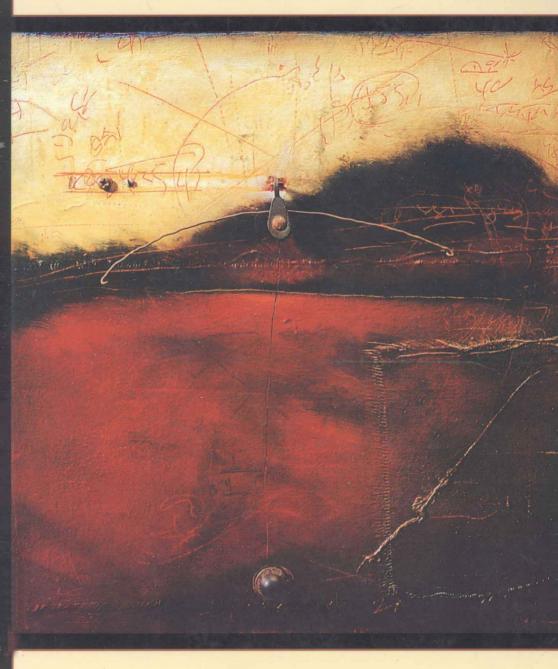
LONDA SCHIEBINGER



HAS FEMINISM
CHANGED SCIENCE?

W HAS FEMINISM CHANGED SCIENCE ?

Londa Schiebinger

HARVARD UNIVERSITY PRESS Cambridge, Massachusetts London, England

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Library of Congress Cataloging-in-Publication Data

Schiebinger, Londa L.

Has feminism changed science? / Londa Schiebinger.

p. cm.

Includes bibliographical references and index.

ISBN 0-674-38113-0 (alk. paper)

ISBN 0-674-00544-9 (pbk.)

1. Women in science. 2. Women scientists. 3. Feminism.

I. Title.

Q130.S29 1999

508.2--dc21

98-42423

HAS FEMINISM CHANGED SCIENCE?

For my parents, with love

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Acknowledgments

HIS BOOK was much harder to write than I ever imagined. I am especially grateful to the scholars who took time to guide me through the intricacies of their fields. Linda Fedigan provided crucial correctives concerning primatology along with insights into women's status in the discipline. Scott Gilbert's humor and good cheer led me through some dark and otherwise mysterious areas of biology. Amy Bug kept me from losing nerve in my conclusions to Chapter 9; and Catherine Kallin, Katherine Freese, and Elizabeth Simmons invited me to the Aspen Center for Physics, where I enjoyed not only the rarified air of the Colorado Rockies but the pleasures of frank discussion concerning gender in physics. Catherine and her husband John Berlinsky kindly read Chapter 9 and helped with several important points. Contact with Adrienne Zihlman reminded me, the historian whose subjects are usually dead, that talking to historical figures can be extremely profitable. Adrienne also supplied useful documents and viewpoints. Nancy Krieger redirected my interpretation of aspects of medical history and offered other valuable insights. Mary Golladay at the National Science Foundation graciously answered questions about statistics and sent along tomes of information.

Many of my colleagues from science departments at Pennsylvania State University amiably suffered through interviews probing their lives, their career advances, and "changes women had made in science," as I was then improperly phrasing it. These interviews became a radio series on women and minorities in science. I also had many opportunities to discuss these issues with working scientists at the Space Telescope Science Institute in Baltimore, Cornell University, the University of Chicago, Oregon



State University, Harvard University, Georg-August-Universität in Göttingen, Karlsruhe Universität, the Royal Danish Academy of Letters and Sciences in Copenhagen, the University of Lund (Sweden), and elsewhere.

A special thanks to Natalie Davis, who made possible a year at Princeton University, where this project began. Thanks, too, to Thomas Laqueur, Lorraine Daston, Roy Porter, and Everett Mendelsohn, who have been generous supporters of my projects over the years. I am indebted to Ilse Costas and Regine Kollek, who kept me up-to-date on developments regarding women and science in Germany and facilitated my lengthy visit to Germany in 1995. Thanks also to Elke Kleinau, who arranged a room for me in her institute at the University of Hamburg, where much of this book was written. Research support was provided by the National Science Foundation, the Deutsche Forschungsgemeinschaft, and the Office for Research and Graduate Studies at Penn State.

