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COMMENTARY

How Our Culture Keeps Students Out of Science

By *PETER WOOD* | AUGUST 08, 2008 ✓ PREMIUM

In March, Bill Gates, the founder of Microsoft, testified before the House Committee on Science and Technology about the abject failure of American schools, colleges, and universities to prepare students for advanced study in the sciences.

Well, that's not exactly what he testified. The purpose of his trip to the Hill was to impress on Congress the need for more H-1B visas. Those are the visas extended to highly trained experts for specialized jobs. Microsoft, said Gates, can't find enough top-quality computer scientists who are U.S. citizens or already have the right visas. But, he added, a solution is at hand: America's first-rate graduate schools have a wealth of brilliant scientists and engineers in the pipeline. A large portion of them, however, are foreign nationals here on student visas, and are destined to return home after they graduate. Wouldn't it be smarter for our nation to give them H-1B visas so they could stay here and put their training to work helping American companies?

Gates has a compelling point — largely because the shortage of Americans holding or pursuing advanced degrees in fields like computer science defies conventional market explanations. The average annual salary in the field is more than \$100,000. Meanwhile, we have a robust supply of high-IQ baristas and college graduates with jobs that a generation ago would not even have required a high-school diploma.

So while Gates didn't make the point in so many words, his call for more H-1B visas was really testimony to the incapacity of American education to inspire children to take an interest in science and motivate young adults to follow through. He noted that 60 percent of the students at the top American computer-science departments are foreign-born.

Gates is hardly the first to sound the alarm. Back in 2003, the National Science Board issued a report that noted steep declines in "graduate enrollments of U.S. citizens and permanent residents" in the sciences. The explanation? "Declining federal support for research sends negative signals to interested students." That seems unlikely, in that the alleged decline hasn't dampened the enthusiasm of students from all around the world for our country's graduate programs.

The precipitous drop in American science students has been visible for years. In 1998 the House released a national science-policy report, "Unlocking Our Future," that fussily described "a serious incongruity between the perceived utility of a degree in science and

engineering by potential students and the present and future need for those with training."

Let me offer a different explanation. Students respond more profoundly to cultural imperatives than to market forces. In the United States, students are insulated from the commercial market's demand for their knowledge and skills. That market lies a long way off — often too far to see. But they are not insulated one bit from the worldview promoted by their teachers, textbooks, and entertainment. From those sources, students pick up attitudes, motivations, and a lively sense of what life is about. School has always been as much about learning the ropes as it is about learning the roles. We do, however, have some new ropes, and they aren't very science-friendly. Rather, they lead students who look upon the difficulties of pursuing science to ask, "Why bother?"

Success in the sciences unquestionably takes a lot of hard work, sustained over many years. Students usually have to catch the science bug in grade school and stick with it to develop the competencies in math and the mastery of complex theories they need to progress up the ladder. Those who succeed at the level where they can eventually pursue graduate degrees must have not only abundant intellectual talent but also a powerful interest in sticking to a long course of cumulative study. A century ago, Max Weber wrote of "Science as a Vocation," and, indeed, students need to feel something like a calling for science to surmount the numerous obstacles on the way to an advanced degree.

At least on the emotional level, contemporary American education sides with the obstacles. It begins by treating children as psychologically fragile beings who will fail to learn — and worse, fail to develop as "whole persons" — if not constantly praised. The self-esteem movement may have its merits, but preparing students for arduous intellectual ascents aren't among them. What the movement most commonly yields is a surfeit of college freshmen who "feel good" about themselves for no discernible reason and who grossly overrate their meager attainments.

The intellectual lassitude we breed in students, their unearned and inflated self-confidence, undercuts both the self-discipline and the intellectual modesty that is needed for the apprentice years in the sciences. Modesty? Yes, for while talented scientists are often proud of their talent and accomplishments, they universally subscribe to the humbling need to prove themselves against the most-unyielding standards of inquiry. That willingness to play by nature's rules runs in contrast to the make-it-up-as-you-go-along insouciance that characterizes so many variants of postmodernism and that flatters itself as being a higher form of pragmatism.

