

these articles do not get paid for their articles. This is in contrast to books, where book authors earn royalties with each purchase. Suber asks the OA activists to treat journal articles as lower hanging fruits and treat books as higher hanging fruits. He argues that readers are likely to buy a print edition of a book even if the book is OA and digitally available for free. I am not so sure because I feel the younger generation, who have been exposed to computers from their childhood, is completely at ease in reading an entire book on a tablet.

Chapter 6 provides details of copyright issues with publishers. It clearly explains that almost all the publishers have allowed green OA with or without an embargo of a few months. Chapter 7 discusses the economics of these journals. Suber argues that many gold OA journals do not charge processing fees and, even if they did, it is either waived or paid by sponsors on behalf of the authors. He also rightly argues that hybrid OA journals do little and may in fact double dip economically by asking both author side fees as well as hike subscription charges.

Chapter 8 questions as to whether a shift to OA will leave casualties. Suber argues that green OA may or may not affect journal subscriptions. He cites the example of physics wherein two major academic societies, APS and IOP, have publicly acknowledged that self-archiving has not affected their subscriptions. As mentioned earlier, most of the toll access publishers willingly allow green OA. This is because librarians still have an incentive to subscribe because of embargo policies that may limit the deposition of the post print in the repository and because libraries may like to provide their faculty with a formatted, copy-edited and paginated version of the manuscripts. However, as Suber rightly argues, green OA policies are justified even if they do create risks for toll access publishers because there are no reasons to put the thriving of monopolistic commercial publishers ahead of research itself. Chapters 9 and 10 discuss the future of OA and self-help tips for a researcher. They are short chapters, but well written and succinct.

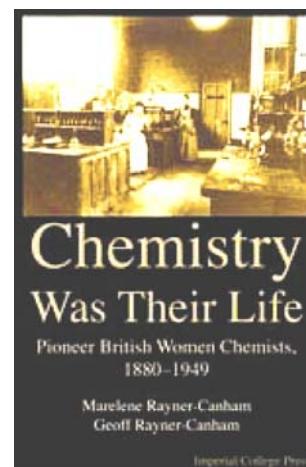
It should be noted that I am not an indiscriminating advocate for OA. I believe gold OA risks taking the community down an expensive, hazardous route. Data from Cornell and University of Maryland show that institutions pay

much more under an author-side fee model because the rise in article processing charges (APCs) rivals that of increase in the subscription rates. Based on the experience of publisher subscription increases, one tends to believe that the publishers of gold OA journals will also do the same (i.e. increase APCs) when they achieve monopoly. Thus, I believe, under current circumstances, gold is costlier than the more widely existing (subscription + green) model, especially for developing countries like India. I thus strongly believe that institutional repositories have to be exploited and all Indian institutions should actively encourage their researchers to self-archive their post print in their institutional repository. Such a move would not only enhance green OA, but also provide a source and showcase the intellectual property emanating from the institution.

This book is clear in its recommendation. If you are a publisher of journals, adapt to OA, otherwise, you will become obsolete like what happened to the typewriter manufacturers with the advent of the computer. If you are a scholar, try to publish in OA gold journals; if not, at the very least, deposit all your post prints in a repository and support green OA. By supporting green OA, the researcher is not only supporting the OA movement, but also enhancing the visibility of his/her research. On 16 August 2012, Georgia State University distributed copies of Suber's book to new faculty and administrators on campus. Included with every book were details on the benefits of OA and a link to their institutional repository. It is high time that Indian institutions follow the above example.

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Chemistry Was Their Life: Pioneer British Women Chemists. Marelene Rayner-Canham and Geoff Rayner-Canham. Imperial College Press, 57 Shelton Street, Convent Garden, London WC2H 9HE. 2008. xvii + 542 pp. Price: US\$ 114.

Suggest to a present-day high school student in Bangalore who is interested in chemistry that she should not have the same professional ambitions as a boy in her class and she will likely laugh right in your face. Today, in most countries of the world, women can qualify themselves for a career in teaching and research, and aspire to the topmost positions in both academia and industry. There is no barrier stopping women from achieving their goals, not on paper, at least.

This equality did not exist too long ago – not even in the West – as this book reminds us. This publication from the Imperial College Press in London chronicles the life and times of pioneer British women chemists born between 1880 and 1949. On the occasion of its centenary in 1947, the Chemical Society released a book on some distinguished British chemists who had died since the First World War. No mention was made of any female chemist from that period, which creates the impression that women were either entirely absent from the scene or that they had done nothing worthwhile in the laboratories. The authors of the book under review provide evidence to the contrary.

