

## TEACHING AN UNDERGRADUATE SEMINAR IN WOMEN AND SCIENCE

Laura E. Kay

It has been my experience that many undergraduate women hesitate from pursuing a scientific career because of a serious lack of self-confidence. They are usually the minority in their upper division science classes, and feel uncomfortable “talking science” in or out of the classroom. They may find themselves spending too much time arguing with male students (or TAs or teachers) about whether women are capable of doing scientific research, and by their senior year may be quite demoralized and stressed out. Because of heavy courseloads and laboratory work demands, the majority of science majors have not taken any women’s studies courses and have not been exposed to academic material about the history of women, the problems common to women in universities and in the professions, the experiences of women working as scientists, and the feminist debates on the enterprise of science.

To address some of these issues, I designed a seminar on ‘Women and Science’ to be offered to Barnard College (a women’s school) and Columbia College undergraduates. The course was taught through the Women’s Studies Department so that the students could receive ‘social science’ distribution credit for the seminar. The class met once a week for two hours; they were required to do a fair amount of reading and writing, and eight guests (women doctors, scientists, and engineers) came to the class on different occasions. I selected 25 of the forty students who applied to be in the seminar (and even that was too many). There were 2–4 upper division majors, each from astronomy, physics, pre-med, biology, chemistry, psychology, education, and women’s studies. The readings came from 5 or 6 books and from 500 pages of articles compiled for the course.

In her review article of the “History and Philosophy of Women in Science,” (1987), Londa Schiebinger<sup>1</sup> notes the four approaches taken by those analyzing the situation of women in science:

- “Not so few,” *e.g.*, joining other historians of women in searching for accomplishments by women in scientific areas that have been neglected by traditional historians of science,
- “Why so few,” *e.g.*, studying structural barriers to the profession of science that have served to keep out women,
- “Naturally few,” *e.g.*, looking at arguments that women are biologically unfit to be objective scientists, and
- “The Impact of the Few,” *e.g.*, discussing what effect the absence of women has had on the enterprise of science.

This seminar more or less followed this outline. The first third of the course focused on the history of women in science. The discussions were on Margaret Alic’s<sup>2</sup> book *Hypatia’s Heritage: a History of Women in Science from Antiquity Through the 19th Century*, on the history of women healers and women in the American medical profession, and on the efforts of women to become scientists in America and encountering discrimination in obtaining educational and professional credentials. Students each read a biography of a female scientist, doctor, or engineer, and reported on their

subject to the class. We also discussed the 'lost women of science'; those who dropped out early in their careers, or did not receive proper credit for their work and are thus not well known today. (Two examples that have received much attention in the last decade are the biologist Rosalind Franklin and the physicist Mileva Einstein-Maric, Albert Einstein's first wife).

The middle third of the course addressed the contemporary experiences of women in science. For this the students read first person accounts by women in science, as well as Vivian Gornick's<sup>3</sup> book *Women in Science*, which was based on interviews with 100 women scientists in 1980 and 1981. We discussed the current statistics on women in the science professions, and devoted a week to the science education of girls and women. Guest speakers attended the seminar and gave an additional perspective based on their experiences.

For the final third of the course, we explored the feminist critiques of the institutions of science. This included looking at the language of the scientific revolution (the notion of 'nature' as 'she'), and examining scientific racism in the 19th century (many good examples are presented in Gould's<sup>4</sup> *The Mismeasure of Man*; we were also impressed by how racist Darwin appears to 20th century sensibilities). Many students chose to write one of their papers on Mary Shelley's novel *Frankenstein*, which can be read as an early feminist critique of the scientific revolution. We did a section on the 'Politics of Women's Biology', and read some papers disputing the objectivity and accuracy of studies reporting gender differences in brain lateralization, aggression, hormones and math ability, etc. We talked about whether such studies will seem as unscientific to future generations as the 19th century studies discussed by Gould seem to us. We debated the question of objectivity in science (*e.g.*, the myth of the neutrality of science, the feminist critique of scientific objectivity, etc). We ended the course by reading Sue Rosser's<sup>5</sup> book *Towards a Female Friendly Science*.

Class discussion began with the readings, but often became more free-form. What I found particularly interesting was the differences in the experiences of the astronomy and physics majors compared to the biology and chemistry majors. The biology and chemistry students took most of their classes at Barnard, in courses where almost all of the students and many of the faculty are women. They seemed more confident of themselves as scientists than the physics and astronomy majors who took most of their courses at Columbia, in classrooms with primarily male students and nearly always male professors. Intense discussions ensued on issues of whether women were less competitive and aggressive than men, on how to improve educational opportunities for women, on the forgotten historical women of science, and on whether women should change to better fit the profession of science or whether science should change to accommodate the needs and interests of women.

The students generally found this class to be an extremely useful experience, because it gave them an opportunity to obtain information and discuss issues which are not covered in their science courses. Many expressed regret that they had not had time for women's studies classes earlier on in their academic career. There was variation in how much students felt empowered, or depressed, by hearing the experiences of other women scientists. But they often felt relief at finding that problems which had seemed solely individual and personal were often common among the other students in the

seminar or the authors of the articles. They also got quite excited about the more philosophical material in the last third of the course, and regretted that we ran out of time to pursue it further.

Courses on 'Gender and Science', 'Women and Science', etc. are most often taught through Women's Studies, Biology, Anthropology, or Sociology Departments. Most astronomers do not have an academic background in Women's Studies (I had a second A.B. degree from Stanford in Feminist Studies) and may feel unqualified to teach such a course. However I believe these courses are most effective when scientists are themselves involved, either as instructors, guest speakers, or co-teachers. Courses taught by historians and sociologists tend to focus more on critiques of scientific practices and institutions and may include little appreciation of why anyone wants to do science in the first place. Thus I would strongly recommend team-teaching with a person who has some background in Women's Studies.

My syllabus is available for distribution; a 300 page compendium of syllabi for courses on 'Gender and Science' can be obtained from: Dr. Roberta Pollack, Biology Dept., Occidental College, Los Angeles, CA 90041 (include a check for \$15 made out to Occidental College to cover xeroxing and postage charges).

## ENDNOTES

- <sup>1</sup>Schiebinger, Londa. 1987. "The History and Philosophy of Women in Science: A Review Essay," in *Signs: Journal of Women in Culture and Society*, vol. 12, no. 21, pp. 305-332.
- <sup>2</sup>Alic, Margaret. 1986. *Hypatia's heritage: a History of Women in Science from Antiquity Through the Nineteenth Century*. Boston: Beacon Press.
- <sup>3</sup>Gornick, Vivian. 1983. *Women in Science: Portraits From a World in Transition*. New York: Simon and Schuster.
- <sup>4</sup>Gould, Stephen J. 1981. *The Mismeasure of Man*. New York: W. W. Norton and Company.
- <sup>5</sup>Rosser, Sue. 1990. *Female Friendly Science: Applying Women's Studies Methods and Theories to Attract Students*. New York: Pergamon Press.

## ADDITIONAL REFERENCES

- Rosser, Margaret. 1982. *Women Scientists in America: Struggles and Strategies to 1940*. Baltimore: Johns Hopkins Univ. Press.
- Troemel-Ploetz, Senta. 1990. "Mileva Einstein-Maric: The Woman who did Einstein's Mathematics," in *Women's Studies International Forum*, vol. 13, no. 5, pp. 415-432.

Laura E. Kay: Dept. of Physics and Astronomy, Barnard College, and Dept. of Astronomy, Columbia University, Box 46, Pupin Hall, 538 West 120th Street, New York, NY 10027