the book represents a major contribution to the literature in this area and deserves space on the bookshelf of any worker in this and related fields.

Prof. Peter Salamon
Department of Mathematical and Computer Sciences
San Diego State University
5300 Campanile Drive, CA 92182-7720
USA

PII: S1385-8947(00)00185-6

Fundamentals of equilibrium and steady-state thermodynamics

Nicholas W. Tschoegl, Elsevier Science BV, 2000, 266 pp, US$ 183.50 (hardback), ISBN 0 444 50426 5

Teaching thermodynamics is a challenge. Normally a lecture is based on the students' experience and knowledge of elementary mechanics and physics. On this basis, the concepts of thermodynamics are introduced and the laws of thermodynamics and its consequences seem to follow naturally. Therefore, the logical structure of thermodynamics is often hidden behind the empirical knowledge. To clarify the theoretical concepts, it is useful to review such elementary courses in the light of clear postulates. Tschoegl did this in an advanced course at the California Institute of Technology. The material presented there has now been worked over, resulting in this book.

In this respect, thermodynamics can be compared to geometry. Almost everybody knows the elementary operations in geometry, but it has been a long and tedious process to put all the properties of the Euclidian geometry on an axiomatic basis. The main difficulty is to distinguish between what we know from experience and what we know proven from the postulates.

Nicholas Tschoegl has tried the same for steady-state and equilibrium thermodynamics: to put the logical structure (axiomatic or postulatory basis) in the centre of the presentation. Therefore, the book is structured into paragraphs comparable to theorems, lemmas or statements in a mathematical textbook. These paragraphs contain either a thermodynamic statement, its derivation from the postulates, or comments and applications. These paragraphs were grouped into chapters and the chapters were grouped into three parts (Equilibrium Thermodynamics, Steady-State Thermodynamics and Appendices).

The basis of the book are the definitions and the postulates as described above. Every statement is proven or at least explained in terms of these definitions and postulates. Of course it is not done so strictly and rigorously as in a textbook about axiomatic geometry, but the logical structure comes out clearly. However, more care should have been taken with the proper formulation of the definitions (for example, on page 7, 1.13 reversible process: "A reversible process is conducted ... in such a manner that the system and its surroundings are restored to their initial state". Obviously the word 'are' should be replaced by 'can be', and on page 4, 1.4: "Work is the transfer energy to the microscopically observable co-ordinates of motion". Energy is not transferred to co-ordinates; it is transferred to the system, resulting in a change of co-ordinates). Moreover, the term 'observable' is not defined. Therefore, in this 'postulatory' approach, former experience and the logical structure have again been mixed and not clearly separated. Consequently the goal of the book is only partially met.

Nevertheless, the other parts of the book, where the author follows more or less the usual arguments of thermodynamics, are very appealing and clearly written. It can be used very easily as the basis of an advanced course about the principles.

The book is attractive to everybody who is interested in the theoretical foundations of thermodynamics and especially to lecturers of elementary and advanced courses.

Prof. Herbert Steinrueck
Institute of Fluid Dynamics and Heat Transfer
University of Technology Vienna
Wiedner Hauptstrasse 7
A-1040 Wien
Austria

PII: S1385-8947(00)00186-8