Int. J. Heat Mass Transfer. Vol. 14, pp. 1753–1754. Pergamon Press 1971. Printed in Great Britain

BOOK REVIEWS

U. GRIGULL and E. HAHNE (Eds.), **Progress in Heat and Mass Transfer,** Vol. I (Monograph series of the International Journal of Heat and Mass Transfer) Pergamon Press, 1969. Price £12 ($32.00) viii + 471 pp.

THIS is the first volume in a series instituted by this Journal to satisfy an urgent need. This arises from the acute pressure on the Journal's space and the Editors' understandable insistence on conciseness and brevity, which forces them, reluctantly, to refuse valuable, but lengthy, manuscripts that would suffer grievously from a drastic reduction in extent. I am not sure, however, that the solution adopted by the Editors and Publishers really solves the problem. The volume contains six unquestionably valuable but specialized monographs or doctoral theses. It is, therefore, unlikely that individual designers and research workers or specialized institutes will acquire this handsomely produced volume at the high price that must be charged in the circumstances. The hope is that enough libraries will put it on their shelves thus making the volume accessible to active workers if and when they need it. The circulation of the volume is further impeded by the fact that abstracting journals are not very likely to include detailed reviews, article by article, and one wonders how the word about its existence can be spread around. Perhaps a cheaper mode of publication, for example in the form of a research supplement patterned after the illustrious *Forschung auf dem Gebiete des Ingenieurwesens*, might provide a happier way out.

In order to bring the individual articles to the readers' closer attention, I reproduce here the Contents *in extenso*:

1. *Recommendations for the calculation of heat transfer to hydrogen, with particular reference to the design of cooled rocket motors*, H. BARROWS and W. D. MORRIS (Univ. of Liverpool) 54 pages.
2. *Precise determination of the thermal conductivity of helium gas at high pressures and moderate temperatures*, C. Y. HO and W. LEIDENFROST (Purdue University) 44 pages.
3. *Influence of mass injection of turbulent flows near walls*, E. BAKER (Pratt Institute) 96 pages.
4. *The influence of Prandtl number and surface roughness on the resistance of the laminar sublayer to momentum and heat transfer*, C. L. V. JAYATILLEKE (Imperial College) 138 pages.
5. *Survey and evaluation of techniques to augment convective heat and mass transfer*, ARTHUR E. BERGLES (Mass. Inst. of Technology) 94 pages.
6. *Optimal design of a natural-circulation boiling-water channel*, D. B. BANDY and S. G. BANKOFF (Northwestern University) 47 pages.

The first two contributions deal with correlations and measurements, respectively, of thermophysical properties. The third and fourth contributions concern themselves with turbulent flow. The last two contributions share the improvement of heat transfer as their common theme.

The praiseworthy characteristics of all six papers include a thoroughness and evident competence of the treatment as well as unusually extensive and very valuable literature references. Understandably, there is no common index. On the other hand, the papers have been, obviously, written over lengthy periods of time which, together with the publication (and review) delay, makes them somewhat dated in detail, though still indispensable for the right specialists.

The first paper correlates useful formulae for the calculation of heat transfer to hydrogen in all its forms and over a very large range of pressures and temperatures. The second paper describes the design of a very elaborate installation for the measurement of the thermal conductivity of fluids and reports them for helium over a modest range of temperatures and pressures. Both pairs of authors enter a plea for more, more precise, and more trustworthy measurements of thermophysical properties. It is, indeed, astonishing that this should be still necessary, but workers in this field know about it and are willing to make the effort given willing support. The other astonishing characteristic is the relatively minor role that statistical mechanics has so far played in reducing the need for directly measured data.

The third paper, like the second, is more in the nature of a research report even though it does include a good summary of past work, as one would expect from a doctoral thesis. More or less the same can be said about the fourth contribution, it being noted that both authors were research students under the supervision of Professor D. B. Spalding.

The fifth monograph gives a useful and thorough review of heat-transfer augmenters, including surface promoters (mechanical and chemical treatment), displaced promoters (flow disturbers away from surface), vortex flows, twisted-tape generators, vibration of the fluid or surface, electrostatic fields and various types of fluid additives.

The last paper addresses itself to the problem of optimization by the application of optimal control theory. In the problem treated, the heating section is fixed in volume and length, but the heat flux distribution and heater tube shape are optimized.

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S. V. PATANKAR and D. B. SPALDING, **Heat and Mass Transfer in Boundary Layers,** Second Edition. Intertext, London (1970).

THE INTERNATIONAL acclaim accorded to the first edition of this book has mandated a second edition which retains the proven basic approach but tightens the numerical developments, incorporates the experience gained over a three year period and extends the method to new problem