BOOKS

Air Tables, D. P. Jordan and M. D. Mintz, McGraw-Hill, New York (1965). 797 pages, $17.50.

Fundamental to the analysis of one-dimensional compressible flow of a perfect gas is a set of relations which quantitatively sets forth relations between various states and flow parameters during the process. These have been well established, widely used and have been tabulated frequently. The present work represents a further and more exhaustive tabulation. The functions which are given are for the isentropic, the frictionless constant area, the adiabatic constant area, the isothermal, and the normal shock flow processes. These are given first for constant heat capacity values of 1.2, 1.3, 1.4, 1.5, 1.6, and 1.67 with the mach number as parameter where appropriate at interval and range 0 (0.01) 1.60 (0.02) 2.00 (0.05) 9.00. A second series gives the functions for air as undissociated real gas. Full account is taken of both variable heat capacity and gas imperfections. As background information taken from Bureau of Standards data, this is given for air compressibility, density, heat capacity, enthalopy, entropy, heat capacity ratio, velocity of sound, and inverse enthalopy and entropy (the latter two tables unfortunately having a minor error in labeling of quantities). The compressible flow functions for real air are organized into three sets of tables, the first and last as for the perfect gas, and the second for generalized flow processes including the other three. Each table is organized with mach number, stagnation pressure, and stagnation temperature as parameters. The range for these, subject to overall limits of available state data, are: mach number, 0 (0.01) 1.60 (0.02) 2.00 (0.05) 8.00; stagnation pressure, 0.10, 0.40, 0.70, 1.0, 4.0, 7.0, 10.0 *a* and *m*; and stagnation temperatures 200°, 300°, 400°, 500°, 700°, 1,000°, 1,500°, 2,000°, 2,500°K. These tables represent the most significant contributions of new data.

In the introduction there is briefly presented the basis for each table. In addition this is a comprehensive set of illustrative examples which demonstrate the full capability of the tables. All the data presented were developed by a high-speed digital computer. It is probable that most users will be individuals who will work with computers themselves and who would prefer some means whereby the task of transcribing tabular data to a computer could be simplified. The appearance of this extensive and valuable publication demonstrates again that the best methods of coping with the problem of data

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Communications to the Editor

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Mass transfer in a horizontal rotating cylinder with applications to the oxygenation of blood, Landino, Enrique, J. G. McCreary, W. A. Thompson, and J. E. Powers, **A.I.Ch.E. Journal, 12,** No. 1, p. 117 (January, 1966).

Key Words: A. Testing-8, Evaluating-8, Effectiveness-9, 8, 7, Performance-9, 8, 7, Feasibility-9, Operation-9, 8, Characteristics-9, 6, Dimensions-9, 6, Oxygenator-9, 10, Blood Oxygenator-9, 10, Rotating Cylinder-9, 10, Mass Transfer-4, 8, Oxygenation-4, 8, Absorption-4, 8, 10, Oxygen-1, 9, Blood-1, 5, Theory-10, Experiment-10, Equations-10, Calculations-10, Analysis-10, Theoretical-0.

Abstract: A horizontal rotating cylinder blood oxygenator has been developed. The formulation of a mathematical model to aid in the development of this apparatus is reported in this study. The theoretical model is used to evaluate the effectiveness of the oxygenator and to test the effects of cylinder dimensions and operating parameters on the performance of the oxygenator. Results of experimental tests of the oxygenator with a carbon dioxide-water system and one in vivo test on a dog are compared to the mathematical calculations.

Forced convection mass transfer: Part III. Increased mass transfer from a flat plate caused by the wake from cylinders located near the edge of the boundary layer, Thomas, David G., **A.I.Ch.E. Journal, 12,** No. 1, p. 124 (January, 1966).

Key Words: A. Mass Transfer-8,9,7, Convection-8,7, Forced-0, Naphthalene-1,9, Hydrocarbons-1,9, Boundary Layers-9, Laminar-0, Air-5, Wires-6,9, Cylinders-6,9, Promoters-6,9, Turbulence-6,9, Velocity-6, Spacing-6, Locations-6, Tollmein-Schlichting Waves-6, Rates-7, Wind Tunnel-10, Sublimation-10.

Abstract: Enhanced rates of mass transfer in the wake region behind detached cylindrical turbulence promoters were investigated with the naphthalene sublimation technique. The effects of the free stream velocity and the location of the cylinders relative to the flat plate mass transfer surface were observed. The differences between the rate of mass transfer behind one and behind two cylinders, possible effects of Tollmein–Schlichting waves, were also studied. These studies were conducted in a once-through wind tunnel.

Tracking function approach to practical stability and ultimate boundedness, Paradis, W. O., and D. D. Perlmutter, **A.I.Ch.E. Journal, 12,** No. 1, p. 130 (January, 1966).

Key Words: A. Stability-8,9, Practical Stability-8,9, Liapunov Stability-9,8, Asymptotic-0, Ultimate Boundedness-8,9, Systems-9, Independent-0, Chemical Process-9, Van der Pol Equation-9, Defining-8,4, Predicting-8,4, Testing-8,4, Analysis-8,4, Tracking Function Analysis-10,8, Tracking Functions-10,8, Liapunov Analysis-10,8, Isoclines-10, Limit Cycles-9.

Abstract: A graphical method of analysis is presented for studying the practical stability and ultimate boundedness of autonomous second-order systems. It is argued that these measures of stability are in many cases more germane to design than Liapunov stability. The method incorporates much of the geometric character of a Liapunov analysis, but it is shown that a Liapunov function, relatively difficult to obtain, can be replaced by a set of easily postulated scalar functions which collectively yield the required stability information. Examples which demonstrate the use and effectiveness of the method are given.

Free tear sheets of the information retrieval entries in this issue may be obtained by writing to the New York office.

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input to a computer, particularly thermodynamics and fluid mechanics data, have yet to be identified or even significantly investigated.

NEWMAN A. HALL
COMMISSION ON
ENGINEERING EDUCATION

Advances in Chemical Engineering, Thomas B. Drew, John W. Hoopes, Jr., and Theodore Vermeulen, Editors, Giles R. Cokelet, Assistant Editor. Academic Press, New York and London (1964). Volume 5. 317 pp, $14.00.

In common with the preceding volumes of this series, this book contains a series of separate articles on topics of current interest in chemical engineering. I think that the subjects have been well chosen and that the book should be valuable for anyone already working or starting to work in the fields considered.

Professor J. F. Wehner of the Department of Chemical Engineering at the University of Notre Dame has written the first article, "Flame Processes—Theoretical and Experimental." He is concerned principally with laminar, one-dimensional situations; turbulent and diffusion flames are not reviewed. Since flames are, in essence, integral, nonisothermal reactors, the interpretation of experimental results in terms of basic kinetics offers well-known difficulties. To introduce the subject, a review is given of the theory of the structure of one-dimensional laminar flames. Although some equations are given, the discussion is largely qualitative in nature. A succeeding section is devoted to the experimental determination of temperature and composition profiles. Here free radical concentrations inside a flame are shown graphically, and it seems to me that a little more description of possible ways these concentrations were measured would have been helpful.

The review on flame processes continues with a discussion of the stabilization of flames, ignition, and the transition to detonation. The last part of the article is descriptive and is concerned with the burning of solid propellants and chemical synthesis in flames. This last subject, which might interest many chemical engineers, is covered lightly.

"Bifunctional Catalysis" has been reviewed by J. H. Sinfelt of Esso Research and Engineering Company. This article is perhaps the one of most interest to the classical chemical engineer. The large amount of work which is necessary to obtain basic data on the kinetics of a moderately com-