dergraduate courses. The last chapter of this book is devoted to a discussion of more complex problems. Although the examples used in this and other chapters are largely of metallurgical origin, they are nonetheless interesting and educational to chemical engineers.

Like many chemical engineering textbooks published in the last 15 years, there is an attempt to make the book self-contained by appending summaries of relevant mathematics used. But one wonders whether an appendix on matrix algebra is any longer necessary since the subject is now included in most undergraduate curricula. The appendix also contains a list of available optimization subroutines which many readers will undoubtedly find useful.

While some may pick faults with the rigor of the treatment, the emphasis on the problem-solving aspects of optimization has provided a unifying theme to the material covered. There is much to be said for this approach since most chemical engineers will be concerned with optimization only as the means to an end. Practicing engineers will find in this book a compact survey of process optimization, unencumbered by mathematical niceties. The perspective developed in this book would help them both to recognize problems and to communicate with experts. It is safe to predict that this book will stimulate a renewed interest and awareness of the potential in process optimization.

RICHARD S. H. MAH
NORTHWESTERN UNIVERSITY
EVANSTON, ILLINOIS 60201

The New Heat Transfer, Eugene F. Adiutori, The Ventuno Press, (1974). 230 + pages. $19.95.

You can't say that the author doesn't warn you. In the Preface: "It is neither a textbook nor a handbook. It is not intended to impress the reader with my erudition or to dumbfound him with mathematics."

No argument so far. Continue. "It is an attempt to describe the new heat transfer and its application to engineers and educators who are familiar with the old heat transfer. . . . Much of this book is at odds with what has been considered accomplished scientific fact for many decades."

So that's what it is: a Manifesto to overturn the Heat Transfer Establishment (HTE). Abolish the heat transfer coefficient! Exile dimensional analysis! Burn your log-log paper! Thus shall we come to the Promised Land, the new dispensation of wisdom, The New Heat Transfer (TNHT), and The New Engineering (TNE).

It is not for this reviewer to prejudge the future of the Revolution, nor have I much spare time or enthusiasm for defending the HTE. But it does seem to me that the author ought to have studied the battlefield and sharpened his weapons before offering battle. Let me offer one example from the process heat exchanger field. (I will let the film cooling and pool boiling HTE's defend their own turf.)

The author disposes of the heat transfer coefficient on the grounds that it is sometimes a function of the temperature difference. Truly, for some processes—nucleate boiling multicomponent condensation, etc.—h is not independent of ΔT. But for most important industrial processes—single and most two-phase forced convection, h is independent of ΔT, or nearly so. And when h's (and therefore the U) are constant, the design integral can be analytically evaluated, once and for all, for a given flow arrangement, giving us the Mean Temperature Difference (MTD) concept and the LMTD configuration correction factor charts.

But the author does not mention this—is he even aware of it? He writes the integral of the heat flux over the heat exchanger, but he does not give an example of how it is to be evaluated, not even a little old countercurrent double pipe. And there is no mention of the MTD.

And when U is not constant? Incredibly enough, the average heat exchanger designer long ago learned to use the technique of flux balancing if all else fails. [An early published example is Colburn and Hougen, *Ind. Eng. Chem.*, **26**, 1178 (1934).] Designers will commit all manner of outrages to avoid flux balancing if they can because it is tedious, and yet this is exactly what Mr. Adiutori would have us do always, on the grounds that it is simpler and more straight-forward. Incidentally, there is no mention of the use of a computer in this book; certain calculations are rejected as impossibly difficult which in fact are utterly trivial in this light.

Now let us admit that heat transfer people sin quite as often as anyone else. (It may be observed that no revolution to date has done much about that except change the definitions.) But the author reacts in a highly nonlinear way, forbidding in TNHT the use of many concepts and techniques of overwhelming value, simply because they are occasionally misused. (Savonarola?!)

Thus, the author rejects dimensional analysis for all because it has been misused by a few. He does not understand its basic validity and its power of generalization and in effect requires us to limit what we can design to what we have already built and tested.

