

Advancing Minorities in Science and Engineering Careers

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I have been asked to talk about a study I conducted between 1993 and 1995 on African American Ph.D. chemists. At that time, about 400 or so African-Americans had received Ph.D.s in chemistry. In this study, a random sample of 45 chemists was selected for interviews. All were U.S. citizens who had received their Ph.D.s prior to 1994. Even today we have very scant information about the experiences of ethnic and racial minorities in the scientific and technical workplace. This is the focus of my presentation today.

The study, which was conducted as a cohort analysis, parallels a study I conducted earlier that was published in my first book, *Black Scientists, White Society and Colorless Science: A Study of Universalism in America*, (Associated Faculty Press, Inc., 1985). The first study examined career patterns of both African-American and Caucasian Ph.D. scientists in the United States. In both studies, the cohorts parallel various civil rights and legislative issues. Cohort 1 received their doctorates prior to 1955; Cohort 2 between 1955 and 1964; Cohort 3 between 1965 and 1974; Cohort 4 between 1975 and 1984; and Cohort 5 between 1985 and 1994.

I will summarize some basic trends before looking at the cohorts individually, lest you think that what happened in Cohort 1 is no longer relevant to more recent cohorts. Prior to the mid-1960s, black Ph.D. chemists were employed almost exclusively in historically black colleges and universities, regardless of the institution from

which they earned the Ph.D. The second major sector of employment prior to the mid-1960s was government. As we will see later, this has changed somewhat over time.

The passage of the Civil Rights Act of 1964 brought about a sea change in the opportunity structure for African-Americans in terms of their participation in sectors of the economy from which they were previously excluded or restricted. Only with the introduction of federal legislation, did new opportunities appear. As a result, Cohort 3 is the largest cohort in the study. In terms of academic employment, only during this period were opportunity structures about equal in HBCUs, predominantly white colleges and universities, and government. Some of the people who were hired by predominantly white institutions were recruited from some of the HBCUs.

For Cohort 1 (before 1955), the opportunity structure for employment outside of HBCUs was extremely limited. A few people were employed in industry and predominantly white institutions; however, the vast majority were employed in black colleges. In some instances, very fair-skinned African-Americans “passed” in order to work outside of HBCUs. However, some individuals who could pass chose not to do so. For example, one fair-skinned interviewee related this experience. An interviewer once asked if he was Indian or Hawaiian. When he replied that he was a Negro, the interviewer’s response was that that was “too bad because it is illegal... to hire Negroes in our labs.” If the answer had been Indian or Hawaiian, he might have been hired. Ultimately, he got a job in industry, where he was very successful. Ironically, the company that first turned him down ended up being taken over by his company. Because of that one African-American, the company had to change all of its meeting sites because hotels at that time (especially in the South) were racially segregated.

In Cohort 1, a number of African-Americans graduated from the top chemistry departments. As many pointed out, they were good enough to be educated in these institutions, but not to be hired on their faculties. In one case, an interviewee was the only doctoral student to pass his preliminary exams in a very prestigious department. Nevertheless, he could not be hired on that particular faculty. One of his classmates, who had not performed as well, was hired on this faculty. According to most of the Cohort 1 respondents, this experience was typical for African-Americans who attended these schools at that time.

With Cohort 2 (1955-1964), we begin to see the results of federal regulations promulgated in the late 1950s and early 1960s. One respondent began his career in industry with a master's degree. A white technician refused to work for him, so he had to do most of his lab work himself. Because of the conflict, he decided to return to graduate school to pursue his Ph.D. Upon his return to the company in the mid-1960s, there had been a major change in how he was received. He credited federal intervention (the Civil Rights Act of 1964) for the changes in his company. In this case, he was able to get a high-level position because he fit the company's requirements—a fair-skinned African-American. According to the respondent, if the company was going to have a black person in the lab, that person would have to look as much like his white counterparts as possible. In his case, he could "pass." However, another problem he encountered was that, being single, the company exerted a lot of pressure on him to get married.

Another Cohort 2 graduate of a top program had a very good offer from one of the larger chemical companies. However, because there were so few African-

Americans with Ph.D.s in chemistry, he decided to pursue a career in academia where he could dedicate his career to increasing the number of African-Americans in chemistry.

Cohort 3 (1965-1974) was the largest cohort in the study, primarily because of anti-discrimination legislation and legal challenges to discriminatory practices. Companies and schools that violated anti discriminatory regulations could lose their federal contracts. Things began to change for Cohort 3, as more black people were able to pursue careers in industry. By the time of Cohort 4 (1975-1984), the vast majority of interviewees were pursuing careers in predominantly white colleges and universities and industry, with government a distant third. By the time of Cohort 4, respondents who took academic positions were most likely to pursue careers in institutions that were very similar, in terms of racial composition, to their undergraduate programs.

One young interviewee in Cohort 5 (1985-1994) explained that he received a number of invitations for job interviews but very few offers. The experience revealed that the myth that blacks with Ph.D.s in chemistry from very good schools had boundless opportunities was indeed a myth. The respondent was invited to apply for a faculty position. The process went on for months, and he felt that he was invited to campus only to meet an EEO requirement. Almost nine months later, the respondent received an offer, which he refused because of the way he had been treated.

