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BOOK REVIEWS

S. L. DIXON, **Thermodynamics of Turbomachinery** (3rd edition). Pergamon Press, Oxford (1978). 366 pp. Price $12.75 (flexi), $37.00 (case).

IN 250 pages of text and a further 100 of worked examples, the author provides a thorough account of the theory of turbomachine thermodynamics. Axial and radial machinery is analysed, together with cascade design and blading characteristics; cavitation and three-dimensional flows receive more detailed treatment than in earlier editions, and a list of symbols is now included.

The text contains few printing or grammatical errors although unattached participles (and confusion between p and ρ, and between singles and plurals) can be found, together with some mathematical slips such as that in equation (2.1) which defines mass flow. Generally, however, the book is both concise and clear which will greatly assist its use in education.

Using this book as an introduction to the state of the art, the reader might expect the author to have updated more of his references and included more new data. For example, in a reference to IFR gas turbines, "recent NASA design studies" prove to have been quoted in a paper dated 1959, and in several chapters it is difficult to find quoted work which is less than ten years old. However, since the book is more concerned with the essentials of turbomachine thermodynamics than with collation of recent data, these criticisms are of less importance.

The book should prove valuable to those students already having a grasp of thermodynamic fundamentals, and intending to specialize in turbomachinery. It is, however, essentially concerned with the latter and does not consider installation problems in much detail; even though the performance of a turbomachine cycle can be powerfully influenced by the characteristics of inlet and outlet components. Additionally the performance of turbomachinery at off-design conditions is of vital concern in many important applications and could perhaps have been given more space in the text. Within the constraints of its title, however, the book provides a coherent treatment of turbomachinery thermodynamics and, by concentration on this aspect, should provide third-year students and intending specialists with a firm grounding in the subject.

L. H. TOWNEND

A. M. A. REZK (Editor) **Heat and Fluid Flow in Power System Components.** Pergamon Press, Oxford (1979). £24.00 (U.S. price $55.00).

THIS book consists of a collection of 20 individual papers selected from a total of 170 which were presented at the Second Conference on Mechanical Power Engineering held at the Faculty of Engineering, Ain-Shams University, Cairo, Egypt, in September 1978. The reasons for the choice of the particular 20 papers included in this compilation are not quite clear, especially since it is stated in the Preface that all papers will appear in the conference proceedings. In spite of this apparent duplication of publication, the included papers do appear to be reasonably well written, of varying technical depth, and cover a relatively wide range of topics which are loosely grouped together under the books' stated title.

The papers are divided into three sections dealing with heat transfer in power system components, non-reactive (chemically) flows, and reactive flows, respectively. Papers in the first section primarily deal with the effects of various parameters upon the rate of heat transfer between solid surfaces and single or two-phase fluids, whereas papers in the second section are concerned with hydrodynamics in various geometries. The third section, consisting of just three papers, includes only combustion studies. The mix of papers encompasses the entire span of theoretical analysis to equipment performance, with a decided tilt towards the former. Some of the diverse topics included consist of forced convection heat transfer, condensation, film cooling, pool boiling, heat pipe performance, multi-pass heat exchangers, two-phase instabilities, turbine performance, impinging jet sprays, flame propagation and so on.

Individuals involved in basic research directed towards phenomenological understanding of power system components would find this book interesting. However, I do not feel that it would be a useful addition to one's personal library. University or corporate libraries may consider its purchase, especially if the complete conference proceedings are not available.

Argonne National Laboratory RALPH M. SINGER
Argonne, IL 60439, U.S.A.

FRANCIS G. SHINSKEY, **Energy Conservation Through Control.** Academic Press, New York (1978). £12.00.

IT IS well established, if insufficiently recognised, that improved control of energy intensive processes offers a prolific means of energy saving. Consequently a book on the subject, intended specifically for practising control engineers, is most welcome—especially when, as in the this case, the author is widely experienced in the field. At the same time, despite the title, it is not confined to either energy conservation or control, its essentially practical orientation ensuring that wider issues receive generous consideration, including such aspects as overall system design, economics, product quality and plant reliability.

Some indication of the scope of the book is provided by the chapter headings: Thermodynamics and Energy Conversion; Combustion Control Systems; Steam Plant Management; Compressor Control Systems; Refrigeration; Evaporation; Drying of Solids; Distillation; Heating, Ventilating and Air Conditioning. Excluding Chapter 1, which introduces the thermodynamic concepts of available work and irreversibility, each chapter reviews the basic features and characteristics of typical types of plant in the field in question, and goes on to deal with alternative control arrangements with particular (but by no means exclusive) reference to energy saving. Although the descriptions of plants will be of interest to those unfamiliar with them, and are notably comprehensive (the chapter on Heating, Ventilating and Air Conditioning, for example, includes both heat pumps and solar heating), it is in the treatment of control that the author's expertise really tells. Apart from his considerable practical knowledge of systems, his attention to detail is at times remarkable, extending not only to recommending suitable control parameters, but also to providing meticulous advice on instrumentation requirements. Herein undoub-