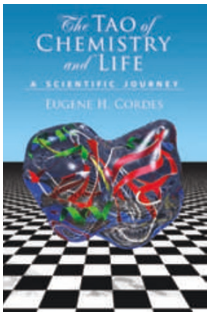
Back to basics



The Tao of Chemistry and Life: A Scientific Journey

By Eugene H. Cordes

OXFORD UNIV. PRESS: 2009. 426 PP. £34.99.

Fritjof Capra's *The Tao of Physics* was published just as I started college, and although I'd like to say it seduced me away from bench chemistry and into quantum mechanics, in fact I didn't read it until much later. When I did, it propelled me into a more systematic exploration of philosophy, and, ultimately, back to graduate school, this time in the humanities. I remain impressed with Capra's ability to interweave the physics and philosophy, keeping both accessible, yet accurate. *The Tao of Physics* moves smoothly between the two poles as it develops the relationships between these varied ways of comprehending the workings of the Universe.

Eugene Cordes's *The Tao of Chemistry and Life: A Scientific Journey* takes a very different path. Cordes, frustrated over the years with his experience of teaching flavourless introductory chemistry courses to the understandably indifferent, isn't as much an explorer of the philosophical frontiers as he is a reassuringly patient and clear guide to the ways in which chemistry is "profoundly important to all sentient beings". Cordes wants his readers to be clear that molecules and molecular processes are what provide life with both an underlying unity and the potential for great diversity, and that molecular recognition and the intimate relationship between structure and function are key to understanding how living organisms work. Without a grasp of these principles, argues Cordes, you cannot understand how your own body functions — or malfunctions. This is Dr Oz's *You — The Owner's Manual* taken to a new level.

The Tao of Chemistry begins with the essentials of molecular structure and covers the basic typology of biological chemistry; proteins, lipids, carbohydrates and steroids each get a chapter. The interplay of structure and function that Cordes considers so fundamental is well illustrated by a chapter on antibiotics and another on chemical communication. The book has a retro aesthetic; chapters are prefaced with a summary and end with a listing of the key points, crucial terms are italicized and no colour figures, sidebars or text boxes clutter the pages. The text is extraordinarily readable for the non-specialist (my 15-year-old son had no difficulty following an early chapter). Cordes's focus is unapologetically biological. Readers who seek a similarly lucid and crisp exposition on the materials of modern life or the environment will need to look elsewhere.

The progression of the science in *The Tao of Chemistry* is anchored historically by references to the Nobel prizes awarded for many of the principles that Cordes presents. Non-scientists will find some familiar names mentioned here and there, which may offer further context for the scientific points Cordes is developing. I found that the appearance of so many Nobel Laureates in quick succession in the text provided a firmer sense of the arc of chemistry and biology's development over the past century, one I hope I will carry through into my own teaching of the introductory course.

Although chemists and biologists are not Cordes's audience, they will appreciate his choice of less-clichéd examples to illustrate concepts, including the repackaging (and repatenting) of the chiral form of omneprazol, and the ability of the simple hydrocarbon farnesene to act as trail pheromones in fire ants. Scattered throughout the text are references from which an enticing leisure reading list for chemists and biologists could be drawn up — ranging from Daniel Charles's biography of Haber to Thomas Eisner's *For the Love of Insects* and John Emsley's *The Thirteenth Element: The Sordid Tale of Murder, Fire and Phosphorous*.

Despite Cordes's tip of the hat to the philosophical in the title, there is very little in the book beyond the introductory material on the scientific method and the definition of life. These first chapters, along with Cordes's personal anecdotes and the sociological and philosophical excursuses in later chapters all felt superficial to me, on the level one might expect in a *New York Times* article, rather than the nuanced reflections of a long-time practitioner of chemistry. Readers desiring a richer admixture of personal reflection and philosophy, albeit one having a far less systematic approach to the science, will find Max Perutz's collection of essays *I Wish I'd Made You Angry Earlier* more satisfying. Try Perutz's paean to Dorothy Hodgkin, *Passion for Crystals*, which touches on some of the same chemical principles as later chapters in *The Tao of Chemistry*, or delve into *Swords into Ploughshares*, which considers the ethics of research in the context of nuclear chemistry and physics. Similarly, Oliver Sach's *Uncle Tungsten* has more to offer the reader in terms of understanding how scientists approach a problem, although again at the cost of the methodical laying-out of a single area of science that Cordes manages so well.

Cordes's clarity combined with his generous sprinkling of off-beat examples makes *The Tao of Chemistry* an excellent choice as the text for a non-majors course or for a book club with patience and fortitude — non-specialists will need to take it at a slow and steady pace, but will be amply rewarded for their efforts. I plan to keep a copy on hand to offer the friends and relatives who forward me chain e-mail about canola oil containing cyanide and causing mad cow disease. ❐

REVIEWED BY MICHELLE FRANCL

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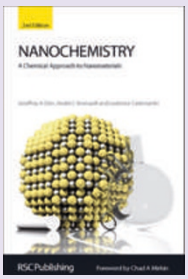
ON OUR BOOKSHELF



Nanochemistry: A Chemical Approach to Nanomaterials

By Geoffrey A. Ozin, André C. Arsenault and Ludovico Cademartiri

RSC: 2008. 876 PP. £45.00.

Rapid and numerous developments in nanotechnology have led to the second edition of *Nanochemistry* being published just three years after the first. This updated and expanded edition offers a comprehensive guide to the chemistry of nanotechnology and serves as a textbook for undergraduate and graduate students.

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