Whereas I was once excessively careful to keep my p… lives completely separate, I have since found that each has enriched the other, even if balancing time remains a challenge.

The growth in the number of women students in mathematics since "my century" is very encouraging. When my sister was in college, she was typically the only woman in her mathematics classes. By the time I entered college seven years later, most mathematics classes did have a few women students. On the other hand, I was the only woman in my entering class in graduate school. It is wonderful to see that roughly half the graduate students at Dartmouth are women. I look forward to the day when women are equally represented at all levels of the profession and students are not surprised to walk into a room filled with women mathematicians.

Thought Problems

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"Problems that can be solved by thinking" have held a special fascination for me as long as I can remember. Finding a solution just by exercising one's wits is such a powerful and satisfying experience. I am sure this feeling is shared by many people other than professional mathematicians: how else can one explain the success of puzzles in newspapers and magazines?

Another important thread in my life, also going back to my childhood, is the joy of creating something. This act of creation could be physical and concrete, such as weaving grass carefully dried for a week, painting crazy animals on every available piece of cardboard, or putting together clothes for a favorite doll. Or it could be abstract and all in my mind, such as inventing fairy tales for my younger brother, or thinking up new episodes in the long and complicated epic yarns, in which I figured prominently of course, that I had made up and that I reviewed in my mind before falling asleep at night. The longest-lasting of these yarns was set in medieval times, although the period in my fantasies bore little resemblance to what life in the Middle Ages really must have been like. Another one was inspired by *Robinson Crusoe*, or rather, by the adaptation I read and cherished as a child. The Dutch translator had omitted much of the political discourse of the original. Also, he had realized that Defoe's descriptions of Crusoe's small practical discoveries that enabled his survival on an uninhabited island did not make much sense and had quietly improved them. Only when I had left behind the Dutch translation of my childhood and bought the original version in English did I realize, as an adult, that the wonderful descriptions of exactly how Crusoe made cheese, letting it ripen in special caves, how he fired clay pots, or how he produced yeast to make his bread rise, and so many others that had made the book sparkle for me were not in the original. Fortunately my parents still had my old books, and I recovered this one on my next visit; I treasure it still.

Sometimes both "solving by thinking" and creativity played a role in my favorite childhood activities: for instance, designing clothes (whether for dolls or real people) requires quite a bit of three-dimensional geometric insight, and it delighted my seamstress grandmother that I could "see" how to create a shape by cutting away pieces of fabric and sewing the pieces together again, even if my needlework was not up to par. Gaining insight by the combination of thinking and creating can give such a pure, almost child-like joy, a sense of wonder and of deep satisfaction—feelings I experience again when I have learned or built some new mathematics, even though a lot of hard work and frustration may be required before getting there!

My parents were very strict in some ways; I often felt that many of my school friends were allowed much more (staying up late, going out on weekend nights . . .). Only much later did I realize that in other ways they were much more "open" than many other parents: my brother and I were both encouraged to read widely (which we did, voraciously) and to be creative. My father was a coal mine engineer, but he would really have preferred to be a scientist. His parents were poor and had received only minimal schooling; no one in the family had ever gone to high school. When my father's teachers lobbied for this smart boy to be allowed to go to high school and then college, his parents knew only two models of careers for college-educated people: medical doctors and the engineers who worked in the coal mines that dotted their home region of Belgium. Since my father couldn't stomach the sight of blood, it was naturally decided that he would study to be an engineer. Since you have to pick your major before you enter a Belgian university, he didn't even get a chance to change his mind at college. Because of the costs of sending my father to college, his parents couldn't save for a little house of their own for their retirement—as long as my grandfather worked they lived in a house provided by his employer—so they made a deal with my father: they would invest in his future, and he would buy them a place when they retired. And so it happened. At college, my father discovered how much he liked science, especially physics; later in his career, he would take, at every possible opportunity, continuing education courses to learn more. He always took the questions that his curious daughter asked him very seriously and would explain to me with great patience how things worked, if he knew, or spend a lot of time and effort to think about ways in which we might discover the answer. Only later did I understand that he had sometimes pretended not to know, so that I could discover the solution myself, with some guidance.

From when I was little, until almost the end of high school, I had asserted that I wanted to be an engineer. Nobody ever told me that I couldn't, so it didn't occur to me. It may have helped that I went to an all-girls school (all public schools in Belgium were then single-gender schools); I was never exposed to the attitude that girls might not be as good at mathematics or science as boys, because there were no boys. My parents never made any distinction between my brother and me in their expectations for our education and careers. Later on, I did meet people who felt or even articulated very clearly that women were less "suited" for mathematics or science, but by then I was confident enough to take this as a sign of their narrow-mindedness rather than let it influence me. At some point, I was complimented that I "talked mathematics like a man," which I found very bemusing; only later did I realize that this showed an implicit belief on the part of the speaker that women typically do not produce good math.

My decision to become an engineer changed in my senior year in high school. In preparation for choosing their major prior to going to university (as was still customary in Belgium then), high school seniors were invited to visit different departments at neighboring universities. I first visited the mechanical engineering department at the University of Gent, famous as the birthplace, many decades earlier, of concrete reinforced with steel bars. Their very impressive lab, in which materials were tested to the breaking point by having enormous machines pull or squeeze them, impressed me much less than a later visit to the nonlinear optics lab in Brussels where we learned about the physics and mathematics that make a hologram possible. Seeing how a lens transforms a light intensity distribution in a bundle of parallel rays into a completely different pattern in the focal plane, with intriguing interference phenomena that encode the original information (which I later came to understand constituted the Fourier transform of the original distribution), was much more fascinating than watching a big machine pull on a steel rod until it snapped. After these university visits I decided to study science and not engineering, even though my mother grumbled that scientists were like artists, whereas engineering was a real profession.

Although I had always liked mathematics, it wasn't until college that I started to think I might become a mathematician. I had already selected physics as my major; to make it possible to switch majors I took an extra four classes one summer. Nevertheless I remained a physics major, mostly because of one very inspiring professor, again in nonlinear optics. Making a hologram oneself seemed much more fun than complex analysis. For my Ph.D. I worked on mathematical physics, a discipline that tackles with mathematical rigor problems that come from physics; techniques and approaches I learned in that apprenticeship have served me well ever since, even though I now more commonly look at problems originating in signal analysis or computer science.

My not very standard path toward applied mathematics and especially the problems in electrical engineering that have inspired some of my best work have been an asset rather than a drawback, at least in my experience. It has meant that I have had to learn some advanced mathematics on my own, probably along a more meandering path than if I had learned it in an organized curriculum. (It is ironic that this is often the material in courses at Princeton University, where I now teach!) But it also means that I often have a different "take" on a problem, which, when I am lucky, leads to the solution. When that happens, there is again that joy (*yes!!!*) and also a sense of wonder that the patterns we mathematicians learn to recognize and understand can be useful in so many different contexts.