

## Review of the book

J. D. Lewins, *Thermodynamics: Frontiers and Foundations*, 2009, 441 pp.

This is a rare book, a masterpiece that speaks loudly of the beauty and “life” in thermodynamics. Jeffery Lewins has made a major contribution by offering us this treatise at a time when many think that thermodynamics is mature and derisory. The many are wrong, because they were poorly taught. With Jeffery Lewins’ book in hand they have a chance to finally learn the truth, about thermodynamics and especially the great impact that this science is having on our affluence and civilization.

Lewins’ book delights the reader with erudition, wit, art and history. There are real individuals and human events behind the laws, concepts and formulae of thermodynamics. Lewins teaches where this science and language came from, and in what sequence. Each chapter ends with the biographical sketches of the main names and what they did for the science and technology of power from fire as opposed to power from animals and slaves.

The book presents the discipline in a very clear (sharp) direction, from foundations to ... other foundations on contemporary frontiers. It starts with the laws (zeroth, first, second and third) and continues with fundamentals of engineering thermodynamics (e.g. power, refrigeration, cycles, efficiencies, availability, exergy, entropy generation) and the fundamentals of equilibrium and chemical thermodynamics (maximum entropy, minimum energy, thermodynamic functions and surfaces).

The presentation is designed for maximum effect in teaching. The ideal gas model is used early and extensively, because it is simple and familiar. Real fluids, surface tension, bubbles, drops and mixtures come later. More specialized fields such as radiation and statistical thermodynamics complete the treatment and give this book its monumental stature.

*Outposts of the empire* is the chapter where the frontiers—the battles and the hopes—are outlined as an open invitation to come, to play, to do something original. This chapter is a *tour de force* of the most active domains today: thermoelectricity, irreversible thermodynamics, endo-reversible thermodynamics, and the constructal law of design in nature.

Above everything stands the fact that this book is highly original. It is an account of Jeffery Lewins’ distinguished career at the University of Cambridge. His contributions to practically all sectors of thermodynamics are used as illustrations throughout this book, for example, his theories on bubbles, drops, thermoelectricity and the vortex tube.

Art and beauty resonate throughout the book, from the highly original book cover, to the drawing with the horse who knows the difference between the stable and the metastable!

The University of Cambridge has been a leading “school” in the history of thermodynamics. To the names of Hawthorne, Pippard, Denbigh and Haywood, we now add Jeffery Lewins.

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