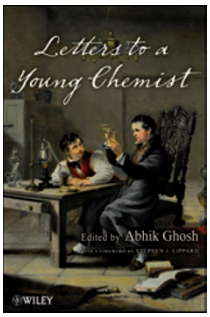
Chemical counselling



Letters to a Young Chemist

Edited by Abhik Ghosh

WILEY; 2011. 320 PP
£26.95

The sciences are littered with books designed to inspire and motivate young students to pursue the major questions of their respective fields. Others provide thoughtful insight about their subjects for the lay-person. Often these books are inspirational without trying, tackling the big questions in any given field without fanfare. Many are the by-products of other media such as TV series and promote their subjects widely, often aided and abetted by a science 'celebrity'. The so-called Brian Cox effect does it for physics and Carl Sagan has inspired generations of astrophysicists. Biology and the natural world has had Sir David Attenborough as a flag-bearer for decades, but chemistry is notable for its absence of popular inspiration. Perhaps it is the nature of chemistry that fails to grab the prime-time audience or the best-seller lists — atomic-scale processes are difficult to grasp and hard to visualize. Images of incredible stellar nurseries from the Hubble space telescope, exotic locations and the curious mating rituals of cute yet fierce animals may make for better television and glossy coffee-table books.

Still, chemistry has its fair share of inspirational science. There is such a wealth of historical, world-altering discoveries out there that, if the public only knew about the science behind them, they would surely be inspired. Or would they? Perhaps it is the future challenges of chemistry that should be the source of inspiration for future generations of chemists. *Letters to a Young Chemist* takes exactly this approach and frames the fascinating research questions of chemistry as letters, written by a diverse group of academics, in response to a fictional undergraduate student called Angela, who is interested in pursuing a career in chemistry research. The letters vary greatly in tone and nature with the authors embracing a variety of roles; for example, as Angela's anaesthesiologist during childhood surgery, or a favourite and proud uncle. The editor, Abhik Ghosh, has pulled together a diverse collection of essays addressing some of the most fascinating and fundamental questions that modern chemistry researchers are attempting to address. The 'Letters to…' format brings unity to what would otherwise be a strange mix of chemistry sub-fields.

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The book is broken into four themed sections. 'Functional Materials' introduces nanotechnology using a Doctor Seuss analogy and goes on to discuss materials inspired by nature, and the elegant sophistication of supramolecular structures. The link between nature, biology and chemistry is expanded in 'Chemistry and Life Sciences', with topics ranging from bioinorganic chemistry to deceptively simple visualization tools based on fluorescent proteins. 'From Fundamentals to Applications' covers perhaps the widest range of topics including anaesthesia, theoretical chemistry and photochemistry. The chemistry/life sciences interface features heavily throughout the book, but the final section returns to the arena of materials chemistry. 'Chemistry and Energy' is the most cohesive section — with the authors all identifying the need for more effective means of harnessing solar energy as the most important issue. This does make this section slightly repetitious when compared with the others, but provides a consensus that can be rare in scientific fields.

The more subtle messages inherent in many of the essays speak strongly about the changing face of chemistry. From high-brow lunchtime debates between students and professors, discussing how chemistry research applies to the big issues of the day, to reassurances that, despite being female, there is very definitely a place for scientists like Angela in the world of academic chemistry research. One particularly refreshing aspect of the book was that the people writing about the research were as diverse as the science itself. Many of the authors seem aware that inspiring students to pursue research in chemistry is as much about breaking down cultural assumptions as it is about finding an intellectually challenging and important question to work on. Inspiration takes many forms, and many of Angela's correspondents share the experiences that were their own personal sources of inspiration at key moments in their career.

My main criticism is with regard to the differing levels of assumed knowledge between essays. In some, complex molecules are drawn; in others, simply named. In a few essays, advanced concepts are named then brushed over while very simple ones (even to undergraduate chemists) are described in precise detail. Some of this might be ascribed to differences in undergraduate curricula between countries, but it makes parts of the book inaccessible to a wider audience. The book is clearly aimed at college students, those at the same stage of their careers as Angela, but those with some chemistry background or the willingness to look things up would also enjoy it. The book is a great source of chemical processes in real-world contexts for educators at a variety of levels, which are regrettably rare. To give one example, the description of a pulse-oximeter in 'Anesthesia: Don't Forget Your Chemistry' covers several topics in basic spectroscopy and allows normally obscure theory to be placed firmly in a tangible context.

I will certainly be recommending it to undergraduates who express an interest in chemistry research because I can think of few better ways to convey what it is actually like to focus intently on a research question that fascinates you — although it's often hard enough to get them to read their textbooks! In the best possible way, *Letters to a Young Chemist* left me wanting more — whether it be longer essays on some of the topics or more essays on a wider range of ideas. It is difficult to pick which I would prefer. Perhaps a second volume may satisfy that need in the future! ❐

REVIEWED BY KATHERINE HAXTON
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