

BOOKS

Introduction to Chemical Process Technology by P. J. v. d. Berg and W. A. deJong, Delft University Press, D. Reidel Publishing Co., 1980, pp. 309, \$26.00.

The book provides an introductory and qualitative viewpoint of the overall chemical industry and a few, but far from complete, details of about ten chemical processes or products.

The best section of the book is on ammonia production covering almost 38 pages. In this section the authors qualitatively discuss the entire process of producing ammonia from methane; several factors affecting production rates, catalyst life, shift reactions, drying, methanation, etc., are discussed. Unfortunately, as is true throughout the book, the literature referenced was both few in number and old.

Production of unsaturated hydrocarbons, mainly ethylene, propylene, acetylene, and butadiene are superficially covered in 29 pages. The latest general reference was published in 1973, and it is obvious that much of the latest technology or thinking is not reported.

The chapter on monomers and polymers is limited to 21 pages. Several key, newer, developments of the last 5 to 10 years are not reported. The entire operation of a petroleum refinery is discussed in 44 pages. Various refinery steps include distillation, thermal cracking, catalytic cracking, catalytic reforming, hydrocracking, isomerization, alkylation, and polymerization. As was true in other sections, highly simplified chemical steps are shown but not really discussed.

Other chapters cover the production of inorganic acids (14 pages), fertilizers (17 pages), chlorine and caustic soda (17 pages), and chemicals produced by partial oxidation processes (46 pages). In the latter chapter, attention is given to production of acetaldehyde, acetic acid, cyclohexanol and adipic acid, benzoic acid and phenol, acetone, terephthalic acid, methanol, formaldehyde, ethylene oxide, acrylonitrile, acrolein, acrylic acid, phthalic anhydride, vinyl chloride, maleic anhydride, and propylene oxide; coverage is extremely short in all cases. Topics discussed in other chapters include raw materials, removal of carbon dioxide and hydrogen sulfide from industrial gases, and some energy and environmental problems.

Most American professors would find little or no use for this book in any chemical engineering courses except possibly at the freshmen level. The material covered in the book is in general better discussed in other books or in encyclopedias.

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Safety in Process Plant Design by G. L. Wells, John Wiley and Sons Inc., 276 pages, \$59.95.

The first two hundred pages of this book describe, in addition to risk and safety analysis methodologies and equipment codes and safety legislation, just about every safety problem one might encounter in a chemical plant—from clogged toilet bowls to nuclear blast protection. Obviously, this leaves little room for expanded coverage of any single topic. There is one paragraph on static electricity; only half a page is devoted to exothermic reactions; preliminary hazard analysis and failure modes and effects analysis are allotted two pages; formulas are presented uncritically without derivation and there are almost no example problems. Thankfully, there are copious literature references (about 300) so if the reader wants to learn more about static electricity or flammability, he is told where to look. The British engineer however will have a decided advantage in finding the references; much American literature, is not cited.

The book reads a bit like a condensed medical dictionary which lists various ailments, how to diagnose them, and what to do about them. Dr. Wells is a 'more-of, less-of', disciple of the Kletz-Gibson-Lawley I.C.I.* check-list, hazards-and-operability-study school, and the book is strongly oriented towards this qualitative approach, which has proven very difficult to implement in an American engineering environment. Dr. Wells' description of quantitative safety study techniques is often weak. As far as this book is concerned, computers do not exist. Only a few fault trees appear in the book; and in these the symbols are inconsistent and confused. No distinction is made between conditional and unconditional probabilities, and no mention is made of the increasingly popular parameter ENF, the expected number of failures. The formulas given for calculating demand rates on protective system and plant availability changes with storage tank are not rigorous: rigorous formulas appear in uncited American literature.

The next-to-last chapter is devoted to two, long, AIChE-student-contest type problems which demonstrate safety considerations in process analysis. The last chapter demonstrates how various check lists can be applied to the analysis of a piping and instrumentation diagram.

The author chooses to preface each chapter with one or more quotations by 'Murphy', or literary or political notables. Some of these pearls are only marginally appropriate. Chapter nine, for example, carries a quotation attributed to Leon Trotsky: "Ideas that enter the mind under fire re-

main there securely and forever." Leon Trotsky, I recall, died at the hands of a Spanish assassin in Coracão, Mexico with a pickax securely and forever imbedded in his cranium: the ultimate learning experience, I suppose.

Dr. Wells' offering is not suitable as a text because there are no homework problems, few example problems, and the theory is not adequately developed. It could however, be valuable to practicing engineers who want to know what to look for when they do a safety analysis.

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Waterborne Coatings: Emulsion and Water-Soluble Paints by Charles R. Martens, Van Nostrand Reinhold, October 1980, 316 Pages, \$22.50.

This is a one-volume reference that touches on all types of water-borne coatings. It covers raw materials, manufacture, formulation, testing, application and environmental regulations for these coatings.

Because of the very broad area covered, treatment of any individual topic is quite superficial. Because of this the book would have applicability to anyone seeking some familiarity with the coatings industry. This could include research and development personnel supplying the industry or those in sales or marketing dealing in the area. Anyone who has had organic chemistry can manage the most difficult parts.

The book is poorly laid out. There are several examples of text broken up by several pages of unrelated tables. Additionally, there are probably 100 or more typographical errors, which are annoying. The environmental section contains some complete errors all leading to the impression of a poorly-edited book.

As a review work for someone wanting a superficial fast look at the industry it is a satisfactory publication.

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ERRATA

In "On the Possible Existence of Concentration Stability Effects Within a Continuous Well-Mixed Reactor When a Solid Catalyzed Liquid to Gas Reaction Occurs" by Ian A. Webster [AIChE J., 27, 301 (1981)] Equation (1) should appear as follows:

$$\frac{\rho_i x_i}{\tau MS} - \frac{\rho_o x_o}{\tau MS} = r(x_o)$$

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