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Profitable Promises: Essays on Women, Science, and Health

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**In a Science Restructured Along Feminist Lines,
Would the Laws of Gravity No Longer Hold?**

By:

Ruth Hubbard

Though we see the same *world*, we see it through different eyes.

Virginia Woolf,

Three Guineas

The feminist insights that have resulted in restructuring knowledge in the humanities and social sciences have hardly touched the natural sciences. Even at my own university, which is not known to be at the forefront of the feminist revolution, the *Harvard Crimson* has complained that too few faculty members in the English department were versed in feminist scholarship to make the department attractive to graduate students. A similar situation would be unthinkable in the sciences.¹

The reason is that scientists (meaning natural scientists) believe that they simply render nature as it is. They equate science with nature, or the closest approximation to it that they can technically achieve, because they believe that what we call nature, as well as the scientific processes of investigating it, are universal and independent of human history and culture. Scientists, they believe, try to come as close as they can to rendering nature and they do so objectively, that is, irrespective of their personal or cultural commitments. The degree to which they succeed in comprehending nature and making it comprehensible to others determines the quality of their scientific work—whether it is good or bad science.

In contrast, I would answer the question with which I entitle this essay by saying that in a feminist universe apples will indeed continue to fall unless someone throws them up in the air, but this does not mean that all attempts to understand this reality scientifically would necessarily produce the laws of gravity as we know them.

The point is that both nature and the sciences that try to explicate it are cultural constructs that operate for specific purposes and serve the contexts in which they are produced. This is not to deny that nature exists; but our conceptions of it, even prior to any conscious effort at description or explanation, necessarily are interpretations, and embedded in history and culture.²

Scientific Objectivity

That scientists have difficulty understanding this situation is due to their belief that the methodology of science ensures objectivity. Scientific experimentation and verification, they argue, are accessible to anyone and results are "true" only to the extent that they can be replicated and shared by whoever wishes to try. Therefore, there can be no question of subjectivity or cultural bias. One way they achieve this illusion of universality is by erasing the scientist/agent and reporting their observations in phrases that begin with "It has been observed that..." or "It will be seen that..."

I agree that subjectivity and bias can be reduced within the limited context of a scientific experiment, whose questions and parameters are precisely defined and isolated from the wider world in which the scientists and their experiments are situated. But objectivity, so deemed, cannot guard against the biases and commitments shared by substantial interest groups, and it can avoid them even less if these commitments are shared by the entire culture. This is why reputable nineteenth-century biologist were able to "prove" that the brains of women and of African American men were smaller than those of Euro-American males and how Arthur Jensen in 1969 was able to "prove" that the IQ of African Americans is lower than that of Americans of European descent.³

Feminists recognize that subjectivity is unavoidable. To acknowledge it enhances our ability to appraise our relationship to the objects and people among whom we live and work. Not only is the personal political, but it informs all our thoughts and actions. We can deny our subjectivity only by ignoring it, because we cannot eliminate it. This realization puts us at odds with scientists who make objectivity a cornerstone of what they believe about their method of investigation. But in science, as elsewhere, objectivity exists in dynamic, dialectical tension with subjectivity. If anything, it would be enhanced to the extent that scientists acknowledged their social, philosophical, personal, and other locations relative to the objects they study.

Since scientists are a rather homogeneous group—predominantly European or Euro-American, male, upper-middle-class—and have passed through an educational process that has taught them to look at the world in specific ways, their so-called objectivity is enclosed within their shared commitments. Only by ignoring these limitations can a distinguished scientist, like my Harvard colleague E.O. Wilson, open the last chapter of his *Sociobiology: The New Synthesis*, which deals with human nature and social relationships, with the words: "Let us now consider man in the free spirit of natural history, as though we were zoologists from another planet completing a catalog of social species on earth."⁴ This statement implies not only that there is a "free spirit of natural history," but that earthly zoologists can look upon their fellow-human beings, whom

Wilson with due objectivity calls "man," as though they were "zoologists from another planet," which planet would of course have developed the same academic disciplines as Western societies.

Small wonder that the "human nature" Wilson projects is characterized by personality traits that make for success in modern capitalist societies and by gender differences that can provide achievement-oriented men with stay-at-home wives to care for these men and their children. I do not want to belabor the issue, except to point out that the fact that a distinguished scientist can offer such value-laden descriptions illustrates the apparent naiveté and ideological biases, which are among the barriers that a feminist restructuring of science will need to overcome.