Rayner-Canham identified 896 academic women chemists on the rolls of the Royal Institute of Chemistry and Chemical Society, and pieced together biographies of 141 of these women. They take care to present the details of these women's lives and works in the appro-

prate historical context. In many cases, there was precious little for memoirists to work with. Many of these women were unmarried and relatives did not always preserve the spinsters' papers. So the science historians scoured college newsletters, which mentioned alumnae deaths and even ran full-fledged obituaries at times. The University of London granted women B Scs in 1881; women at Oxbridge were granted degrees by their parent universities only in the 1920s. Evidently, women had to fight for inclusion every step of the way, starting from entry into higher institutes of learning, right up to membership of professional societies.

Since the women gravitated specifically to pharmacy, biochemistry and crystallography, one chapter is devoted to each of these disciplines. Women had always worked in apothecaries – pharmacies were an updated version of the same. Agatha Christie, who wrote murder mysteries where poison was a choice weapon, had trained to be an apothecary assistant. In general, women may have been naturally attracted to branches of chemistry that dealt with life. But the authors suggest that there was another factor that aided their entry into biochemistry: the need for personnel in this emerging field was so high that it overrode any virulent opposition; pragmatism beats dogmatism every time. Having a supportive figure like Frederick Hopkins at Cambridge University must have helped. After he won the Nobel Prize in 1915 for discovering the importance of vitamins in the diet, his lab was flooded with applications for research positions. Half these positions went to women. In his group, everyone interacted in a spirit of camaraderie and women had no cause to feel isolated in their pursuit of science.

We learn that close to 60 women had worked in Hopkins' research lab including Kamala Bhagwat, the first Indian woman to earn a PhD in a scientific discipline. This is the place where she earned her advanced degree. She is quoted in the book: 'I applied for admission to his [Hopkins'] laboratory, although it was already full. Then the unexpected happened – a kind scientist already working in the laboratory offered me the daytime use of his bench while he would work at night. Professor Hopkins accepted this solution and I was admitted to this great laboratory on 18 December 1937 – the happiest and proudest day of my life.'

The authors point out that modern crystallography, like biochemistry, had a fair share of mentors who created an open and friendly atmosphere in their labs, chief among them being the Braggs, father and son who shared the Nobel Prize in Physics in 1915, and the controversial scientist, John Bernal, a pioneer in X-ray crystallography in molecular biology. A less charitable view was that the field attracted women because the 'business of calculating data was a very laborious occupation and smart fellows who could find other things to do would generally do them, unless they were absolutely dedicated to the business of X-ray crystallography'. This is where women chemists gained the widest recognition, and Dorothy Crowfoot is a character central to this book. Her story cannot fail to inspire.

As a teenager, Crowfoot had received as a gift W. H. Bragg's book *Concerning the Nature of Things* featuring discussions of how scientists could use X-rays to study atoms and molecules. By then, she had already established an attic lab where she grew crystals of copper sulphate, alum, and had once made haematin from her own blood, which she had collected in a test tube after severe nose bleeding. She began attending Oxford University in 1927 and spent two years in Bernal's lab in Cambridge. At Oxford, she continued research as a fellow at the women-only Somerville College. In 1942, Crowfoot began working on the structure of penicillin, moved on to vitamin B-12, and finally to the protein insulin.

The crystallographer who had made a habit of cracking the structures of biochemically important compounds got due recognition in the form of a Nobel Prize in 1964. But at the end of World War II, Crowfoot, then wife of a historian and a mother of three children, was still only a tutor at Oxford. While her male colleagues held lucrative positions at the university, she was in debt and her lab lacked some necessary equipment. Though she bore the brunt of patriarchal pettiness, she was generous to researchers in her group, always sharing credit with them. Many international scientists, including some in India, can trace their crystallographic 'lineage' to the laureate. Another scientific 'heir' who worked in her lab as an undergraduate and switched fields later on was the former British Prime Minister Margaret Thatcher.

The authors state that World War I gave these graduates the best chance to prove themselves. Their male colleagues were conscripted in large numbers and the women were called upon to fill those vacancies. Overnight, academic labs transformed into miniature factories for fine chemicals, previously produced mainly in Germany. The Ministry of Munitions created new positions: women analysed samples of poison gases and devised protection against them; they undertook research in metallurgy and analytical chemistry. After the war, the best of these qualified women were retained in industry; new employment avenues became open to them other than teaching and pharmacy. Some of the men who returned did not like the sight of these women flocking to lecture halls and laboratories, but fortunately their displeasure had no power to make the clock turn back.

Reading this well-put-together narrative about the British women's tribulations and triumphs, one's thoughts turn to one's own compatriots. Surely, there must have been women in India who worked in the laboratories in a comparable timeframe. Which were the schools, polytechnic institutes and universities that nurtured them? Who gave these graduates a break? The stories of the pioneers deserve to be widely known. After all, it is the success of these precious few that makes it easy for today's Indian schoolgirls to be matter-of-fact about achieving their ambitions in science. By recalling their contributions, we would be repaying our debt of gratitude.

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