

### III. ANALYSIS

THE “PROBLEM” OF WOMEN IN SCIENCE:  
WHY IS IT SO DIFFICULT TO CONVINC  
PEOPLE THERE IS ONE?

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You’ve heard all the statistics about women in astronomy, about women in science more generally, and the various interpretations of what those statistics mean, so that you know, without my having to tell you, that it is still very difficult to convince working scientists that there is a problem or that it is *their* problem and not the fault of women astronomers themselves.

My goal is to try to explain to you why scientists have such difficulty acknowledging the *sources* of the anomalies we’ve heard about at this meeting. Perhaps the Baltimore Charter will address some of these issues in its final form.

I have spent the past 20 years as a feminist analyst and activist—in that order—because analysis must precede activism if policy recommendations are to be effective; and the last eight of those years studying the ideology of science and science achievement. What I plan to do in this talk is to link the ideology of patriarchy and the mythologies that dominate the search for new scientific talent.

Let me start with the ideology of patriarchy. From a feminist point of view, patriarchy is the domination of a society by males whose primary purpose is to construct and to maintain a certain power relationship over women. In such a society (and we feminists believe that we live in one), much of what we take to be traditional or even “true” is really an extended political maneuver to maintain those unequal power relationships between males and females.

This does not necessarily imply a conspiracy, in which every man colludes with every other man to keep women out of power. Rather, we believe that in their enjoyment of privilege and individual advantage all (or most) men accede to the system that is in place and have no particular interest in making change.

This theory was first sketched out in modern times by the theoretician Kate Millett, who began with the observation that there were three dimensions on which males and females are differentiated: temperament, role, and status.<sup>1</sup> Ask the man on the street, ask the traditional psychologist, where sex differences lie and they will tell you first, that women are temperamentally, *i.e.*, psychologically different from men, women are more passive and men are more active; women are more dependent, men are more independent. This means women are less comfortable with and less likely to seek a life of their own. In terms of rationality, women are intuitive and rely on their feelings for truth, while men are more concerned with what is demonstrably true, and more systematic in their thinking. Consider what these “sex differences” mean for women in science.

Along dimension two—adult roles—patriarchs want people to believe that adult role differentiation is just as natural as (and, indeed, grows out of), temperamental differences. The mothering desire to marry and to make a home is as natural for females, just as is the male’s need to make his mark in the outside world. Woman is a

private entity, man a public one. And, finally, as an equally natural consequence of role differentiation, men enjoy higher status than women because what men like and do is socially more important than what women like and do.

Virginia Woolf, one of our inspirators, a novelist of the early twentieth century, once said of the differential status enjoyed by the novelists Jane Austen and Leo Tolstoy, that Tolstoy was considered the greater writer because he wrote about war and peace, while Austen limited herself to the drama of interpersonal relationships. But who decides, Woolf asked profoundly, that war is more important than interpersonal relations? Someone else—the society in which the novelists wrote and are read. Since men derive status from what they do, the argument soon becomes cyclic: what men do is more important because men do it.

Now, in the popular view, the causal chain of temperament-role-status begins with temperament and ends with status. Temperamental differences supposedly coincide with birth, and it is those temperamental differences which lead inevitably (logically and naturally) to role and status differentiations. Since the key years of professional advancement (in our era) are between twenty-five and forty, the years when “normal” women are fulfilling their mother-home yearnings, men do end up in higher status positions than women.

Thus Millett explained how patriarchy works. But her most important contribution to our thinking about our lives was simply to *reverse* that causal chain, much in the way we tell our political theory students that Marx stood Hegel on his head. Status, argued Millett, comes first in importance. For patriarchy, the most important task is to maintain the superiority of males over females. And to do this, to keep women out of power, women are assigned roles that isolate them from other adults and busy them in caretaking.

How are these different roles assigned? And what causes women to accept these assignments? In her most brilliant insight, Millett accused the people-professionals (social and behavioral scientists, therapists, and educators) of being the new “priesthood” exercising social control by redefining what is “normal” and what is not. Let a woman declare the mother role to be constricting, she is declared unnatural, abnormal, in need of “professional help.” And that, Millett helped us see so clearly (and for the first time), was the ultimate punishment for non-appropriate role behavior.

