Has Feminism Changed Science?

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Feminism has brought some remarkable changes to science. Who could have predicted just a decade ago that the chief scientist at NASA would be a woman or that the president of the foremost association of Japanese physicists would be a woman? Who would have expected to see *Science,* the premier science journal in the United States, debating whether a "female style" exists in science or the famous French physicist Marie Curie, once shunned by the prestigious Parisian Académie des Sciences, exhumed and reburied in the Pantheon, the resting place of such national heroes as Voltaire, Rousseau, and Hugo?

The current "science wars," as the unfortunate tussles between scientists and their critics are called, offer a certain measure of the successes of feminism in science. I was shocked to read in Paul Gross and Norman Levitt's *Higher Superstition* that "the only widespread, *obvious* discrimination today is against white males" (1994, 110), but I was more surprised by the depth of our agreement. Feminists and some of our most vocal opponents now agree that women should have a fair chance at careers, inside and outside academia. We agree that the "record of science, until recently, is—in its social aspect—tarnished by gender-based exclusions." We agree further that "baseless paradigms" in medicine and the behavioral sciences have been pretexts for subordinating women. "All this," Gross and Levitt claim, "is beyond dispute and generally recognized" (110). From a historical point of view, this depth of agreement marks an extraordinary change for women, who were admitted to American and European universities only about a century ago, to graduate programs even more recently, and who were told as late as 1950 that women simply need not apply for professorships in biochemistry. By this measure, we have all become feminists.

One area of disagreement remains, however, and here Gross and Levitt speak for many in proclaiming that "there are as yet no examples" of feminists uncovering sexism in the substance of science—as opposed to women

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merely being excluded from this or that area of inquiry. More than a decade ago when I wrote a review essay on gender and science for *Signs,* one of my purposes was to highlight feminist critiques that revealed "gender distortions" in science (Schiebinger 1987). Providing concrete examples of the multifarious ways that regimes of inequality produced and reproduced gender in the substance of science was an important project in 1987. Today, I want to highlight a different question: Has feminism changed science? After being in business for nearly two decades, what new insights, directions, and priorities have feminists—men or women—brought to the sciences?

Let me offer the examples of two sciences in which gender studies have made deep and lasting impressions: medicine and primatology. The late 1980s saw mainstream biomedicine's great awakening to women's health concerns. Feminists began to shower infamy upon several influential medical studies that omitted women completely—notably the 1982 "Physicians Health Study of Aspirin and Cardiovascular Disease" performed on 22,071 male physicians and 0 women and the "Multiple Risk Factor Intervention Trial" studying coronary heart disease in 15,000 men and 0 women. Even in studies where women were included, the male body typically represented the normal human; the female body has traditionally been studied as a deviation from that norm (Rosser 1994).

Beginning in the late 1980s, feminist reform in publicly funded biomedical research in the United States was pushed forward through strong measures taken by the federal government. In 1986 the National Institutes of Health (NIH) initiated a requirement that medical research include female subjects where appropriate, and in 1991 distinctively female health concerns began to be addressed by the fourteen-year $625 million Women's Health Initiative. The 1990 founding of the NIH Office of Research on Women's Health represented a triumph for feminism. Between 1990 and 1994, the U.S. Congress enacted no fewer than twenty-five pieces of legislation to improve the health of American women. While many feminists argue that these reforms in clinical and biomedical medicine have retained too narrow a focus on disease management, few deny the importance of the reforms undertaken within NIH (see Fee and Krieger 1994; Ruzek, Olesen, and Clarke 1997).

Similarly, primatology has undergone a sea change with respect to gender. The composition of the profession has changed dramatically from the 1960s, when American women received no Ph.D.s, to today, when they receive 78 percent of Ph.D.s in primatology granted each year.[1] But more

[1] I thank Trudy Turner and Linda Fedigan for these numbers. See also Fedigan 1994.

important have been the changes in the content of the science. In primatology, as in medicine, the majority of feminist changes to date have come from reevaluations of stereotypical attitudes toward both males and females. Only in the 1960s did primatologists begin questioning stereotypes of male aggression and dominance and begin looking seriously at female behavior. They began studying the significance of female bonding through matrilineal networks and analyzing female sexual assertiveness, female social strategies, female cognitive skills, and female competition. Today, in a turnabout from the 1960s, conventional wisdom on baboons recognizes that females provide social stability, while males move from group to group. Changes in primatology have been so foundational that at least one mainstream primatologist, Linda Fedigan (1997), has pronounced it a feminist science.

