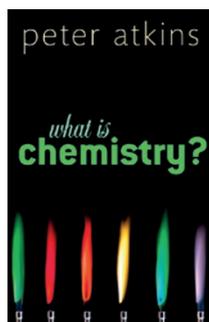


Ask Atkins



What is Chemistry?

by Peter Atkins

OXFORD UNIV. PRESS;
2013. 122 PP £11.99

When Richard Dawkins published *The Greatest Show on Earth* in 2009 — an account of the evidence for evolution — it came as a surprise to realize that he hadn't written such a book before. Dawkins has been the foremost public expositor of evolutionary theory since *The Selfish Gene* (1976), yet he admitted that in his earlier books he had simply assumed evolution was true and had nowhere explicitly set out the reasons for that position.

Peter Atkins is the closest equivalent to Dawkins in chemistry. Although he published his first overview of the field aimed at the general reader (*The Periodic Kingdom*) only in 1995, many chemists are likely to share my perception that Atkins has been cheerleading their cause for as long as they can remember. Not only have his textbooks educated several generations of students (myself included), but the clear and precise articulation that made them so successful has also been put to use in communicating the value of chemistry to a broader public.

So it's a surprise too that Atkins hasn't previously produced a book like *What is Chemistry?* While *The Periodic Kingdom* was a conducted tour of the chemical elements, and *Atkins' Molecules* (1987) introduced non-specialists to the molecules of everyday life, from oxygen to monosodium glutamate (the title itself reveals how the author has become an iconic brand for chemistry popularization), never before has he surveyed the entire field of chemistry: why it exists, what it does and why we should value it.

That's what he attempts here, and one thing that certainly isn't surprising is that the result is pretty much unimprovable.

To provide such an overview in barely more than 100 pages sounds like a tall order, but the brevity of the book is key to its value. There's no end to what one could say about chemistry, but Atkins has managed to differentiate what someone curious about the topic really does and does not need to know in order to grasp its scope. There are no wasted words, no digressions or footnotes (aside from a few pointers to more information). But neither is the result a dry skeleton. At no point is the reader patronized or subjected to the falsely chummy tone that often mars popular science. There's no straining for effect: Atkins trusts that the reader will be prepared to read about spectroscopy or nucleophilic substitution without it being spuriously pumped up with wonder or superlatives. The author wins his readers' attention simply through an elegant and lucid description of the subject he loves, and the effect is rather like that of a concise and traditionally well-crafted film in comparison with bloated and hyperventilating blockbusters.

Atkins' approach is disarmingly straightforward: seven short chapters on chemistry's origins, scope and organization, its principles (atoms and energy), its reactions, techniques, achievements and its future. Of these, the discussion of techniques is the greatest departure from the norms of popular science, and among the book's most valuable features. All too often the techniques of science are taken for granted, even though many science historians have long argued that it is frequently new methods, rather than new concepts, that drive progress in understanding and capability. This chapter perhaps most explicitly reveals Atkins' intended audience. It's probably fair to say that most lay readers don't greatly care whether results were obtained by UV-visible spectroscopy or X-ray diffraction; but for the young student of chemistry, negotiating the profuse thickets of instrumentation and methodology can be tough.

Like several other advocates of chemistry, Atkins takes as his starting point the contrast between its negative public images — its smells, opaque notation and industrial effluents — and its central role in modern civilization. He does

not whitewash its problematic aspects, admitting that "Chemists meddle at the very roots of material Nature, taking the atoms she provides and recasting them into compounds that are alien to her and which, intruding into her ecosystem, can upset the fine balances of life." He discusses chemical weapons and the Bhopal incident.

But he leaves no doubt about where the balance of credit lies: "Chemistry holds the key to the enhancement of almost every aspect of our daily lives, from the cradle to the grave and all points in between". Material comforts, health, communication, energy and — perhaps most of all — fertilized food production: all depend on chemistry. But Atkins' case is not just utilitarian. The insights that chemistry offers into the workings of the world are, he says, "an enhancement of the human condition, for they lend understanding to wonder and thereby add to our delight."

Atkins has managed to differentiate what someone curious about the topic really does and does not need to know in order to grasp its scope.

This righting of the injustices done to chemistry is a motivation for some previous attempts to explain chemistry to a wide audience, such as Ronald Breslow's *Chemistry Today and Tomorrow* (1996) and several books by John Emsley. It's sad but true that the case still has to be put this way. Until we have a better public discourse about science and its applications (which could start by denying that the two are actually distinct), that is likely to continue.

Recommending that every chemistry student in the world read a book by Peter Atkins feels a bit like recommending that everyone buy their books from Amazon. But what can you do? If this book had existed when I was an undergraduate, I'd have benefited tremendously. Now you can. □

REVIEWED BY PHILIP BALL

Philip Ball is a science writer based in London, UK.