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## A CRITICAL OVERVIEW OF FEMINIST SCIENCE(S)

MEGAN IVERSON

Feminist activity has traditionally been an investigation and criticism of today's fundamental intellectual beliefs. Since the late 1970s, feminists have extended their critique to science. In their investigations, they have enumerated the low percentage of women employed in the various professions that are termed "hard science,"<sup>1</sup> and criticized the often sexist and androcentric explanations traditionally utilized by the profession. Some have even gone so far as to reject science's emphasis on rationality, because reason is a trait which is stereotypically denied to women (Longino and Hammonds, 164). Different feminist critiques usually state that science needs to change in at least one of the above mentioned areas, and some come to the additional conclusion that science needs to relinquish its dominant place in modern society.

Although these recommendations seem simple, the exact manner in which science needs to change is a crucial (and largely unanswered) question. In this paper, I will attempt to summarize how various feminist camps would change science by examining the three problems with science listed above.<sup>2</sup> This will, I hope, lead to an understanding of those feminist criticisms that help to refine science, making it more truly that which it purports to be, and those that wish to change science, making it something else.

It is important to emphasize that through the former type of criticism, science, *qua* definition, will not be changed while science, *qua* activity, will have to be modified drastically in

many cases. For these feminists, the most troublesome problem with science pertains to the questions that many scientists ask (which often assume the inferiority of women and minority groups), and to the conclusions that these already tainted experiments reach. These critics are committed to revealing the androcentric, sexist, and racist assumptions that riddle science's iron mask of objectivity.

The latter type of criticism, presented by the more radical feminists, desires to change the actual *definition* of science. After explaining this type of criticism, I will argue that these ideal revisions do not even represent a picture of a new science. Instead, under the guise of rejecting rationality, these writers describe a science that varies little from the science of today, even in its actual *practice*. On the other hand, if their critique does advocate a genuine redefinition of science, the recommended change shifts the focus of scientific knowledge so greatly that it is no longer recognizable as scientific knowledge, and is instead poetic knowledge.<sup>3</sup>

### **Feminist-Advocated Revisions to Science**

The first charge, that there are not many women in science, seems simple enough to explain: there are fewer women in most traditionally male careers. Moreover, just like most male-dominated fields, it is difficult for women to integrate themselves into the system for a variety of reasons. Feminists, however, see a special problem with science. They link the difference in numbers with current practices of science itself. Feminist analysts claim that fewer women go into science *as a consequence* of the male bias and emphasis on rationality. Therefore, the explanation of the first problem will come with examination of the other two.

Results in science are often tainted by human bias, a second problem that feminists find. While bias is inherent in any human endeavor, it is especially dangerous in science, as Westernized society has often permitted science to claim complete (or near complete) impartiality. Thus, it has

traditionally been difficult to question the results of science, even though the conclusions of science should be open to doubt and questioning from their inception.

Bias of some kind sneaks into the conclusions of every scientific study. Without explanation, data is a useless set of numbers, and so a scientist must "reveal" its significance through interpretation. As many philosophers of science have revealed, the number of interpretations to any set of data is as limitless as the human imagination (see Popper). As scientists process the data, the information travels through many filters in their brains, and one of these filters is the social roles in the scientists' society (which is, for the most part, Westernized society). Therefore, rationalization of social roles automatically and unconsciously occurs in all but the most exacting of minds. In this manner, social roles are discreetly able to affect the results of science, while these scientists mistakenly think that science (or, more exactly, biology) originally determined social roles. Thus, science tends to confirm the social roles that it has supposedly tested impartially.<sup>4</sup> In this case of blind leading the blind, the circularity causes a constriction, binding those already less powerful into their supposedly "nature-given" roles of weakness, which has a tendency to hinder social reform. How, for example, can women be treated as equals to men if science says that they are inferior, even if, as these critiques say, this is precisely *because* women are treated as inferior?

