



20

Negotiating choices

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As a child in an academic family, I always had a lot of books around and read extensively and fairly indiscriminately. As I grew older, some of this curiosity was channelised towards science, encouraged to some extent by a very good science teacher in primary school and our neighbours who were botanists. Overall, though, when I look back, I can see that the dominant influence in shaping my academic interests was that of my father. I do not remember that he ever paid any attention to homework or examination preparation but he had an enormous range of intellectual interests himself and, when he found the time, he was always interested and encouraging about whatever I might be reading or learning.

The school system and the competitive aspects of studying science began to be important sometime around the age of 13 or 14 i.e. during the Junior and National Science Talent examinations. My school expected every student who was academically good would study science and try to get into medicine. While I enjoyed history and literature, I fell in with expectations as far as science was concerned but I just could not see myself as a doctor.

I wanted to continue with science, and specialize in chemistry. Since chemistry generally gets pretty poor press among the young, largely because of the way it is taught, I feel I ought to

explain my choice. Like everyone with any intellectual ambitions, I liked mathematics and physics and wanted to develop the associated conceptual and quantitative skills. Biology, and in particular molecular biology, was clearly very much the subject of the future. Since chemistry involved the application of physical concepts to understand a diverse range of chemical phenomena, including those in biological systems, I thought it represented a reasonable compromise. Even in the 1980's, B.Sc. (Chemistry) was a fairly odd first choice for anyone to make. To maintain some credibility in the eyes of my peers, I decided I would sit for the IIT-JEE exam and try for the integrated M.Sc. program in Chemistry in IIT-Kanpur. I did obtain a respectable rank in the JEE exam but for various personal reasons the IIT-Kanpur option did not work out.

I ended up in the B.Sc. Chemistry program in St. Stephen's. I cannot claim that I enjoyed it greatly but it left me with a lot of time for myself which I utilized to learn some things on my own. After completing the B.Sc. degree at Delhi University, I went on to do the last two years of the Natural Sciences Tripos in Cambridge, UK. By the time I went to Cambridge, it was reasonably clear to me that I wanted to do theoretical chemistry/chemical physics, not molecular biology, and I chose my options accordingly. I enjoyed the undergraduate experience in Cambridge very much. The effectiveness of being taught by individuals who were actively engaged in their subject made quite an impression on me—not just in theoretical and physical chemistry which in any case interested me, but also in subjects that I did not have to study or have not had to teach since then, such as synthetic organic chemistry.

I chose to stay on in Cambridge for a Ph.D. in quantum scattering and spectroscopy with David Clary. Quantum scattering techniques are useful for understanding reactions of molecules in the gas-phase, specially in conjunction with experimental molecular beam and spectroscopic studies. By the time I completed my Ph.D. in 1990, I knew I wanted to do more work on reactions in condensed phases e.g. in solution and on solid surfaces and this would require learning statistical mechanics and computer simulation techniques. I found a postdoctoral position which would

allow me to make this shift with Horia Metiu in Santa Barbara, California. I stayed in Santa Barbara for just about a year and a half before returning to IIT-Delhi for a temporary position in 1992. In 1993, I returned to an independent postdoctoral position in Cambridge, UK. In 1994, I joined the Department of Chemistry at IIT-Delhi as a faculty member and I have been there ever since. In terms of milestones in my personal life, I got married in 1992 and my daughter was born in 2000.

Given the nature of this volume, it is tempting to indulge in some generalizations based on my experience of being a women scientist in India. The postdoctoral years between 1992 and 1994, when I had no thesis and no postdoctoral advisor to worry about seem, in retrospect, to have been a very formative period when I had academic independence without day-to-day academic responsibilities. In contrast, being a faculty member at IIT required a complicated balancing act between research, teaching and one's personal life.

While the IITs are probably among the few institutions in India where one can combine research and teaching, unfortunately these two activities are not always viewed as mutually complementary. I have found that one of the positive spin-offs of having to teach at both undergraduate and postgraduate levels has been that I have had to keep in contact with the mainstream of the subject and, over the years, this has given me a much broader understanding of the chemical sciences. I have had to adapt my research interests to find problems that are reasonably interesting to me, potentially interesting for my research students and doable within the constraints of the academic environment that I find myself. This has often meant that some attractive research directions could not be pursued or had to be abandoned. Like many others working in India, I have often felt that one's published work tends to be ignored or under-cited. On the other hand, the absence of a high-pressure, grant-driven research environment, typical of the US, has meant that I have had considerable freedom to work on problems of my choice.

The complexities of negotiating gender and professional roles tend to become most acute for most women in their late

twenties and thirties. This is partly because these are the years when decisions regarding marriage and children are made but also because these are the years when one has to establish one's academic independence and viability. In my case, these years also coincided with my decision to return to India. I was born in the US and therefore I had to make a conscious decision to give up US citizenship in favour of Indian citizenship in my mid-twenties. Perhaps for this reason, in my mind, I have found myself comparing the nature of intellectual marginalization due to gender with that due to working in a developing country. Clearly both factors can distance you considerably from the mainstream of scientific activity and can lead to considerable scepticism as to the worth of one's contributions, both in one's own mind as well as that of one's professional peer group. This type of intellectual marginalisation is specially insidious given the nature of scientific research, which requires that any contribution in order to be consequential must be validated and amplified by the scientific community. The glass ceiling that hits one is not just in terms of access and advancement in the organisational power structures of science, but in one's own ability to extend and develop ideas. I raise this issue in the hope that it may help us think of the mechanisms to build up a culture of intellectual self-confidence and productivity, which must necessarily be more subtle than administrative measures to ensure that scientific institutions and activities are more inclusive of different social categories. At personal level, being an "Indian" and a "woman" are as intrinsic parts of my identity as my interest in doing science and therefore, I guess, like most of Lilavati's daughters, I have tried to integrate and do some justice to these different aspects of my identity. In the context of our society, to have had the opportunity to do is to have been quite fortunate.