I am grateful to friends and colleagues who nodded appreciatively each and every time I told them the manuscript was finished: Nancy Brown, Mary Pickering, Claudia Swan, Susan Squier, Gillian Hadfield, France Cordova, Amy Greenberg, Sandra Harding, Margaret Jacob, Joan Landes, Dorothy Nelkin, Bonnie Smith, and Lindy Brigham. I also owe a great deal to my fine research assistants, Anne Demo and Linda Lasalle. Thanks, too, to my editor, Elizabeth Knoll, for her helpful comments.

Finally, Robert Proctor remains a loving source of inspiration and support.

HAS FEMINISM CHANGED SCIENCE?

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Introduction

Feminism has brought some remarkable changes to science. Who, just a decade ago, could have predicted that the chief scientist at NASA would be a woman, or that the Secretary of the Air Force would be a female professor of engineering? Who would have expected to see *Science*, the nation's premier scientific journal, debating whether a "female style" exists in science, or Marie Curie, once shunned by the prestigious Parisian Académie des Sciences, exhumed and reinterred in the Panthéon, the resting place of heroes like Voltaire, Rousseau, and Victor Hugo?¹

The question of gender in science is pursued by scholars from many disciplines and with widely varying perspectives. Historians study the lives of women scientists in the context of institutions that for centuries held women at arm's length; sociologists focus on women's access to the means of scientific production; biologists scrutinize how scientists have studied women; cultural critics explore normative understandings of femininity and masculinity; philosophers and historians of science analyze the influences of gender on the content and methods of the sciences.

In this book I summarize and analyze these sundry scholarly approaches. What one gains in breadth, of course, one loses in specificity. Even for specialists, however, it is useful to take stock, to reconsider the relationships among various lines of investigation and argumentation, to identify what has been done and done well, and to highlight questions that remain to be answered. Within gender studies of science, I am also trying to effect a shift away from abstract critique toward the more positive task of asking what useful changes feminism has brought to science. For long enough we have asked what science is doing wrong. It is time



to look at what gender studies can offer in the form of new perspectives, new research projects and priorities.

The literature on gender and science is scattered across the academy and often written in the dialect of a particular discipline. Philosophers and historians of science have made gender and science an area of expertise; academic positions are now being established in this field of study. But knowledge that has been so assiduously culled from archives is still little known among scientists, even sometimes among those with a keen interest in the topic. Lack of time and the rigors of the laboratory are clearly reasons. But, more than that, this literature is sometimes difficult—written in the high and sometimes esoteric language often required of academic humanists for advancement within their profession. At one level, I see this book as a translation project, an attempt to make clear to readers of diverse backgrounds and interests the important issues concerning the place of women and gender in science.

The current "science wars," as the often-childish tussles between scientists and their critics are unfortunately called, provide 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," but I was more surprised at the extent of our agreement. Feminists and some of their most vocal opponents agree that women should have a fair chance at careers, inside and outside academic life. We agree that some women thinkers have been rightfully restored to their place in history. 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 is beyond dispute and generally recognized," Gross and Levitt claim, even among political conservatives. This depth of agreement marks an extraordinary change for women, who were admitted to American and European universities only about a century ago, admitted to graduate programs even later, and told as recently as 1950 that women need not apply for professorships in biochemistry. By this measure, it seems we have all become feminists.2

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' having uncovered sexism in the substance of science. One reason for this disagreement is that Gross and Levitt focus on feminist historians and philosophers of science and overlook the contributions of

scientists, many of whom not only apply feminist insights in their work but have contributed to feminist theory and practice. It is primatologists themselves, for example—not academic outsiders—who provocatively claim that primatology is a "feminist science." Whether or not one considers this claim justified, feminist interventions have remade foundational paradigms in the field. Nonhuman females are no longer seen as docile creatures who trade sex and reproduction for protection and food, but are studied for their own unique contributions to primate society. As we shall see, feminism has brought changes to other fields of science as well.

