SOCIAL, INSTITUTIONAL, AND CULTURAL INFLUENCES OF GENDER ON SCIENCE

JESSICA UTTS

Science today is in a sad state. What was once primarily a mechanism for exploring and solving problems and acquiring basic knowledge has turned into an ego and numbers game. Individual scientists are under tremendous pressure to publish a large quantity of papers, with less regard for quality. Whereas once scientists could pursue questions based on curiosity, now they are more likely to pursue popular research areas. This trend is particularly damaging for parapsychology because it is not considered to be a legitimate area of research by many universities.

I begin by contrasting what an ideal research environment would look like with what is currently the norm in science. In the remainder of the paper I examine the present status of women in science from the perspective that if women would enter the mainstream of science in greater numbers, we could see an unprecedented shift towards a healthier, more productive way of doing science.

As my audience is probably most familiar with the research environment in parapsychology, let me begin by asking what would constitute an ideal setting for productive research in parapsychology? Undoubtedly each reader has his or her own opinion on this question, but one hopes that most would agree on certain conditions. The following list is presented in probable decreasing order of agreement, and of course represents my opinion. First, there would be a well-funded laboratory. Next, there would be an interdisciplinary team of researchers working together, receiving equal credit. Salaries would be based on education, experience, and competence. Information would be shared both within the laboratory and with colleagues in other laboratories. Innovative research would be encouraged. There would be tightly controlled research using the best methods of experimental design and statistical analysis, and there would be exploratory research with less stringent requirements, perhaps conducted in the field instead of the laboratory. The traditional scientific epistemology, which separates the

object of study from all else, would be questioned; the system as a complex whole would be studied.

In my opinion, this description of an ideal environment extends to other areas of science as well. Yet, very little science is conducted under such conditions. Instead, there is vicious competition for recognition and funding, interdisciplinary research is devalued, women receive lower salaries than men at all levels of academia, scientists jealously guard their ideas, innovative research is neither funded nor published, and good science is defined only as that which purports to be objective, impersonal, and reductionist. In what follows, I make no attempt to explain the historical reasons for this state, but I do speculate on possibilities for the future. In particular, I argue that as women enter science in greater numbers, we could see a move towards the ideal environment I have described.

SCIENCE AS A SOCIAL SYSTEM

Scientists do not conceive or develop ideas in a vacuum. Even those who work primarily alone rely on the work of others, for science is a cumulative enterprise. But how do scientists decide what ideas are important to pursue? How do they keep current, given that journal publications are often two years out of date by the time they appear in print? Methods differ in each area of science, but the common theme is that an informal network exists, and an individual scientist is at a severe disadvantage if he of she is not a part of that network.

Crane (1972) studied the stages of growth in new areas of science. She found that after an initial period of discovery, "a few highly productive scientists set priorities for research, recruit and train students who become their collaborators, and maintain informal contact with other members of the area" (p. 40).

The Current Status of Women in the Social System

As we shall see, this system puts women at a distinct disadvantage. Women are less likely to be part of the informal network. An article in the *New York Times* (Angier, 1991) examined the reasons that there

were so few women elected to the National Academy of Sciences. Based on interviews with women scientists, Angier (1991) reported:

> Many scientific enterprises require extensive collaborations between teams of researchers. Men still seem to feel more comfortable collaborating with men than with women. Missing the information that is passed around in informal social interactions leaves women at a disadvantage. In addition, scientists from conservative countries such as Japan and the Middle Eastern cultures may be even more reluctant to collaborate with women. (p. B5)

Sandler (1986) makes this same point, and gives several examples in which women were treated as outsiders. She notes that

> each sex is often more comfortable with its own members, and the implications of this for women in academe are substantial. The discomfort of some men may make it difficult for them to mentor or sponsor women, so that women may be at a distinct disadvantage in professional advancement. (p. 8)

Sandler (1986) argues that subtle differences in treatment begin with young students and continue into the highest ranks of academia. Specific examples cited include the fact that people are more attentive when men speak than when women speak, women are more likely to be interrupted than men, and people are more likely to respond extensively to men's comments than to those made by women. Both men and women are guilty of these behaviors.

