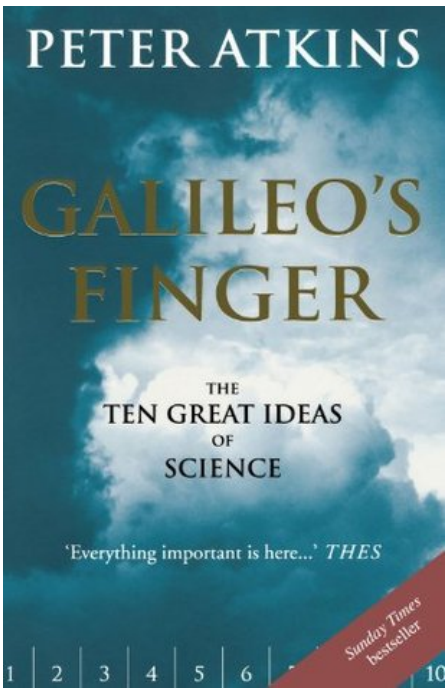

Galileo's Finger: The Ten Great Ideas of Science

Peter Atkins

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Galileo's Finger: The Ten Great Ideas of Science

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Galileo's Finger: The Ten Great Ideas of Science Peter Atkins
Why *Galileo's* finger? Galileo, one of whose fingers is preserved in a vessel displayed in Florence, provided much of the impetus for modern science, pointing the way out of medieval ignorance. In this brilliant account of the central ideas of contemporary science, Peter Atkins celebrates the effectiveness of Galileo's symbolic finger for revealing the nature of our universe, our world, and ourselves.
Galileo's Finger takes the reader on an extraordinary journey that embraces the ten central ideas of current science. "By a great idea," writes Peter Atkins, "I mean a simple concept of great reach, an acorn of an idea that ramifies into a great oak tree of application, a spider of an idea that can spin a great web and draw in a feast of explanation and elucidation." With wit, charm, and patience, Atkins leads the reader to an understanding of the essence of the whole of science, from evolution and the emergence of complexity, to entropy, the spring of all change in the universe; from energy, the universalization of accountancy, to symmetry, the quantification of beauty; and from cosmology, the globalization of reality, to spacetime, the arena of all action.
"My intention is for us to travel to the high ridges of science," Atkins tells us. "As the journey progresses and I lead you carefully to the summit of understanding, you will experience the deep joy of illumination that science alone provides."
Galileo's Finger breaks new ground in communicating science to the general reader. Here are the essential ideas of today's science, explained in magical prose.

Galileo's Finger: The Ten Great Ideas of Science Details

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From Reader Review Galileo's Finger: The Ten Great Ideas of Science for online ebook

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Itsbecka says

I like this one, but it may be a little much for some. P. Atkins is a famous author/editor of Physical Chemistry textbooks (if that's a hint). He writes well, but it can be dry. I'd suggest the Bill Bryson instead.

Bill Bogert says

Before I read this book, I did not grasp the beauty of science, always preferred meaning to non-meaning. This book changed all that.

Peter says

The hardcover edition that I'm reading has a different jacket design and contains 380 pages. On page 18, I have: "Brains are great consumers of energy, and it is a good idea to get rid of your brain when you discover you have no further need of it." and it may be appropriate to confirm to what extent the book is a part of a cartography experiment being carried out by the publishers; the quotation certainly sounds like a trafficking operation backed by God's Bankers (as indeed does the first paragraph of Chapter five). The frontispiece contains an image the reader is given to understand to be the middle finger of Galileo's right hand, and, as such, it might be appropriate to consider what the significance of the phallic symbolism of this image would be as well as the concept of Adam's rib more generally to explain an (acutely, by modern standards) incomplete understanding of individual and collective behavio(u)r from the time before Darwin was born (some of the themes are introduced from the end of p33; the author may consider some of the answers to be mysterious-p36). To what extent might a decent elaboration be able to include the reasons why the oldest profession is called the oldest profession, and why the second oldest profession is called the second oldest profession? What else may be generally relevant in this context? The reader is informed on page 25 that natural selection is an arms race: arrangements have been developed and implemented to grapple with, and mediate, alternative offerings of what the meaning is of the word is. There's a lot going on on page 37 (and indeed on p39, p41-3, p51 and p248) that needs to be unpacked, de-convoluted and worked through carefully, especially the significance of those floating packets of text in inverted commas not quoting direct speech. What interpretation should be put (on p38) on: "...there was a view that Africa was an inappropriate location for the cradle of mankind; England was much preferred, the Home Counties preferably but the West Country would do." and what would its significance be?