The same criticism applies for the bias feminists find in the research programs of science, but this problem is much more difficult to detect. According to the scientific method, in the initial stages of research, scientists must form a hypothesis. Feminist scientists have found that these hypotheses are often loaded questions, assuming superiority of white males, who are, incidentally, the people doing the research.<sup>5</sup> Additionally, the questions asked often benefit the male scientists exclusively, eliminating women from the studies.<sup>6</sup> If the research continually excludes females from its studies or asks questions that assume that women are inferior, science *cannot* reveal the truth for which it is searching.

The writers who advocate the previously enumerated revisions are not trying to change the manner in which we should do science *ideally*; it is merely assisting scientists in making the scientific method be everything it purports to be. I believe that the revelation of problems in science is the major contribution of the feminist critique, although it could be seen as less of a feminist critique and more of another (previously overlooked) dimension of the ongoing analysis of science's limitations. The term "feminist" stems only from the aspect of science that it criticizes. Although it is impossible to eliminate all bias in science, this "feminist" critique is necessary since the uncriticized science was biased against more than half of the world population.

### **The Problem with Rationality**

Many feminist writers are interested in modifying the practice of science itself; they consider science, as it is currently styled, to be an inherently sexist endeavor. Ultimately, a feminist critique of science that wants to change science itself has to undermine one of the foundational beliefs in science and rebuild the discipline with a new goal in mind. The pillar that the more radical feminists seek to remove is science's—and consequently, all of Westernized scientific society's—emphasis on rationality. The remainder of this paper will discuss the problem with rationality for feminist theorists, and the problems these theories endure as a direct result of the rejection of rationality.

Although no "feminist science" says that women are not rational (indeed, this would undermine the women's movement), many of the more radical feminists say that rationality is not women's only way of obtaining knowledge. Each of these "standpoint feminists" and "contextual empiricists"<sup>7</sup> are very clear on that matter, but they are less clear when describing exactly what knowledge these women can accrue. When science enters the picture, the confusion becomes even greater: for how can women share their special

knowledge (which they would have to do in order to contribute to science)? This knowledge certainly cannot be considered reproducible if it is not even possible to explain what kind of knowledge it is, and yet explanation seems withheld. Helen Longino seems to notice a lack as well:

It is . . . hard to find commitments to particular epistemological theories, where by an epistemological theory we mean a justificatory theory. Instead, we find recipes for inquiry, suggested procedures for deciphering nature, none of which amount to criteria of justification (Longino and Hammonds, 174).

The women who posit feminist science prototypes do not give us any way to verify science studied under their theories. This almost seems to be the point—everyone can have different knowledge. Therefore, there can be several “truths” for one physical phenomenon. One should distinguish this from the views of anti-realists, who think that no one can know the truth so the theory that fits the data most perfectly is the best theory. Many feminist scientists seem to feel that each separate “truth” is The Truth.

As long as people want knowledge simply for the pleasure and satisfaction that it brings to the soul, a system of multiple truths is fine. However, most of the more radical feminist theories have a further requirement. Most require that science have a specific research program—it should seek to perform certain duties in the world. This is a useful by-product of the feminist examination of scientific programs. Once it was revealed that scientific programs were value-laden rather than objective, it was possible for people to choose a value to espouse within the scientific program. Feminist writers such as Mary Tiles and Evelyn Fox Keller argue that, in the past, value was an understanding of nature obtained through domination.<sup>8</sup> This domination produced ways in which humans could use nature. Tiles assumes (in a rather forceful manner) that this domination is due to the equation of knowledge in current



science with power and control over nature, or forcing nature to do our bidding. Although this equation *per se* is unique to Tiles, all of Keller's writing constantly alludes to this view of an inherently manipulative and dominating science.

The words "manipulation" and "domination" are strong euphemisms for the common scientific practice of testing in isolation and control groups. Perhaps their feminist emphasis of interaction is a better way to do science, but the question remains: can we *know* something without testing? It seems science depends on testing for the numbers and observations used in theories, and numbers are difficult to embrace without some type of isolated testing.