There is some indication that changes are underway. Several professional organizations have initiated programs to help support women and to encourage young girls to enter scientific professions (e.g., see Vandervoort, 1985). The National Science Foundation has several funding programs specifically for women. These programs not only have direct benefits, they also increase general awareness of the problems.

The consequences of this differential treatment of women in science can be seen by the differences in publication status for men and women. Women publish less than men, their publications are not taken as seriously, and they are less frequently cited. Cole (1979) studied research productivity for 565 academic scientists over a 12-year period and found that the median number of publications for the men in his

study was eight, whereas for the women it was only three. It is difficult to determine whether this is a result of choice or circumstance, but common myths about the cause were dispelled by Cole. He found that the difference could not be explained by marital status, family responsibility, or status of one's academic institution.

When women do publish, their work is not evaluated as highly as that of their male colleagues. In a study originally conducted by Goldberg in 1968 and repeated by Paludi and Bauer in 1983, college students were asked to rate identical articles purportedly authored by John T. McKay, Joan T. McKay, or J.T. McKay. The mean rating scores for the three names for the 1983 study are given in Table 1, where the ratings ranged from one to five, with one being most favorable. Notice that both men and women students rated the articles by "Joan" least favorably and those by "John" most favorably. Follow-up interviews indicated that most students believed the articles by "J.T." were written by a woman.

TABLE 1
Mean Rating Scores by Purported Author

Reviewed by	Article Authored by		
	John T. McKay	Joan T. McKay	J.T. McKay
Men	1.9	3.0	2.7
Women	2.3	3.0	2.6

Billard (1989) reviewed studies showing that publications by women are cited less frequently than those by their male colleagues, although women tend to cite articles by other women more than do men. This fact illustrates another explicit way in which women are disadvantaged: Citation counts are sometimes used as a measure of the importance of one's work in assigning pay raises and promotions.

The Potential Impact of Women on the Social System

I believe that as more women enter scientific professions, they will have an impact on the system that will go beyond simply gaining pay and status equity. Matyas (1985) cited research showing that graduate students who had an advisor of the same sex published significantly

more research than those with an advisor of the opposite sex. She noted that "research indicates that among graduate women a productive professor/student working relationship is positively correlated with positive self-image, higher career goals, more publications, and lower attrition rates" (p. 82). Therefore, as more women become available to serve as advisors and mentors for women graduate students and junior faculty, a new social system should emerge that includes women and that is more favorable to them.

There is another social force acting in science, one in which I believe women may have an advantage. In an invited essay in the *Journal of Scientific Exploration*, Thomas Gold (1989) argues that there is a "herd instinct" in science. Gold attributed the resistance to new ideas to the fact that "if a large proportion of the scientific community in one field are guided by the herd instinct, then they cannot adopt another viewpoint since they cannot imagine that the whole herd will swing around at the same time" (p. 105). Gold continues by explaining how difficult it is for anyone who strays from the herd to receive funding and to publish in scientific journals. The end result of this process is the appearance of unanimity, centered at the point representing what the majority opinion was when the process started. This opinion may or may not be the truth, but, as Gold notes, "once a herd has been established in a subject, it can only be broken by the most crass confrontation with opposing evidence" (p. 109).

It is my opinion that women are less affected by the herd instinct and that this factor will have a significant impact on changing its influence over science. Women faculty interviewed at the University of California at Davis noted that they are more likely than their male colleagues to be involved in interdisciplinary research (Johnson, Timm, & Merino, 1989).

Further, in our culture, men were raised to identify themselves with their choice of career. This is less the case for women, and as such, women can stray from the herd without losing their sense of identity. In a study of creative male and female mathematicians, it was discovered that their motivations for and methods of doing research were different (Helson, 1980). He notes: "The creative men described themselves as having confidence, initiative, ambition, impact on the environment, and intellectual balance and soundness. In contrast, the creative women described themselves as non-adventurous and inner-focused" (p. 29).

