

Biochemical Engineering, Second Edition, S. Aiba, A. E. Humphrey, and N. F. Millis, Academic Press, Inc., New York (1973). 434 pages \$28.50. Also publ. in English by Univ. Tokyo Press, Japan, 6000 yen.

Generally speaking, this well written book covers the application of the basic principles of biochemistry, microbiology, and chemical engineering for the production of biochemicals from microorganisms. Although the new field of study of biochemical engineering is in vogue among chemical engineering departments, Drs. Aiba, Humphrey, and Millis are the only authors to date to provide a text. This is primarily due to the very wide scope of biochemical engineering and the specialized background in the biological sciences as well as chemical engineering that is required. The reader should therefore not expect and, indeed, will not find a text that covers all the various topics in depth. The reader will find in this text an introduction to most of the areas of biochemical engineering.

The objective of the text is to "... provide the industrial worker with a useful source book ..." and "... to provide the biochemical engineering student with a logical scheme of approach to the subject." Upon reading the book I find it to be of value to any area of industry concerned with microorganisms, from waste treatment and foods to the pharmaceuticals and medical products.

The early chapters require some background in biochemistry and microbiology and cover the general topics of cell composition, metabolism, replication and control, enzyme kinetics, and continuous culture of single cells. Later chapters are more concerned with the engineering aspects and cover: agitation and aeration, scale-up, air and media sterilization, equipment design, instrumentation, and recovery of fermentation products. The final chapter is new and deals with immobilized enzymes.

There are a number of significant changes in the second edition. The first and most notable is the price. Although the first edition was reasonably priced at \$15.00 for 333 pages, the second edition is not so reasonably priced at \$28.50 for 434 pages. This makes the student think twice about buying the required text. The contents have been updated and expanded considerably. The new chapters include Translation of Laboratory Culture Results to Plant Operation, Equipment Design and Asepsis and Immobilized Enzymes. Other sections with major revisions are biological mechanisms of control, enzyme kinetics, and measurement and control of fermentation.

The chapter on Translation of Laboratory Culture Results to Plant Opera-

tion starts with an interesting and mostly descriptive treatment of the topic. Most of the chapter, however, is concerned with a mathematical analysis of oxygen transfer into and vapor transfer out of a shake flask through a porous plug.

The chapter on Equipment Design and Asepsis covers the special requirements of an aseptically operated fermentation reactor. Such topics as bearing assemblies, motor drives, aseptic seals and aseptic inoculation and operation are briefly discussed to provide practical solutions to the real problem of contamination. Much of this chapter is borrowed from Chapter 10 of the first edition.

The last chapter, Immobilized Enzymes, deals with immobilization techniques, kinetics, and practical applications of immobilized enzyme systems. Although this chapter is rather brief, it provides a good introduction for this topic.

In summary, although this text does not cover the various topics in depth, it provides a well written introduction to biochemical engineering. Furthermore, reference lists at the end of each chapter provide a means for the reader to extend his study of the subject matter. The authors are commended for making available an updated edition of this text to bioengineers and applied microbiologists.

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Processes for Major Addition-Type Plastics and Their Monomers, Lyle F. Albright, McGraw-Hill, New York (1974). 385 pages. \$22.50.

Aside from its lengthy title, this book will probably be best remembered as the one which tells it like it is, albeit awkwardly. About equal weight is given polyethylene, polypropylene, polyvinylchloride, and polystyrene polymerizations and their monomer processes. An important constraint to the potential reader is that only addition-type plastics processes are discussed, but this should not detract from its welcome appeal as a state of the art source on monomer synthesis. The author seems to belabor his concern about proprietary issues, but this text does let the sun shine in on an overly secretive industry. The almost total lack of substantive reference to vinyl copolymers and to styrene-based and ethenic elastomers will obviously restrict its potential utility.

Although it is suggested that this book can be used as an undergraduate, senior-level text for design purposes, it seems more appropriate as a textbook for process analysis rather than process synthesis situations. Even though liberally laced with references, about 100 per chapter and a goodly portion are patent citations, the rather unusual reference order suggests a last minute change in organization. Other production features include the unexplained or unitalicized use of "h" and "s" which appear to refer to hours and seconds. In sporadic instances, attempts are made to include metric and nonmetric units by parenthetical insert and this makes reading somewhat tedious. It may always be difficult to create a fact book which reads like *Gone With the Wind*, but this one could have been enhanced by use of a small superscript reference notation.

In spite of the several compositional and organizational shortcomings, this book is recommended as a much needed reference for the chemical engineer just entering the plastics industry and to the process design engineer who has not yet been caught up in the swirl of the "big four" of the plastics industry.

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ERRATA

In "Facilitated Transport via Carrier-Mediated Diffusion in Membranes: Part I. Mechanistic Aspects, Experimental Systems, and Characteristic Regimes" by J. S. Schultz, J. D. Goddard, and S. R. Suchdeo [20, 417 (1974)], the following corrections should be made:

In Figure 4b, τ_R should read τ_F .

In Table 6, the heading "S species" should be raised 3 lines and centered under title. Also the heading "F non-volatiles" should be moved 18 spaces to the left (centered above bracket).

On page 437, the 7th line before Equation (4.23) should read "... upstream concentration is increased while maintaining the downstream at zero is ...".

The 4th line in the Figure 9 legend should read γ instead of α .

On page 434, the 1st line from bottom should read "... model, open circles (Kreuzer ...) and the 2nd line from bottom should read "... III. Ward (1970b) analysis. IV Weak boundary ...".

On page 441, in the 7th line following Equation (5.19), delete "not".

Add the following to the Literature Cited: Nystrom, R. A., "Membrane Physiology," Prentice-Hall, Englewood Cliffs, N.J. (1973).