new edition has many new examples integrated into the text, obscuring the statement of principles, which is hardly different from before: The examples add some good physical chemistry (e.g., elementary gas-phase reactions) and physical organic chemistry (acid-base catalysis), but they lack industrial importance and are not optimally chosen for chemical engineers.

One sees in the third edition a glimmer of the contributions of chemical engineers to reaction kinetics. There is a recognition of the advantages of flow reactors in the laboratory, but still little appreciation of the concept of reaction rate or the basis for the "reactor design" equations. Modern computational methods of determining nonlinear rate equations from kinetics data are cited, but the rationale of the methods and guidance in their application are lacking.

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Biomass Conversion Processes for Energy and Fuels, Edited by Samir S. Sofer and Oskar R. Zaborsky, Plenum Press, 1981, 420 pages, price $49.50.

The past decade has seen an explosion of interest and government support in the area of synthetic fuel development. Much of this effort has been directed at gaseous and liquid fuels derived from coal and oil shale. The area of biomass while less prominent than coal and shale has also received considerable interest as a source of alternate energy. This book was written to be an introduction to the field of biomass conversion.

The book is organized in a logical manner of resource identification, conversion technology and economic considerations. This allows the reader to focus on those topics of individual interest without undue searching. The individual chapters are written as stand alone sections including an introduction and summary. The part of the book dealing with conversion processes brings together the main technologies of direct combustion, thermochemical processes and biochemical processes. Each of these areas includes a chapter on basic principals followed by chapters giving commercial or development applications. The authors should be credited with bringing together this diverse subject matter in a very cogent form.

The major inadequacy of this book is the ignoring of the most controversial aspect of biomass conversion: overall energy balance. Do these technologies produce fuels with more energy than is needed to produce them? While it was not the intent of the editors to deal with such topics, the ignoring of the topic was an oversight. The uninitiated reader may well be lead to false impressions of future potential for the field.

The question of product quality is generally overlooked when dealing with fuels production. It is, therefore, very difficult to derive meaningful economic assessments. The treatment of economics and product qualities (and potential markets) are the weakest parts of the book. Chemical engineers will find the material on energy balances, which appears in at least three parts of the book, rather elementary and repetitive. On the other hand the chapter on anaerobic digestion and methanogenesis is quite advanced for most engineers without a biochemical background. This unevenness in level of detail is inevitable in such a book.

The editors have succeeded in their objective of presenting an introductory text in a rather diverse area. It largely ignores, however, the controversial topic of overall energy balance which limits its usefulness. This book may well be an excellent reference for a senior design course and will serve as a good introduction to this field for the practicing engineer.

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Solar Heating and Cooling, Active and Passive Design, Second Edition, Jan F. Kreider and Frank Kreith, McGraw-Hill, 1982, 479 pages, price $29.95.

What a difference seven years can make! The first edition praised solar energy as the wave of the future. An optimistic claim was made that the USA could increase energy consumption by solar energy more cheaply than by other energy sources. In sharp contrast, the present edition declares, "Solar energy is expensive energy".

Early enthusiasts were prone to gloss over the two key drawbacks: sunshine is diffusive, and sunshine is intermittent. Collection and storage of the energy requires a lot of capital. This book gives an excellent treatment of the science and engineering of radiation collection and thermal storage. It concludes that solar energy is competitive with some conventional fuels in some parts of the USA. Photographs show four installations, including one for domestic hot water in author Kreith's condominium in Colorado.

This new edition has 140 pages more than the first, it uses smaller type and smaller margins, and thereby doubles the printed matter. New material is particularly rich in information on designing and sizing domestic hot water systems, solar-heated swimming pools, and passive and active space-heating systems. The careful, detailed cost calculations allow for interest rates up to 25%. The result is an interesting, readable, pragmatic book. It can be used as a college text, although no problems are given. It has value as a reference.

There are no photos for solar cooling. Solar cooling has not achieved success. An absorption system, for example with an aqueous solution of lithium bromide, could be used. Solar energy would be employed to drive off the absorbed water. The chapter on solar cooling also points out that a storage tank used to store solar energy during a heating season can also be used to "store cold" during a cooling season. This requires that the auxiliary heating and cooling system be a heat pump.

Brief sections are devoted to wind turbines, ocean thermal energy conversion, solar ponds, photovoltaic cells, wood stoves, legislation, and tax incentives. Excellent sun-path diagrams, insolation maps, and climatic data are provided.

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