

# *Hers*

By K.c. Cole

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IKNOW few other women who do what I do. What I do is write about science, mainly physics. And to do that, I spend a lot of time reading about science, talking to scientists and struggling to understand physics. In fact, most of the women (and men) I know think me quite queer for actually liking physics. "How can you write about that stuff?" they ask, always somewhat askance. "I could never understand that in a million years." Or more simply, "I hate science."

I didn't realize what an odd creature a woman interested in physics was until a few years ago when a science magazine sent me to Johns Hopkins University in Baltimore for a conference on an electrical phenomenon known as the Hall effect. We sat in a huge lecture hall and listened as physicists talked about things engineers didn't understand, and engineers talked about things physicists didn't understand. What I didn't understand was why, out of several hundred young students of physics and engineering in the room, less than a handful were women.

Some time later, I found myself at the California Institute of Technology reporting on the search for the origins of the universe. I interviewed physicist after physicist, man after man. I asked one young administrator why none of the physicists were women. And he answered: "I don't know, but I suppose it must be something innate. My 7-year-old daughter doesn't seem to be much interested in science."

It was with that experience fresh in my mind that I attended a conference in Cambridge, Mass., on science literacy, or rather the worrisome lack of it in this country today. We three women - a science teacher, a young chemist and myself - sat surrounded by a company of august men. The chemist, I think, first tentatively raised the issue of science illiteracy in women. It seemed like an obvious point. After all, everyone had agreed over and over again that scientific knowledge these days was a key factor in economic power. But as soon as she made the point, it became clear that we women had committed a grievous social error. Our genders were suddenly showing; we had interrupted the serious talk with a subject unforgivably silly.

For the first time, I stopped being puzzled about why there weren't any women in science and began to be angry. Because if science is a search for answers to fundamental questions then it hardly seems frivolous to find out why women are excluded. Never mind the economic consequences.

A lot of the reasons women are excluded are spelled out by the Massachusetts Institute of Technology experimental physicist Vera Kistiakowsky in a recent article in *Physics Today* called "Women in Physics: Unnecessary, Injurious and Out of Place?". The title was taken from a 19th-century essay written in opposition to the appointment of a female mathematician to a professorship at the University of Stockholm. "As decidedly as two and two make four," a woman in mathematics is a "monstrosity," concluded the writer of the essay.

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Dr. Kistiakowsky went on to discuss the factors that make women in science today, if not monstrosities, at least oddities. Contrary to much popular opinion, one of those is not an innate difference in the scientific ability of boys and girls. But early conditioning does play a stubborn and subtle role. A recent Nova program "The Pinks and the Blues" documented how girls and boys are treated differently from birth - the boys always encouraged in more physical kinds of play, more active explorations of their environments. Sheila Tobias, in her book, "Math Anxiety," showed how the games boys play help them to develop an intuitive understanding of speed, motion and mass.

The main sorting out of the girls from the boys in science seems to happen in junior high school. As a friend who teaches in a science museum, said, "By the time we get to electricity, the boys already have had some experience with it. But it's unfamiliar to the girls." Science books draw on boys' experiences. "The examples are all about throwing a baseball at such and such a speed," said my stepdaughter, who barely escaped being a science drop-out.

The most obvious reason there are not many more women in science is that women are discriminated against as a class, in promotions, salaries and hirings, a conclusion reached by a recent analysis by the National Academy of Sciences.

Finally, said Dr. Kistiakowsky, women are simply made to feel out of place in science. Her conclusion was supported by a Ford Foundation study by Lynn H. Fox on the problems of women in mathematics. When students were asked to choose among six reasons accounting for girls' lack of interest in math, the girls rated this statement second: "Men do not want girls in the mathematical occupations."

A friend of mine remembers winning a Bronxwide mathematics competition in the second grade. Her friends - both boys and girls - warned her that she shouldn't be good at math: "You'll never find a boy who likes you." My friend continued nevertheless to excel in math and science, won many awards during her years at the Bronx High School of Science, and

then earned a full scholarship to Harvard. After one year of Harvard science, she decided to major in English.

When I asked her why, she mentioned what she called the "macho mores" of science. "It would have been O.K. if I'd had someone to talk to," she said. "But the rules of comportment were such that you never admitted you didn't understand. I later realized that even the boys didn't get everything clearly right away. You had to stick with it until it had time to sink in. But for the boys, there was a payoff in suffering through the hard times, and a kind of punishment - a shame - if they didn't. For the girls it was O.K. not to get it, and the only payoff for sticking it out was that you'd be considered a freak."

Science is undeniably hard. Often, it can seem quite boring. It is unfortunately too often presented as laws to be memorized instead of mysteries to be explored. It is too often kept a secret that science, like art, takes a well developed esthetic sense. Women aren't the only ones who say, "I hate science."

That's why everyone who goes into science needs a little help from friends. For the past 10 years, I have been getting more than a little help from a friend who is a physicist. But my stepdaughter - who earned the highest grades ever recorded in her California high school on the math Scholastic Aptitude Test - flunked calculus in her first year at Harvard. When my friend the physicist heard about it, he said, "Harvard should be ashamed of itself."

What he meant was that she needed that little extra encouragement that makes all the difference. Instead, she got that little extra discouragement that makes all the difference.

"In the first place, all the math teachers are men," she explained. "In the second place, when I met a boy I liked and told him I was taking chemistry, he immediately said: 'Oh, you're one of those science types.' In the third place, it's just a kind of a social thing. The math clubs are full of boys and you don't feel comfortable joining."

In other words, she was made to feel unnecessary, and out of place. A few months ago, I accompanied a male colleague from the science museum where I sometimes work to a lunch of the history of science faculty at the University of California. I was the only woman there, and my presence for the most part was obviously and rudely ignored. I was so surprised and hurt by this that I made an extra effort to speak knowledgeably and well. At the end of the lunch, one of the professors turned to me in all seriousness and said: "Well, K.C., what do the women think of Carl Sagan?" I replied that I had no idea what "the women" thought about anything. But now I know what I should have said: I should have told him that his comment was unnecessary, injurious and out of place.

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