is usual in undergraduate heat transfer texts, the chapter on heat exchangers makes little or no mention of the calculation of pressure drops. Although, as the author says, 'heat-exchanger design is a professional problem', it is not difficult to make students aware of the importance of pressure-drop calculations by including a few worked examples and problems. Heat exchangers provide an excellent illustration of the use of the Reynolds analogy: heat transfer and pressure drop are intimately related.

Despite the above criticisms, Professor White's book is well written, attractively set out, and it includes many useful diagrams and photographs. It is well worth recommending to students, although some supplementation would be necessary to ensure a well-balanced diet.

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ARTHUR H. LEFEBVRE, **Gas Turbine Combustion**, Hemisphere Publishing Corp., 1983, $38.50, 531 pp.

TEXTBOOKS on gas turbine combustion are very rare and therefore this book fills a long-felt demand from university teachers as well as from researchers and practicing engineers.

The subject of combustion embraces a wide variety of processes and phenomena and there are a large number of books and journal articles written on combustion in general. The situation is not so good for the particular field of gas turbine combustion because no good textbook has been available, although there is plenty of literature written in that field. Courses in gas turbine combustion are given by many universities both as regular courses and short courses suitable for advanced training of engineers. Such courses are commonly used also by the gas turbine industries for their advanced education. Lefebvre's book is an outgrowth of the short courses given at Cranfield Institute of Technology in England and at Purdue University in United States as well as of his many years teaching and consulting in the combustion field. The material in the book is well balanced and is suitable for educational purposes as well as for reference.

The book has eleven chapters. The first discusses the main performance requirements and basic design features, types, and arrangements of combustors. Chapter 2 deals with combustion fundamentals, and Chapters 3 and 4 cover design and performance of conical, two-dimensional, and annular diffusers, relationship between size and pressure loss, pattern factor, hole discharge coefficients, and many other topics.

Chapters 5–7 deal with such key aspects of combustion performance as high combustion efficiency, flame stability, ignition theory, and ignition performance. Chapter 8 is devoted to heat transfer including wall cooling techniques for application to advanced technology engines. Chapters 9 and 10 treat fuel, fuel injection, and the impact of alternative and synthetic fuels on combustor design and performance. Mechanisms of atomization and means to measure and characterize drop sizes are discussed as well as practical methods of achieving a well atomized spray. The last chapter discusses combustion-generated pollution. Pollutant formation, reduction and design of low-emission combustors are reviewed, including the development of variable geometry, multistage, and lean, premixed/pre-evaporated combustors.

The book is well written and contains the appropriate formulas and relationships necessary for design and performance-prediction of gas turbine combustors. Each chapter ends with a complete list of references. SI units are used as the basic system, but occasionally both SI and British units are quoted.

Both aircraft and industrial combustion chambers are considered but the aircraft type clearly dominates. The book can, however, be recommended for use when designing both types of combustors and should certainly be on the reference shelves for all engaged in design and development of gas turbine combustors.

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