The catalog of counter-arguments to this book could be extended much further, failing which Mr. Adiutori promises to write more books. His unconventional advertising techniques and his strident literary style guarantee that the HTE will not be able to avoid him entirely. However, the HTE has demonstrated its imperviousness to slings and barbs in the past, and I doubt that it will deign to do battle this time either (or even jostle itself into awareness that there might be one).

This, I submit, is unfortuate. Reading TNHT is not a particularly pleasant technical or literary experience, and it certainly didn't convince me of the error of my ways. But it did make me marshal arguments to dispute Mr. Adiutori. This led back to the basic structure of the heat transfer design process and made me a little more aware of how the pieces fit together. I think that is a useful experience for anyone (and a unique one for many) and one which is less likely to be achieved with a more conventional book. It is on this basis that I can recommend that the heat transfer engineer read some of Mr. Adiutori's book, particularly Chapters 1, 2, 3, and 6. Even Karl Marx couldn't ask for anything more than a fair hearing.

KENNETH J. BELL
OKLAHOMA STATE UNIVERSITY
STILLWATER, OKLAHOMA 74074

Chemical and Process Technology Encyclopedia, D. M. Considine, (Ed.), McGraw-Hill, New York (1974). 1261 pages. $35.00.

Given the current paper, energy, and money shortages, in the writer's opinion publication of this book represents a disservice to the nation and the world. It represents ample argument for requiring publishers to file an EIS justifying their desecration of forests and streams and adding to the pollution burden. The book aims to provide a "large portion of highly select information" conveniently and economically, which the writer interprets to mean a sort of poor man's Kirk-Othmer. The treatment of the select (whatever that means) information is at a level of sophistication well below the level of a graduate chemical engineer. It is likely that only in that context "the reader will find all the answers he is seeking within this one volume." As to "extensive reference lists, carefully culled for value," the writer's comments are (1) rare and (2) not by my standards.

The book's strong points? It's legible, paper is good quality, and it has more than 70 pages of index.

The book's weak points? As advertised, is not "a fundamental reference" to most "chemical, metallurgical, mechanical, and electronics engineers; physicists and other scientists; and such professionals as materials, product, plant, and design engineers." Its treatment of chemical engineering technology from absorption through water treatment is too elementary. Where it isn't elementary, it tends to be parochial; for example, distillation is treated from the control standpoint which isn't in itself bad, but it doesn't represent the whole subject. Definitely sixth-grade are "Plastics," "Petrochemical Complex," "Process Industries," "Process Plants, Packaged" and others.

As for chemical process technology, it's a question of emphasis. Some thirty or so rather rare elements from actinium through ytterbium are in total number of pages (more than 100) given greater coverage than industrially significant materials such as beer, butadiene, caprolactam, cement, phenol, phenolic resins, polyethylene, polystyrene, PVC, propylene oxide, urea, and zeolites. The reader has probably guessed that this vitriolic review has resulted from the writer finding his favorite subject, "Beer," treated only by six words under the heading "Pasteurization." As for you sophisticates, don't laugh; "Wine" gets the same treatment. And the teetotalers have nothing to be self righteous about; "Ice-cream" is in the same boat. Nitrogen compounds such as amines, amides, imides, amino acids, peptides, proteins, and pyridines are given coverage far out of proportion to the usefulness of the information to technically trained people in industry.

The organization of the subject matter is not what the writer would prefer. Separating Caustic and Chlorine. Rubber and Elastomers, Ethylene Oxide and Ethylene Glycol, Chlorination and Chlorine Organics, Paper and Pulping, Iron, Iron Ore, Iron and Steel, Iron and Steelmaking does not make for one-stop shopping.

Well, as the saying goes, beauty is in the eye of the beholder. Unfortunately, the writer is not sufficiently facile with words to paraphrase this saying so that it applies to reviewing a book, but hopefully, the reader will understand.

C. L. BECKER
M. W. KELLOGG CO.

Introduction to Organic Electrochemistry: Techniques and Applications In Organic Synthesis, M. R. Rifi and Frank G. Covitz, Marcel Dekker, New York (1974). VIII, 417 pages. $26.50.

