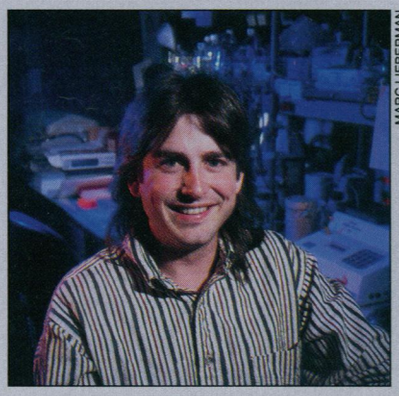
Coping With Today's Ph.D. Glut and Funding Cuts

John Quackenbush was listening to the radio when he heard astronomer Carl Sagan make a pitch for volunteers to read science books to the blind. Great, thought Quackenbush, until he heard Sagan say the program was important because "America is facing a shortage of scientists and engineers." That's when Quackenbush got mad: "I wanted to hit the radio," says Quackenbush, a 32-year-old theoretical particle physicist who's working in the genetics department at Stanford University after failing to find a job in physics.



MARC LIEBERMAN

Angry young man. Publications and awards didn't get this particle physicist a job in his field. He's doing biology now.

It's a particularly bad time to be a physicist—or, for that matter, an astronomer, chemist, mathematician, or engineer. The unemployment rate for mathematicians hit an all-time high of 5% in 1992, according to the American Mathematical Society. (The normal jobless rate is about 2%.) Membership surveys by the American Chemical Society and the American Institute of Physics indicate that job searches are taking longer than ever. Even Ph.D.s in many of the biological sciences, where opportunities once seemed unlimited, are facing a tough job market as the pharmaceutical and biotechnology industries anxiously await the outcome of the current debate on health-care reform.

"Classified ads for industry and academic jobs are down everywhere," says a spokesperson for *C&E News*, where job listings have fallen from a 1991 high of 1200 in one issue to 600 in 1993. Adds economist Alan Fechter, executive director of the National Research Council's (NRC's) Office of Scientific and Engineering Personnel, "There's no relief. Everyone is being hit hard." A recent NRC report finds a "sluggish" job market for new graduates.

What made Quackenbush especially angry was Sagan's reference to what young scientists call "The Myth." In the mid-1980s, when these young scientists entered graduate school, an idea began to circulate that the country was on the brink of a shortage of Ph.D.s triggered by mass retirements of professors hired during the boom years of the 1960s and a surging economy fueled by high-tech industries. That alarmist view was based in part on a 1987 National Science Foundation study pointing to a declining pool of college-aged students; its conclusion was picked up and disseminated by prominent figures in the scientific community as a warning that the country needed to train more researchers.

But those commentators never foresaw the recent recession, the end of the Cold War, the federal deficit, and major cutbacks in state university budgets, all of which have triggered layoffs and hiring freezes in many fields. At the same time, U.S. universities are awarding an increasing number of science and engineering Ph.D.s—the 1992 figure set a record—renewing an upward trend that had flattened during the 1970s and early 1980s. Adding to the competition is a flood of scientific talent from the former Soviet Union and Eastern bloc nations. "Right now, there's no question there's an oversupply of Ph.D.s," says Betty Vetter, a demographer who is executive director of the Commission on Professionals in Science and Technology.

Behind every statistic, there are many anecdotes of impossible odds to find a job: Quackenbush, for example, was one of 817 applicants for a tenure-track job as a physics professor at Amherst College in Massachusetts. "I didn't get very far, but I didn't take it personally," says Quackenbush, who has a Ph.D. in theoretical particle physics from the University of California, Los Angeles, a prestigious UCLA Academic Senate teaching award, and two single-author papers in *The Physical Review D* and *Physics Letters B* (as well as a distinguished postdoctoral fellowship at UCLA). Two job offers from national labs fell through when funding dried up. Today, Quackenbush considers himself fortunate to have found work in a new field, first at the Salk Institute and now at the Stanford Human Genome Center, where he can apply his sophisticated computer skills and grad-school courses in biology.

Confronted with their students' plight, many faculty members are beginning to talk about what to do about the current oversupply of Ph.D.s. Some physics departments, for example, are implementing "birth control" to limit their intellectual progeny. "When I first started talking about this in 1991, it was considered heretical," says California Institute of Technology vice provost David Goodstein, a physicist. "Now, it's striking a resonant chord."

In an e-mail survey of 50 physics departments earlier this year, Cornell University physics chairman Kurt Gottfried found that about a dozen of the best departments were hoping to reduce by one quarter the number of graduate students they admitted this fall. Cornell is going even further, admitting 19 instead of the usual 40 graduate students in physics. Cornell also is beginning to hire Ph.D.s instead of graduate students for teaching slots to create more jobs for Ph.D.s.

But Goodstein says that more drastic steps are required. The only solution to prolonged and exponential growth, he says—the number of scientists worldwide has doubled every 12.5 years from 1700 to 1950—is to reduce the number of schools offering Ph.D.s. That won't be easy: "Eliminating doctoral programs is like walking into a buzz saw," says William G. Bowen, president of the Andrew W. Mellon Foundation and former president of Princeton University, where he was criticized for cutting one doctoral program. In a recent book, *In Pursuit of the Ph.D.*, he and Harvard University president Neil Rudenstine suggest that universities, as a start, consider shutting down smaller doctoral programs, in particular, those producing fewer than four Ph.D.s a year.

With a doctoral degree no longer a ticket to a good and secure research job, some academics are re-evaluating the currency of master's degrees. Robert Birgeneau, dean of science at the Massachusetts Institute of Technology, has proposed high-quality terminal master's programs to prepare students for jobs in industry or government. These degrees would be a step above those earned by students who drop out of Ph.D. programs. "Industry has backed away from hiring Ph.D.s," says Birgeneau. "It might serve the country better by giving more students a dignified master's degree." Universities could also learn from business and other professional schools, which keep statistics on what happens to their students.

But the greatest change must come from within the scientific community. And Sagan is the first to agree: "If I were to do that ad today, I wouldn't make that point [about a shortage]. I know they're having trouble finding jobs."

–A. G.