

## BOOK REVIEWS

*An Engineer Rebels Against Dimensional Analysis*  
EUGENE F. ADIUTORI: *The New Heat Transfer*  
Second Edition. Ventuno Press, West Chester, Ohio, USA, 1989

The introducing three sentences of the preface tell us everything on the intention of the author. They read:

*"This book describes a new engineering science based on the simple idea that: Engineering sciences should be founded on free form description of behavior, using fundamental parameters such as temperature, pressure, heat flux, flow rate, volts stress.*

*They should have NOTHING TO DO with contrived parameters such as electrical resistance, heat transfer coefficient, friction factor, elastic modulus."*

These three sentences are the motto of the whole long book.

Part 1 contains a heavy attack against heat transfer coefficient, thermal conductivity, radiative emissivity, moreover, against dimensional consistency, group parameters, power laws and log log graph paper. It suggests that all classical "Laws" (Ohm's law, Fourier's law, etc.) describing material behavior should be abandoned because they are not of general validity. It states that the formula

$$y = f(x)$$

is exactly the same as

$$y = Hx$$

if  $H$  may depend on  $x$ , moreover, the latter is misleading as it appears to state that  $y$  is proportional to  $x$ .

The reader can wonder at the antipathy towards the old ideas that have proved useful for long. The numerical examples presented in the book make the reasons clear.

The refuted ideas are really impotent regarding the problems of free thermal convection and in the field of pool boiling of which the author is, probably, an expert.

These old ideas, accompanied by poor education, can prevent an engineer from working with success in the above fields.

Part 2 bears the title "The New Electrical Science". It deals with a little part of electricity only. The ideas presented in Part 1 are shifted to very simple electric networks consisting of resistors and, at most, one non-linear two-pole element, say a thermistor. Series-connected and parallel-connected devices are the most complicated situations mentioned. The proposed replacement for inductance and capacitance is naive and the reader has to know considerably more on electricity than the author to understand anything in a correct way.

Part 3 gives a short review of how the "old sciences" were generated and how to generate "New Thermal Science".

Part 4 discusses the main features of the literature reporting experiments. Here, Mr. Adiutori complains that the contrived and group parameters, the reduced data, prevents the reader of a paper reporting experiments from knowing anything of what really was measured.

At this point Mr. Adiutori is quite right. It is often so and his anger against the obstacles is reasonable. The example used in this Part is film cooling.

The last part of the book deals with pool boiling. One can learn what the difficulties were and are when studying the so-called pool boiling curve. Thermal stability is discussed repeatedly.

Pool boiling is an important practical problem, with which science has a lot of difficulties. We do not know the details of the physical processes playing the important roles in pool boiling. We do not know the fundamental differential equations that should be the basis for constructing really useful nondimensional parameters. And yet, the dimensional analysis pretends being successful. This may be the starting point of Mr. Adiutori's thinking. It is obvious from the book that he has an inventive mind and is a skilful engineer, and refuses everything not useful enough in his special field.

The book as a whole resembles winding stairs. The ideas are presented repeatedly. Some pearls of the discussions make the book valuable but, I think, they are not worth the time needed for reading more than four hundred pages.

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