

Leaving scientific careers

Leaving Science: Occupational Exit from Scientific Careers. By Anne E. Preston. New York, Russell Sage Foundation, 2004, 208 pp., \$37.50/hardback.

During the last 30 years, there has been a reduction in the percentage of U.S.-born men choosing science and engineering majors and an accompanying decline in the number of bachelor's and doctoral degrees awarded in those fields. At the same time, both governmental and private organizations have financed programs to attract young women students to science and engineering. This has been successful, and the percentage of natural science and engineering degrees awarded to women has increased from 12 percent in 1970 to 38 percent in 2002. Much attention has been focused on these two phenomena. However, the other end of the pipeline has not received its due share of attention. During this same time period, the number of professionals leaving science for other careers has dramatically increased. Anne Preston, an economics professor at Haverford College, wrote *Leaving Science: Occupational Exit from Scientific Careers* to focus attention on this problem and to provide reasons for it and possible solutions.

Preston used three different data sets in her research. The first was a stratified systematic sample collected by the National Science Foundation in 1982 of more than 100,000 respondents to the 1980 census who had reported they were scientists. The survey respondents were resurveyed in 1984, 1986, and 1989. Although the data were helpful in establishing national patterns of exit from science during a specified time period,

they had several limitations. Consequently, Preston relied more heavily on the second and third data sets. The second data set was the result of a work-history survey sent to the population of active female alumnae and a random sample of active male alumni who received degrees in science, math, or engineering from an unnamed large public university in the Northeast from the mid-1960s to 1991. Approximately 35 percent, or 1,668, of the surveys were completed and returned. The third data set was a subset of the second. From these 1,688 respondents, 26 pairs of women and another 26 pairs of men were selected to participate in interviews concerning both their education and career experiences.

The research shows that the problem begins early, as 36.5 percent of the female and 27.4 percent of the male science graduates left science even before they entered the labor market, that is, they took a nonscientific job or none at all. For those having held a job in a scientific field, both men and women were more likely to leave for nonscience employment than to remain unemployed. Women were 50 percent more likely to exit for nonscience employment, and more than 230 percent more likely (330 percent as likely) to exit employment altogether, with about 45 percent of those women doing so in order to care for their family.

Preston delved deeply into the effect of family responsibilities (spouse and children) on career outcomes and the differences between the genders in this area. She found that family responsibilities "commonly result in the reallocation of the women's time away from work and toward the family," while "for a man [they] lead to a reallocation of time toward work to increase the size

and stability of his income." Furthermore, women are much more likely to sacrifice their careers in order for their husbands to advance theirs than vice versa. On the other hand, women are also much more likely to feel that they can leave their careers in science because they have a financial cushion from their husband's income.

Preston states that there are several factors that contribute to a person's decision to exit the scientific field. These factors include low pay and lack of opportunity, inadequate or no mentoring, discontent with science itself, accelerating knowledge growth in one's area of expertise, and gender discrimination.

Low pay and lack of opportunity were the primary reasons cited by male scientists exiting the field, while for females, these reasons were mentioned, but were seldom the major causes of exit. Having a mentor in college and early in one's scientific career has a crucial impact on whether one stays in the field. However, men and women receive mentoring at significantly different rates. Primarily because males dominate the scientific field, young male scientists are much more likely than females to receive good mentoring, both formal and informal. Discontent with science itself is another reason for exit that has a significant gender difference; female scientists are more inclined to be dissatisfied with the lack of personal contact and unemotional nature of their work. However, both men and women who exited science related that they found alternative careers more interesting and rewarding. The requirement of constantly updating skills in fields where knowledge growth is accelerating is often a factor leading to exit from science. Once again this weighs more heavily on females,

who usually have less time during nonwork hours to devote to study. On the matter of gender discrimination, Preston writes, “While perceptions of discriminatory treatment and unequal opportunities were not a direct cause of exit for any of the interviewed women, a majority of the women recalled instances when they felt that they were not respected or not treated appropriately solely because of their gender.”

Preston has done an incisive analysis of the national and university data sets. She draws her conclusions based upon rigorous statistical analysis and,

as an economist, in a few cases also provides explanations in terms of economic theories, for example, using the human capital theory to explain why “income-seeking” scientists leave the field. The interviews provide a more indepth understanding of the reasons for exit than would have been obtained from relying only on the survey data. Numerous quotes from interviewees give the reader a more personal aspect and allow the reader to empathize with interviewees. This book is a valuable addition to the literature on the subject as it describes the first significant examination of this

worrisome increasing trend of exit from scientific careers. Furthermore, the policy recommendations it includes are realistic, and most of them have already been implemented in some places, but now just need to be expanded. Serious consideration should be given to these recommendations if the United States is to maintain a healthy scientific workforce.

—Ronald Johnson

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