Thus, I believe that as more women enter science, the herd instinct will have less of an impact, traditional scientific boundaries will be more readily crossed, and innovative research will become more commonplace.

WOMEN IN ACADEMIC INSTITUTIONS

Because the majority of research scientists are employed by academic institutions, the way in which those institutions provide incentives and rewards influences the progression of science. This influence begins at the undergraduate level, and it continues through graduate school and faculty status. The extent to which the system does or does not reward and encourage women is of particular interest, for women will never enter science in large numbers unless they are suitably rewarded for doing so.

The Current Status of Women in Academic Institutions

In an article entitled "Bad News for Women Scientists—and The Country," Vetter (1989) noted the disturbing fact that "more than 40 percent of women now in the doctoral workforce have ten or more years of experience—yet they are still no closer to equality with their male peers [than they were 20 years ago]" (p. 10). She cites statistics showing that women continue to be paid less than their male colleagues with the same level of education and experience, at all levels of academia. Constance Holden, reporting on a survey conducted by the American Association of University Professors, noted:

> Gender imbalances are still pronounced: 72.6% of all full-time faculty are men; 19.9% of women faculty members are professors compared with 53.6% of the men. Male full professors at research institutions earn nearly $8100 a year more than their female counterparts. (p. 680)

Women not only receive lower salaries than men, but they are also less likely to be promoted. Vetter (1989) quotes statistics showing that among doctoral scientists and engineers employed in academic institutions, 59.8% of men were likely to be tenured, compared with 36.1% of women. Johnson, Timm, and Merino (1989) note that "the ratio of

tenured to non-tenured faculty has improved slightly for men while remaining stable for women over the past decade" (p. 2). Sandler (1986) cites a study in which department chairs were asked to assign faculty ranks based only on examining the candidates' vitae. For identical vitae with male and female names attached, the men were assigned the rank of associate professor, whereas the women were assigned the rank of assistant professor.

Ahern and Scott (1981) conducted a study in which they used matched triads (one woman and two men) with the same year and field of doctoral degree, same institution at which the degree was earned, and same race. They studied the occupational attainment of their sample in 1979, broken into cohorts according to year of attaining the doctoral degree (1940-59, 1960-69, 1970-74, and 1975-78). For all four cohorts, women consistently were at lower ranks than men.

Billard (1989) summarizes the results of the Ahern and Scott study for the mathematical sciences, dispelling common explanations for the discrepancies. She found:

> A lower commitment to research with a correspondingly heavier teaching load did not affect women differently than men in the same position. In fact, a higher percent of those whose primary activity was teaching rather than research was promoted by 1979 from assistant to associate professor. Another commonly believed explanation viz., that women lost time due to childbearing, did not stand up to scrutiny. Indeed married women with children fared better than married women with no children who in turn fared better than unmarried women with no children. (p. 648)

Sadly, males do not seem to recognize the inequities going on around them. A recent survey of members of the American Astronomical Association found that nearly 33% of the women respondents felt they had been victims of discrimination in promotions. However, of the male respondents, only 7.6% acknowledged that they had witnessed discrimination against their female colleagues regarding promotions. Responses were similar for questions about pay and about general social treatment (Flam, 1991, p. 1605).

Not only do women in academia receive lower salaries and hold lesser ranks, but they must face what Sandler (1986, p. 2) called "the chilly climate for women on campus." Sandler noted that this climate is

often not intentional, and it is often the result of a series of small inequities that magnify in combination:

> Even those most concerned about equity may inadvertently treat women in ways that convey a powerful, subtle or not so subtle message to women—and to men—that somehow women are not as serious professionally, or as capable as their male peers, nor are they expected to be forceful leaders, to achieve at the same level or to participate in formal and informal professional activities as fully, as actively, or as successfully. (p. 2)