This book is important for those interested in the electrochemical approach to making synthetic organic chemicals. It is a How-To-Do-It book, written by men well versed in the practice of what they teach, and an up-to-date Baedeker of the published literature on electro-organic chemistry. Aside from M. J. Allen's vestpocket sized *Organic Electrode Processes* (Rheinhold, New York, 1950), this is the first attempt to bring all the separate but relevant disciplines into unified focus and to forge the chain that is needed to proceed from an idea to an industrially viable process. The emphasis is on experimental techniques rather than electrochemical engineering, although the latter is by no means ignored.

Chapter 2 on Basic Principles is a gem. Not only are the formal aspects of the science clearly presented (an achievement, as regards electrode kinetics), but the effects of less publicized variables (agitation, leakage, additives, etc.) are clearly explained. Also, how controlled potential electrolysis, useful in sharpening selectivity of products in batch electrolysis, has to be abandoned in continuous, steady state electrolysis, where selectivity may be controlled by degree of conversion.

Chapter 3, on Apparatus and Techniques, is replete with detailed descriptions, diagrams, and even lists of supply houses where special equipment may be purchased. Special attention is given to materials of construction, selections of solvent and electrolyte, instrumentation, and the various kinds of voltammetry that are used to unravel electrode mechanisms. The practical problems of scale-up are nicely discussed.

The next two chapters are for the organic chemists. His reagents are electrons (as chemicals go, they are cheap, indeed). Chapter 4 deals with electron addition, that is, reduction at a cathode.

Chapter 5, deals with electron abstraction, that is, oxidation at an anode. The various kinds of oxidations that can be performed include the Kolbe reaction, oxidation of unsaturated compounds, anodic halogenation, and other miscellany.

The authors deserve kudos for including Chapter 6, Electroinitiated polymerization, and Chapter 7, Electrocoating, both of which are new and fast moving developments in the applied plastics industry. They, too, have made substantial contributions in these fields.

Another unique feature of this book is Appendix A, Questions and Answers (over 30 pages). This reviewer read the book first, with interest and pleasure. He then went through the Q and A bit, for a second helping of the same lively fare.

Appendix B, Glossary of terms, is very lucid, and Appendix C, Charts of Electrode Potentials, is obviously useful.

This book has an excellent author and subject index. The text is remarkably free from technical and typographical errors.

R. B. MACMULLIN
ASSOCIATE EMERITUS, RBMA
FELLOW, AIChE
MEMBER EMERITUS, ESC

ERRATA

In "Prediction of Diffusion Coefficients for Nonelectrolytes in Dilute Aqueous Solutions" by W. Hayduk and H. Laudie [**20**, 611 (1974)], the exponent for viscosity in Equation (4) was incorrectly printed as 1.4. Equation (4) should read:

$$D_{12} \frac{13.26(10^{-5})}{\mu_2^{1.14}\, V_1^{0.589}} \qquad (4)$$

W. HAYDUK

In "Pressure Drop and Holdup in Stratified Two-Phase Flow" by T. W. F. Russell, A. W. Etchells, R. H. Jensen, and P. J. Arruda [**20**, 664 (1974)], the second line of Equation (20) on page 666 should read:

$$+ \frac{H_A}{C_B D}(6\alpha - 2\alpha^3 - 6\beta \sin^{-1} \alpha) \qquad (22)$$

A. W. ETCHELLS

In "Gas Absorption by Non-Newtonian Liquids in Agitated Vessels" by J. F. Perez and O. C. Sandall [**20**, 770 (1974)], the figures and figure titles do not agree. The figure titles are in the proper order and the corrected figure order should be: 2, 4, 5, 1, 3.

Orville C. Sandall

In "Computation of Vapor Liquid Equilibria for Hydrogen and Light Hydrocarbon Systems" by S. P. Singh and P. K. Mukhopadhyay [**18**, 1171 (1972)] the following changes should be made:

1. Equation (19) is valid only up to $R = 2.4$. For $R > 2.4$, $l_{12}/P_a = 0.01$.
2. The ordinate on Figure 2 should be l_{12}/P_a.
3. In Equation (20), T is in °R.
4. Equations (21) and (22) yield only approximate values of P_a and T_a. For the estimation of phase equilibria, the P_a and T_a values in Tables 1 and 2 on page 1246 should be used.

P. K. MUKHOPADHYAY

(Continued on page 1246)