You can see why Millett’s analysis has been so powerful a motivator for the New Feminism, both because it sheds new light on so many previously accepted traditions, and because it made us angry. It was like the Copernican Revolution, standing conventional assumptions about women’s temperament, roles, and status on their head. And why so many women in the early 1970s began to look at the arrangements they had made with life, their relationship to men and other people, and had what they called the “click!” experience. When you suddenly saw your own circumstances in these political terms, something went “click!” and life was never the same thereafter.

Now how does all this bear on women in science? I think it’s clear that the temperament required for dedicated, original work—the staying-up-all-night kind of work, the I-can’t-think-about-anything-else-darling-not-even-you-tonight-because-I’ve-got-those-things-growing-in-the-petri-dish kind of intensity—is of course antithetical to what is considered normal behavior for a female. So the female finds herself in a double bind. Insofar as she experiences the feelings of the scientist, she is not feminine, and insofar as she accedes to the needs of her feminine nature, she won’t be taken seriously

as a scientist. Those childbearing years, when the woman is healthiest and has the most energy for child rearing, coincide with the peak opportunity years in any profession. And to the extent that she is tempted to take a break, the cost to a woman's career, given the dominance of the male model in science, is high. Indeed, many of the reasons women give for leaving science, and the reasons men give for not encouraging them to stay involve this double bind.

There are, in the Millett model, only three appropriate roles for women in our society. One is the mother role, the second is the wife-like role (in science, the research associate), the third is the decorative role (only possible, incidentally, when you are young). If you don't fit naturally into any of those, you're in what they call the witch-bitch trough. Look around at the careers that are considered appropriate for women, and you can readily see that they are extensions of these three roles. Working with children or old people in some nurturing capacity is of course an extension of the mother role. Women who are research associates all their lives, or secretaries, or nurses, or assistants-to are playing out for the men they serve a wife-like role. And women who entertain, in every variety of that function, are decorative objects.

Within the ideology of science there is one additional bias at work that we don't see in all the other professions. This is the powerful idea that any really good work is going to be done when the scientist is young. If a woman returns to university to do science at thirty-five, even if she intends to spend the next thirty years in full time science, her colleagues believe she's not very likely to make a major contribution. Science is a young person's game. This myth originates in data culled from eighteenth and nineteenth century science where young men didn't live very long. Most likely (and this is not just my interpretation, but that of historians of science), another variable is at work besides the number of brain cells in youth: newness to the field.

In the end, of course, knowledge is power, and so it is not surprising that any dominant group will try very hard to keep subordinate groups away from knowledge. We know that during slavery and beyond, African-Americans were forbidden from learning to read, the first tool of knowledge. In the same spirit, every colonial power has kept its "natives" to a limited educational avenue. As women seek the very highest achievements in their knowledge gains, it will bring them not only power but status, and that is exactly what the entire patriarchal structure is designed to prevent.

There have always been women scientists; we know that, especially in astronomy. How did these women scientists of yesteryear deal with these traditions and proscriptions? Mostly, as Margaret Rossiter, Evelyn Fox-Keller, and Vivian Gornick have amply documented, by accepting these restrictions and accommodating their ambitions to men's needs for domination.<sup>2</sup> Until the late 1960s, that is, until the new wave of feminism, the survival strategy of the typical American woman scientist was to persuade the men who taught her, funded her, and with whom she worked, that there were (as Betty Friedan put it baldly) three sexes: men, women, and me: "All of what must be true of women in general is not true of me," these women wanted to convey. "And to prove that to you, I will make myself as much like you, the dominant sex, as I can. I will deny my sisterhood with other women if that is the price I have to pay, deprive myself of family, if that is necessary. I'll have no spouse, pretend to have no social life, and certainly not display my sexuality in order to make you think I am not like other women, and therefore don't deserve a female's status."

There is documentation for this pattern of accommodation, and here I'm indebted to Margaret Rossiter, the historian of American women in science, who tells us that women scientists used their initials, not their first names, on research papers, to appear as much like men (that is, to disappear) as they could. Rossiter reports that such women were even reluctant to answer questionnaires about being women in a man's world. Those who were married followed their husbands as research associates, thankful to be able to do science at all.