The arguments on p49 appear to be a chaotic mess; chapter two appears to consist largely of running commentary (the main point, relating to the development DNA fingerprints, appears to be presented in the

last paragraph of p79).

The beginning of p109 is fascinating: "A question anyone might forget to ask is why anything happens at all." (similarly on p275: "Where is it anything happens?") Who would like to go first? And on p110, the question relating the symbolism of filth appears to be hinted at, and in this context, the process of distillation appears to be a euphemism for putting over there. So what does all of that mean, and why does it matter?

On p111, we may understand the core of two of Mr Atkins' anxieties. Firstly, "That is another problem with thermodynamics: its aura is so Victorian." It may be worth spending some time considering the subject's aesthetic qualities in this context. What can we do to design and craft machines that purr comfortingly, feel floaty, and satisfy the community of marketing professionals' desire for freshness and vitality? And to do so in an organisational setting that sustains corporate staff well-being? Secondly, "In the early nineteenth century, the steam engine epitomized wealth; later we shall see that it actually epitomizes change, but we will settle for wealth for the moment.", we are given to understand that Mr Atkins prefers wealth to [social/other kinds of] change, so how much wealth would satisfy Mr Atkins? (the question of where it comes from needs to be addressed separately in an appropriate setting). "Be patient," we are told on p114, "Let the story unfold," is rather more terrifying: Galileo was shown the instruments of torture and the noun in Italian for history and horror story sound quite similar, and it can be difficult to anchor the actualité at times. The content of p120 begs a question or two; and again on p124. The apparent conceit of the content of p125 appears to be quite remarkable.

"Now for the crucial point," the reader is offered on p127: is that true? What else appears to be particularly significant in this context? The significance of the content of pp128-130 needs to be addressed elsewhere. And opportunities to end the rot alluded to on p132 may need to be identified.

Perhaps we can skip chapter six for this reading: there are coercion difficulties with symmetries that need to be addressed and resolved satisfactorily elsewhere (OK-ty-p227). In chapter 7, boundary conditions are introduced in inverted commas on p223.

#peopletrafficking - p259

#moneylaundering - p259

The central point on p286, relating presumably to calibrated reference standards, could be tweaked a little bit to make it more digestible. The content of p297 appears to be a slightly pretentious way of describing spark erosion, and so the right is reserved to reject the terms of business on offer on p299. The arguments on p300 appear to be defective. Advanced notice of a reference to Kant is given on p303: to the extent Kantian imperatives are relevant to arguments in this book, to what extent should the reader expect to find them towards the beginning?

I would recommend to interested readers Jacob Bronowski's The Ascent of Man in the first instance.

Plamen H. says

http://bookeyeview.blogspot.com/2013/...

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Fulvia says

Great book ! 10 Science ideas that should be taught at school. Those subjects are important for everyone to learn, at least the general ideas. I recommend this book !

Keith says

Page 1 "Prologue" Atkins seems to believe that the Scientific Method actually is used. "The procedure that gets taught as "The Scientific Method" is entirely misleading. Studying what scientists actually do is far more interesting." (http://www.dharma-haven.org/science/m...)

I find that how things are actually discovered is much more interesting than the story that is concocted later to make it sound logical. That was sufficient to cause me to set the book aside for a few years. Now I am putting it back into my to-read queue since the book is about 10 great discoveries. It might even have something interesting about how they were discovered.

Another reviewer recommended A Short History of Nearly Everything as being less dry.

Erik says

I may have under-rated this tour of the greatest scientific ideas. Having just finished my course on Great Ideas, I see just how hard it is to write something like this, even when you are teaching students with a good general background. You could of course use one of those gee whiz books which seriously distort scientific discovery to draw out some insane metaphor that makes no sense: women are waves men are particles? Atkins doesn't do that. My quibbles: no Newtonian gravity, no discovery of astronomy, calculus. The chapter on logic and incompleteness was...well incomplete. He calls it a "helicopter to the summit" of Goedel's argument but it's really best to leave it out. But I learned from the chapters I knew the least about (DNA) and it will serve as a platform for a course, but be prepared to fill in details.