Blind Alleys

Feminism is a complex social phenomenon and, like any human endeavor, it has suffered its share of misadventures and traveled down a number of blind alleys, as can be seen in the trials and tribulations of liberal feminism, long the leading form of feminism in the United States and much of Western Europe.³ Who, these days, is not in favor of equal opportunity for women, or, to put a label on it, who is not a liberal feminist?

Since Mary Wollstonecraft's vigorous call for equality in her Vindication of the Rights of Woman (1792), liberal feminism has informed major legislation guaranteeing women equal education, pay, and opportunity (the Equal Pay Act of 1963; Title IX of the Education Act Amendments of 1972; the Equal Opportunity Employment Act of 1972). It is also the guiding principle of the much maligned doctrine of affirmative action, which accelerated women's entry into the professions. Liberals generally see women as the in-principle equals of men—everything else being equivalent—and therefore strive to provide women with the skills and opportunities to make it in a man's world. Feminism at this level has made such an impact that most people no longer even think of these issues as "feminist."

While liberal feminism has served women well, it also has led into certain blind alleys. In the attempt to extend the rights of "man" to women, liberals have tended to ignore gender differences, or to deny them altogether. For all practical purposes, so the thinking goes, women think and act in ways indistinguishable from men. Only women have babies, but childbirth is supposed to take place exclusively on weekends and holidays, not to disrupt the rhythm of working life. Liberal feminists tend to see sameness and assimilation as the only grounds for equality, and this often requires that women be like men—culturally or even biologi-

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cally, as when the U.S. Army introduces the "Freshette System," a plastic spout designed to give women equal opportunity to urinate while standing in the field.⁴

A second problem with liberal feminism (also called "scientific feminism," "feminist empiricism," or "equality feminism") is that it seeks to add women to normal science, leaving the latter unperturbed. Women are supposed to assimilate to science rather than vice versa; it is assumed that nothing in either the culture or the content of the sciences need change to accommodate them.⁵

In the early 1980s feminists began developing what is sometimes called "difference feminism," which embraced three basic tenets. First and foremost, difference feminism diverged from liberalism in emphasizing difference, not sameness, between men and women. (It differed from the older and more deeply entrenched tradition of biological determinism by claiming that women were fundamentally different from men by dint of culture, not nature.) Difference feminism also tended to revalue qualities that our society had devalued as "feminine," such as subjectivity, cooperation, feeling, and empathy. And the new strand of feminism argued that, in order for women to become equal in science, changes were needed not just in women but also in science classrooms, curricula, laboratories, theories, priorities, and research programs.

The philosophical roots of difference feminism can be traced to the nineteenth century, when advocates such as the German writer Elise Oelsner taught that the "superior nature of women" could reform science by directing knowledge away from the pursuit of power and toward greater equality, freedom, and fraternity for all humankind. Oelsner did not believe that feminine qualities belonged to women alone. For her, "the eternal feminine" had animated Jesus, Plato, and Schiller, men whose lives displayed supposedly feminine values—"a world-conquering virtue, readiness to self-sacrifice, warmheartedness and devotion." In our own century the psychotherapist Bruno Bettelheim held that a "specific female genius" could make valuable contributions to science.