When Gornick interviewed 100 women scientists in the 1970s, some of them by then in their sixties and seventies, they had, they reported to her, a very good life. It had not occurred to them that they might have had a better life, have done science at a much higher level had they been willing to fight for what they deserved. They had not organized, they hadn't made waves, they hadn't complained. Such women might do science, even good science, but—and this is my interpretation—being “in denial” of how their own lives and work had been affected by their gender, they could not have been very good mentors for young women. In feminist language, we would say, they had “internalized the values of their oppressors.”

Like men, they would most likely concur that, on average, women were probably not as good scientists as men, they of course being the exception. They would probably have had as little time and tolerance for gender-specific role conflict as the men they worked with. So a younger woman coming to talk about her need to schedule a pregnancy might find in the older woman scientist just as deaf an ear to her particular needs as she would find in men. Of course, there were exceptions, but denial, our historians tell us, was the norm.

When Fox-Keller's much heralded biography of the late Barbara McClintock came out, arguing that McClintock's insights into corn genetics were “feminine” in their challenge to the dominant command-and-control paradigm in mainstream cell biology, and that her isolation as a scientist was gender related, McClintock's response was “Hogwash.” She insisted that there was nothing in her work that had anything to do with maleness or femaleness. Despite bad treatment, even at the end of her life, she continued to internalize the values of the dominant class.

Today's young woman scientist has been educated—whether she acknowledges this or not—by these analyses. Feminism has been in the air for twenty years. Instead of denying her womanhood, today's woman wants to have it all. She is willing to associate with other women. She knows that the men-women-me strategy must fail. But, as she pursues her scientific career, she runs right smack into unregenerated views of what science is and what makes a good scientist that are still held by most of her male mentors and colleagues—views that are virtually unchanged in the twenty years that have passed.

Many well-intentioned graduate professors, lab directors, and deans can and do point with pride to their fairness in handling their women students, to the absence of sexism, chauvinism, and sexual harassment in their domains. And I'm sure that, individually, they are very attentive to those issues because superficially, they are liberated, too. But when a woman scientist fails or quits, or doesn't achieve her predicted potential, they still blame her. Worse yet, I will argue, they are unwilling to examine their behavior in terms of the prevailing norms (in politics we call these “belief systems”) in science.

In the few minutes remaining to me, allow me to turn your attention to how this ideology affects the teaching and recruitment of scientists. Its components are these:

First, elitism. The Baltimore Charter wants to claim that the enlargement of science to include women will bring about the betterment of science. Let me challenge you. There are tens of thousands of scientists who don't think science could be any better than it is. And if you tell them that you are going to better science there will be skepticism. They will tell you, as they recently responded to Radcliffe's president, Linda Wilson, herself a chemist, when she publicly criticized the competitiveness and "fierce rivalries" in today's science,<sup>3</sup> that they are defending "excellence." They think the quality of American science, at least at the graduate level, is the best in the world, the best it can be. Elitism, of course, also means that only a very few can do science; hence the process must be selective, weeding out all but the very fit, by means of killer first-year college courses, characterized by grading on a curve.

Second, predestinarianism—a term I borrow from seventeenth century Protestant theology. Many scientists believe that people who are going to do science are predestined and will be discovered early if at all. That's the reason that when scientists get interested in education they tend to tinker with the schooling of the very young. The Education Directorate of the National Science Foundation, to take but one example, spends over \$500 million per year on pre-college science, a mere \$70 million on undergraduate science. Why this skew? Because, many scientists believe, investment only in the very young is likely to pay off.

The third component of their dominant ideology is that, unlike most other professions, science is a calling. As a result, issues of mobility and family needs are necessarily secondary to the work itself. And this tradition not only inhibits women; it also weighs heavily on family men. A recent Ph.D. in chemistry told his chairman he didn't want to leave town right away because his wife was moving ahead in a banking job. His professor's response was to cease to help the young man find a post doc, stating: "If you're not going to take your career seriously, I don't have to." This professor spoke entirely from ideology. He had no data that men who are married to dependent wives lead more productive lives in science than men who are not. It was just his view that a scientist must focus—whatever the personal cost—continuously on his career.

And, finally, linked to all these, is what we in social science call solipsism. Solipsism is a tendency to find truth and inevitability in one's own experience. The men in science—your professors and your mentors—are going to extrapolate back from their own experience in helping you design yours. With the best of intentions, they'll say "When I was twenty-eight, I . . ." or "After my postdoc, I . . .," all of which may or may not be relevant for you. In the best circumstance, you can educate them, and explain to them why this particular career line isn't appropriate for you. In the worst possible case, as with the chemist Ph.D. just described, they may think less of you because you're not moving in familiar tracks.

