York (1975), pp.xx & 512, £14.45.

I HAVE had great difficulty in deciding for whom this book is intended. It is undoubtedly, as the author states, a text book on classical thermodynamics for students who have already