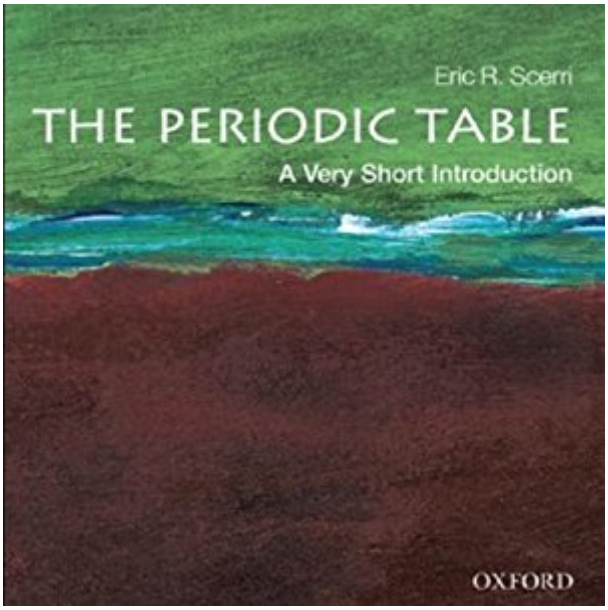
Periodic Table: A Very Short Introduction



Synopsis

In this authoritative Very Short Introduction to the periodic table, Eric Scerri presents a modern and fresh exploration of this fundamental topic in the physical sciences, considering the deeper implications of the arrangements of the table to atomic physics and quantum mechanics. Scerri looks at the trends in properties of elements that led to the construction of the periodic table, and how the deeper meaning of its structure gradually became apparent with the development of atomic theory and quantum mechanics, so that physics arguably came to colonize an entirely different science, chemistry.

Book Information

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Customer Reviews

The Periodic Table is an amazing item, familliar to all with even a smattering of Chemistry knowledge. Its rows and columns of boxes contain just one letter (or two) and a number. Chemists early noted a regularity in the few chemical elements they knew. Mendeleev started out with 7 columns (inert gases were unknown until 1894), using early atomic weight values. The repetition in chemical properties was immediately apparent. Moreover, it was also evident, when an element was placed in a wrong column, chemically, that the atomic weight must be wrong. Elements were soon discovered which did not fit at all, and new columns needed to be interpolated. When the structure of the atom became known (after 19l5), atomic weight was replaced by atomic number. The Periodic Table continued to survive and reflect every succeeding development in atomic physics. Enjoyable science history reading!

A very interesting short book. I had never thought about all of the effort and work over the years by so many different people to generate all of the information that is reflected in the Periodic Table.He starts with the elements and some history of the discovery of the elements first identified by man. Interesting to understand how some brilliant men looked at the things around them, and figured out that there were some basic elements involved, and then determined what these basic elements were. The instrumentation available to start this work many years ago was crude in comparison to what is available today. From the initial work the scientific community evolved to identify the elements as we know them today, and their relationship to each other. They identified that the atoms are made up of electrons in outer shell(s), with a nucleus of charged protons and uncharged neutrons. Mendeleev, the Russian genius made significant contributions to the development of the Periodic Table. I had never known that there are approximately 1,000 different Periodic Tables which have been developed over the years.All in all an interesting and informative little book. It is the story of how science struggled to develop that icon known as the Periodic Table of Elements.

I find the Very Short Introduction books generally a very helpful and quick introduction to an area. This one lives up to that reputation. So far I'm about Ãƒâ Ã Â way through and am enjoying it and learning from it.

I really enjoyed this! The book is much like the Periodic Table itself, a lot of information in a very organized, concise package. Not only does it give a history of its development, but also its ongoing adjustments and alternative arrangements. It will leave you with a sense of awe at the natural organization of the universe.

If you already understand the periodic table, this will give you a good sense of its history and importance. If you don't already understand the periodic table--I didn't, and purchased this to help me do so--you'll need acquire that knowledge from another source.

What an interesting series! I devoured this monograph. I will be exploring other titles. Quality publication, decent typesetting, and the writer is not a slouch for style either. Bravo!