None of what I have been speaking of—the elitism, the predestinarianism, the fact that science is considered a calling, their solipsism—is particularly directed against women. But these features of science, I will argue, have a disproportionately negative effect on anybody whose lifestyle or values or expectancies don't mirror theirs. Which leads me to my last point: How do we change ideology? Like religion, it is very difficult

to argue someone out of a set of beliefs which have worked very well for their colleagues and themselves, and so the feminist strategy in the nineties has had to shift from an argument about *means* to a focus on *outcomes*.

In the first stage of our drive for equity, we feminists attempted to achieve equality of opportunity or fairness, which we assumed to be synonymous with impartiality. We thought that if we could just remove structural barriers, male privilege, segregation, and gender bias, we would achieve at least educational equity. In the second stage, it became clear that even without barriers, women and men have different experiences in school. Minority students, of course, all the more. A teacher looks at you and is influenced by stereotyping, what sociologists call your “latent status,” your gender, your skin color, your ethnic origin.

It soon became obvious to feminist activists and researchers that removing barriers would not suffice, but that it would be necessary somehow to achieve *equality of experience* by means of all-girls math classes, Summermath compensatory training, career awareness, consciousness raising, and an extra dollop of math/science self-esteem. The test of whether or not there had been equality of experience would be whether or not there was *equality of outcomes*. Today, the feminist educator’s position is this: It doesn’t matter to us how an institution gets there, what rules it adopts or what rules it changes. We want to see women equally represented among the math/science majors and in the math/science professions.<sup>4</sup> If, as some longitudinal studies of gifted children show, six percent of the top one percent of math-achieving boys attain the Ph.D. in math, science, or engineering,<sup>5</sup> then we want to see six percent of the top one percent of math-achieving girls do the same. Whatever the individual behavior, we’re looking for aggregate outcomes. So for every female who drops out, there has to be some female who’s attracted in.

Finally, I’d like to assert, although I can’t yet prove this, that whatever we do to enhance the attainment of women in science is most probably going to benefit men as well. We’ve already seen evidence that those changes that make women feel more comfortable in math and science—personal attention in a more collaborative atmosphere—benefit men just as much. That is why feminists like myself are shifting our focus from individual differences to a more organizational perspective.<sup>6</sup> We are no longer asking women to adapt themselves to existing structures, but to negotiate from strength for changes in established institutions and places of work. This means we feminists and you women scientists ought not look for palliatives but for more radical action. To accomplish this, young women in science are going to have to embrace feminism and acknowledge that—and this is my commercial—you’re here because of us. There is no question in my mind that this country would not have moved off the male-dominant model had we not forced open those doors. You saw the figures today, the number of women in science over age forty compared to the number of women in science younger than forty. Whether you see yourself as “political” or not, whether out of a sense of obligation, or because it is a very exciting and important movement, I am inviting you to join us in our struggle.

There’s a terrible staple of tradition in American feminism. Every seventy-five years or so, we have to start over from scratch. Our movement disappears from the history books and from our consciousness. For the sake of yourselves, for the sake of your yet younger sisters, help us make sure this never happens again.

## ENDNOTES

- <sup>1</sup>The following is taken from Kate Millett, *Sexual Politics*, 1970.
- <sup>2</sup>Margaret Rossiter, *American Women in Science*, Volumes I and II; Evelyn Fox Keller, *Gender and Science*, Vivian Gornick, *Women in Science*.
- <sup>3</sup>"Radcliffe President Lambastes Competitiveness in Research," description of Wilson's talk at a meeting of the National Academy of Sciences on the subject of the future of the American research enterprise, as reported in *The Scientist*, January 20, 1992, pp. 3 and 7.
- <sup>4</sup>Elizabeth Fennema, "Justice, Equity, and Mathematics Education," in E. Fennema and G. Leader, *Mathematics and Gender*, New York: Teachers College Press, 1990, 1–10.
- <sup>5</sup>Camilla Benbow, papers (1992).
- <sup>6</sup>Mary Frank Fox, sociologist of science, Pennsylvania State University, takes this position in her writing. Personal communication to the author.

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