

BOOKS

Advances in Polymer Sciences and Engineering, K. D. Pae, D. R. Morrow, and Y. Chen (eds.), Plenum Press, New York (1972). 346 pages. \$19.50.

This book is a collection of 18 papers presented at the Symposium of Polymer Science and Engineering in October, 1972, at Rutgers University. Although the book has a rather fashionable title, *Advances in Polymer Sciences and Engineering*, readers with a chemical engineering background may be disappointed that a majority of the papers discuss polymer physics and morphology and that very few deal with the engineering aspects of polymeric materials. In other words, it would be fair to say that the title of the book is misleading to the extent that it totally lacks a presentation of recent advances in polymer engineering.

The book, however, contains several good papers which discuss in detail the surface morphology and crystalline structure of polymers in the solid state as affected by deformation and temperature. These papers assume that readers have some background in crystallography, x-ray diffraction, and electron microscopy. This book would be a helpful reference worth including in a library for polymer physicists as a collection of research monographs in the rapidly growing field of polymer sciences and engineering.

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Modern Petroleum Technology, 4th Edit., G. D. Hobson and W. Pohl, (ed.) John Wiley & Sons, New York (1973). 996 pages. \$45.00.

I can highly recommend this book to any engineer working in the petroleum or related industries. It covers the full breadth of the industry from exploration and production to transport and from refining to distribution in terms that one not well versed in the petroleum field can easily understand and yet covers the subject in such depth that a person with expertise in the field will find the book of great value. If one would own but one book on the industry which is both authoritative and encyclopedic, this would be it.

The early chapters discuss the oc-

currence and origin of oil and gas, geological structures, exploratory methods, drilling, production and recovery—each in highly technical detail. However, it is not necessary to be a geophysicist or petroleum engineer to understand it.

The next half dozen chapters cover the refining of oil to finished products. The operations of a refinery are covered in some detail from typical organizational structures to safety considerations and from tank farms to pollution control and maintenance. Many processes are discussed—from typical yields to hardware design. Some of the processes covered are distillation, thermal and catalytic cracking, visbreaking, coking, catalytic reforming, hydrodesulfurization, and alkylation. In addition, many finishing processes are covered including Merox sweetening, solvent extraction, dewaxing, and hydrofining. Petrochemical manufacture is covered in a separate chapter.

A list of some of the chapter titles in the rest of the book will give an indication of how thoroughly this book covers the petroleum industry, for example, petroleum gas, aviation fuels, motor gasoline, diesel engine fuels, domestic fuels, industrial fuels, lubricating oils, petroleum waxes, bitumen, automatic control and instrumentation, transport by pipeline, transport by sea, and transport by road and rail. Each subject is covered authoritatively and in depth.

This book is well written and should be in easy reach of anyone working in the petroleum industry. It would serve as a basic reference for answering questions about the industry.

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Chemical Engineers' Handbook, R. H. Perry and C. H. Chilton (eds.), McGraw-Hill, New York (1973). \$35.00.

The Fifth Edition of the *Chemical Engineers' Handbook* has now been published. Dedicated to the late Cecil H. Chilton, it is a fitting memorial to a man who devoted so much time and effort to this revision.

While handbooks of this type are never satisfactory replacements for well-written, specialized texts, they prove to be of invaluable assistance for a rapid perusal of an unfamiliar area and of most value for the collection of data and correlations that may be em-

ployed to solve so many diverse problems.

The latest edition is still surprisingly of manageable size and reasonable cost. It is exceptionally well indexed with many clear and simple plots or sketches. Those who were in charge of the individual sections are, in most instances, well-recognized experts in their fields.

No detailed review of the voluminous contents could even be contemplated and none will be attempted. Suffice it to say that this new Perry-Chilton Handbook is a superb, updated version of the Handbook chemical engineers have used for so long and so usefully.

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A Guide to Process Engineering with Economic Objective, G. L. Wells, John Wiley, New York (1973). 168 pages. \$10.75.

Professor Wells prepared this text for a second-year course in chemical engineering at Sheffield. His early introduction of economics is commendable, with some excellent examples of cost estimates and applied microeconomics. After some study, this reviewer found that there were perhaps some oversimplifications and almost superficialities in such introductory economics, as might be expected.

The book is well organized and well written, but definitely a guide as is indicated on the title page. It leans heavily on Rudd and Watson's *Strategy of Process Engineering* and includes examples for optimization by linear programming and dynamic programming. Apparently the intent is an early preparation for utilizing computer calculations for design, simulation, and process control.

The book may prove useful in stimulating an early interest in process engineering and related economics. Unfortunately, there are about two years of study in chemical engineering before an undergraduate is able to understand Chapter 6 on Process Charts. Hence, its shortcoming seems to lie in almost no treatment of the creative portions of process development and process design, which is to raise the question: How do chemical engineers proceed to develop and design a reactor and sep-

arating system for a new and unknown process to make a new and hopefully profitable product?

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π -Particulate Information, Particle Science and Technology Information Service, University of Technology, Loughborough, Leicestershire, England. \$43/yr.

π -Particulate Information is the only current awareness journal concentrating its coverage on the field of particle technology. Particle science and technology is concerned with the study of powders, particle dispersions in liquids and gases, etc., and the applications of the results of these studies to process operations. Some of the subject areas covered by π are particle size analysis, storage and handling of powders and granules, environmental control by air and water filtration, comminution, and granulation, etc. Consequently the scope of π ranges over many industries including chemical, pharmaceuticals, mining and mineral processing, environmental control, fertilizers, pigments, iron and steel, and atomic energy. Indeed it is the aim of π to bring discoveries and developments within one industry or discipline to the attention of others.

