Int. J. Heat Mass Transfer. Vol. 26, No. 7, pp. 1105–1106, 1983
Pergamon Press Ltd. Printed in Great Britain

BOOK REVIEWS

F. W. SCHMIDT and A. J. WILLMOTT, **Thermal Energy Storage and Regeneration.** Hemisphere, 1981, 352 pp., $35.50.

THIS book covers the techniques and theories of storage of thermal energy in various matrices. It is written by two experts in their appropriate fields. The first four chapters are devoted to the single blow problem of gas passing continuously in one direction over a solid matrix. Solutions are given to various problems which can be applied to the control of drying or cooling of beds of grain, other foodstuffs and industrial granular or powder products. Among many applications considered are heat storage capabilities of particular constructions in buildings and thermal stores built into solar collectors. The latter and major part of the book deals with counterflow regenerators including finite conductivity and non-linear models. New concepts in the solution of the models using digital computers, parallel flow regenerators, heat storage exchangers and packed beds are discussed.

It is obvious to anybody who knows the research work of the two authors that Schmidt has written the first four chapters and Willmott the remaining ten; this is not only indicated by the content but there is a definite change in style. The book brings together the work published mainly by the authors and that of several other workers in the field. The work is presented in a coherent manner. It is easy to follow with equations, etc. numbered in such a manner that referral back when hunting for information is simple. The worked examples enable students and people new to the subject to test their knowledge as they progress through the book. As usual, the printing expenses have demanded several shortcomings in the presentation, many times the layout does not allow figures to be accompanied by the appropriate text. It would be much easier to read if there was a pull-out of the most important equations, thus preventing repeated referral to several pages.

Unfortunately, there are several omissions. The regenerator sections make no mention of their use in Stirling cycles and similar applications which produce refrigeration or power. There is no comparison anywhere in the book with practical devices. Perhaps the authors considered that these were too large a subject to be tackled in an already weighty book.

The book fills a void in the English language on a specialised subject which is rapidly growing in importance. There are some excellent texts on this subject written in German, mainly generated by Hansen. Although the topic is in a backwater of heat transfer, the book is to be recommended as it will introduce the reader to several important energy storage methods and mathematical techniques, both of which are in great demand today.

J. B. HARNESS
School of Chemical Engineering
University of Bradford
Bradford
West Yorkshire BD7 1DP, U.K.

N. P. LEONACHESCU, **Heat Transfer between Buildings and Soil.** Editura Tehnica, Bucharest, 1981 (in Romanian), 260 pp.

THIS book is dedicated to the study of the heat transfer by pure conduction between buildings and soil in the steady state. It is both a textbook for the civil engineering student interested in the energy-efficient conceptual design of buildings, and a handbook for the practising engineer. The book is organized in three main parts, depending on the relationship between a building and the adjacent soil:

buildings with the floor at ground level;
buildings partially buried in the ground;
buildings totally buried in the ground.

The book begins with a systematic treatment of the phenomenon of heat transfer through the soil, which may make contact with either the atmosphere or the underground water table. Next, specific solutions are developed for calculating the heat transfer in a wide variety of configurations, from buildings resting on top of the soil to underground pipes and storage houses. The book excels in the graphic presentation of results for engineering calculations: this information is condensed in 160 illustrations. In addition, the book contains many sample calculations as well as soil engineering data of general interest. On the theoretical side, Leonachescu's approach emphasizes the importance of visualizing the heat flow (heat flux lines) through the ground, hence, the importance of the *Leonachescu points* associated with the separation of the heat flux lines attracted by competing heat-sink effects.

This book distinguishes itself through its timeliness and its relevance to the development of new technology for the energy-efficient buildings of the future. It is recommended to the heat transfer engineer active in the field of energy conservation.

A. BEJAN
Department of Mechanical Engineering
University of Colorado
Boulder, CO 80309, U.S.A.

C. O. BENNETT and J. E. MYERS, **Momentum, Heat and Mass Transfer.** McGraw-Hill, 1982, 3rd edn., 832 pp.

THE FIRST edition of the book was published in 1962 and was considered, at that time, to be one of the best university textbooks on this subject for chemical engineering students. The appearance of a third edition is an indication of its undiminished popularity. It is, however, surprising how little this edition differs from the original volume. The most notable changes are the partial introduction of SI-units and an increase in the number of problems. The treatment remains unchanged and, although starting from very elementary concepts, a reasonable level is attained in fluid mechanics and heat transfer. The obvious gaps are a lack of any reference to two-phase flow in the former, and an inadequate treatment of heat transfer to boiling liquids in the latter. More attention could also have been given to condensation of a vapour from an inert gas as an example of simultaneous heat and mass transfer.

The part on mass transfer is uneven owing to the lack of a clear objective and a coherent development of a mass transfer concept. After a conventional introduction to diffusional and convective mass transfer, discussion shifts to unit operations based on mass transfer. Most of it is devoted to separation by equilibrium stages. As such calculations require only mass balances (occasionally also enthalpy balances) and the knowledge of equilibrium relations, it could be argued that they do not form a good illustration of application of the theory of mass transfer. For reasons of space, the treatment is too superficial anyway and some of the graphical techniques, e.g. the Ponchon–Savarit, are no longer in use. In my opinion, the value of the book would be enhanced if material, not based on mass fluxes, were left out and replaced by extended