Dialectical tensions between objectivity and subjectivity are inherent in feminist as well as in scientific scholarship and have been explored by Sandra Harding⁵ and others. These scholars have also begun to call attention to the systematic explorations of nature indigenous to Africa, Asia, and the so-called New World, and to the fact that these explorations have been obscured by Euro-American domination in science as well as in politics.⁶ Critics of Western science must begin to collect concrete examples of different, ordered, systematic ways of viewing and explaining nature, and that have yielded the kinds of useful knowledge that Western scientists believe arise uniquely from our way of understanding nature through science. I shall come back to this point in a little while with reference to women's traditional ways of exploring nature.

Feminist analysts and critics of science such as Carolyn Merchant and Evelyn Fox Keller have described the ways in which Western science has transformed nature from an organism into a machine, and how the transformations in ideology that accompanied the technical innovations through which nature has been made available for large-scale use and exploitation have introduced gender metaphors, so that nature has become feminine and science masculine.^{7,8} Such formulations have not entered the scientific mainstream. As with objectivity and subjectivity, a chasm still yawns between scientific and feminist views about science and nature. To the extent that conventional scientists know of the feminist analyses, they tend to brush them aside as sociology or philosophy or history of science and as irrelevant to scientific practice. They certainly do not acknowledge them as necessary to a more comprehensive, and hopefully less domineering and destructive, understanding of nature.

Animal Behavior and Human Origins

Against this bleak backdrop, it is interesting that there are two areas in which feminist thinking has, in fact, changed scientific descriptions and explanations—the study of animal behavior and of human origins. Here a rich literature has developed in which feminist reappraisals have made a difference. So let us look at this point of light, lest my entire discussion be cast in gloom.

In 1948 Ruth Herschberger caricatured the standard experimental approaches of sex differences research and the resulting descriptions of primate behavior.⁹ But her

delightful book got little notice until it was resurrected in the 1970s, when feminist biologists, anthropologists, and historians of science began to recast the standard descriptions of animal behavior and of evolution and primate and human origins. In "Have Only Men Evolved?" I questioned Darwin's theory of sexual selection, which was based on the assumption that males are always in competition with each other for sexual access to all available females, while the females stand by and wait to go off with the winner.¹⁰ As we saw earlier, according to this formulation, males are therefore said to have evolved to be aggressive and competitive, females coy and choosy. In the same essay, I also called attention to the various gender assumptions underlying contemporary descriptions of animal behavior and of human origins. Book-length discussions of these topics by Sarah Blaffer Hrdy, Nancy Tanner, and others have since changed these fields.^{11,12} Recently, Donna Haraway has broadened the analysis by looking not only at underlying assumptions about gender, but also at assumptions about race, class, and colonized/colonizer status that have been incorporated into standard thinking about primate origins and behavior.¹³

In an interesting essay, Hrdy has reflected on the process by which she came to question the descriptions of primate behavior she had accepted as a student and young researcher while watching monkeys in the field.¹⁴ She argues that, in the standard male-centered accounts, "no conscious effort was made to leave...female sides to stories" out of the descriptions (p. 127), but simply no one ever troubled to look at what the females were actually doing. And she attributes the shift in focus introduced by female researchers, including herself, to their "empathy for other females" (p. 120). While I am uncomfortable with this entirely individualistic explanation that does not acknowledge the cultural and professional contexts in which scientists make their observations and formulate their explanations, this is an astonishing admission to come from a scientist who is in the mainstream of her field and, on the whole, not critical of the ordinary processes by which science is made. It suggests that scientists who study animal behavior are open to exploring the dynamic interrelations of subjectivity and objectivity which go into the initial process of making observations and into the subsequent attempts to abstract and generalize from them.

Reductionism and Hierarchy

This kind of openness to the possibility that feminist insights have something important to contribute is not shared by scientists who study the "hard" sciences, the sciences that consist of taking the objects of daily experience apart into smaller and smaller units, and eventually into "ultimate" particles.

It is a good question why, in the hierarchy of scientific fields and knowledge, the more abstract and intangible the objects under investigation, the higher the status of the field. That is what puts mathematics and the most mathematicized fields, such as theoretical physics and particle physics, at the top of the hierarchy. It is also what gives reductionism its high status, because reductionism is based on the assumption that to understand the world, we must take it apart into smaller and smaller bits. The claim is that only when we understand those bits will we be able to figure out how the whole thing works. This way

of looking at the world ignores the dialectical transformations that connect the parts with the whole. The fact is that we cannot, for example, deduce how cells function by studying the molecules inside them any more than we can predict how a society will function by studying the individuals who live in it.