The contents of π result from the scanning of about 200 journals by the P.S.T.I.S. staff, and also cover British Patents, reports and books. These are backed up by various abstract services and cooperating members in Czechoslovakia, East and West Germany, Japan, South Africa, and Sweden. Over 300 references are collected for each issue and has reached 500 in the May, 1973, issue of π . A current list of forthcoming conferences, exhibitions, and short courses is also included. Computerization will enable the production of KWIC subject indices and author indices at least every six months.

π is issued monthly, for an annual subscription of £16 (\$43), and can be sent by airmail for an extra £5 (\$13.50). A composite subscription, which includes 3 copies of π per issue plus 8 hours of literature search time, is £40 (\$108), with £15 (\$40) for airmail delivery. A large proportion of the papers listed in π are stored by P.S.T.I.S., and photocopies can be supplied at a cost of 4p per page.

Sample copies of π can be obtained from Paul R. Foxcroft, Information Officer, Particle Science and Technology Information Service, University of Technology, Loughborough, Leicestershire, LE11 3TU, England.

Engine Emissions, George S. Springer and Donald J. Patterson (eds.), Plenum Press, New York-London (1973). 371 pages. \$28.50.

To the serious researcher in the field of emissions from transportation engines, *Engine Emissions* provides an excellent review of the state of the art (science) of the sources and mechanism of emission formation during the combustion processes in spark ignition, diesel, and aircraft engines. The relevant literature is extensively covered to illustrate the various experimental techniques and often conflicting results common to this area; in addition, the present and next generation of instrumentation and techniques for measur-

tate and Propylene" by R. D. Newman and J. M. Prausnitz [19, 704 (1973)], the retention volumes for solvent-polyisobutylene systems were incorrectly calculated as a result of a card-punching error in data reduction. The reported results are based on an erroneous polymer weight of 2.3218 g whereas the correct weight was 2.0995 g. Therefore the activity coefficients in Table 6 are too large by about 10% and the χ values are too large by about 0.1. A revised Table 6 is given here.

The results shown in Figure 5 are too high by about 10% and in Figure 6, the χ values for cyclohexane, *n*-hexane, toluene and benzene in polyisobutylene are about 0.1 unit too large.

TABLE 6 (REVISED). ACTIVITY COEFFICIENTS AT INFINITE DILUTION (WT. FRACTION) AND IN PARENTHESES, FLORY χ PARAMETERS FOR SOLVENTS IN POLYISOBUTYLENE $\Omega_1 \propto (\chi)$

Solvent	50°C	75°C	100°C	125°C	150°C
Benzene	5.93(0.72)	5.84(0.68)	5.75(0.64)	5.66(0.60)	5.56(0.56)
Toluene	5.30(0.60)	5.21(0.56)	5.12(0.55)	5.01(0.49)	4.91(0.45)
<i>n</i> -hexane	6.29(0.48)	6.44(0.47)	6.58(0.46)	6.72(0.45)	6.86(0.44)
Cyclohexane	4.56(0.33)	4.64(0.32)	4.72(0.32)	4.80(0.31)	4.88(0.30)

ing emissions are examined.

Engine Emissions gives the reader a view of the sophistication necessary to gain an insight into the fundamentals of this source of our air pollution problems. It is not easy reading and the average chemical engineer will need a great deal of persistence to digest the various chapters unless this happens to be his particular field of specialization. However, even for the relatively disinterested chemical engineer, selective reading in *Engine Emissions* will be informative and useful, if only for the reason that it very aptly indicates the complexity of characterizing and identifying emission sources—necessary information before we can proceed to their elimination.

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In "Vapor-Liquid Equilibrium Calculations for Concentrated Polymer Solutions" by D. C. Bonner and J. M. Prausnitz [19, 943 (1973)], several corrections should be made:

- Equation (5) should read

$$\frac{\tilde{p}_v}{\tilde{T}} = \frac{\tilde{v}^{1/3}}{\tilde{v}^{1/3} - 1} - \frac{1}{\tilde{v}\tilde{T}}$$

- Equation (6) should read

$$\tilde{T} = \frac{\tilde{v}^{1/3} - 1}{\tilde{v}^{4/3}}$$

- Equation (25) should read

$$\alpha \equiv 1/v \left(\frac{\partial v}{\partial T} \right)_p = \frac{3\tilde{v}^{1/3} - 3}{4T - 3\tilde{v}^{1/3}T}$$

- The middle curve in Figure 8 should be labeled $\Delta = 0.02$.

In "Catalytic Oxidation of Hydrogen Chloride in a Fluid Bed Reactor" by Shintaro Furusaki [19, 1009 (1973)], the ordinate in Figure 2 should read Rate $\times 10^3$ (mg mol/g-cat s).

In the Letter to the Editor from R. D. Gunn and C. J. King [19, 1285 (1973)], one reference is missing. It is: Gunn, R. D., and C. J. King, "Mass Transport Characteristics of Freeze-Dried Foods," *Chem. Eng. Progr. Symp. Ser. No. 108*, 67, 94 (1971).

ERRATA

In "Thermodynamics of Concentrated Polymer Solutions Containing Polyethylene, Polyisobutylene, and Copolymers of Ethylene with Vinyl Ace-