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A freedom to question...

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I must admit that I found it odd when asked to write a piece on my life as a physicist. My contributions to physics are modest and I have lived through fairly unremarkable times and circumstances. What justifies the writing of this essay then, is the 'odder' fact that being a woman physicist makes me unusual.

I was born into a middle-class family which was well travelled and broad-minded. My parents were the primary source for my education until I was about nine years old; my teachers mostly inspired me with fear. My mother and I would sit together in the afternoons and would read, draw, or look over lessons. An early memory is of her using an array of katoris to explain the idea of multiplication. My father travelled considerably, but when in town worked out of an office at home. He gave me puzzles in arithmetic and taught me tricks and ways to rationalise the multiplication tables. This introduction to basic numeracy influenced my enjoyment of mathematics during my school years. Because it was done in a relaxed atmosphere I never viewed it as any different from play. I also had access to an assortment of popular books in science bought for my older brother. I read them with curiosity and only partial comprehension.

By the time I was nine, I had decided that I had no need for a God. I reasoned that there was no room for a heaven in the solar system, and hence no room for God. My mother, herself a believer, handled my queries beautifully by telling me to seek the answer for myself. Years later, I realised that my father was a confirmed skeptic and agnostic. I think this freedom to question played a role in my growing interest in the natural world. When I was in middle school, my mother, by then an active journalist and writer, took special interest in my basic science education. When I was in class six, she along with a young and enthusiastic teacher, translated an excellent book on basic science by Ekalavya from Hindi into English. It brought textbook knowledge into the tangible world and made our science classes very exciting to me. At home, my father, an electrical engineer, would patiently explain how simple household gadgets worked. I didn't always understand, but years later found that stored memory useful.

During high school, my interest in science, and physics in particular, was heavily influenced by my older brother, who had himself chosen physics as his major in college. His discussions with the family about things he had read and studied opened up the entire world of academia to me. Here, it seemed that one could as an adult pursue one's interests single-mindedly, without worries about earning a living! Until class ten, I also had very good teachers who encouraged questioning. I enjoyed listening to and reflecting on their descriptions of the physical universe.

In my last two years of high school negative influences both from school and society began to erode my confidence and motivation. There was a general perception that being female was incompatible with an aptitude for science and mathematics. I also felt a revulsion for the madly competitive atmosphere of an Indian high school. My brother, firmly confident of my interests and abilities, urged me to be more ambitious. This wasn't enough to bolster me and I finally ended up in a local college, majoring in physics. The experience of a mediocre curriculum and faculty was a huge disappointment and I wished I had heeded my brother's advice, if only to have suitable peers to converse with.

My undergraduate education was mostly self-taught and

deepened my interest in physics, though I didn't actively think of it as a career option. The path that followed seemed only natural. This period of self-education was special because I felt no external pressure and hence spent hours mulling and working through basic physics. Although naturally gregarious, I became a bit of a loner, finding my own company and that of my family far more rewarding than what I found readily available at college. The following two years were spent at an I.I.T., a stark contrast to my undergraduate institute. I did not appreciate the pressure, but I did benefit greatly from exposure to both an excellent curriculum and peers. It was here that I met my future husband, also a physicist. He is a feminist and is one of the reasons I continue to do physics today. Despite the travails of living apart for several years during our Ph.D. and postdoctoral years, he has been steadfast in his commitment to support my interests.

I did my Ph.D. at Syracuse University under the guidance of Prof. Rafael Sorkin, who became my mentor in the purest sense of that word. My thesis work was on the effect of topology on the states of quantum gravity. It required familiarity with graduate level mathematics which I had to teach myself. This rekindled my interest in mathematics, and in a sense directed the course of my future research. Subsequently, during my postdoctoral years, I worked on mathematical aspects of general relativity and quantum gravity, and my collaborators included mathematicians. After several rewarding years of postdoctoral research, I joined the Raman Research Institute, Bangalore, where I now work on the causal set approach to quantum gravity.

I don't think I would do anything important very differently! Of course, once having chosen a particular path, one sometimes wonders how the other paths might have been. I do know that I began with the advantage of a supportive family and that I have benefited greatly from deep friendships through demanding times.