Women on the Verge of a Glass-Ceiling Breakdown

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Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering. Committee on Maximizing the Potential of Women in Academic Science and Engineering; Committee on Science, Engineering, and Public Policy; National Academy of Sciences; National Academy of Engineering; and Institute of Medicine of the National Academies. National Academies Press, 2007. 348 pp., illus. $50.95 (ISBN 9780309100427 cloth).

Breaking through the Spiral Ceiling: An American Woman Becomes a DNA Scientist. Laura L. Mays Hoopes. *Lulu.com*, 2011. 176 pp. $14.00 (ISBN 9780557923205 paper).

Every Other Thursday: Stories and Strategies from Successful Women Scientists. Ellen Daniell. Yale University Press, 2008. 296 pp., illus. $17.00 (ISBN 9780300510843 paper).

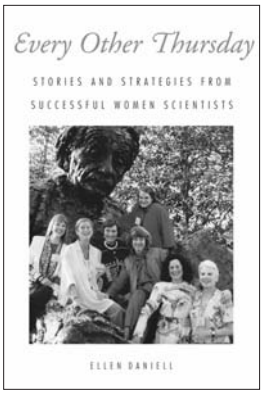
The Madame Curie Complex: The Hidden History of Women in Science. Julie Des Jardins. The Feminist Press, 2010. 352 pp., illus. $10.17 (ISBN 9781558616134 paper).

Motherhood, the Elephant in the Laboratory: Women Scientists Speak Out. Emily Monosson, ed. Cornell University Press, 2010. 232 pp., illus. $17.95 (ISBN 9780801476693 paper).

Women in Science: Then and Now. Vivian Gornick. The Feminist Press, 2009. 152 pp. $12.76 (ISBN 9781558615878 paper).

I attended my first Gordon Conference as a newly minted PhD graduate in the late 1980s. (Most Gordon Conferences, for those unfamiliar with them, are like summer camp for scientists. The participants spend a week together, often in a relatively remote location. This particular one was at a boarding school in a very small town in New Hampshire.) Although I enjoyed hearing about the new science, I dreaded the forced camaraderie of mealtimes, since I knew no one there, except by reputation, and some very famous scientists were in attendance. One evening, I sat next to an eminent (male) biochemist, and we ended up talking about the recent appointment of Dr. Maxine Singer as the new president of the Carnegie Institution of Washington, where I was a new postdoctoral fellow in the Department of Embryology. Jokingly, Dr. Eminent Biochemist said, "Well, she's a woman. What more do you women want?" I just smiled, being the shy, young person I was then, but that comment has stuck with me for more than 20 years.

The issue—growing and maintaining a successful career as a woman in the sciences—is one that remains of concern today. Most readers are likely familiar with the controversy caused by the comments of Dr. Lawrence Summers in 2005, when, as president of Harvard University, he suggested that underrepresentation of women in science in the upper echelons may be a result of aptitude differences compared with men, rather than historical patterns of discrimination against women (Marcella Bombardieri, Boston Globe). Whatever the reason, a 2011 report by the National Institutes of Health (*http://news.sciencemag.org/scienceinsider/2011/04/womens-share-of-nih-grants-drops.html?ref=hp*), concluded that older women are generally less successful at earning grants intended for established scientists, although women are well represented in early-career grant programs, which shows that women are indeed underrepresented at the senior levels. Important questions stem from this observation: Is the difference in achievement today a reflection of the difficulties that previous generations of women have had in gaining a foothold at the beginning of the pipeline and so will cease to be a problem in coming years as younger women in the pipeline mature? Or is it that women have a higher propensity to drop out of the pipeline than men, even today, and so the achievement gap will continue to be an issue in the future? If the latter is correct, what can and should be done?



A selection of books on the topic of women in science has been published recently and included several anecdotal reports from or about women scientists. *The Madame Curie Complex: The Hidden History of Women in Science* by Julie Des Jardins chronicles several important women in the past century who achieved success despite discrimination against their gender in terms of access to science education, especially at the graduate level, and to jobs in scientific fields. Starting with Marie Curie, each section describes the life and times of extraordinary women who made substantial contributions to the canon of science throughout the years. Many worked alongside husbands in unpaid, volunteer positions, since antinepotism rules at most universities were quite strict. The first stories about astronomers, and then about physicists (especially during the

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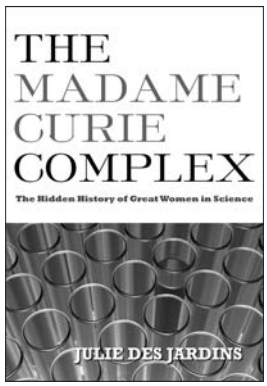
years leading up to the development of the atomic bomb), including that on Maria Goeppert Mayer, winner of the 1963 Nobel Prize in Physics, were less familiar to me, since my training is in biology. The later stories tell of significant biologists, such as primatologist

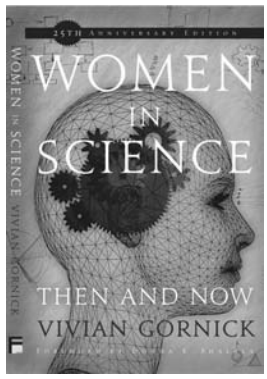


Jane Goodall (known to many through the *National Geographic* specials of the 1960s and 1970s) and Barbara McClintock, who was awarded the Nobel Prize for Medicine in 1983—more than 30 years after she discovered "jumping genes" in maize. Each of these women, in addition to mastering their science under difficult conditions (and often being the only women in their classes at school and the only women in their workplace), also had to learn how to navigate among the men who greatly outnumbered them in their fields. Des Jardins's book illustrates that different women negotiated this societal terrain with different levels of success.