The aversion to long-term and deeply committed study of science among American students also stems from other cultural imperatives. We rank the manufacture of "self-esteem" above hard-won achievement, but we also have immersed a generation in wall-to-wall promotion of diversity and multiculturalism as being the worthiest form of educational endeavor; we have foregrounded the redistributive dreams of "social justice" over heroic aspirations to discover, invent, and thereby create new wealth; and we have endlessly extolled the virtue of "sustainability" against the ravages of "progress." Do all that, and you

create an educational system that is essentially hostile to advanced achievement in the sciences and technology. Moreover, those threads have a certainty and unity that make them not just a collection of educational conceits but also part of a compelling worldview.

The antiscience agenda is visible as early as kindergarten, with its infantile versions of the diversity agenda and its early budding of self-esteem lessons. But it complicates and propagates all the way up through grade school and high school. In college it often drops the mask of diffuse benevolence and hardens into a fascination with "identity."

That could be a good thing if the introspections were enriched by professors who could show students where Plato or Shakespeare had touched such depths, or who could startle them by showing where Hobbes or Tocqueville had seen them coming. But in a curriculum dissolved in the sea of minutiae and professorial enthusiasms, the opportunity to pass through moody introspection and back into the sturdy world of real people grows rare.

The science "problems" we now ask students to think about aren't really science problems at all. Instead we have the National Science Foundation vexed about the need for more women and minorities in the sciences. President Lawrence H. Summers was pushed out of Harvard University for speculating (in league with a great deal of neurological evidence) that innate difference might have something to do with the disparity in numbers of men and women at the highest levels of those fields. In 2006 the National Academy of Sciences issued a report, "Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering." Officials of the National Science Foundation and the Department of Education are looking to use Title IX to force science graduate programs to admit more women. The big problem? As of 2001, 80 percent of engineering degrees and 72 percent of computer-science degrees have gone to men.

A society that worries itself about which chromosomes scientists have isn't a society that takes science education seriously. In 1900 the mathematician David Hilbert famously drew up a list of 23 unsolved problems in mathematics; 18 have now been solved. Hilbert has also bequeathed us a way of thinking about mathematics and the sciences as a to-do list of intellectual challenges. Notably, Hilbert didn't write down problem No. 24: "Make sure half the preceding 23 problems are solved by female mathematicians."

Obsession with the sex and race of scientists is just one more indication of how American higher education has swung into orbit around the neutron star of identity politics. Talk to recent college graduates and you are likely to hear something like: "Asian students are just better at science and math." That is a verbal shrug, not a lament. The reward of 16 years of diversiphilic indoctrination turns out to be a comfort zone of rationalizations.

In his testimony, Bill Gates did more than glance at the failures of American schooling. Our record on high-school math and science education is particularly troubling. International tests indicate that American fourth graders rank among the top students in the world in science and above average in math. By eighth grade, they have moved closer to the middle

of the pack. By 12th grade, our students score near the bottom of all industrialized nations. As a result, too many of them enter college without even the basic skills needed to pursue a degree in science or engineering.

And Gates has backed his words with money. The Bill & Melinda Gates Foundation, he reported, has spent \$1.9-billion to "establish 1,124 new high schools and improve 761 existing high schools." The Gates-supported schools have as "common elements" such anodyne features as "high standards," "relevant, challenging course work," and "high levels of support." Gates also supports "great transparency and accountability."

The sheer magnitude of the effort could make a dent, the way Andrew Carnegie's libraries opened the world of books to millions of Americans. I applaud the philanthropy and hope Gates's STEM (science, technology, engineering, and math) initiatives in Texas, Ohio, and other states bear fruit. One way culture changes is through the efforts of determined reformers, and Gates qualifies.

On the other hand, nothing in his testimony suggested recognition that American education's cultural imperatives play a role in diminishing the importance of science and technology in the eyes of the great majority of students. I don't take it as a tragedy if our top graduate programs fill up with ambitious and talented students from abroad; if we need to issue more H-1B visas to sustain our high-tech industries, let's do it with dispatch. Welcoming some of the world's most educated, talented, and ambitious scientists to our shores only strengthens the nation. But the apathy of so many homegrown American students to the intellectual challenges of science is something else — something that building schools, multiplying computers, and ginning up STEM programs won't touch.

Bill Gates may not be the right person to tell us how to restore that mixture of awe, admiration, sheer ambition, delight in meeting difficulties, and stubborn curiosity — the patient exuberance — that draws students into the adventure of science. A few of our students catch it despite the preoccupations of their teachers and their textbooks. But what to do about the larger problem? I'm starting my own Hilbert's list.

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