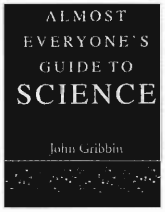
Almost Everyone's Guide to Science: The Universe, Life and Everything

G Venkataraman



Almost Everyone's Guide to Science: The Universe, Life and Everything
John Gribbin (with Mary Gribbin)
Universities Press
p. 232, Rs.190, 1999.

John Gribbin is an astronomer turned popular science writer with a large number of books to his credit. The title of the book under review might suggest that it is some kind of a dictionary or encyclopaedia, but it is not. Rather, it is an attempt to give a broad-brush explanation of the whole of science in a language that everyone would understand. In twelve chapters and about two hundred and odd pages, the author takes the reader through a tour of physics, chemistry, molecular biology, evolution, geology, climatology and even cosmology! Clearly an ambitious programme, but Gribbin does it reasonably well.

The chapters go as follows: 1. Atoms and Elements 2. Inside the Atom 3. Particles and Fields 4. Chemistry 5. Molecules of Life 6. Evolution 7. Our Changing Planet 8. Winds of Change 9. The Sun and its Family 10. The Lives of Stars and 11. The Large and the Small. There is a short introductory chapter that deals with the philosophy and the methodology of science, the bottom line being that if a model or theory disagrees with experiment, it is wrong.

The author starts from the 'small' and progresses to the 'big'. The first three chapters are devoted to physics and the reader is told about atoms, their internal structure, the behaviour of atoms in the aggregate, nuclear structure, quarks and the fields that govern the four basic forces. Chemistry comes next and is presented as quantum mechanics in action. Bonding and structure form the main focus and this paves the way for a description of bio-molecules leading on naturally to a discussion of evolution both at the macro and the molecular levels. Thereafter it is geology, the science of weather, the solar system, the birth and death of stars and finally the cosmos itself with emphasis on the birth and the subsequent expansion of the Universe, as also the relationship between elementary particles on the one hand and the early Universe on the other.

Now for some comments. The book is addressed to a general audience and therefore belongs to the category of popular science. As the author puts it, "I [normally] write [a] book ... that I wish somebody else had written for me so that I would not have to go to the trouble of finding out things for myself. This time I am writing for everybody else in the hope that there will be something here for everyone to enjoy." The book is certainly interesting and well written. Scientific explanations are elegantly simplified without sacrificing basic accuracy. I liked, for example, the way inter-atomic attraction and renormalisation are discussed. There is a fair sprinkling of anecdotes, which adds interest for the reader. Moreover, since the whole of the Universe is the canvas, the author is able to link diverse topics like, for example, the

influence of the changing climate on evolution. Thus the reader is able to get a broad overview of the Universe rather than compartmentalised descriptions.

As far as our students are concerned, given the declining standards of English, I am not sure if they would be comfortable with this book, barring perhaps the IIT-types. Though it is supposed to be popular science, the reader has to think, absorb, and digest. If the student is accustomed to this sort of reading, then she or he would cetainly benefit from this book as it would promote a broad and comprehensive view of science, very necessary even if one wants to specialise.

In one important respect this book left me rather disappointed and that is the total absence of illustrations. I can understand a book on mathematics not carrying any figures but a book of this sort, especially in this day and age when one can do wonders with graphics? To sum up, the book is good and well written but it sort of lacks the sparkle of Gamow.

The production values are excellent and the publisher deserves to be complimented.

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Science and Hypothesis

N Mukunda

Science and Hypothesis
H Poincaré
Dover Publications
(1952)

Jules Henri Poincaré was one of the most profound thinkers of the late 19th and very early 20th century. Apart from his path-breaking work in many areas of mathematics, he was also deeply involved with the physics of his day, and made lasting contributions to celestial mechanics, optics and electrodynamics. His collection of essays titled "*La science et l'hypothese*" was published in French in 1902, and its English translation appeared in 1905. It has long been a classic of the literature of science, covering some areas of mathematics and physics of that period.

Poincaré divides his thirteen chapters into four major parts respectively titled 'Number and Magnitude', 'Space', 'Force' and 'Nature'. While the first two parts devoted mainly to arithmetic and geometry retain their value to this day, the last two parts dealing with physics are understandably out of date on account of the great progress that has taken place over the past century. In his penetrating logical analysis of the arithmetical operations and the meaning of magnitude, Poincaré brings out the key role of the method of proof by induction. He expresses beautifully, as only a master can, the true spirit behind mathematical thinking: it is the form, not the matter, that is of the essence; and relations between objects, not the objects themselves, are of the greatest concern. His extremely close touch with physics seems reflected in the statement: "The mind only uses its creative faculty when experiment requires it".

When he turns to geometry the situation is rather different. As against the essentially