

BOOK REVIEWS

Advances in Heat Transfer, Vol. 7, 8, 9. Edited by T. F. Irvine, Jr. and J. P. Hartnett. Academic Press, New York and London; Vol. 7 (1971), Vol. 8 (1972), Vol. 9 (1973).

NINE volumes of *Advances in Heat Transfer* have been published since 1964. Volumes 7 through 9 are the subject of this review, but a few remarks will be given first about the series as a whole.

Each volume contains between 4 and 6 articles of about 100 pages in length which, the editors assert, are "designed to fill the information gap between regularly scheduled journals and university level textbooks". The authors of the individual articles are usually well known research workers in their respective fields. Some are better suited than others to compose review pieces of the type published. The bulk of the authors are from the United States, but the rest of the world, particularly Eastern Europe, is also represented.

Most of the articles deal with fundamental, rather than applied topics, but all but two of the volumes have contained at least one article which I would term "applied". Volume 9 contains two such articles.

The field most frequently addressed has been thermal radiation, perhaps out of proportion to its importance (5 articles), while turbulent flows, including boundary layers, rank second with 4 articles. Only one article has appeared which can be considered to amount to a survey of heat transfer problems affecting a single field—it appeared in Volume 4 and relates to "Heat Transfer in Biotechnology". Three articles have appeared dealing explicitly with experimental methods, and at the risk of disclosing my own personal bias, I would like to suggest to the editors that they consider more such for future volumes. The remainder of the articles deal with a variety of topics. In no particular order, they include: mass transfer in boundary layers (3), natural convection (3), mathematical methods (3), boiling and condensation (3), multiphase flow (2), MHD and plasmas (2), high speed and low density flows (3), thermophysical properties (2) and channel flows (2). Topics which have merited only a single article include laminar boundary layers, non-Newtonian flow, liquid metal flows and unsteady flow phenomena. Combined effects have been dealt with occasionally as have current areas of interest such as heat pipes and thermosyphons and the effects of reduced gravity on heat transfer.

Research workers will find the *Advances* a useful starting point for their own research, since the state of the art up to about a year or two before the article appears is discussed and the references are current. The authors are usually deeply involved in the fields themselves and are familiar with reports, dissertations and publications which the casual investigator might overlook. Some of the articles appear to be more a survey of the authors own work than a comprehensive survey of the field but this is perhaps unavoidable given the nature of human emotion. Designers will find some of the articles useful and some not. In my view, the editors would be well advised to try to persuade future authors to address specific design problems and to write their articles in such a way that designers will find them easier to use.

The editors have prepared both Authors and Subject indexes. The latter should be helpful to users of the books and the former to readers who are interested to learn how often and in what context their own work has been cited (or not, as the case may be).

Volumes 7 through 9 deal largely with topics which have been discussed in earlier volumes and which, in most instances are old enough to be considered "classical". The single "new" technology (not to imply that significant advances haven't been made in many of the others) is discussed in Volume 7 in an article on heat pipes. The electrochemical method, a quite new technique for developing experimentally information on mass transfer coefficients is also described in Volume 7.

Volume 7 was published in May, 1971 whereas the latest article referenced was in early 1969. This fact may reflect the normal publication time lag, and if so indicates that the *Advances* are about as poorly off in that regard as most research journals.

Articles in Volumes 7-9 which deal with topics treated in earlier volumes are thermal radiation (Volume 7), natural convection (two articles, Volumes 8 and 9), mathematical methods (Volume 8), condensation (Volume 8), multiphase flow (Volume 8), turbulent boundary layers (Volume 8), cryogenics (Volume 9) and low density flows (Volume 7).

Individual articles appearing in Volumes 7 through 9 are listed below in the order in which they appear along with a brief description of the contents of each. The number of references is also given and the year in which the last one appeared. It should not be presumed, however, that the review is therefore complete up to that year, since in a number of instances only one or two references are cited for that year and those are often the authors own.

On the whole, the editors, Messrs. Irvine and Hartnett are to be congratulated on taking on and continuing the task of providing the heat transfer community with this series of volumes.

Contents and brief synopses

Volume 7

W. B. Hall, *Heat Transfer Near the Critical Point*. Discusses physical properties including the importance of their variation, equations of motion. Results in forced, free and combined convection and boiling. 57 references to 1969.

T. Mizushima, *The Electrochemical Method in Transport Phenomena*. Theory (brief), applications and results in which electrical current measurements yield mass transfer rates. 59 references to 1969.

G. S. Springer, *Heat Transfer in Rarefied Gases*. Free molecular and transitional flows, mostly external. Table of accommodation coefficients. 154 references to 1970.

E. R. F. Winter and W. O. Barsch, *The Heat Pipe*. Description of the phenomenon. Literature survey covering most aspects of heat pipes. 170 references to 1971.

R. J. Goldstein, *Film Cooling*. Primarily results of experimental studies. Both slots and single and multiple hole geometries. 72 references to 1970.