NY TIMES ARTICLE: WHY ARE THERE STILL SO FEW WOMEN IN SCIENCE?

by Neal Koblitz

Last October the magazine section of *The New York Times* published a long article by Eileen Pollack on the obstacles to women in science. In 1978 Ms. Pollack had been one of the first two women ever to earn a bachelor of science degree in physics from Yale University. She left physics (for reasons discussed below) and eventually became a professor of creative writing at the University of Michigan. In 2005, after Harvard president Lawrence Summers provoked anger by suggesting that women are intrinsically less capable than men in the hard sciences, she decided to "look up my former classmates and professors, review the research on women's performance in STEM fields [science, technology, engineering, and mathematics] and return to Yale to see what, if anything, had changed since I studied there." Not surprisingly in view of her current profession, her article is very well written — in an engaging way, it gives a good overview of a complex situation. My purpose here is to summarize the key points in Pollack's article.

First, in her own case the main reason for her crisis of confidence that caused her to leave physics was that no one encouraged her. "By the start of my senior year, I was at the top of my class, with the most experience conducting research. But not a single professor asked me if I was going on to graduate school." Thirty years later, when she interviewed her senior thesis advisor, he said, "I would have to say that what you did [as an undergraduate] was exceptional." She comments: "'Exceptional'? I echoed. Then why had he never told me?" Pollack believes that this is typical of women's experience in many fields. "The most powerful determinant of whether a woman goes on in science," she writes, "might be whether anyone encourages her to go on."

I'd like to interject a personal note. At about the same time as Pollack found faculty at Yale to be unsupportive — more precisely, four years earlier — Ann had a similar experience at Princeton, where she was graduating with a degree in history of science. None of her professors encouraged her to continue in the field. In fact, when she asked one of them (Gerald Geison) for a letter of recommendation, he said that he simply couldn't write one if she were applying to a history of science program. When she explained that she was applying "only" in history (presumably a "softer" area), he reluctantly agreed to write something. (Years later he must have been surprised when Ann was awarded a prize by the History of Science Society at its 1990 annual meeting for an article she had written in its premier journal *Isis*.) In 1974 I was the only one who encouraged Ann to go to graduate school — I had read (and typed) her senior thesis, which showed a degree of scholarly sophistication and originality of thought that was truly exceptional for an undergraduate. This was obvious to me at the time, but apparently it escaped the notice of any of her professors.

Getting back to Pollack's article, here are some of the main points she makes:

• Some things have improved greatly. For example, when she went back to interview people in the Yale physics department, she found that the chair was a prominent woman astrophysicist named Meg Urry (currently president of the American Astronomical Society). And, compared to the 1970s, a far greater percentage of undergraduate majors in

the physical sciences were female.

• However, many studies have shown that anti-women bias (often unconscious) persists on a large scale. Pollack writes:

> Last summer, researchers at Yale published a study proving that physicists, chemists and biologists are likely to view a young male scientist more favorably than a woman with the same qualifications. Presented with identical summaries of the accomplishments of two imaginary applicants, professors at six major research institutions were significantly more willing to offer the man a job. If they did hire the woman, they set her salary, on average, nearly $4,000 lower than the man's. Surprisingly, female scientists were as biased as their male counterparts.

• It is necessary to document the discriminatory attitudes that still exist and use that to argue for special efforts to encourage women. Prof. Urry told Pollack, "I've thought for a long time that understanding [that] this implicit bias exists is critical. If you believe the playing field is equal, then any action you take is privileging women. But if you know that women are being undervalued, then you must do something, because otherwise you will be losing people who are qualified."

• The cultural milieu among young people is not necessarily better now than it was in the 1970s. Pollack comments on the popularity of the TV show "The Big Bang Theory," which perpetuates an all-male, all-nerd stereotype about scientists. She also notes that "If anything, the pressures [on young women] to be conventionally feminine seem even more intense now than when I was young."

• It is important "to recognize the potential of women who discover a passion for science relatively late. Studies show that an early interest in science doesn't correlate with ability. You can be a science nut from infancy and not grow up to be good at research, Urry said, or you can come to science very late and turn out to be a whiz."

• Even women who succeed in establishing themselves in the scientific professions often experience discrimination. For example, according to a study published in 2012 by the American Institute of Physics based on a survey of 15,000 male and female physicists in 130 countries, "In almost all cultures, the female scientists received less financing, lab space, office support and grants for equipment and travel, even after the researchers controlled for differences other than sex."

• One should not be too quick to accept the notion that family pressures are the main obstacle and the main explanation for the severe under-representation of women in the hard sciences. Pollack writes:

> No one is claiming that juggling a career in physics while raising children is easy. But having a family while establishing a career as a doctor or lawyer isn't exactly easy either, and that doesn't prevent women from pursuing those callings. Urry suspects that raising a family is often the excuse women use when they leave science, when in fact they have been discouraged to the point of giving up.

• Pollack summarizes her conclusions as follows: "As so many studies have demonstrated, success in math and the hard sciences, far from being a matter of gender, is almost entirely dependent on culture — a culture that teaches girls math isn't cool and no one will date them if they excel in physics; a culture in which professors rarely encourage their

female students to continue on for advanced degrees; a culture in which success in graduate school is a matter of isolation, competition and ridiculously long hours in the lab; a culture in which female scientists are hired less frequently than men, earn less money and are allotted fewer resources."

• When women are frustrated by the lack of supportiveness or outright bias against them, they should think of the advice given by an African American graduate student Pollack interviewed: "As my mother always taught me, success is the best revenge."