Technical Bookshelf

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The New Heat Transfer. By E. F. Adiutori. Pub. by, and order directly from, Ventuno Press, Box 40321, Cincinnati, OH 45240. 230 pages (no index). $19.95.

Reviewed by Otto Frank, Process Design Group Leader, Allied Chemical Corp.

The practicing chemical engineer looking for an up-to-date text dealing with applied heat transfer will be disappointed with Mr. Adiutori's book because it is not so much a textbook as a philosophical treatise expressing the author's personal point of view regarding engineering analysis in general, and heat transfer in particular. The concepts are frequently at odds with accepted principles and may therefore be in conflict with the procedures normally used for solving heat-transfer problems.

Those interested in buying the book would be well advised to preview its content by first reading two earlier articles published by the author ("New Theory of Thermal Stability in Boiling Systems," *Nucleonics*, **22,** No. 5 (1964), p. 92, and "Non-Linear Heat Transfer Phenomena," *British Chem. Eng.*, **10,** No. 12 (1965), p. 840). To a large extent, the present book is an elaboration of these papers. In it, with a considerable outpouring of purple prose and the use of carefully selected examples to make sweeping generalizations, the author tries to tear down the "old heat transfer" and simultaneously defend himself against all detractors.

His purpose is to demolish a series of sacred cows presently accepted by most members of the profession. As stated in the book's epilog, he tries no less than to ". . . . describe the shortcomings of the old heat transfer and erect the foundation and framework of the new heat flow. . . . .". Thus he suggests that:

- The use of heat-transfer coefficients be eliminated because they are not constant, are nonlinear, and are frequently a cofunction of ΔT.
- Boiling heat flux is not, as frequently defined, proportional to the third or fourth power of ΔT, but in case of nucleate boiling is basically a linear function.
- The application of dimensional analysis "clouds the mind," since dimensional numbers have no physical significance.
- "Because of its poor mathematical foundation," the old heat transfer cannot come to grips with dynamics and system stability.

Mr. Adiutori characterizes the nonlinear behavior of heat flow with the expression $q=f_1$ (system properties) f_2 (ΔT), which he insists will replace the established function $q=h\ \Delta T$. He also proposes to eliminate the concept of thermal conductivity by replacing Fourier's equation, $q=k(dt/dx)$, by $q=f_1$ (system properties) f_2 (dt/dx). While dismissing out of hand the use of heat-transfer coefficients, he offers no practical procedure for their replacement other than to state that the thermal behavior of a given system must be established empirically.

In the more-restricted area of coefficients dealing with change-of-phase heat transfer, the author's criticisms have some validity. Despite the claimed existence of a monolithic opposition to his concepts, there are suggestions in the literature that many correlations characterizing such coefficients are inconsistent, and that the definition of heat flux in terms of a ΔT power function may be unrealistic. Unfortunately, the examples in the text are presented in an extremely idealized form, dealing exclusively with pool boiling. Forced-convection boiling and condensation are dealt with in four and six lines, respectively.

It is obvious that the field of dynamics and stability most strongly attracts Mr. Adiutori's interest. He treats this subject in an essentially nonmechanistic fashion, mathematically establishing a criterion for stability and then using a graphical analysis to determine points of instability in a fluid or heat-flow system. It is an interesting procedure for dealing with a subject that he claims ". . . . is completely foreign to the old heat transfer." Again, his illustrative examples are restricted to an idealized pool-boiling system and at best only in-

dicate the possibilities for broad practical applications.

As stated by the author, the function of this, the first of three volumes, is primarily to outline the scope of the "new heat flow." Vol. II will deal with its application to research and development, and Vol. III with design/analysis. It is to be hoped that Mr. Adiutori will concentrate his efforts in enlarging the discussion of instability concepts, since this is the field in which he appears to be making the most original contribution.

Maintenance, Replacement and Reliability. By A.K.S. Jardine. Wiley, New York. 199 pages. $9.75.

Reviewed by F.A. Holland, Dept. of Chemical Engineering, University of Salford (U.K.).

This book discusses decision-making in the context of operating equipment. Although of primary interest to production, mechanical, quality and reliability engineers, it may also be of interest to those chemical engineers who feel that they need some instruction in how to build up mathematical models.

The book is largely composed of specific cases—such as (1) determination of the optimal replacement policy for two machines, one of which acts as a standby, when the operating cost of a machine increases with use, and (2) determination of the optimal number of workshop machines to meet a fluctuating workload.

While the volume is written to be self-contained for those with first-year college mathematics, the average chemical engineer would get a great deal more out of it if he had first taken a basic course in process-engineering economics.

The book is well written, and amply illustrated with simple and instructive diagrams. The mathematics have been kept as simple as possible within the context of a subject that academics have a tendency to treat in a highly mathematical way. Although this has meant the liberal use of simplifying assumptions, the author has taken great pains to spell these out. The more mathematically able reader can readily use the book to serve as a basis for further development.

In short, this good little book on a specialist topic provides a worthwhile contribution to knowledge. Similar books on other specialist topics over the whole spectrum of process engineering economics are needed, and one hopes that this work may inspire others to write them. There are no problems given in the text for the student to solve, so that a teacher would need to develop additional problems if he wished to use the book as the basis for a course. However, as a basis for introducing a teacher to a new area, the book is ideal.

How You Can Soundproof Your Home. By Paul Jensen and Glenn Sweitzer. Pub. by, and order directly from, Lexington Pub. Co., Lexington, Mass. 101 pages. $7.95.

Reviewed by Richard J. Peppin, Kodaras Acoustical Laboratories (Elmhurst, N.Y.), div. of Electrical Testing Laboratories, Inc.

Many people, whether apartment dwellers or home owners, are annoyed with noise produced from within the house by appliances, plumbing and ventilating equipment. Probably an equal number are annoyed with noise from their next-door neighbors, trains, aircraft and vehicular traffic.

With only textbooks on acoustics, or very specialized books on industrial noise, currently available, this book could fill a void in the literature.

The introduction and first two of the book's eight sections deal with the basics of noise and an evaluation of aircraft, highway and railroad noise at a particular site. Sections three through six cover noise control; section seven is a list of manufacturers of noise-control products, and section eight contains a list of suggested reading. The book is 8½″ x 11″, soft-covered, spiralbound, with much of each page devoted to illustrations, graphs or tables, and with too much empty space (somewhat overpriced at $7.95).

Ideally, from the book one could learn the fundamentals of acoustics and noise control, and hence be able to pick the proper technique or construction to make a home or apartment comfortably noisefree. However, anyone not familiar with basic acoustics and noise control (i.e., decibel addition, logarithmic plots, etc.) will find it practically impossible to interpret or use many of the figures in the first few sections.

In several of the figures, a decimal point is erroneously used in place of a

