Making a Difference

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I was going to be a musician. I was studying the flute with William Kincaid, and came to the realization that I didn't have what it takes. You have to be able to concentrate on the music and fine motor skills for many hours a day and I got bored. I said, "If I'm not going to do something in music, I should do something useful," so I went back to school. A zoology professor enticed me to work in his lab. I started doing experiments, and never looked back. It suited my brain and personality better than music. I decided to go to The Rockefeller University for graduate work.

Later, I was a postdoc in Don Brown's laboratory at the Carnegie Institution, and we were doing some of the first DNA sequencing. I was invited to give a talk at Cold Spring Harbor. I was supposed to see Jim Watson, and as I was leaving the building, I ran into this very small woman, quite old, and although I'd never met her, I thought to myself, this must be Barbara McClintock. She introduced herself and apologized for missing my talk, which surprised me. *Why should she be apologizing to me?* We talked for hours and I missed my appointment with Watson. She was so clear and insightful, which didn't fit with her reputation for being impenetrable. I went back to Baltimore and photocopied all of McClintock's papers. She had invented a language of her own, making up words for concepts before other people saw them. Genetics is tough because it's abstract, but it was really beautiful, and I was possessed with the urge to understand its molecular basis. At that time there hadn't been any plant genes cloned, and people were saying you couldn't do it. Don Brown, who had become director, was recruiting to replace a departed staff member, and offered me the job. I was supported by Carnegie for the first couple of years, and I struggled to figure out how to clone plant DNA. I got to know McClintock quite well. It was a marvelous experience. She shared all of her genetic strains, and the genetics helped the molecular information make sense.

I didn't worry about not being able to clone plant genes until I burned out a postdoc on it. I picked it up after she left the lab, she was so discouraged. I had the confidence that if you did it right, you could do it. I remember doing every little step, steps that you don't even think about today, incredibly scrupulously.

Yes, indeed, no colonies, no clones. For reasons I couldn't reconstruct today, I collected all the bacterial strains I had and plated the same packaging mix on every strain. On one of those strains there were tons of colonies. I think the answer was that plant DNA is much more heavily methylated than animal DNA, there are a lot of bacterial strains that just can't deal with methylated DNA, and I happened to pick one that did. Once the phage were cloned, it was not a problem plating them on the original strain.

It wasn't as difficult to get started in research as it is today. Back then I had no preliminary data, no clear-cut idea of what I would encounter, no detailed methods. What I did have was "why this is interesting" and "here's how I think I'm going to do it." My grant application went to a program officer named Mary Clutter, former assistant director of the National Science Foundation (NSF). She was taken with my proposal to try to clone plant DNA and decided to fund it. I don't see that kind of risk-taking now at NSF.

My current position is not a political appointment. I'll be there for 3 years and undergo the transition. In some of our activities at the State Department, we work through the American Association for the Advancement of Science (AAAS) fellows program, a spectacular program that brings in people from all over the country, usually at the beginning of their careers, to work in Washington for 2 years. That has made a difference. People often stay in Washington and end up in a variety of policy-making roles.

Young people, especially young women, ask me whether they are good enough. My observation is that it's as much wanting to succeed as it is using your brains. I've seen very bright people fall out of the system, and not so bright people receive Nobel prizes. Barbara McClintock used to say that she would never have become a scientist under the conditions I had to face. Part of the problem is the peer review system. It's like a democracy, better than anything else you can invent, but far from perfect. When you're in a group situation it's really hard for outliers to win the majority of a committee. This is a big problem for scientific culture. We have become very risk-averse, and the budgets are determined politically. It's a long way to November. Some of the candidates have come out with credible statements about how they would fund science and technology. We'll see what happens. One nice thing is that there is an increasing recognition and awareness of science and technology, and some of those skills are important in many other occupations.

-As told to Lynne Lederman, Ph.D., a freelance medical writer based in Mamaroneck, NY.