Sandler gives scores of examples in which women were treated as less than equal, as sexual objects, as not serious about their professions, and in numerous other inappropriate ways. Commenting on the effect of these behaviors, Sandler argues that they accumulate to the point that they can be very damaging to a woman's career:

> These inequities often create a work and learning environment that wastes women's resources, for it takes time and energy to ignore or deal with these behaviors. The chilly climate undermines self-esteem and damages professional morale. It may leave women professionally and socially isolated, restrict their opportunities to make professional contributions, and dampen their participation in collegial and academic activities. (p. 3)

Studies have also shown differences in the treatment and success of men and women in graduate school. According to Widnall (1988), "data show that women enter graduate school in the same proportion relative to their percentage of B.S. degrees as do men in the various technical specialties" (p. 1741). However, women have a higher attrition rate than men once they have started graduate school. Matyas (1985) reviews research showing that once in graduate school, women are perceived as less serious, less dedicated, and less capable, and that their work is less frequently reinforced than their male counterparts' work. She also noted, using data from 1981, that men received twice as many research fellowships as women. Further, 45% of women doctoral students used personal funds as their primary source of financial support, compared to only 30% of the men.

Widnall (1988) reports that although men and women enter college with similar levels of self-esteem, the college experience tends to lower self-esteem for women and raise it for men. She reports a study by

Arnold (1987) that followed a group of 80 students who were valedictorians of their high school classes in 1981. Students were asked to rate their intelligence as compared with their peers, as average, slightly above, above average, or far above average. At high school graduation, the men and women rated themselves equally, with just over 20 of each placing themselves in the highest category. By the senior year of college, none of the women placed themselves in the highest category, whereas 25% of the men did. This was despite the fact that the men had an average grade point average slightly below that for the women.

These results indicate that women enter graduate study with lower self-esteem than their male counterparts. The differential treatment they receive once they are there seems to manifest itself by further lowering their self-esteem and creating a feeling of helplessness. Reporting on surveys of graduate students at Stanford and MIT, Widnall (1988) observes that "men most often expressed anger, even rage, at the system and suggested ways that it should be changed, whereas the women more often described the effect that the current system had on them and expressed feelings of frustration and discouragement" (p. 1743). These surveys also indicate that women's health was more likely to be affected. According to Widnall:

> Significantly larger percentages of women students than men students in both the Stanford and the MIT studies reported that the environment was detrimental to their health. In the Stanford study, 23% of the women versus 9% of the men reported that they thought they were on the verge of a nervous breakdown. (p. 1743)

It can be assumed then, that women enter the junior levels of academia with lower self-esteem and more feelings of helplessness than their male colleagues. Once there, the "chilly professional climate" described by Sandler (1986) can serve to further discourage and hamper their progress. It is not surprising, therefore, that women have not yet achieved professional equity in academia.

The Potential Impact of Women on Academic Institutions

As noted earlier, as more women enter academia and are able to serve as advisors and mentors for women students, the climate should begin to get better, at least for those students. Relevant to my idealized view of

how science should be conducted, women faculty are more likely to participate in interdisciplinary and team research than their male colleagues.

Although interdisciplinary team research has traditionally been undervalued, that view is beginning to change. An All-University Conference on Graduate Student and Faculty Affirmative Action held in June 1990 by the University of California resulted in the establishment of a task force to study the university-wide faculty review process. One of the preliminary findings of the task force was that research has been too narrowly defined as "discovery research," with little credit being given for integrating research areas across disciplinary lines. Presumably, the final recommendations of the task force will include encouragement for more interdisciplinary research. Within my own discipline of statistics, a recent panel report recommended "the establishment of an Institute for Statistical Sciences that will serve to encourage cross-disciplinary research between statistics and other fields" (IMS Panel, 1990, p. 121). The recommendation was followed, and the National Institute of Statistical Sciences was launched in Research Triangle Park, North Carolina, on December 3, 1990.

