Int. J. Heat Mass Transfer. Vol. 16. pp. 1823–1824. Pergamon Press 1973. Printed in Great Britain

BOOK REVIEWS

L. N. PERSEN, **Boundary Layer Theory.** 212 pp., Tapir, £3.30.

THE AIM of Professor Persen's book is to provide a simple introduction to the nature and analysis of boundary layers. It is a work written for the undergraduate in engineering and it is brief enough for its material to be taught in a single course. Indeed the book is even shorter than the number of pages suggests (212), since the large typeface and open layout rarely allow more than 300 words per page.

Of the nine chapters in the book four are concerned with providing appropriate mathematical expressions of the laws of momentum, mass-conservation and energy. One chapter is devoted to hydrodynamic solutions to laminar flow (similarity solutions and the Pohlhausen method) and two to the turbulent boundary layer. The latter treatment rests almost entirely on the notion that the mean velocity profile possesses a universal shape in $u^+ \sim y^+$ coordinates. The book ends with two chapters on heat transport through boundary layers, one each for laminar and turbulent flow; in these chapters the treatment parallels that of the hydrodynamic analyses. There is no index but this is compensated in part by a detailed list of contents.

Despite the author's claim that the book presents '[the] theory in the way it is usually done according to the latest papers in the field', only two of the 23 citations refer to works published in the last ten years. It is thus scarcely surprising if the book, especially in its treatment of turbulent flow, seems rather out of date. While the text is always understandable it frequently lacks the idiom that would condense a bulky sentence into a few words; the quotation from the preface above provides a typical example. There are numerous typographical mistakes in the text and though none that I found was serious (indeed as a member of the Heat Transfer Section at Imperial College I found 'D. B. Schlichting' a gem of unconscious humour) their presence undermines somewhat one's trust that the algebraic statements are without error.

The production of the book is disappointing in the standards attained. Photo offset reproduction from typed masters is now becoming increasingly popular as a means of keeping the price of books with low volume sales at reasonably modest levels. With due care, extremely satisfying results can be achieved by this process as evidenced by recent volumes from Academic and the MIT Press. In the case of the present work however the appearance of the pages is not visually attractive: where text and figures appear together their arrangement is often poor; many of the symbols are so faint as to be scarcely legible; and in several places the axes on figures employ lettering so small that some would find difficulty in reading them.

Perhaps the present book has evolved as something of a reaction to Professor Schlichting's well known reference work of the same name. Whilst Persen's '*Boundary Layer Theory* is indeed a more appropriate companion for a first course in the subject than Schlichting's, I believe that, unless cost is of overriding importance, teachers whose courses cover heat as well as momentum transport would prefer their students to dip into Kays' *Convective Heat and Mass Transfer* (McGraw-Hill) or *Heat Transfer* by Bayley, Owen and Turner (Nelson).

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Annual Review of Fluid Mechanics, Vol 4, 1972, edited by M. VAN DYKE, W. G. VINCENTI and J. V. WEHAUSEN. Annual Reviews, Inc., Palo Alto, California

This volume contains reviews by:

H. Villat, As luck would have it—a few mathematical reflections;
D. R. F. Harleman and K. D. Stolzenbach, Fluid mechanics of heat disposal from power generation;
D. L. Turcotte and E. R. Oxburgh, Mantle convection and the new global tectonics;
R. R. Long, Finite-amplitude disturbances in the flow of inviscid rotating and stratified fluids over obstacles;
T. L. Jahn and J. J. Vetta, Locomotion of protozoa;
P. H. Roberts and A. M. Soward, Magnetodynamics of the earth's core;
E. Becker, Chemically-reacting flows;
M. G. Hall, Vortex breakdown;
C. Hunter, Self-gravitating gaseous disks;
T. Y.-T. Wu, Cavity and wake flows;
G. I. Barenblatt and Y. B. Zeldovich, Self-similar solutions as intermediate asymptotics;
E. Berger and R. Wille, Periodic-flow phenomena;
D. P. Hoult, Oil spreading on the sea;
L. van Wijngaarden, One-dimensional flow of liquids containing small gas bubbles;
J. H. Milgram, Sailing vessels and sails;
H. Ashley and W. P. Rodden, Wing-body aerodynamic interactions;
L. N. Howard, Bounds on flow quantities.

Volume 4 follows the pattern of the earlier three in containing a selection of surveys of divers areas of fluid mechanics. Some are clearly expositions of scientific problems, whereas others are of engineering or technological interest. Those by Harleman and Stolzenbach, Becker, Hall, Wu, Barenblatt and Zeldovich, Berger and Wille, Hoult, Wijngaarden, Milgram, Ashley and Rodden, and Howard fall within the latter category. The approaches, however, vary from empirical to mathematical. The standard of

presentation is high, and serves to maintain or even enhance the high reputation of the series. This is not to say that there are no flaws, but rather that they are outweighed by the excellence here displayed.

This book should be in all engineering libraries, and on the shelves of practitioners of fluid mechanics. It will be of great value for some years to come.

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