Feminists see this domination of nature as completely alien to the female sensibility. Instead of manipulating nature, feminists would have scientists merely observing nature and noting the interactions between its different parts. The feminist theories of Longino,<sup>9</sup> Harding (1993, 242), and Keller,<sup>10</sup> however, insist that we should replace the scientific view that values the domination of nature with a scientific program that has an all-inclusive social conscience; every human being should benefit from scientific research. Can feminists simultaneously will that we merely view interactions with a non-productive attitude while simultaneously producing information that is socially useful? They cannot. They still need some sort of testing mechanism, and current scientists have not discovered any means to do tests without being "manipulative." Perhaps this contradiction is what sparked one (non-feminist) female scientist to remark, "One still wants to know whether feminists' airplanes would stay airborne for feminist engineers" (Margarita Levin, quoted in Longino and Hammonds, 180).

It is also a problem that few writers, even as they champion a science that includes women's ways of knowing, clearly indicate the type of change that would occur. Keller is one of the writers that does give an idea of the practices of feminist science; however, her examples are entirely particular, without any sort of guidelines or directions for the type of science that

should occur if her version of feminist science were widely adopted. These examples, pulled from her own life as well as the life of Barbara McClintock (Keller, 1985), show how the rest of science did not ask the questions that she and McClintock asked.<sup>11</sup> She claims that their research questions were rejected out of hand simply because they were feminine sorts of questions. In Keller's research on slime mold aggregation, she thought that a factor other than a genetically dominant molecule caused the characteristic migration of the amoebae. Her line of questioning was not followed immediately by the scientific community, and she felt that this was due to the largely male scientific community being trapped in a mind set that explained nature through "master molecules," that is, organisms which are genetically constructed to "lead."

Fortunately I have actually performed experiments on slime mold (*dictyostelium discoideum*) myself, so I was able to understand the question that Keller was posing. She asked a question that was, for all practical purposes, *no different from questions scientists normally ask in science*, or, more specifically, why is a particular molecule the center of aggregation rather than another? Her colleagues were simply answering the question with theories they had available, which included genetic differences. Once they found that the aggregation occurred under sparse light and nutrient conditions, they discovered that Keller was in fact asking a crucial question. It is now widely accepted that aggregation is caused by one amoeba lacking either food or water and beginning to emit pulses of cyclic AMP. Although the questions that Keller asked eventually led to the best theory, she did not succeed in showing that those questions were fundamentally different from those employed by her male counterparts.

Finally, I would like to argue that if women (or people in general) are able to "know" in their own ways, this knowledge is highly subjective by definition. It cannot be shared effectively, it cannot be reproduced, and it cannot be harnessed to solve problems (even socially responsible ones), all of which are characteristics of the knowledge we now term "scientific."



With an interactionist view, knowledge comes from the way the world interacts with the “knower” personally. Keller calls this a “dynamic objectivity” (Keller 1985). She presents a similar theory, posited by Ernest Schachtel, that focuses on an allocentric, or “other-centered” perception of the world. About this type of perception, Schachtel says:

In order to have an object speak to you, you must take it for a certain time for the only one that exists, the only phenomenon which, through your devoted and exclusive love, finds itself placed at in the center of the universe. . . . [H]atred is unable to see its object in its totality (Schachtel, 225, 226; quoted in Keller 1985, 119).

Viewing an object in this way sounds more poetic or artistic than scientific (not that scientists must hate the things that they study). “Seeing an object in totality” or “letting the object speak to you” seem to be types of knowledge valued in the arts. But artistic knowledge, whatever its merits, is just that-artistic. It should not be accepted as scientific knowledge.

### **Conclusion**

This paper has shown that while science certainly has had problems with bias towards women, the feminist critiques of science remain just that—critiques of a discipline with the intention of improving the practice and refining the goals, rather than redefining the methods. Feminists are unable to reject the rational and controlled foundation of science without abandoning science (and with it, scientific knowledge) as a whole. The remaining feminist contributions to science are divided into the kind that are meant to modify science and the kind that create a necessary discourse. The former is useful to scientists, while the latter reveals to everyone the honored and central position of science in Westernized society (perhaps bringing this privilege into question). The feminists who want

to change the foundations of science, however, have not yet provided a firm enough groundwork to facilitate a move from traditional science.