Of course, feminist interventions have not occurred uniformly across all of the sciences. A lack of gender neutrality can be documented in the social, medical, and life sciences, where research objects are sexed or easily imagined to have sex and gender. The physical sciences, however, have by and large resisted feminist analysis (for a number of historically specific reasons that I have discussed elsewhere [Schiebinger 1999]). Here I turn to a different question: In the instances where positive change in science has resulted from a critical awareness of gender, what has brought success?

There is a pressing need to dispel the myth that currently has a stranglehold on many feminists and nonfeminists alike—that is, the myth that women qua women are changing science, that women have been the primary architects of foundational disciplinary changes. The question of who or what might create beneficial change in science has been confused by Americans' distrust of feminism. For many, *feminism* is still a dirty word, even among those who support the advancement of professional careers for women. Especially within the sciences, people seem to prefer to discuss *women* rather than *feminism*. This refusal to acknowledge politics—to call a feminist a feminist—has led to a simple equating of women entering the profession with change in science. Many women scientists, however, have no desire to rock the boat, and women who consider themselves "old boys" often become the darlings of conservatives.

People often conflate the terms *women, gender, female, feminine,* and *feminist*. These terms, of course, have distinct meanings. A woman is a specific individual; *gender* denotes power relations between the sexes and includes men as much as it does women; *female* designates biological sex; *feminine* refers to idealized mannerisms and behaviors of women in a particular time and place; and *feminist* defines a political outlook or agenda. Emphasizing women as the crucial element in the process of change within the sciences

overlooks the hard-won successes of twenty years of academic women's studies, the role of feminist men, and much else. Introducing new questions and directions into the natural sciences requires long years of training in a discipline, sustained attention to gender studies and feminist theory, the support of universities and agencies that provide funding for such work, the existence of departments that recognize that work as tenurable, and so forth.

There is no firm starting point—no Archimedean point—that, once established, will ensure progressive reform, unless it is a critical understanding of the problem, which is in large part already available. Feminists have tended to make a distinction between getting women into science and changing knowledge. Getting women in is generally considered the easier of the two tasks. However, both require tools of gender analysis. Both are institutional *and* intellectual problems. Bringing feminism successfully into science will require difficult battles and a complex process of political and social change. Science departments cannot solve the problems themselves because the problems are deeply cultural. That does not, however, let them off the hook. Change must occur in many areas: conceptions of knowledge and research priorities, domestic relations, attitudes in schools, university structures, classroom practices, the relationship between home life and the professions, and the relationships between different nations and cultures.

Government programs are also important supports in this ongoing process. Bernadine Healy, a former head of NIH, put it simply: "Let's face it, the way to get scientists to move into a certain area is to fund that area" (*Science* 1995, 773). In the United States, advances in women's health research have been reinforced by laws requiring that grant applications include female participants in medical research. Similar efforts could be made to foster feminism in science nationwide. In Congress, the Morella Commission has called for a full review of women in science, and a federal bill proposed in 1993 would set up a seventeen-member commission to study the problems women face entering and succeeding in technical professions. No action has yet been taken (the two bills are still in committee); nonetheless, the groundwork for action has been laid. In Europe, the European Union set up a new commission in the spring of 1998 to oversee efforts to improve the status of women in European science.

These projects marry research on women and gender to government initiatives, a kind of mission-oriented science that is well precedented. The U.S. Manhattan Project was government-directed science aimed at securing national defense, and the Apollo Program to land men on the moon, the attempt to build, launch, and operate a space station, and the costly Human Genome Project are all examples of mission-oriented government

science. Governments might launch a "Feminist Science and Engineering Initiative" aimed at analyzing gender in the content of the sciences and securing equality for women in science and technical fields. Such initiatives should be collaborative efforts joining the expertise of scientists and humanists.

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