

## BOOK REVIEWS

**Thermal Energy Storage**, Edited by E. G. KOVACH. Pergamon Press, Oxford (1977). 84 pp.

THIS short book is the report of a NATO Science Committee Conference held in March 1976 to discuss Thermal Energy Storage (TES). The preface tells us that the Science Committee Conferences are planned to focus attention on what is not known rather than what is known; the subject matter is deliberately limited to permit treatment in depth and that it is hoped that through intensive group discussion the invited participants will achieve a consensus view of past achievements and future prospects. It is therefore against these objectives and in this context that the book must be assessed.

Like all the products of consensus, it is unexciting; but then one does not look to committees for thrills: one looks to them for balanced judgement, arrived at by intensive debate on the basis of a variety of personal experiences. Unfortunately here one looks in vain for judgement. There are plenty of assertions of prejudice, most of which I share, such as that TES can have a large impact on future design of buildings; but there is no assessment of how cost-effective this would be or even whether it would be economic at all. Nor is there any suggestion of how much energy such installations would save or how big they would need to be.

In fact there can be no judgement of this nature because there is not one cost given. The prospects for Thermal Energy Storage depend on how much it will cost and how much it will save. Without this information a book which purports to be a "full examination of its (TES's) potential" cannot be read without a certain sense of unreality.

Moreover there is very little technical information in the book, on the constraints imposed by rates of heat transfer to and from the store or the extent of losses in store.

Finally, the very richness and extent of suggestions prevents any clear structure of thought emerging. Inevitably, with so many distinguished and fertile imaginations involved in the exercise, this danger was unavoidable, but when it comes to cast all this into a book for others, the attempt to get everything into the final text again inhibits any form of evaluation.

We have therefore a book of good ideas, but very little criticism—either formal criticism according to technical or economic criteria, or informal criticism depending on the value judgements of the participants or a ruthless editor. The book is, as a consequence, unsatisfactory.

That being said, one should add that it is nevertheless useful to have a succinct collection of so many good ideas. The book has value for that reason alone, but it does not achieve the high aims set for the conference.

NIGEL LUCAS

**Sun Power**, F. McVEIGH. Pergamon Press, Oxford (1977). 180 pp. Price £6.00

WITH the widespread recognition that our reserves of fossil fuel are limited, people all over the world are seeking ways and means of using solar energy. Professor McVeigh's book "Sun Power—an Introduction to the Applications of Solar Energy" gives the lay reader a concise overview of many possibilities for using solar energy in the future. The book emphasizes, however, thermal applications of solar energy for water heating, space heating, and thermal power, while other applications such as photo-voltaic cells, bio-conversion, photo-chemistry and wind power are treated only superficially.

For the general reader, the most interesting features of the book are the applications to space heating which are illustrated with diagrams and photographs of a number of homes in Europe and in the United States. However, the treatment of all topics is largely descriptive, and the person looking for assistance in design and analysis will not find this book sufficiently technical.

The author also introduces the reader to some of the economic implications of solar energy. In the section dealing with life cycle cost, the reader is cautioned that in the equations the term " $f_a$  defined as the annual inflation rate in the price of competitive energy", should not be inflation in the actual cost of competitive energy but, rather, the difference in the annual inflation rate of competitive energy sources minus the general inflation rate. If one were to use the actual inflation rate in the price of competitive energy, the solar option would have a more favorable economic projection in comparison with fossil or nuclear energy than is warranted.

The book is well organized, attractively illustrated and clearly written. It will be an enjoyable experience for the layman who wants to get an overview of solar energy and some of its applications in an evening of reading.

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**Heat-Transfer Calculations Using Finite Difference Equations**, DAVID R. CROFT and DAVID G. LILLEY. Applied Science, Barking (1977). 283 pp. Price £16.00.

THE APPEARANCE of yet another text on finite-difference methods would seem to need some special justification on grounds of originality or utility. In this book, which in spite of the title is concerned solely with conduction heat transfer, the authors emphasise the solution of practical problems without making any claims for originality in the techniques employed. To this end considerable space is devoted to computer solutions of the finite-difference equations, simple program listings and the consideration of miscellaneous problems. This is the most useful part of the book: advice on the selection of the most suitable solution method, combined with the detailed working out of problems, may well be helpful to the newcomer to the subject. The rest of the book is disappointing. The authors have collected together most of the standard methods with full acknowledgement to the original sources. Unfortunately there has been no gain in clarity in the rewriting and no serious attempt has been made at a critical evaluation of the methods presented. The rather confused structure of the book, which may be attributed to its origin as a series of lectures and its alleged emphasis on practical application, has resulted in some unnecessary repetition. The simple problem of transient, one-dimensional, heat conduction is dealt with three times while a review of iteration methods appears in two places in almost the same words.

It is not easy to identify the "widely acknowledged gap in the heat-transfer literature" which the authors claim to have filled with this work. As an introductory text it is inferior in every way to Smith's excellent monograph (G. D. Smith. *Numerical Solution of Partial Differential Equations*. Oxford University Press, Oxford, 1969). Practical engineers and research workers will find clearer and more detailed treatments in many of the works cited.

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