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# What Scientist Shortage?

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A scientist shortage? Again? The gloomy warnings are back. They're underpinned by declines in science studies by U.S. students and a post-Sept. 11 falloff in the enrollment of foreigners, who have traditionally filled as many as half the graduate slots in U.S. universities and have taken jobs here after graduation. A crisis is in the making, says a report by a pillar of the scientific establishment, the National Science Board, which warns that the "trends threaten the economic welfare and security of our country." While the United States is losing ground, it states, other nations are increasing their production of scientists. A Nobel laureate warns of "irreversible damage." Overall, a grim picture—of questionable validity.

Obscured by the alarmist rhetoric are the repeated false alarms, erroneous forecasts and gluts of unemployed scientists—rather than shortages—that have been the reality in the scientific marketplace for decades. In the mid-1980s, government forecasters warned that the "baby bust" portended a crippling "shortfall" of 675,000 scientists over the next 20 years. By 1990 the forecast was dropped down the memory hole as joblessness increased in scientific ranks.

In 1995 an article in a publication of the American Mathematical Society noting the abundance of unemployed math PhDs observed: "At current hiring levels, it would take several years to absorb this backlog, even if all Ph.D. production suddenly ceased." The plight of chemists was summarized last year in a headline in a leading chemical journal, "Slump Continues for Chemists: Unemployment is at a record high, but opportunities exist for the well prepared."

The scientific establishment is usually united on the theme of more is better. But the disparity between party line and job statistics has grown to the point where a leading figure of science has broken with the crowd. Last February Donald Kennedy, editor of *Science*, co-wrote an editorial that asked, "Why do we keep wishing to expand the supply of scientists, even though there is no evidence of imminent shortages?"

In reply to its own question, the editorial observed that "policies are set mainly by elders, who, like the institutions that employ them, have little incentive to downsize their operations." To which it added, "We've arranged to produce more knowledge workers than we can employ, creating a labor-excess economy that keeps labor costs down and productivity high."

Average salary scales for professors show the marketplace value of different disciplines: law, \$109,478; business, \$79,931; biological and biomedical sciences, \$63,988; mathematics, \$61,761.

The failure of more Americans to pursue science studies can in part be attributed to poor high school and college programs for nurturing scientific talent. But the much-lamented turn away from science also reflects sound economic calculation. The post-college route to a science PhD usually takes five to seven years. Postdoctoral fellowships, now a commonplace requirement for most academic and many industrial jobs, run for two to three years. Postdoctoral wages average around \$35,000 a year, without benefits.

At the postdoctoral stage, fledgling scientists are well into their thirties, some in their early forties. With good luck, the next step will be a tenure-track academic appointment, which, after seven years, may or may not result in a secure job. No wonder fewer and fewer Americans opt for a career in science. Even so, jobs remain scarce.

For scientifically talented foreign students, especially from developing countries, a scientific career based on training in the United States is a wondrously appealing opportunity, usually financed by their home countries in the hope that they will bring back the benefits of science and technology. In droves, however, they choose to make their careers in the United States.

The alarmists of scientific shortage have been warning for decades that a homeward exodus of foreign scientists will someday occur. But contrary to this expectation, the "stay" rates of foreign doctoral students have actually increased, according to the National Science Foundation, which reports that 71 percent of foreign citizens who received their PhDs in 1999 were still in the United States two years later—up from 49 percent in 1987.

The foreign-born have always played a major role in American science and technology—indispensably so in the development of the atomic bomb and the space program.

Visa disruptions arising from anti-terrorism measures have seriously interfered with foreign studies in this country, leading to abrupt declines in foreign enrollments. But remedies are already reducing these difficulties and easing entry.

There's no shortage of scientists and there's no impending crisis. The American scientific enterprise is thriving, and will continue to thrive, with its traditional mix of foreign and home-grown talent—regardless of the worry-mongers who periodically sound false alarms.

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