Hi, I'm Sharon Bertsch McGrayne and I've just read The Periodic Table: A Very Short Introduction, by Eric R. Scerri (Oxford 2012).The periodic table of the elements is one of the icons of science. As author Eric Scerri writes, "The periodic table ranks as one of the most fruitful and unifying ideas in

the whole of modern science, comparable perhaps with Darwin's theory of evolution by natural selection. After evolving for nearly 50 years, ... the periodic table remains at the heart of the study of chemistry."But there have been roughly 1,000 versions of the table since Mendelev's breakthrough in 1869. In modern times, we learn from Scerri, there have been Theodore Benfey's spiral, Fernando Dufour's three-dimensional tree, circles, ellipses, left step tables, and short forms, medium-long-forms, and long-forms.Each version serves a different purpose, Scerri writes. "Whereas a chemist might favour a form that highlights the reactivity of the elements, an electrical engineer might wish to focus on similarities and patterns in electrical conductivities."Ironically, the one we all remember from high school is used because it's convenient. Separating out the rare earth elements, as it does, makes the table narrow enough to fit the endpapers of chemistry books and the bulletin boards of labs and classrooms.As old as the icon is, it's still making discoveries, Scerri emphasizes. For example, the table was one of the primary principles used in the search for superconductivity; it was the clue that placed yttrium within a new set of superconducting compounds. Drugmakers, noting that gold and platinum sit next to each other on the table, replaced platinum atoms with gold atoms in various compounds and wound up with useful pharmaceuticals. And potassium, which is readily absorbed by the body, has been replaced in some molecules by rubidium, which lies below potassium and mimics it; the result is treatments for brain cancers.Naturally, on the influence of physics on the table, Scerri sides with chemistry. He notes that Einstein's theory of relativity explains the color of gold and the liquidity of mercury as relativistic effects due to fast-moving inner-shell electrons. But he emphasizes that quantum mechanics has had a profound influence on the periodic system.The periodic table, he continues, has "served as a testing ground for the theories of atomic physics and for many early aspects of quantum theory and the later quantum mechanics. ... But what seems to be forgotten in the current reductionist climate is that the periodic table led to the development of many aspects of modern quantum mechanics and so it is rather short-sighted to insist that only the latter explains the former."In short, he disapproves of modern textbooks that treat chemistry as "nothing but physics `deep down' and [that say] that all chemical phenomena, and especially the periodic system, can be developed on the basis of quantum mechanics." In fact, he argues that the explanation of the periodic system is still incomplete and far from perfect. For example, he writes that it is still unclear whether hydrogen should be placed with the alkali metals or the halogens -- or whether it should "float majestically" atop the table, as a special case... above the law, very much like the British Royal family once was."In concluding his book, Scerri writes about some scientists today who believe that the table's approximate repetition of the properties of the elements reveals, not an objective fact about the

natural world, but a property imposed on nature by human agents. For them, of course, discovering the best periodic table is irrelevant.Scerri, though, argues that the repetition of the properties of the elements -- while neither constant nor precise -- reveals an objective fact about the natural world. And for him, the best table would maximize the number of atomic number triads. Triads are groups of three elements where the atomic weight of one element is roughly the average of the other two. Using this system, for example, Scerri would sit hydrogen on top of the halogens.So why is someone like myself, a non-chemist who just wrote a history of Bayesian statistics, interested in this book?As a writer, I enjoyed reading about many interesting and to me unknown stories about the history of the table. Scerri's historical depth also resonated with me because of my days as editor and writer about physics for the Encyclopaedia Britannica. One particular facet of the article I co-authored on "The Atom" comes to mind. A young English physicist Henry Moseley who died in World War I at the age of 26 put the periodic table on a rigorous basis by confirming experimentally that each element has a different atomic number. In our Encyclopaedia article, we brought out the then little-known fact that in all likelihood Moseley was directly influenced by Niels Bohr's version of the atom because the two men had spent time together in the same laboratory.Another aspect of the periodic table appeared in the history of the chemical industry that I wrote a while ago. One of the chapters is about Thomas Midgley, the inventor of leaded gasoline and CFCs, who carried a copy of the periodic table in his pocket. The table was the foundation -- and extent -- of much of Midgley's chemical research.Finally, this is a beautifully produced little book that's ideal for gift-giving. It's a summary of Scerri's full-scale The Periodic Table: Its Story and Significance. It's part of a series of "Very Short Introductions" published by Oxford University Press.Its cover -- "based on a concept by Philip Atkins," whatever Oxford thinks that means -- is an irresistibly silky-smooth landscape of greens and browns. At $12, it's a pocket-sized book to give a chemist or a chemistry student -- or simply a friend who likes science.

Fascinating read even for the lay person like myself

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