However, I believe the climate on most campuses will not change significantly until there is a critical mass of women in administration. The daily climate on any campus is strongly influenced by department chairs, deans, and higher level administrators. On most campuses, these are the people who are responsible for pay raises and promotions. By their actions, these people send messages to the campus community about what constitutes acceptable behavior. For example, the seriousness with which complaints of sexual harassment are treated sends a message to others who might trivialize such behavior.

It is well documented that women tend to have a management style that is different from men. In a Fall 1990 special issue of *Time* magazine entitled "Women: The Road Ahead," Rudolph (1990) noted:

> Some observers are beginning "to see the emergence of a new style of management—most frequently but not exclusively practiced by women—that is less rigid and hierarchical, more open and inclusive, than the classic male approach.... Women bring a problem-solving attitude that embraces coordination more than the masculine drive to have power" says Juanita Kreps, former Secretary of Commerce. This new style, that emphasizes cooperation, open recognition, and empathy in negotiations

> has hardly transformed the workplace into a comfy and peaceful place. Work force demographics suggest though that the emerging female style of management will become more prevalent, not only because more women will achieve positions of power but also because a flexible, mediating approach will be vital in dealing with America's ever more heterogeneous workers. (p. 53)

It remains to be seen whether or not women will be able to assert this style of leadership in academia. A report issued in 1984 found that the average number of women at the level of dean or higher in colleges and universities was 1.1 per campus (Sandler, 1986). Sandler comments: "Women administrators may find that efforts at a more collaborative, open-to-discussion leadership style are perceived as a sign of weak leadership, although the same efforts might be praised if undertaken by male administrators" (p. 7). Until women enter academic administration in greater numbers, we will not be able to measure the influence of differing management styles.

SCIENCE IN A CULTURAL CONTEXT

Science is a product of Western civilization, and as such, it reflects its biases. Each generation thinks that its current view of reality is correct, and yet time after time the next generation supplants it with new "truths." James Burke (1985), in the book to accompany his television series "The Day the Universe Changed," gives numerous examples. For instance, until the middle of the 19th century, the biblical version of history, setting the age of the world at approximately 6,000 years, was regarded as fact. In 1902, Max Planck's theory of radiation convinced scientists that all extraterrestrial radio emissions would be too weak to be detectable. So convinced were they, that no one bothered to investigate the question further until 1930, when Bell Telephone was trying to find out why there was static in their new car radios. When meteorologist Alfred Wegener proposed his theory of continental drift in 1915, he was ridiculed and scorned. It wasn't until 1966, with the accumulation of evidence from several areas of science, that his theory was recognized as correct.

Burke (1985) summarizes his view of the caution with which we should accept science as truth by noting:

> In spite of its claims, science offers no method or universal explanation of reality adequate for all time. The search for truth, the "discovery of nature's secrets" as Descartes put it, is an idiosyncratic search for temporary truth. One truth is replaced by another. The fact that over time science has provided a more complex picture of nature is not in itself final proof that we live by the best, most accurate model so far. (p. 337)

Science as Male Culture

It is no secret that science has been dominated by men. What is less obvious to those who have not read the feminist science literature is the extent to which that has limited our current version of "truth."

The most obvious manner in which truth has been distorted is that women or female animals have not been used as subjects. As Black (1988) expressed it, "women are virtually absent in most accounts of human existence" (p. 168). Larsen (1988) reported that in psychology, this has led to a distortion of what constitutes psychological health for women: "Clinicians described healthy men and healthy adults as alike and as fitting the male sex-role stereotype, but women were described differently from healthy adults" (p. 27).

In recent years the National Institutes of Health (NIH) have come under attack for failing to recognize that most of their research support has been used for studies on men, yet the results have been reported as if they applied to all people. There is now an NIH policy requiring applicants to explain how women will be incorporated into their research, or to justify why they will not be included.

Less obvious than the lack of women as subjects (and experimenters) is the extent to which the methods of science are the product of our male-oriented culture. Before elaborating on this theme, let me distinguish between the cultural aspect of gender and biological aspect of sex. By gender, I mean the societal norms regarding male and female thought and behavior. As such, women are capable of conducting masculine-oriented research, just as men are capable of conducting feminist-oriented research.