Tulpesh Patel says

Galileo’s Finger is based around 10 great ideas of science that have emerged since the time of Galileo and covers evolutionary theory, genetics chemistry, quantum theory, cosmology and mathematics. Prof Atkins distils these grand, far-reaching ideas into three or four potent words (something which I found an admirable feat in itself) and then proceeds to unpack beauty of the scientific thinking and discovery behind it.

I have stated my admiration for Prof Peter Atkin’s way with words before http://www.ahsstudents.org.uk/news/20..., having being mesmerised during his talk on the Limitless Power of Science. Because the British Humanist Association are so darned great, they’ve put his whole talk up online http://www.youtube.com/watch?v=cxaIju.... Watch and learn. I wrote my report that Galileo’s Finger was a must read, and having recently just re-read it (a lot of my non-fiction/pop. science books will remain in boxes in my parent’s attic until they visit Norway at Easter, and I need my regular science fix), I thought I would write up a review and hopefully encourage a few more people enjoy it too.

Whilst there has been a trend for pop science books to adopt a conversational tone (and occasionally becoming a little too ‘chatty’), Galileo’s Finger reads more like 10 excellent undergraduate primer lectures delivered with wonderful poetical prose. (The quote heading this blog comes from this very book.) Prof Atkins moves from the more tangible aspects of science, biology and chemistry, towards concepts which become more and more abstract and theoretical, ending with that most abstract concept of all, mathematics, all the while weaving together the underlying beauty, interconnectedness and sheer majesty of the universe (or maybe universes?) we inhabit. There is a lot crammed into what is a surprisingly slim book, so for those looking for a little detail I would recommend reading Prof Steve Jones’ fantastic Almost Like a Whale http://www.amazon.co.uk/Almost-Like-W... for an updated version of Darwin’s Origin of Species; Profs Brian Cox and Jeff Forshaw’s Why Does e=mc2 http://www.amazon.co.uk/Why-Does-mc2-... for one of those conversational pop science takes on physic; and Alex Bellos’ Alex’s Adventures in Numberland http://www.amazon.co.uk/Alexs-Adventu... a fun look at the history and beauty of mathematics.

The Galileo’s finger is peppered with witty asides, including references to beans causing flatulence, but on the whole the writing is serious and dense. What really elevates this book above others of the same ilk is that that Prof Atkins shows a great deal of patience, and some ingenious metaphor and analogy, in talking the reader through not just one but many concepts which are baffling even our greatest scientific minds. These are 10 great lectures that leave you at no point feeling lectured; it’s one of those books that I think really can be savoured by all because only curiosity, not scientific literacy, is assumed.

Szplug says

> *Information is immortal, and information is ruthlessly selfish.*

Absolutely brilliant. Atkins' explanation of elemental emplacement within the Periodic Table, the aesthetic potencies of *Symmetry*, and the pretzel-form conundrums of *Spacetime* are superb, while his presentation of electron shells and *Atomic* structure within the waveform/particle duality that defines the essence of *Quanta* is the best and clearest I have ever come across. And that's without mentioning the *one-two* punch of *Evolution* and *DNA* with which he opens the affair, nor the chapter on *Entropy* linking energy states to both the origin of change *and*, in a most intriguing of alignments, our tugging friend gravity; while the concluding one on *Mathematics*, both difficult to digest and Gödel good, expands upon his postulation that *when mathematics confronts the physical world, it sees its own reflection*. Our numbers, in infinite progression, hallowed be thy names...

> *The formulation and elaboration of the concept that complexity is fabricated from simplicity was a profoundly important conceptual step, and this attitude still lies at the core of modern science.*

What I particularly appreciated about Atkins—a British academic of the type I most admire to his very core—is his no nonsense approach: there's none of the silly and clunky low-culture metaphors and examples favored by the likes of Brian Greene, and which always set my teeth on edge. Atkins assumes you want the serious goods and are prepared to exercise your mind in the process; and that's what he delivers, in *spades*. The pace is brisk, the knowledge of a breadth, and his clarity starkly illuminative. It's the kind of book that not only made for a most enlightening and enjoyable (honest!) read, but will be kept at hand to return to time and again over the years whenever my understanding of its ten constituent scientific *Ideas* needs shoring up—that is say, continuously.

