WHAT THEY'RE USING

Review by K. M. Kiser
Assistant Professor of Chemical Engineering
State University of New York at Buffalo

FUNDAMENTALS OF CHEMICAL REACTION ENGINEERING, by Walter Brotz; translation from German by D. A. Diener and J. A. Weaver; Addison-Wesley Publishing Company, Reading, Mass., 1965. 325 pages. $15.00.

It is stated in the translators' preface of this book that the book can be used at the senior or first-year-graduate level. Most seniors will in fact find it to be a rather sophisticated mathematical treatment not only of reaction engineering but also of some conventional unit operations as well. Though sophisticated, the mathematics are not beyond that to which current undergraduates are exposed.

Much of the material contained in the first 183 pages is not directly related to reaction engineering and will not be new to a fourth-year student. In the first 68 pages, the reader is taken through stoichiometry and thermodynamics and introduced to chemical kinetics and catalysis, the last two subjects in 24 succinct pages. Primarily these 183 pages contain a wealth of design information about fluidized beds, packed beds, and heat exchangers. Much of this information is very skillfully organized into tables and graphs. The text is short on theory but long on application.

The remaining 231 pages are concerned with various types of reactors and their design. The presentation is good. More emphasis is put on the derivation of the equations here than in the first section and this is as it should be. In keeping with the first part of the book, the heat and mass transfer aspects of reactor design are emphasized. The book should be of value to those wishing to bring themselves up to date on the subject of reaction engineering.

This reviewer attempted to use the book for a fourth-year, one-semester course covering applications of transport theories, including reactor design. The sections covering the conventional unit operations were well-received. Students found the charts and graphs particularly useful. Most disturbing to them was the lack of problems and a sufficient number of illustrative examples. While the symbols in the text have been properly "Americanized," the formulation of the equations is not always that of the more conventional texts. As a result, the students encountered some difficulty when problems were assigned from other texts. One final point: few undergraduate courses are so broadly based that this book can be used in its entirety. With the present curriculum at the State University of New York at Buffalo this reviewer probably would try to use it again.

For a first printing there are surprisingly few errors. To show that it is not perfect, however, the section on multiphase reactors (pp. 232-246) is singled out. Here signs are lost and notation is poor. For some reason the symbols for the mass transfer coefficients are changed from that introduced earlier (p. 108). Concepts like conversion are introduced for no apparent reason. More importantly, the development of the transfer coefficients on page 235 is at best misleading. Does the author (or do the translators) really mean k_{G_1} and k_{G_1} to be the film coefficients pertaining to the case of absorption without chemical reaction? Since no use is ever made of this concept the reader never finds out.