

BOOK REVIEWS

Temperature Response Charts: P. J. SCHNEIDER. Wiley, New York, 1963, 153 pp. 58s.

TRANSIENT heat conduction calculations for engineering components frequently require the use of a computer because of the complicated body shapes and boundary conditions and the non-uniformity of the material properties. In order to obtain approximate values quickly in the preliminary design stages or to provide an order of magnitude check for numerical calculations it is convenient to use exact analytical solutions for simple body shapes with isotropic properties and idealized boundary conditions. This can be difficult: the analytical solutions are scattered throughout the literature, not all of which is easily accessible, and even these comparatively simple solutions may still require considerable calculation.

These two difficulties are greatly eased by Dr. Schneider's book *Temperature Response Charts*. The book is a collection of temperature-time charts obtained from some fifty exact solutions for a wide range of body shapes and boundary conditions. The charts are clearly reproduced and easily read being plotted in a consistent way with a common notation. The chart list, unfortunately, is inconvenient to use. It would be better if the primary classification of the charts was by body shape instead of boundary condition. But this is a small criticism; the book is a valuable source of data for anyone doing calculations in this field.

B. J. HILL

Einführung in die Trockentechnik. Translated into German by W. ULLMAN from the Russian text of G. K. FILONENKO and P. D. LEBEDEV, VEB Fachbuchverlag, Leipzig, 1960, 246 pp. 22 DM.

THIS introduction to the technology of drying consists of two parts. The first is concerned with the physics of the process, and deals with the definition and measurement of the properties of moist gases and solids and with the calculation of the rate of drying under simple circumstances. The second is devoted to a description of industrial processes and plant, including discussion of convective, contact, radiation and high-frequency drying.

The methods described for calculating the convective drying rate must be regarded as rather crude, when compared with modern knowledge of heat and mass as displayed, for example, in the present journal. Thus, dimensional formulae are given for the gas-side transfer coefficients which express the influence of gas velocity, but not the influences of the shape and size of the wetted surface. The calculations of heat and material balances on the other hand are described well and in detail,

extensive use being made of the enthalpy-composition diagrams. The treatment of the processes occurring within the moist porous solid is based on the work of Luikov, but the full mathematical theory is not given.

The second part of the book contains many line drawings of actual plant, together with data on their performance. Materials considered include: wood, leather, paper, textiles, lacquered wares and finely divided substances. A few examples of design procedures are included. There is some discussion of costs, but optimal-design procedures are not presented.

D. B. SPALDING

The Chemistry of Combustion Reactions: G. J. MINKOFF and C. G. H. TIPPER. Butterworths, London, 1962. 393 pp.

THE title of this book is an accurate mirror of its contents. It will not be of direct utility to those interested principally in heat transfer since chemical problems are the primary consideration. Radiation in flames is not discussed. A short discussion of elementary flame theories is given, but heat and mass transfer are not discussed explicitly. The only direct consideration of heat transfer is an elementary discussion with respect to thermocouple measurements. It does, however, offer one of the most complete and recent surveys of the literature of combustion.

Combustion is taken in the limited sense to include the exothermic reactions of oxygen with hydrogen, carbon and their compounds rather than the more general definition which includes all self-catalysed gas phase reactions. The treatment is readable and scholarly rather than pedantic. One has the impression of a review article rather than a text. The complexity of the material, however, may discourage the newcomer and outsider. The comments by the authors are often illuminating, but they have not been successful in integrating the material. This is unfortunate although considering the complexity of the material one could hardly expect the organization and clarity to approach Steacie's tour de force *Atomic and Free Radical Reactions*. The reviewer feels, however, that Steacie's book would have provided a good model for the present text.

The literature is surveyed with reasonable completeness through 1960 with scattered references as late as 1962. It will be of considerable use to students in the field. A reader will require some knowledge of basic physical chemistry and reaction kinetics as well as specialized information on chain branching and chain termination processes. The treatment is sufficiently detailed so that the results and methods are clear to the reader.

A fault in the treatment is the use of many meaningless equations abstracted from original texts to serve as illustrations. An example of this is the flame equations of Klein (p. 321) which are presented with no explanation of his method of successive approximations using integral equations and with no explanation of the meaning of the symbols. This confuses the uninitiated, irritates the careful reader, and wastes space which would be better devoted to a verbal explanation of the problem.

The reviewer found many points in his own speciality

(flame structure and reaction kinetics) with which he disagrees. More serious than this, however, is the failure to discuss the studies of elementary reactions which flame structure techniques have made possible. This is one of the few regions of combustion where such detail has been possible. Much of this work is recent, but significant studies by Wagner in Germany and Fenimore and Jones in this country which were published as early as 1959 are not mentioned.

R. M. FRISTROM