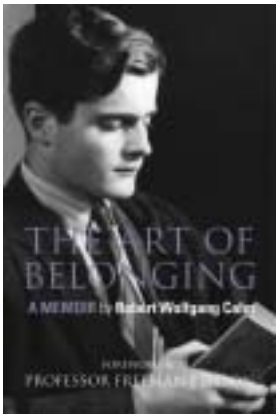
Materials for a life story

Robert Cahn's memoirs recount the experiences of a young scientist during the emergence of materials science after World War II, and extol the value of scientific friendships and their international nature

Marshall Stoneham FRS | *Centre for Materials Research, University College London, UK* | a.stoneham@ucl.ac.uk

What is a memoir? Politicians may be tempted to offer public self-justification by rewriting selections from history. An autobiography for a scientist like Robert Cahn is an opportunity to give shape to events in his life. Moreover, it lets him look at some critical developments in science and the forces that shape future research.

Cahn was born in time to experience life in a musical and intellectual family environment. With the rise of German anti-Semitism, he and his family were forced into different paths and countries, giving serious meaning to his memoir's title, *The Art of Belonging*. Younger scientists may need to be reminded of how profoundly World War II affected science. That war was global, on a wholly different scale, dwarfing subsequent conflicts. As a result, it affected research emphasis, the routes to scientific information, and the lives of individual scientists. Sometimes the science led to important civil applications after the war, even in the case of work that was seemingly specifically military, like the Manhattan project, or the less well-known, but seminal, work by Mott on fragmentation. Although Cahn was too young to be directly involved in such programs, his own research on the science of materials took on a new urgency. The evolution of materials studies is well captured in his book *The Coming of Materials Science* (Elsevier, 2001).



I was fascinated to realize how much Cahn's career has in common with my own. We share an education in what is now Cumbria, in northwest England, and a formative experience at Harwell, a center that has been beneficial to many UK scientists. We both recognize gains from working in a large technology-based organization that needs scientific solutions to new challenges. What was special about the UK Atomic Energy Authority at Harwell was the combination of a challenging atmosphere and working with excellent and supportive colleagues.

Cahn's memoir shows a young scientist involved in the emergence of materials science from many incoherent strands and different technologies. The field benefited from the new tools that were evolving and the increasing sophistication and understanding of solid-state physics. The role of dislocations became familiar, transforming fracture and deformation studies. The role of the electron became understood, and the materials science of semiconductors gave birth to silicon technology. But a change in attitude created materials science. In a world war, getting materials right was a matter of life and death. Radical new approaches were accepted, leading to many of the areas in which Cahn has made personal scientific contributions, as well as his subsequent election as a Fellow of the Royal Society. These changes relied on the synthesis of uncorrelated ideas into a cohesive intellectual whole and, hence, to publishing, a major theme running through this book.

Here Cahn's role has been seminal. Three examples show this. First, he was the founding figure in establishing new journals of excellence. *Acta Metallurgica* set important and high standards of quality, while the *Journal of Nuclear Materials* is unique and fulfills a very important role. Second, he wrote stimulating and perceptive essays on materials issues for *Nature*, reissued as *Artifice and Artefacts* (IOP, 1992). Third, his role as editor of a major encyclopedia must be unique. Editing an encyclopedia is no simple task, even if authors supply what they promise on time. Structure, coverage, choice of authors, and timeliness all make demands on the breadth and depth of an editor's knowledge. What will be needed at the time the volumes are published? The large number of volumes one sees around labs and offices attest to the success of Cahn's judgement.

This memoir contains much more, such as Cahn's important involvement in establishing the Science Policy Research Unit at the University of Sussex, UK. He makes telling comments about the way bureaucracy has taken over so much of science. He also makes it clear how much he values the international nature of science, and the benefits and pleasures of scientific friendships. I hope, therefore, that many people, especially younger scientists, read this perceptive and sympathetic book.

Robert W. Cahn
The Art of Belonging: A memoir
Book Guild • 2005 • 178 pp • ISBN: 1-85776-993-7
£15.99

Photophysics of Molecular Materials

Guglielmo Lanzani (ed.)
John Wiley & Sons • 2006 • 600 pp
ISBN: 3-527-40456-2
$259 / £140 / €210

Subtitled *From Single Molecules to Single Crystals*, this comprehensive review of the elementary excitation processes and dynamics of carbon-based π-conjugated materials merges the two differing views of their properties: molecular solids and low-dimensional covalent semiconductors. In each chapter, a broad tutorial introduction gives a solid physical background, further discussed via recent results. Both the molecular, intra-chain character and the solid-state, inter-molecular physics are addressed. Reports on single-molecule and single-polymer chain spectroscopy introduce the on-site phenomena. Chapters are dedicated to nano-probes, and steady-state and transient spectroscopies. The highly ordered state in single crystals is also discussed, as are less conventional tools such as terahertz spectroscopy.

Biomimetics: Biologically Inspired Technologies

Yoseph Bar-Cohen
Taylor & Francis CRC Press • 2005 • 552 pp
ISBN: 0-849-33163-3
$139.95 / £79.99

Containing pioneering approaches to biomimetics, this book includes a new perspective on the mechanization of cognition and intelligence, as well as defense and attack strategies in nature, their applications, and potential. It surveys the field from modeling to applications and from nano- to macro-scales, beginning with using biology to inspire designs as well as biological mechanisms as models for technology. It discusses evolutionary robotics; genetic algorithms; molecular machines; multifunctional, biological, and nanomaterials; nastic structures inspired by plants; and functional surfaces in biology. It also covers biomimetic materials, structures, control, cognition, artificial muscles, biosensors that mimic senses, artificial organs, and the interfaces between engineered and biological systems.

Expert
Graduate
Undergraduate