It is also a good question why knowledge has to be arranged into a hierarchy altogether. Nature is not hierarchical, but the societies in which our kind of science is made are. This is presumably why, though hierarchy is not inherent in nature, we speak of higher and lower organisms as well as inventing a hierarchy of disciplines. But that does not explain why the more abstract sciences have the greatest prestige. I would guess that that has something to do with the differential valuing by Western culture of the body and the mind and of mental and manual labor.

Clearly, in a world full of real, everyday needs and of equally real dangers that grow out of short-sighted pursuits of science and technology, we must reappraise the intellectual and social frameworks that have led to considering the pursuit of increasingly rarefied realms of scientific knowledge to be an unquestioned good. To say this is heresy among my scientific colleagues, but as feminists and people concerned about human survival, we need to face this issue.

Knowledge and Experience

The Canadian feminist and metallurgist Ursula Franklin has argued that the problem with science is that it separates knowledge from experience.¹⁵ She goes on to say that that kind of practice may be all right in astronomy, where our tangible experience is necessarily minimal, but that it is dangerous when we apply it to more daily realms of experience. Turning certain aspects of daily experience into knowledge distorts our experiences because it renders those aspects abstract and unreal.

I was introduced to botany and zoology in college without ever having consciously seen an animal or plant be born, develop and grow, get old, and die. I was introduced to abstractions about genes, which at that time in scientific history were quasi-mathematical concepts devoid of material reality, before I had any experience of the richness and diversity of organic life. This may be a small example and perhaps a less dangerous one than some. Yet I could have accepted (and no doubt did accept) all kinds of destructive ways of thinking about animals and plants. I was quite ready to manipulate plants without trying to integrate what I learned about them with the realities of seeds, soils, and daily labor, or to dissect pickled animals without thinking about how they had lived and died.

Women's traditional knowledge has been embedded in daily realities and labors, and has been inextricable from experience. But, as Ursula Franklin also points out, the radical cleavage of knowledge from experience can make science seem bloodless and abstract, hence often uninteresting to girls and minority children of both sexes whose lives usually are suffused with dailyness. In addition, it downgrades the kinds of knowledge that are intimately tied to experience. Women's traditional knowledge has not been granted the status of science, since science is knowledge abstracted from its origins in daily practice.

As I said earlier, science is considered to be at its best and "hardest" when it mathematicizes nature or, at least, conceptualizes it as broken up into bits devoid of experiential counterparts. The nature described by the "softer" sciences can sometimes still be touched, but usually not by "real" scientists, only by the people who get their hands dirty, the so-called technicians. This radical division of knowledge from experience lends itself to the easy use of science for disfigurement, dismemberment, and destruction. And that is true of peaceful uses of science in agriculture or medicine as well as of its frankly destructive uses for war.

In *The Politics of Women's Biology* I have written about some models of a science more grounded in experience. I cited the women's health movement as an example, because here women have gotten together and, by comparing their experiences and checking them against the scientific descriptions, have tried to get a better understanding of the ways our bodies function. I also suggested that the knowledge women have traditionally gathered in their gardens, kitchens, and sickrooms needs to be acknowledged as scientific. A group of Canadian women have published a series of articles in which they do just that by elaborating on the scientific content of domestic agriculture, food science, and the care of birthing women and of sick people.¹⁶

Karen Messing, a geneticist and feminist at the University of Quebec, has described the problems she and her colleagues have faced when they want to answer questions that grow out of people's daily experience, such as the work practices of female and male workers.¹⁷ These researchers have encountered not only the obvious problems of funding, which in Messing's case has been made easier by an agreement between her university and the two major trade unions in the province of Quebec, but have also found scientists at other institutions less than cooperative. The work Messing and her colleagues are doing is often not considered "real science." For example, they are trying to answer questions about possible genetic damage, produced by exposure to radiation in the workplace, by consulting and examining the people who are directly affected and interested to know the answers because they work there. Yet, more traditional scientists have told Messing that the results would be more valid if she and her colleagues used animal models or isolated cells, and then extrapolated their observations to the presumed experiences of imaginary workers.

The point is that scientists are unwilling to accept feminist insights and methods not only because of traditional gender biases, but also because feminist knowledge tends to be grounded in practice, since feminists are reluctant to separate theory and practice, head and hand. The kinds of decontextualized and alienated knowledge science offers is hard to reconcile with feminist principles, whereas scientists are not eager to acknowledge the contextual location of their work and its inevitable impact on the political and personal realities of people's lives. They tend to touch on real-life implications of their research only when they engage in public relations and wish to highlight the benefits it might yield.

