

[Gallery: G Prathap](#)



Science for the MTVers

What you need to know and where to find it



Imagine trying to convince a young person, brought up on a diet of MTV and ESPN that science matters. The most successful people at the turn of this century (among them, notably, Madonna, the many Michaels - Jackson (MTV), Jordan (ESPN) and Johnson (ESPN)) did not need science in a personally enabling way to get there. Yet it is science, and technology, that delivers them to the living room, in a global village, amplifying and distorting them in proportions grotesque to their relative abilities to improve the physical quality of life. The Whittles and von Ohains are so easily forgotten.

This book is a sincere attempt to convey the principles of science to the MTV generations - from teenagers to baby-boomers alike - in a simple and sometimes simplistic way, always avoiding subtlety. Madonna fans should have no difficulty in following the thread of presentation here.

From Absolute zero (p28) to the Z particle (p126,128), lucid and compressed, almost telegraphic, explanations are offered, with the underlying scientific principles shown to be simple, but of crucial importance, both for unifying the understanding of the universe and for the making of the modern world, through technology.

The book is divided into 18 chapters, with the introductory chapter outlining the epistemological confidence that the universe might be complex but is regular and based on simple principles which are knowable and thereby making it predictable. This deterministic view is upheld throughout, with only minor concessions to the notion of chaos, and little is said regarding complexity, self-organisation, and so on. The epilogue closes the book on the optimistic note that science "gives us a means to predict the consequences of our actions and perhaps, with wisdom, to save us from ourselves."

The universal laws and organising principles governing matter, energy, forces and motion are presented clearly . Matter in every form, from the atom and its sub-atomic constituents to the galactic dust is discussed along with the new-fangled forms of engineered materials. The four fundamental forces and fields are linked to the mechanism of the universe. The various conservation laws are stated clearly. Two chapters describe the restless earth and the various oceanic and atmospheric cycles. Four chapters unravel the miracle of life; the operating principles of natural selection and the transmission through genetic codes and the ladder-like connection from the fundamental molecular units to the ecosystem of the biosphere are nicely brought out.

No book, written on the "What you need to know and where to find it"

This book is a sincere attempt to convey the principles of science to the MTV generations; Madonna fans should have no difficulty in following the thread of presentation here.

As an aerospace structural engineer, I immediately noticed that extremal-action principles, which play a defining role in aerospace development, have been omitted from the narrative.

A compelling case is made out that science really does matter because of the way it has altered our daily lives. A cynic may add, lifting us from

formula can be complete without a discussion on any of the following issues: acid rain, genetic engineering, Green House Effect, mass extinctions, ozone depletion and the Ozone Hole. The scientific components behind these issues are treated in a balanced and responsible way. The Law of Unintended Consequences is neatly brought out here: that in complex systems (eco as well as socio-economic), it is not possible to predict what the consequences of any change will be - small changes can have devastating effects while huge changes can leave the system largely unruffled.

As an aerospace structural engineer who has found that extremal-action principles play a defining role in the development of his discipline, I noticed its omission immediately. No effort was made to demonstrate that the underlying laws of the physical world are governed by a preference for economy which can be summed up by extremisation or optimum principles. Perhaps, it was felt that one need not know these principles at this elementary expository level.

A very useful bibliography recommending additional reading material is organised chapter-wise and appears at the back of the book.

A compelling case is made out that science really does matter because of the way it has altered our daily lives. A cynic may add, lifting us from pain, drudgery and boredom but giving us a lot of things we don't need to buy and offering persuasive dream merchants the reach through the miracle media (print and electronic) to make us spend money we have not got - virtual dreams and virtual reality. Such is the trap that Socrates, Buddha and Gandhi warned us about.

Hazen and Trefil's book is informative, written in a very accessible way and draws many commonplace analogies and metaphors. Both have had excellent track records as scientists doing original research as well as being outstanding communicators of popular science. The Universities Press Edition of this book, which was issued originally in 1991, at a very affordable prize is a must for every home and every school and college library.

Gangan Prathap

This review first appeared in *Current Science*

pain, drudgery and boredom but giving us a lot of things we don't need to buy and offering persuasive dream merchants the reach through the miracle media (print and electronic) to make us spend money we have not got - virtual dreams and virtual reality. Such is the trap that Socrates, Buddha and Gandhi warned us about.

[| About NAL |](#) | [| Review of Wings of Fire |](#) | [| Review of Science Matters |](#) | [| Research Assessment at NAL |](#) | [| The FEPACS saga |](#) | [| Who's Afraid of Research Assessment? |](#)
[| CET Watch 2004 |](#) | [| K A V Pandalai - An Obituary |](#) | [| P N Shankar's columns |](#) | [| Review of Imagined Worlds |](#) | [| The Dharma of Science |](#) | [| Home |](#)
[| Please send us your reaction |](#) | [| Write to G Prathap |](#)

posted on 9 April 1999