Women in Science: Then and Now is a recent release and the 25th anniversary edition of an influential book by Vivian Gornick, entitled *Women in Science: Portraits from a World in Transition.* In 1983, Gornick interviewed more than 100 women scientists—not the superstars of *The Madame Curie Complex* but women in the trenches of science progress. The book is structured as three long essays. The first (Who Are These People, and What Do They Think They're Doing?) describes women who *had* to be scientists—those who brought passion, intuition, and creativity to the process. The second essay (Women in Science: Half In, Half Out) presents some of the discriminatory practices that still occurred in 1980. For example, female research associates had to hide pregnancies or return to work days after the birth of their children in order to avoid losing their jobs. The third essay (Women in Science: Demystifying the Profession) points out that despite consistent claims to the contrary over the decades, women are in fact capable of performing in science just as well as men do. In the new edition, Gornick suggests that things have improved for women in the last 25 years, but that we still have a long way to go. Discrimination today has not been fully eliminated, since few women in academia advance to the rank of full professor.

Motherhood, the Elephant in the Laboratory: Women Scientists Speak Out focuses on another issue of concern to women scientists: how to accommodate having a family around the demands of a career in science. The book consists mostly of short essays and is organized by the decade in which each woman scientist earned her terminal degree (usually a PhD)—from the 1970s through the 2000s. Emily Monosson, toxicologist and this volume's editor, documents the difficulties these women faced in carving a path that worked for themselves and their families while generating a career. She also offers valuable and extensive references on this topic. This chronological perspective allows the reader many insights. Although some aspects of efforts to seek balance between family and career have eased over the years as a result of increased institutional support (e.g., better on-site child care, mandates like the Medical and Family Leave Act), many of the stories reveal choices to leave or never enter tenure-track positions. Other difficult issues discussed by women across the decades include a lack of understanding among colleagues that reduced work comes with reduced pay, the implied (and sometimes genuine) embarrassment that someone with an advanced degree would choose to become a stay-at-home mom (one essay, by Nanette Pazdernik, is entitled "What? I Don't Need a PhD to Potty-Train My Children?"), and blatant discrimination from uninformed supervisors. These essays remind me of my postdoctoral fellowship at the National Institutes of Health when my daughter was an infant and my working hours were 6 a.m. to 3:30 p.m. No one saw that I was at work before anyone else; all they saw was that I ducked out early every afternoon. In one of the more amusing essays entitled "Mothering Primates," Devin Reese describes how she brought her training in animal behavior to the observations of her own children's development, similar to Goodall as she was described in *The Madame Curie Complex.*

Surprisingly, the tone in *Motherhood* from women who obtained their degrees in the 1970s is the most upbeat with the message that one can have it all—but maybe not all at once. Flexibility and creativity in seeking alternate paths are important, and a supportive spouse doesn't hurt, either. Perhaps this point of view comes from reflections of women in retirement, when one can evaluate the sum of one's entire career without being forced to deal with its day-to-day struggles.



Nevertheless, most of the women in the book confirm that being a scientist is something they wouldn't change, despite the pains necessary to achieve a balance.

Another book in the anecdotal realm is a new memoir from an older scientist. *Breaking Through the Spiral Ceiling: An American Woman Becomes a DNA Scientist* describes the journey taken by Laura L. Mays Hoopes, a teacher and scientist now at Pomona

College in Claremont, California. The author reflects on how her early excitement about science was often quashed by arbitrary rules and outright discriminations, and how she successfully persevered to study the molecule whose duplication she found so elegant. Her professional life is illustrated in the context of her personal life—a first marriage to an African-American man who died unexpectedly, leaving her as a single mother with a mixed-race son; a subsequent marriage to another scientist with whom she had a daughter. A selection in the book that resonates with me, in keeping with the dichotomies described in *Motherhood*, is the description of how Hoopes was torn by conflicting responsibilities—to a sick child and to the students in her class. In short, this book is an accounting of a life lived in science, which is the telling of personal and professional struggles and successes that women readers, old and young, will find poignant and familiar.

All of these books raise questions: How does one achieve success? How can one balance a professional life with family, friends, and time for oneself? An approach that works is described in *Every Other Thursday: Stories and Strategies from Successful Women Scientists* by Ellen Daniell. It is the story of "Group," seven women in the San Francisco Bay area who meet biweekly to work through professional and personal problems. *Every Other Thursday* presents the history of Group and explains the structure that these women use to help one another manage jobs requiring a myriad of different skills as well as a work–life balance. The focus is on surviving in an academic science setting (i.e., how to complete lab work, manage postdocs and grad students, write grants and papers, give conference talks, and teach), and the lessons derived are ones that translate to other professions. The tools employed by Group members exceed merely getting together to complain but, rather, form a framework for constructive ways to work through the issues.

The five books described here are primarily stories of and by women, but could it be claimed that these stories, rather than documenting the mainstream experience of women in science, are instead the complaints of the disaffected few? To counter this argument, a recent study published by the National Academies Press, called *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*, examined the institutional barriers to full equality. To quote from their conclusions:

> Women are a small portion of the science and engineering faculty members at research universities, and they typically receive fewer resources and less support than their male colleagues. The representation of women in leadership positions in our academic institutions, scientific and professional societies, and honorary organizations is low relative to the numbers of women qualified to hold these positions. It is not lack of talent but unintentional biases and outmoded institutional structures that are hindering the access and advancement of women. Neither our academic institutions nor our nation can afford such underuse of precious human capital in science and engineering. The time to take action is now. (p. 1)

So how would I now answer the question once posed to me by Dr. Eminent Biochemist at that Gordon Conference more than 20 years ago? What do we women want? To arrive at a point where one's gender (or race or ethnicity) no longer draws attention by simply being uncommon to a group. To be evaluated, equally with men, on merit in the fields of science.

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