What's to Be Done?

As feminists, we cannot accept the idea that all knowledge is equally worth pursuing. What is more, we must insist on democratic mechanisms whereby people other than the scientists doing the work can get involved in decisions about what needs to be done. Such choices must be made on the basis of social utility, not of prestige or profit. Scientists always make choices; but they pretend that their choices are driven by the internal logic of their subject and by the free play of their educated curiosity. Yet it is dangerous to ignore the contextual framework that shapes their subject matter, their curiosity, and their choices.

Given that feminists are not content to study the world, but want to change it, what can we do to bridge the chasm I have described? We must rally our natural allies—the women and men who not only feel threatened by the scientific and technological practices that surround us, but who do not see any prospect of influencing or even understanding them. The prevailing mystification of science and technology is quite unnecessary. Ordinary people need to be able to feel pride in the knowledge and experience they accumulate in their daily lives and not always feel overshadowed by so-called experts. Those of us who are educators must make our training and skills available—and often for translation more than instruction—so that a wider range of people can participate in the process of making and distributing the knowledge that grows out of their daily experience.

Feminists in universities are in a privileged position as long as we remain grounded in the women's movement and the women's community (or rather, communities), because we can then serve as bridges between the university and our communities. Most academic scientists have outside ties only with corporate business and with government agencies, but not with community groups, whether these are organized around health or environmental issues, consumer interests, or conditions of work (such as trade unions). By contrast, I am suggesting that we must ground scientific inquiry in the needs and questions of ordinary people, if science is to be understandable and useful. This may seem a daunting task, but we must take it on if we want to help make scientists partners in a democratic enterprise. And as feminists we cannot afford to settle for less.

1. I am using the conventional short-hand of calling the natural sciences "the sciences," because that is what most people call them; but it might not be bad to adopt the German system in which all ordered knowledge is science (Wissenschaft) and we need to specify the different branches of it—literary, historical, natural, etc.

2. I discuss this more fully In *The Politics of Women's Biology* (New Brunswick: Rutgers University Press, 1990).

3. Arthur R. Jensen, "How Much Can We Boost IQ and Scholastic Achievement?" *Harvard Educational Review* 39 (Winter): 1-123, 1969.

4. Edward O. Wilson. *Sociobiology: The New Synthesis* (Cambridge: Harvard University Press, 1975), p. 547.

5. Sandra Harding, *The Science Question in Feminism* (Ithaca: Cornell University Press, 1985).
6. Sandra Harding, ed., *The Racial Economy of Science: Toward a Democratic Future* (Bloomington, Indiana: Indiana University Press, 1993).
7. Carolyn Merchant, *The Death of Nature* (San Francisco: Harper and Row, 1980).
8. Evelyn Fox Keller. *Reflections on Gender and Science* (New Haven: Yale University Press, 1985).
9. Ruth Herschberger, *Adam's Rib* (New York: Harper and Row, 1948).
10. Ruth Hubbard, "Have Only Men Evolved?" in *Women Look at Biology Looking at Women*, Ruth Hubbard, Mary Sue Henifin, and Barbara Fried, eds. (Cambridge: Schenkman Publishing Company, 1979).
11. Sarah Blaffer Hrdy, *The Woman That Never Evolved* (Cambridge: Harvard University Press, 1981).
12. Nancy M. Tanner, *On Becoming Human* (Cambridge, England: Cambridge University Press, 1981).
13. Donna Haraway. *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (New York: Routledge, 1989); see my review of Haraway's book on pp. 187-195 of this collection.
14. Sarah Blaffer Hrdy. "Empathy, Polyandry, and the Myth of the Coy Female." In *Feminist Approaches to Science*, Ruth Bleier, ed. (New York: Pergamon Press, 1986).
15. Ursula M. Franklin, *The Real World of Technology: The 1989 Massey Lectures* (Toronto: CBC Enterprises, 1990).
16. See the set of articles published in the section entitled, "Women's Practices: Another Science?/Les pratiques des femmes: une autre science?" In *Femmes et/Women and Sciences*. Karen Messing, Maria De Koninck, and Lesley Lee, eds. *Resources for Feminist Research*. Vol. 15, No. 3. November 1986.
17. Karen Messing, "Union-initiated Research In Genetic Effects of Workplace Agents." *Genewatch*, Vol. 6. Nos. 4/5, 1990.

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