Science-tropism

By Dana Cook Grossman

Surely all of us—no matter what field we have ended up in as adults—recall our first flashes of understanding about the scientific process. They may have happened in a school classroom or in solitary observation of the natural world. But the clarity of those "ah-ha" moments transcends place and (for me, at least) time.

Three such incidents stand out in my mind. The first was when I was in fifth or sixth grade. We had been assigned to carry out a biology project at home: sprout bean seeds in damp paper towels and then plant them in two paper cups. One cup was to be placed at the far end of a cardboard box that had had a hole cut into its other end, so we could see the effects of phototropism. And in the other cup, the sprouts were to be planted with the white shoots pointing down and the root tendrils pointing up, to demonstrate geotropism.

I can still recall my amazement when I lifted the cardboard box to water the "phototropic" cup and saw the green vine indisputably snaking toward the hole in the other end of the box. And my sense of wonder when, a few weeks later, I shook the dirt off the plants in the "geotropic" cup and saw, as clear as day, the roots making an S-curve to grow downward and the shoots making an equally pronounced turn upward. Suddenly, "phototropic" and "geotropic" weren't just words in a science textbook—they were very real phenomena.

My second such flash of understanding came in a seventh-grade classroom. Our science teacher managed to keep 30 or 40 preadolescents (class sizes were a lot bigger back in the early '60s!) interested in an experiment that spanned not weeks but months. He brought in two bags of potatoes—one straight from the grocery store and one that he'd had irradiated.

Once a week, the bags of potatoes came out and we counted the number of eyes on each potato, calculated an average for each bag, and plotted the results on a graph tacked to the bulletin board. As the months passed, the grocery store potatoes sprouted more and more little white buds, while the irradiated ones stayed firm and smooth. Eventually, the grocery store potatoes were mushy and more sprout than spud. Their line on our graph was nearly at the top of the paper, while the one for the irradiated batch had hardly budged from zero. I recall being fascinated by the irrefutable data—those two diverging lines on our graph—that radiation had powerful effects.

My third youthful scientific epiphany came during a camp I went to the summer after eighth grade. It was aimed at kids interested in science, and one of the activities I chose was physics. Our counselor had us conduct an experiment that I can still picture. We attached a paper tape to the back of a little cart, set the cart at the top of an incline, tripped a hammer that marked a dot on the tape at a set time interval, and then pushed the cart down the slope. I remember looking at the row of dots on the tape after the cart had reached the bottom; they were very close together at the beginning of the cart's run, when it was going slowly, then farther and farther apart as the cart sped up. I found the unassailable evidence that velocity is a function of both time and speed—those dots marching along the tape—moving and memorable.

Why the nostalgia about learning science? Well, there's also unassailable evidence—about the tenor of the times—in the fact that despite my early fascination with science, I never even considered a career in science. I don't recall being actively *dis*couraged from doing so. And my parents did send me to science camp. But in that day, women weren't *en*couraged to go into science.

Happily, times are different now. One example of why is an initiative begun at Dartmouth College 15 years ago—the Women in Science Project. DMS physiologist Bill North was recently recognized for his role in the program's success; the details are in a story on page 22.

I'm actually not sorry that my career took the course it did. In the pages of Dartmouth Medicine, my colleagues and I get to interpret complex science. Explore its impact from the individual level to the global level. And profile physiologists who are making sure that today's young women *do* feel encouraged to go into science.

Science—understanding it, advancing it, applying it rationally—is so important to the future of society that we, all of us, must be sure young women *and* young men who experience memorable scientific "ah-ha" moments sense the pull not just of phototropism, but of science-tropism as well. ■