> *Life, at root, is molecular bumbling.*

John says

I don't like reading about science, but II know so little about it. A reasonably comprehensible introduction to lots of current scientific thinking. I would have found a list of what was left out particularly helpful, since I lack the background knowledge to figure it out on my own.

David Plunkett says

I think the author's purpose was to inform the reader about how Galileo's ideas intertwine with science's ten great ideas. An example is when Mr. Atkins talks about space time and then tells all about Galileo's work in astronomy and his predictions about space time.

I believe the theme of this book is to inform and explain to the reader the ten great ideas of science and how important these ideas are in today's world. The author also tries to spark an interest in the mind of the reader to continue great work in the field of science.

I think the author's style was an exposition. Mr. Atkins presents the ten great ideas of science and explains Galileo's part in each one. One example is the explanation of the cosmic reality or planets and the real world implications for astronauts and modern space exploration. Another example is when he explains to the reader that space time is a blessing but also has repercussions such as in billions of years the Earth could be no more.

I think the book was very informative regarding these ten great ideas of science. It kept me interested and wanting to read more. The only thing that I would change is to have more emphasis chemistry, physics, and astronomy rather than biology. I thought this book was similar to another book I read about the great ideas and discoveries of physics and astronomy.

Rajith says

By analyzing different kinds of brain damage, and the feelings associated with phantom limbs (people with missing limbs can still feel pain in those non-existent limbs), British neurologist Vilayanur Ramachandran concluded that the brain constructs cognitive maps that are, basically, plausible interpretations of the world. It is those maps that cause all mental life, starting from perception itself. The limb is no longer there, but its representation in the brain is still there, and thus the person feels it as if it still were there. Whether it is truly there or not is negligible compared with the fact that it is represented in the brain. If one generalizes this finding, one reaches the conclusion that all mental life could be "phantom", because that is a general behavior of the brain. All sensory experience is an illusion. All feelings are illusions. Even the self consists of an illusion, largely constructed out of interactions with others. The brain creates these representations of different kinds (from representations of limbs to representations of the I) and then believes that they truly exist and they get associated with feelings. (Thus the solution to the pain caused by a phantom limb would be to induce the brain to believe that the phantom limb does not exist anymore, i.e. to remove the representation of that limb in the brain). In a sense, the entire body is a "phantom limb": the brain constructs its existence and then "feels" it.
His test for consciousness includes three properties: irrevocability, choice and memory. Any living being that exhibits these features can be said to be conscious. Ramachandran thinks that consciousness is located in the temporal lobes and associated limbic structures. Ramachandran thinks he has even located the seat of religious feelings: they seem to originate from the brain's temporal lobes.

An interesting point that the authors make is that both brains and cultures use languages: the brain uses the language of neural chemistry, a culture uses the spoken languages. Unfortunately, he fails to produce a

general meaning of this fact (other than the trivial fact that both are compound objects made of many interacting parts).

Brian says

Detailed explanations for laymen of everything from arithmetic and DNA to quantum mechanics and spacetime. Some take rereading to really get it, others you'll never get. As renowned physicist Richard Feyneman said, "If anyone claims to know what quantum theory is all about, they haven't understood it.

Claudia says

On the sites that want you to give a star rating, I've given this a 5. I feel it's a 4.75, but, quite sensibly, they don't let you make such small fractions. The only reason I don't give it the full 5 stars is that there's a few diagrams where you can tell the book was originally printed in colour and not much thought was given the the shade of grey it becomes when you press the grey-scale button, there's a couple of places where an extra diagram would have been a good idea (the section on genetics was crying out for a Punnet square) and there's a couple of minor typos that, although they are small, are in the worst possible places.

Other than that, I loved the book, because it explained some tricky concepts incredibly well, and in a way that meant I could transfer the understanding to other things (I'm thinking particularly of the 4D cube). I was a bit dubious about the structure to start with but, once you got to chapter 6 and 7 it started to make a lot more sense.

Thoroughly recommended.
