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BASICS

In 'Geek Chic' and Obama, New Hope for Lifting Women in Science

By NATALIE ANGIER

With the inauguration of an administration avowedly committed to Science as the grand elixir for the nation's economic, environmental and psycho-reputational woes, a number of scientists say that now is the time to tackle a chronic conundrum of their beloved enterprise: how to attract more women into the fold, and keep them once they are there.

Researchers who have long promoted the cause of women in science view the incoming administration with a mix of optimism and we'll-see-ism. On the one hand, they said, the new president's apparent enthusiasm for science, and the concomitant rise of "geek chic" and "smart is the new cool" memes, can only redound to the benefit of all scientists, particularly if the enthusiasm is followed by a bolus of new research funds. On the other hand, they said, how about appointing a woman to the president's personal Poindexter club, the President's Council of Advisers on Science and Technology? The designated leaders so far include superstars like Harold Varmus, a Nobel laureate, and Eric Lander, genome meister.

The Rosalind Franklin Society, a group devoted to "recognizing the work of prominent women scientists," has suggested possible co-chairwomen for the panel. Its candidates include Shirley Ann Jackson, a nuclear physicist and president of Rensselaer Polytechnic Institute, and Shirley Tilghman, a molecular biologist and president of Princeton University. Others have proposed Jacqueline Barton, a chemist and MacArthur fellow at the California Institute of Technology. Or, given the increasing importance of brain research, how about a prominent female neuroscientist like Nancy Kanwisher of the Massachusetts Institute of Technology or Carla Shatz of Stanford University?

"People say, oh, we shouldn't have quotas, but diversity is a form of excellence, and there are plenty of outstanding women out there," Jo Handelsman, president of the Franklin society and a microbiologist at the University of Wisconsin, said in an interview. "You don't have to lower your standards in the slightest — you just have to pay attention."

Some would like to see novel approaches to treating systemic problems that often work against

women's scientific ambitions. Mary Ann Mason and Marc Goulden of the University of California, Berkeley, have gathered extensive data showing stark male-female differences in the family structure and personal lives of academic researchers at the top tiers of the profession.

Surveying outcomes for 160,000 Ph.D. recipients across the United States, the researchers determined that 70 percent of male tenured professors were married with children, compared with only 44 percent of their tenured female colleagues. Twelve years or more after receiving their doctorates, tenured women were more than twice as likely as tenured men to be single and significantly more likely to be divorced. And lest all of this look like "personal choice," when the researchers asked 8,700 faculty members in the University of California system about family and work issues, nearly 40 percent of the women agreed with the statement, "I had fewer children than I wanted," compared with less than 20 percent of the men. The take-home message, Dr. Mason said in a telephone interview, is, "Men can have it all, but women can't."

From a purely Darwinian point of view, expecting a young woman to sacrifice her reproductive fitness for the sake of career advancement is simply too much, and yet the structure of academic research, in which one must spend one's 20s and early 30s as a poorly compensated and minimally empowered graduate student and postdoctoral fellow, and the remainder of one's 30s and into the low 40s working madly to earn tenure, can demand exactly that.

Nor do all young men in science accept the notion that their lab bench must double as a sleeping cot while their wives take care of the kids. In a new survey of 19,000 doctoral students at the University of California, Dr. Mason and her colleagues found that while two-thirds of the respondents either had or planned to have children, 84 percent of the women and 74 percent of the men expressed worry about the family-unfriendliness of their intended profession, and many had changed their plans accordingly. While 40 percent of the male science graduate students and 31 percent of the women said they had begun their Ph.D. programs intent on pursuing an academic career — still considered the premier path to science glory — a year or more into their studies, only 28 percent of the men and 20 percent of the women still hoped to become research scientists at a university.

Dr. Mason and other legal experts suggest that President Obama might be able to change things significantly for young women in science — and young men — by signing an executive order that would provide added family leave and parental benefits to the recipients of federal grants, a huge pool of people that includes many research scientists.

Whatever the impediments, women have made great strides in most areas of science. According to Joan Burrelli of the National Science Foundation, whereas 50 years ago women earned a piddling 8 percent of the science and engineering doctorates, by 2006 they claimed a 40 percent share. In 1973, only 6 percent of the Ph.D. scientists employed full time in academia, business or

elsewhere were women; by 2006 the number had risen to 27 percent. Over that same time frame, women's share of full professorships in the sciences quadrupled, to about 20 percent. Yet the stats vary sharply from field to field: 26 percent of full professors in the life sciences are women, but in physics, 6 percent.

For many female physicists, the mystery of women's slow progress through their ranks is nearly as baffling as the research mysteries they confront in the lab. Of course, only 6 percent of physics professors are female; only 4 to 6 percent of the matter in the universe is visible. "Sound familiar?" Evalyn Gates, the assistant director of the Kavli Institute for Cosmological Physics at the University of Chicago, said wryly.

She has urged her colleagues to attack the problem of low female numbers as they would any scientific problem, by systematically gathering data, checking their detectors, factoring out background noise. Yes, girls and women leak out of the pipeline in comparatively greater numbers than males for every scientific discipline, she said, but they fall out of physics first and fastest. Why should it be, she said, that almost half of high school students in Advanced Placement physics classes are girls, but women earn only a fifth of bachelor's degrees in physics? What turns girls away from physics so early?

Some have suggested that girls just can't handle the advanced math of physics. Yet in an analysis of high school students' performance on standardized math tests, published last summer in the journal Science, Janet Hyde and her colleagues found no gender differences in average performance, and even at the uppermost tails of achievement the discrepancies were minor and inconsistent: among whites who scored in the top 1 percent, there were two boys for every girl, whereas among Asian top scorers, there was one full girl for every nine-tenths of a boy. Besides, said Dr. Gates, female students earn half of the bachelor's degrees in another math-heavy discipline called — mathematics.

Others have insisted that women just don't like physics, perhaps because it seems cold and abstract, concerned with things rather than the flesh-and-blood focus of female-friendly fields like biology. But such reasoning, Dr. Gates said, cannot account for the fact that women earn half of the undergraduate degrees in chemistry, which is not quite plush toy material. "Something different is going on with physics, and we don't know what it is yet," she said. The culture? Bubble-headed television shows like "The Big Bang Theory," with its four nerdy male physics prodigies and the fetching blond girl next door?

The difficulties are not confined to America. Surveying some 1,350 female physicists in 70 countries, Rachel Ivie and Stacy Guo of the American Institute of Physics found that, worse than family balance issues or lack of day care options, was the problem of public perception. The women were passionate about their work. They didn't choose physics; physics chose them. Yet 80

percent agreed that attitudes about women in physics needed a serious overhaul.

As long as we're making geek chic, let's lose the Einstein 'do and moustache.