More recently the focus on culturally specific "feminine" characteristics has prompted claims that women have distinct "ways of knowing"—including "caring" (Nel Noddings), "holism" (Hilary Rose), and "maternal thinking" (Sara Ruddick)—which purportedly have been excluded from the practices of the dominant forms of science. Carol Gilligan maintained that women speak "in a different voice" when making moral judgments, that they value context and community over abstract principles. Mary

Belenky and her colleagues, in the influential book *Women's Ways of Knowing*, suggested that women use connected knowledge, contextual thinking, and collaborative discourse rather than "separate" knowledge that privileges impersonal and abstract rules and standards.⁷

The value of difference feminism has been to refute the claim that science is gender neutral, revealing that values generally attributed to women have been excluded from science and that gender inequalities have been built into the production and structure of knowledge. But difference feminism, especially when vulgarized, can be harmful to both women and science. As postmodernists from Donna Haraway to Judith Butler have pointed out, difference feminism too easily posits a "universal woman." Women have never constituted a tightly knit group with common interests, backgrounds, values, behaviors, and mannerisms, but instead have always come from distinct classes, races, sexual orientations, generations, and countries; women have diverse histories, needs, and aspirations.8

Difference feminism has also tended to romanticize those values traditionally considered feminine. The study of the historical construction of gender differences can provide an opportunity to understand what scientists have devalued and why; it should be recognized, however, that in cultures where women are subordinate, the celebrated "feminine" or "women's ways of knowing" usually represents little more than the flip side of culturally dominant practices. In romanticizing femininity, difference feminism does little to overturn conventional stereotypes of men and women. Today's much-touted "holism," for instance, is not unique to women and often has little to offer them. Katharine Hayles points out that the incorporation of the purportedly "feminine" (sometimes improperly identified as feminist) principles of nonlinearity and turbulence into chaos theory, for example, has done nothing to increase the number of women among that theory's practitioners. While so-called feminine traits may sometimes serve as tools for critique, perhaps by allowing us to see aspects of nature that have been misunderstood or neglected, they cannot be expected to ground an entirely new kind of science.¹⁰

Another blind alley has been the search for women's distinctive "ways of knowing." Empathy, for example, has been credited with advancing primatology. In the mid-1980s Thelma Rowell of the University of California at Berkeley suggested that it was "easier for females to empathize with females," and that empathy was therefore "a covertly accepted aspect of primate studies." Jane Goodall's great empathy for chimpanzees and research subjects more generally was thought to derive from the fact that

she is female. Involvement of women in primatology was said to have brought about a revolution in the way we look at animal behavior: before the 1950s, so the story goes, primatologists caught only glimpses of the animals they sought to study. Later, in the 1950s and 1960s, primatologists (among them Japanese men) devised ways to live among the apes and, as a result, were able to observe that chimpanzees make tools, a discovery that redefined what it meant to be human.

Evelyn Fox Keller's writings about the cytogeneticist Barbara Mc-Clintock were taken as evidence that women had their own distinctive methods of research. Though McClintock was not a feminist, Keller's portrayal of McClintock's "feeling for the organism" captured the popular imagination, becoming an icon for a supposed "feminine" or, at times, even a "feminist" science. According to Keller's account, McClintock exuded a close affinity for her research subjects, listening to "hear what the material has to say to you . . . [to] let it come to you." Keller's notion of this feeling for the organism is more complex than generally understood, based as it is on an appreciation of individual difference rather than any essentialist projection of gender. 12

Keller never argued that women—as a class of humans—employ distinctive research methods. But some feminists do argue this, asserting that women scientists tend to be holistic and integrative thinkers who, as a result of their socialization, are less satisfied with reductionist principles of analysis than men are. Linda and Laurence Fedigan have suggested along these lines that "the values traditionally defined as feminine may lead women to be generally more persistent and patient, willing to wait for the material to speak for itself rather than forcing answers out of it, and envisioning themselves as more connected to the subject matter than in control of it."¹³

Donna Haraway has noted that the methodological claims for empathy validate the feminine side of the classic dualism between feeling and objectivity, without reworking the relationship. Women have long been considered closer to nature than men. Louis Leakey reportedly sent Jane Goodall into the field because he believed women were especially patient and perceptive. Leakey commented to Sarah Hrdy in 1970, "You can send a man and a woman to church, but it is the woman who will be able to tell you what everyone had on."