Several issues emerged regarding academe. First, regardless of academic affiliation, most interviewees reported they had difficulty securing research funding, and they believed that funds were not distributed equitably. Some respondents at government funding agencies reported that non-black scientists submitted proposals that were not as well thought out but were funded based upon where the investigators were employed.

Because many respondents saw limited opportunities in major research universities, they chose industry over academe. Although some decided to pursue careers in industry for financial reasons, this was not the only consideration. Others chose to go into industry to increase black representation.

Blacks were far more likely to accept employment in companies they characterized as “welcoming.” This was reflected in a comment by one of the highest-ranking African-Americans in the chemical industry. While being recruited at the company he chose, people in human resources were very friendly and welcoming. In fact, his hosts took him to meet community leaders in both the majority and minority communities, non-profits, etc. In contrast, during a visit to another company, it was very clear that the host was a bigot. On that visit, he was taken to the most dilapidated housing and the most segregated areas of the community.

Another issue is the climate of the particular unit within the company where the individual would be working. In one company, African-American Ph.D. chemists in different units had vastly different experiences. One was struggling to confront numerous challenges and barriers. This individual had been in the same position for about 15 years. Another was in a very nurturing, welcoming environment and was flourishing. This person reported that promotions and assignments were very fair.

Some respondents felt that high-performing African-American chemists and other scientists were not recognized for their contributions. One interviewee in industry commented about his employer: “I think the administration is slower to recognize and to promote black Ph.D. scientists....”. Several interviewees said they believed that their contributions were recognized much more slowly than other people’s contributions. Many

argued that the lack of recognition translates into loss of income—from which they may never recover. Respondents also noted that even supportive environments were not static. They cited cases in which the environment had been friendly or welcoming at one time but changed when management changed.

One respondent who held a senior position in a chemical company indicated that his company tended to recruit only at select institutions where the management and the faculty had very close relationships. The respondent said, “The fact that I am the only African-American at a senior rank is due to the way the company recruits. We tend not to develop networks that would identify African-American Ph.D. chemists for recruitment.”

Many respondents took jobs in industry with the hope of staying on the research and development track and moving up through the ranks. Some respondents indicated that once they attained a certain level on the promotional ladder, it was taken away. A number of respondents who perceived that they could not reach the level of vice president of research decided to move into management. Although some were able to move into line management, most ended up in staff positions, such as equal opportunity and community relations jobs. These jobs were not on the track for upward mobility, because they were support positions rather than positions that contributed directly to a company’s bottom line.

One interviewee said that he had started at a company with tremendous hopes and motivation, believing he would be able to do significant scientific work and win outstanding scientific prizes. Over time, his optimism lessened, and he finally left the bench altogether, and with encouragement, ended up in a management position.

Turning briefly to government, we found that a number of people in the sample who had worked at various federal agencies (with missions related to science and technology) had very different experiences. Although some had done quite well, none was promoted to a senior rank. In one case, an individual who held a high-ranking position in a federal agency had applied for the position earlier, but he was passed over in favor of a colleague. In the end, the colleague did not perform well and was fired, allegedly for incompetence. Under new management, the respondent was promoted. In his new position, he had access to his own personnel records, where he learned that his previous opportunities for promotion to the senior rank had been denied because he was not considered “technical” enough. He also discovered that his critics had earned their Ph.D.s from the same university as he had and had taken similar classes.

All of the women in the study were employed in industry or academe. Most reported experiences that were similar to those of other women scientists. For women, gender mattered as much, or more than, race. Some of the women noted that chemistry in general is a very sexist field and that this was no different in academe—regardless of the racial composition of the institution. They also indicated that they were not included in the so-called invisible college or the good-old-boys network. Some women respondents reported that when they attended professional meetings, especially meetings of the American Chemical Society, their questions were not taken seriously and, in some cases, were even dismissed. Women respondents also reported being given heavier teaching loads and less respect from male students than their male counterparts.

A fairly large number of interviewees indicated that race still affects opportunity, which has also been shown in other studies of African-American

professionals. A few respondents indicated that the role of race in their careers had been insignificant. Although these respondents did not believe that race doesn't matter, they believed that, in the end, good science would be recognized.

Most respondents believed that industry provides the best opportunities for career advancement for African-American scientists. Most were not optimistic about advancement in major research universities. More than 90 percent of respondents indicated that if they had to select a career again, they would choose chemistry because of their love for the discipline. Nevertheless, they recognized that the chemistry community needs to be changed.

Finally, most of the women (and some men) reported that they would tell young women considering a career in chemistry the truth about the discrimination they are likely to encounter. Armed with this information, the respondents believed that new black chemists will be better prepared to survive and thrive.

Question and Answer Session

Suzanne Brainard (University of Washington): Do you think the findings of your research on chemists would transfer to the field of engineering? Is anyone doing similar work focused on engineering?

Dr. Pearson: Some of my earlier work included engineers, as well as other scientists. No one in my area, the sociology of science and the history of science, is focusing on including engineering. Some people outside the field are looking into these things, but their methodology is problematic. Joyce Tang, for instance, is doing some work

on Asian-Americans in engineering, but her work has been criticized for using old databases for engineering and some sciences that are fraught with policy issues. If you don't understand the policy context, your interpretations of the data can be critically flawed. One thing that probably needs to be done, and I think NACME has tried to do this, is an in-depth study of minority careers in engineering. But scholarship in this area is not at the same level as it is in science. Even in science, most studies, at least until very recently, have focused on academic careers rather than on careers in industry.