Too many scientists, too few academic jobs

Graduate education in the sciences is not doing its job. By preparing students only for academic research, the system neglects the range of opportunities for work in science that young scientists want and society needs.

The exponential growth of the biomedical sciences during the 1960s and 1970s has created not only an extraordinary era of new scientific endeavor and innovation but a crisis of opportunity as well. The academic pipeline is full to overflowing with doctoral students from the United States and virtually every other nation in the world. However, the academic marketplace is shrinking; there are too many bright young scientists and too few university jobs.

With this imbalance between the number of jobs and qualified candidates, alternative career choices and training seem an obvious solution. Although jobs in the biotechnology industry and other alternative careers are becoming more attractive and acceptable, doctoral and postdoctoral training are still designed for life in an academic research laboratory; other career choices are still considered second best. People who do not make it in the academic world are made to feel as if they have failed. Particularly because it remains, as Stanford biologist Donald Kennedy says, "the passion of mentors to clone themselves professionally."

It is time for things to change. The structure of education in science needs to broaden to encompass a variety of professional lines of work. In addition, the large cadre of young scientists need to help their universities and faculty in finding new and equally productive ways to use science for society.

This subject, seldom talked about in years past, is finally getting the attention it needs. The future of graduate education was, for instance, the subject of a symposium here a couple of months ago that attracted 400 participants and revealed a widespread desire to open the system even to the point of creating new degrees. Given the success of the M.D.-Ph.D., what about creating programs that combine a science Ph.D. with a degree in teaching or law, in business, science policy or publishing? What about a new academic track for students who want positions in industry—positions for which the ever narrow focus of the present post-doctoral system offer no allure? Perhaps the master's degree in science should be reinvented and accorded due respect. Perhaps we should establish some new degree altogether.

ELIZABETH KERR: STANFORD

There is no disagreement about the high quality of graduate education for those who wish to pursue a career in academic research and have the talent and luck to make it. However, a love of science should not be limited to the academic life. In no other field are all students expected to want to get the same job. Thus, the prevailing attitude that only those scientists who are in academia are successful devalues other career paths and creates barriers between the scientific community and others who use their scientific training in other careers. One factor that perpetuates this problem is faculty who think they have failed if a student chooses an alternative career.

It is, however, encouraging that there are some people in the upper ranks of the scientific hierarchy who share these concerns that seem to be common to graduate students in almost every scientific field. Bruce Alberts, a biochemist who is president of the National Academy of Sciences, said at the Stanford symposium that we should "open up our science departments to a much broader community to redefine, in a sense, what science is and to include a much larger number of people with different occupations into what we call the scientific community....University systems are counterproductive in meeting our nations needs." Bridging the chasm between graduate education in science and schools of education is one example. He pointed out that careers such as elementary and high school teaching ought to be honorable options-rewarding and well rewarded by money and esteem.

The interminable length of graduate education is another issue that requires reexamination. During the past twenty years it has become common for someone to be in graduate school for seven years. A typical post doctoral fellowship now often lasts four or five years instead of two. Often, just one post doctoral fellowship is not enough to ensure academic success even though one fellowship may provide more than adequate training for scientists on other career tracks. Only in the world of academic science is it the norm for to be pushing forty before even approaching the tenure track. By then, teachers are principals and lawyers are partners.

Because of the fierce competition for academic jobs, and increasingly for good research positions in industry, graduating Ph.D.s in the biological sciences need a broader range of skills than those acquired in the standard biomedical doctoral program. We need multidisciplinary programs in science and the opportunity to learn (as part of the curriculum) about management, information technology, and teaching. The gap between generations here is great. When one faculty member said at the symposium that formal training in teaching is "not important," the young audience audibly booed.

Edward Penhoet of Chiron, a biotechnology company in Emeryville noted that in his industry teamwork and the ability to talk creatively with colleagues are valued skills. However, in the present academic world, a student pursuing a Ph.D. soon learns that research done as part of a team does little to help a scientist long the tenure track. This again demonstrates that our graduate training is not providing practical skills for work outside of academia.

There is a lot about our system of graduate education that is good. Its faults lie in its limits and its shortsightedness. In order to meet the needs of today's job market, academic biomedical training needs to diversify. Academic biomedical research needs to slow its rate of expansion but it does not follow that the pool of scientists needs to shrink. We need our scientific leaders to acknowledge the problems with our current system of graduate education and to help us develop one better suited to integrate science into the real world.

Elizabeth Kerr
Howard Hughes Medical Institute
Beckman Center B202
Stanford University Medical Center
Stanford, California 94305-5428

Kerr is a fourth year graduate student in the Program in Immunology. The symposium was organized by BioMass, Biomedical Associated Stanford Students.