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BOOK REVIEWS

D. K. EDWARDS, V. E. DENNY and A. F. MILLS, **Transfer Processes, An Introduction to Diffusion, Convection and Radiation.** Second Edition, Hemisphere, Washington, 1979. 421 pp.

THIS book is another publication of the well-presented "Series in Thermal and Fluids Engineering", and is intended to be an inexpensive text for a first-level undergraduate course in transfer processes. In a field where the beginner frequently has difficulty in understanding the various concepts of the subject, there is clearly a need for textbooks that help the student in this direction. My review of the book material suggests that the authors have adequately met this purpose, and have produced a useful text for a 'first course' in heat and mass transfer.

The book covers the usual topics that one expects to find in an undergraduate Transfer Processes' text: introduction to transfer processes; one-dimensional heat conduction in stationary media; mass transfer (steady and transient diffusion, simultaneous diffusion and convection etc.); transfer of heat and momentum and mass in simple fluid flows; convective transfer rates, natural convection, boiling; thermal radiation; an introduction to turbulent flow theory; heat exchangers and regenerators; mass exchangers and interphase mass transfer.

The subjects are presented in a way that is not different from, or superior to, the popular texts now being used by universities. However, the text is superior to others in engineering content. Furthermore, the authors have presented examples, problems and useful tables in both English and SI units. This approach makes the book very practical in present curricula, for both the student and the instructor.

I appreciated the selection and presentation of the examples, emphasizing the engineering aspects of the transfer phenomena. All examples reflect the subject matter and relate to problems of current interest; spacecraft thermal control, ablation, and passive temperature control of a spacecraft at one astronomical unit from the sun, to mention but a few, are examples which will certainly increase the interest of both student and instructor alike!

The format, large type, and well-presented illustrations are all very good. Appendix A, presenting the 'conservation equations' is a good supplement to the book. There, the mathematical complexities are introduced for the first time, in a way that suggests to the student, who intends to specialize in the subject, what to expect. It would be worthwhile, however, if the authors were to include, in a third edition, more material on numerical methods for transfer processes (there is already a brief introduction to finite difference methods in heat conduction), since their appeal to solving engineering problems is ever increasing.

Finally, the merits of this book worth mentioning are the comprehensive series of tables of constants, conversion factors and properties (Appendix B), the working correlations presented throughout the book, and the list of References, which closes each chapter.

The authors are to be complimented on their work and I believe that the book will find its way on to many book shelves, furnishing the modern engineering student with a guide to the highly interesting field of transfer processes.

N. C. MARKATOS

J. M. COULSON and J. F. RICHARDSON, **Chemical Engineering Vol. 1** (Third edition). Pergamon Press, Oxford (1978). 449 pp. Price £20.00.

VOLUME 1, sub-titled "Fluid Flow, Heat Transfer and Mass Transfer", is one of a six volume series of which Vols 5 and 6 are still in preparation. Originally published in 1954, Vol. 1 is now in its third edition and appears with editorial assistance from J. R. Backhurst and J. H. Harker of the University of Newcastle-upon-Tyne. The most important single change in the current edition is the change to S.I. units.

Coulson and Richardson have produced a major addition to the somewhat limited field of university level chemical engineering texts. Twelve reprints or new editions between 1954 and 1978 demonstrates the continuing success of this book and the S.I. version has been awaited by students for a number of years.

The third edition also incorporates a number of changes; in the preface there is reference to the extension and modernisation of the chapter on Mass Transfer. Comparison with the 1954 edition shows, however, that there has been rewriting and modernization throughout the book. In one area, however, the latest edition might be improved. The authors, eminent in the teaching of chemical engineering, must be aware that some students have little practical knowledge of the form which some relatively common items of plant instruments take. The opportunity to maximise the impact of photographs has in some cases been missed. Photographs, such as Fig. 5.17 which shows Rotameters in cases, convey nothing to the student, perhaps through poor reproduction. Likewise there are other examples of catalogue type photographs, e.g. Fig. 11.10, 11.11 and 11.12 where a special purpose photograph could have conveyed so much more.

Each chapter of the book is concluded with a section "Further reading" and "References"; this is a feature which students find most valuable. Following the Appendix which contains useful Tables of Physical Properties there are a series of numerical problems.

Chemical Engineering Vol. 1 has been a great success and the current edition maintains the original high standard and deserves to extend the success story for some years to come.

W. D. ARMSTRONG

J. M. COULSON and J. F. RICHARDSON (Editors), **Chemical Engineering Vol. 4: Solutions to the Problems in Chemical Engineering Vol. 1,** by J. R. Backhurst and J. H. Harker. Pergamon Press, Oxford (1978). 207 pp. Price £10.50.

VOLUME 4, sub-titled "Solutions to the Problems in Volume 1", is a companion volume to the third edition of Vol. 1 reviewed above.

This book contains the fully worked solutions to over 180 problems which are given in Vol. 1. In the production of a student text of this type there is a problem in determining the extent of the detail which is given; students generally will find an outline of the solution adequate with arithmetical amplifi-

cation only for difficult or tricky points. It appears that the authors have found just about the right balance; in places they might be criticised for presenting slightly too much arithmetic but the extent of the detail necessary is a matter of personal choice. The authors are clear and lucid throughout in their explanations. It should be appreciated that Vol. 4 cannot be used fully without access to Vol. 1, since reference is made to equations in Vol. 1. A reader should also be aware that the number of questions allocated to each field of study is not necessarily indicative of the degree of difficulty encountered in mastering the particular subject. As an example there are no less than 63 problems in the field of Heat Transfer but only 18 in the Mass Transfer section. It is hoped that in a future revision of Vols 1 and 4 this imbalance might be corrected, along with the deletion of two duplicated questions.

Volume 4 is a welcome companion to Vol. 1 and will provide a much needed guide and assistance to many students.

W. D. ARMSTRONG