Int. J. Heat Mass Transfer. Vol. 22, pp. 1463–1464
Pergamon Press Ltd. 1979. Printed in Great Britain

BOOK REVIEWS

THOMAS K. SHERWOOD, ROBERT L. PIGFORD AND CHARLES R. WILKE, **Mass Transfer**, McGraw-Hill Kogakusha Limited, International Student Edition, Tokyo (1975). £8.10.

WELCOME indeed is the appearance in a student edition of this comprehensive work on mass transfer phenomena and principles. In some respects it is a third edition of the well-known book *Absorption and Extraction* by Sherwood and Pigford (second edition, McGraw-Hill, New York, 1952), the principal difference in emphasis being that the earlier book covered the design and performance of mass transfer equipment as well as theoretical principles. The authors have now, wisely, decided that the great increase in the literature on all aspects of mass transfer has made impossible any attempt to include in a single book a coverage in any depth of both the theoretical and practical aspects. So they concentrate mainly on a clear and thorough treatment of mass transfer phenomena and theories, although the last three chapters of the book are devoted to the application of these principles to design and give references to sources of design information. The earlier chapters are concerned with molecular and turbulent diffusion, mass transfer at phase boundaries and surfaces, simultaneous heat and mass transfer, and mass transfer with chemical reaction.

The theoretical treatment of mass transfer is mainly based on the solution of Fick's laws of diffusion for stagnant and moving layers, using eddy diffusivities in situations where turbulent conditions exist. A thorough coverage is provided of the principal mass transfer models developed prior to 1975, the original publication date of the hard-cover edition. Although little more could be added to the authors' treatment of mass transfer situations involving stagnant or laminar flow of Newtonian fluids, there have been recent developments in the study of mass transfer in turbulent flow situations and non-Newtonian fluids, so readers interested in these topics should also refer to the recent literature. The importance to mass transfer of interfacial turbulence and axial dispersion is clearly explained and, where possible, quantitatively treated. The references give a thorough coverage of the literature up to 1975 and a very welcome feature is the inclusion of a number of worked examples and original problems.

In their preface the authors state an intention to emphasise the engineering aspects of mass transfer. They have succeeded admirably in this attempt, and this book can be recommended to all students of chemical engineering and practicing engineers who wish to increase their understanding of mass transfer.

W. J. MCMANAMEY

IRVIN GLASSMAN, **Combustion.** Academic Press, New York.

TEACHERS of combustion have long complained about the lack of a suitable textbook to recommend to students. Most of the books published on the subject of combustion have been based upon research. Textbooks on combustion have been written by Spalding (1955), Foreman Williams (1965), Strehlow (1968), Gaydon (1970) and Kanury (1975). Each of these authors has faced the special difficulty in combustion of being heavily biased towards a particular speciality. Professor Glassman, from Princeton, has written a textbook, entitled *Combustion*, covering a very wide spectrum of the field, including chapters on Thermodynamics, Kinetics, Explosions, Detonation, Premixed and Diffusion Flames, Ignition, Emissions and Combustion of Coal. The book is based upon lecture notes written by Professor Glassman during his twenty years of teaching combustion at Princeton. Many of his former students now hold prominent positions in the teaching of combustion at universities in the United States. This, in itself, is an indication of the successful teaching which is now being passed on to a third generation.

After having read Professor Glassman's book, I am beginning to wonder if it is possible to produce a textbook on combustion which will satisfy other teachers of combustion who are working in different disciplines of the field. Professor Glassman is a specialist in kinetics and his treatment of the kinetic aspects of combustion is excellent. As an aerodynamicist with particular interest in turbulence, I find his treatment of these subjects unsatisfactory. Professor Glassman must be commended, however, for having made the attempt to cover the whole spectrum of combustion, which spreads from chemical kinetics, at one end, to turbulence.

Professor Glassman expresses himself very clearly and he is not afraid of being definitive. He has had many years of lecturing and teaching experience and has had sufficient feedback from his students and audience for him to be rated as a first-class teacher. His book provides a good mix between theoretical analysis and descriptive material. He has avoided sprinkling the book with empirical formulae; he has, rather, chosen to provide a range of selected topics in sufficient detail that the analysis can be followed by a student. Out of the 140 references cited, the majority are prior to 1960; the only chapter containing a significant number of references in the 1970's is Chapter 8, on Environmental Combustion. It should be noted that the "bible" of combustion, written by Lewis and von Elbe was published in 1961. It is apparent to me that Professor Glassman has chosen to concentrate heavily on the well-established aspects of combustion and has decided not to enter into the extensive development that has taken place in the subject of combustion during the past two decades. The book does contain a number of errors in the equations and text, which will cause confusion to students. This book has now become one of the most important textbooks and teaching aids to combustion. It will remain as a record of the great debt that combustion science and technology owes to the teachings of Professor Glassman.

NORMAN CHIGIER
Department of Chemical Engineering and Fuel Technology
University of Sheffield
Mappin St.
Sheffield SL 3JD
England