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### Notes

1. In a 1990 work co-authored with Evelyn Hammonds, Helen Longino cites the percentage of women in several of these “hard science” fields: 4% of physicists, 8% of chemists, 2% of engineers, and 20% of biologists. (She does not cite her source.) I am not sure of the current percentages, nor do I know how this compares to other traditionally male-dominated fields. I am certain that less than half of the people in almost any discipline are currently female. It would be interesting, however, to compare the sexes of scientists who recently entered the various fields since, for example, the number of women currently enrolled in medical school exceeds the number of men (regardless of the fact that a large majority of the current doctors are men). This is obviously due to the fact that the older doctors are predominantly men.

2. I say *attempt* only because the recommendations are so varied, and often vague as well. Many of the critiques simply cite empirical examples of women in science without explicitly explaining how they revised the scientific canon (or how others should revise the canon based on their examples). Additionally, the “moral” of these specific stories is often that it is difficult for a woman to change fundamental beliefs in science. They chalk this up to the “woman” part of the statement rather than the “change fundamental beliefs” part, although several other critiques of science have stressed the difficulty faced by *anyone* who tries to change the fundamental beliefs of science. Additionally, this problem is not unique to science, as the fundamental beliefs of any practice are difficult to change, since those beliefs partially define the practice.

3. It is possible that this is exactly what feminists want—that is, a science that produces poetic knowledge. It would be very difficult to justify this view on any level. Why bother to change science if it turns into poetry? Why not simply abandon science altogether? The importance of science is obvious even as feminists criticize it, for none of the feminists, even the most

radical ones that are prominent enough to be included in the major texts, advocate this approach. For example, the biologist turned feminist philosopher Donna Haraway, who reads science as literature that tells a story about the person who wrote it, offers a position of less importance to science in society, not a rejection of the practice *in toto* (see Longino and Hammonds). Thus, we obviously *need*, at least for the time being, some semblance of the traditional science.

4. A perfect example of this type of bias is the “scientific” explanation of why women are usually monogamous while men are less faithful to their mates. The interpretation of Darwin’s theories seems to indicate that a main goal of all living things is to pass on as many genes to the next generation as possible. Science used this to explain the sexual patterns in humans—women try to have one mate to help rear the child, while men try to scatter their seed to the wind. This explanation completely rules out the factors that traditional female roles have had on their sexual behavior; in the past, a wife could have met with severe punishment for breaking this “biological” rule. Even today the social structure is such that sexually promiscuous behavior is deplorable for women, but more acceptable for men. Is this rule really explaining behavior, or are social roles predetermining the conclusions?

5. This brings to mind the research program described by Okruhlik (1998, 196). She describes the search by scientists for a possible physical reason that women are less intelligent. The scientists continually changed their hypothesis to find some interpretation of size in which men’s brains were bigger than both women’s and other animals’. (Compared to men’s brains, elephants’ are physically larger, and women’s are larger in a proportion of brain mass to body mass.) The research continued without accepting the apparent conclusion to the research—that the question they were asking was not valid, and women are not mentally inferior to men.

6. An illustrative example of this was seen most often in medical research programs, where men were assumed to be the “normal” human and all of the findings about males were

extended to females. This type of practice is rare in medicine today, due to research control.

7. For definitions of these terms, see Harding 1996, 237-42. The exact definitions are not necessary for the purposes of this paper; suffice to say that both of these views allow that women's knowledge is not a merely rational process.

8. Keller (1985) deals with this domination, which is mainly propagated through language. For example, she cites a work by Anthony Storr, which quotes a scientist, when referring to a scientific problem, as saying, "I'll beat the bastard!" Keller interprets "the bastard" to be nature, but "the bastard" could just as easily be a problem of fitting theory to nature. She may think both of these interpretations mean the same thing; I do not.

9. The question that science needs to ask is, "Which philosophical position is most likely to promote social change?" (Longino and Hammonds, 165)

10. See Longino and Hammonds, 167-69; Longino phrases Keller's belief that "human needs drive science."

11. Keller was trying to reject a "master molecule" in a theory of slime mold aggregation, and McClintock was trying to demonstrate that the environment affects DNA, just as DNA affects the living organism and (ultimately) the living environment.