Efforts to refashion science by adding traditionally feminine traits can be appealing: they create immediately life-affirming projects, alluring visions of how things could be different. The attempt to attach the good and the beautiful to women, however, can unnecessarily alienate sympathetic men. Stephen Jay Gould, for example, objected to Keller's claims for McClintock's "feeling for the organism," maintaining that male scientists also "empathize" with their subjects and that little in the supposedly "feminist" method is distinctive to women. Easy stereotypes concerning women and "feminine" qualities can prove needlessly divisive.

There are, to be sure, alternative methods of conducting research, but these are not directly related to sex or presumed womanly traits. In many instances feminism has been advanced through the use of standard methods of scholarship. A historian, for example, may ask new questions but answer them by using standard historical methods, such as archival research, textual analysis, demography, and comparison of evidence. Or a historian may devise new methods to answer new questions. When attempting to make visible the lives of women of a class that did not leave letters, diaries, or other written records, a historian may have to search out indirect sources, such as court records, that provide some glimpses into the lives of silkmakers, brewers, prostitutes, or midwives. These new methods may allow us to look at questions of gender, but the methods themselves are derived from long years of experience in archives and work with historical materials, and not from some set of allegedly feminine qualities.

So, too, in primatology. New methods encouraged the inclusion of formerly ignored research subjects—both females and low-status males. But again, these methods had no special attachment to qualities typically considered feminine (or masculine). In the 1970s Jeanne Altmann drew attention to representative sampling methods in which all individuals, not just the dominant and powerful, were observed for equal periods of time. (Primatologists had previously used "opportunistic sampling," merely recording whatever captured their attention.) Representative sampling required that primatologists evaluate the importance of events by recording their frequency and duration. Commonplace events such as eating, grooming, and lolling thus claimed their place next to the high drama of combat and sexual encounters, allowing for a more nuanced and egalitarian vision of primate society.¹⁶

Sampling methods are quantitative. Some feminists criticize quantitative methods on the grounds that quantification can miss or obscure the messy stuff of natural and social experience. In this instance, however, quantification was good for feminism, providing systematic sampling techniques that allowed primatologists to document the contributions of

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females to particular groups. Feminists need to avoid glorifying or condemning methods yanked from context: too quick a dismissal of quantitative methods limits a scholar's ability to collect and interpret data from a variety of useful perspectives. In many areas of science, as in the humanities, quantitative and qualitative studies can complement each other.

Women's historically wrought differences from men, then, cannot serve as an epistemological base for new theories and practices in the sciences. There is no "feminist" or "female" style ready to be plugged in at the laboratory bench or the clinical bedside. Feminist goals in science will not be realized through the invocation of cliché-ridden principles drawn from a mythical "lost feminine." It is time to move away from conceptions of feminist science as empathetic, nondominating, environmentalist, or "people-friendly." It is time to turn, instead, to tools of analysis by which scientific research can be developed as well as critiqued along feminist lines. I do not put forward these tools to create some special, esoteric "feminist" science, but rather to incorporate a critical awareness of gender into the basic training of young scientists and the workaday world of science.

Will Women Do Science Differently?

People often conflate the terms "women," "gender," "female," "feminine," and "feminist." These terms, however, have distinct meanings. A "woman" is a specific individual; "gender" denotes power relations between the sexes and refers to men as much as to women; "female" designates biological sex; "feminine" refers to idealized mannerisms and behaviors of women in a particular time and place which might also be adopted by men; and "feminist" defines a political outlook or agenda.

The 1980s saw lively debates about the possibility of creating a "feminist science." If gender differences cut as deeply into the cultural fabric as historians and social theorists had discovered, so the argument ran, then the gender identity of the scientist must influence the content of science. These discussions were depoliticized in the 1990s and rephrased as a question: "Do women do science differently?" Even the prestigious journal *Science* jumped rather awkwardly onto the bandwagon with its query: "Is there a 'female style' in science?" Apparently not wanting to use the dreaded term "feminist," the journal's editors chose instead to focus on a "female style," implicitly attaching the question of scientific style to bio-