The male-oriented culture emphasizes authority over majority rule, "hard" data over "soft" data, the impersonal over the personal, and dualism over unity. This cultural context has resulted in the myths that science is always objective, and that a complex system can be explained

by examining the function of each of its parts. To be sure, the success of this way of thinking is based on its observable results. Advances in medicine, electronics, and many of the other "hard" sciences have led to a complacency and trust in the current scientific method. The extent to which this method limits our knowledge will not be evident until a new generation recognizes and overcomes these limitations.

New Science

If the current scientific method works, then why, with the exception of adding female subjects, should we be interested in changing it? The answer is that there are certain questions that cannot even be contemplated under the current methodology, and others where the answers will necessarily be limited. The whole cannot always be explained by the sum of the parts.

What, then, would constitute a better way of doing science? Before expressing some of my own thoughts, it seems appropriate to summarize some ideas from the literature of feminist science. According to Helen Longino (1986):

> Instead of remaining passive with respect to the data and what the data suggest, we can acknowledge our ability to affect the course of knowledge and fashion or favor research programs that are consistent with the values and commitments we express in the rest of our lives. (p. 15)

Marlene Mackie (1988) describes the role of gender in sociological research by expounding on the distinction, originally identified by Bernard (1973), between "agentic" research preferred by males and "communal" research preferred by females:

> Agentic research is specified as preference for "hard" data, quantitative methods, laboratory experiments, social indicators, isolation and control of variables, and statistical tests of significance. Communal research, on the other hand, involves "soft" data, qualitative methods, *verstehen* knowledge, case studies, observation of social behavior *in situ*, and no attempt to control variables or even to talk in terms of variables. (p. 4)

Regarding research in education, Gisele Thibault (1988) has similar comments about what constitutes male-oriented research methodology:

> Feminists criticize educational methods primarily because they are often characterized by dualistic models of human nature and intercourse. Fashioned after scientific methods, they reflect dichotomy, quality, linearity, and fixity. Feminists reject these methods in education—as elsewhere—because they cast reality into rigid, opposed, and hierarchical categories. (p. 84)

Finally, Yvonne Lefebvre (1988) discussed the resistance of many scientists to the notion that there can be a feminist science. She notes:

> The major reason for this resistance, I submit, is science's alleged objectivity. The scientific method consists of observation, hypotheses based on that observation, followed by rigorous testing of such hypotheses by further observation and by still further experimentation. This process is supposed to guard scientific inquiry from subjectivity. (p. 133)

A common theme among these authors and other writers on feminist science and scientific revolution is that there really is no such thing as completely objective science in which the scientist remains the passive observer. Someone has to decide what hypothesis to test and with which measurements to test it. The experimenter effect is well documented, and not just in experiments with human subjects; see Kohn (1986) for a review. Kohn also describes several cases of "scientific delusion." These can occur because when an

> original faulty observation or conclusion is made by a scientist of authority in the field, and it fits the established ways of thinking of the scientific community about the phenomenon in question, it may start an avalanche of *bona fide* experimentation, where the same error is repeated and thus non-existent phenomena become confirmed. (p. 18)

This is reminiscent of Gold's "herd instinct" described earlier.

New ways of doing science, in my view, would keep the best of the old methodologies, but supplement them with more diverse ways of knowing. For example, case studies and experiential reports should be valued as highly for what they can tell us as designed experiments are for what they contribute. Phenomena that exist in nature, such as emotion, should be studied in their natural setting instead of in the laboratory. Interdisciplinary teams should brainstorm on problems

together rather than each studying their own small piece of the puzzle in isolation.

Parapsychology is in a better position than most other disciplines to implement the new science, for several reasons. First, most researchers have been trained in other disciplines and yet speak a common language, so it would be relatively easy to assemble an interdisciplinary research team. Second, because the field is already on the margins of science, its scholars are more tolerant of those who stray from the herd with innovative ideas. Third, within the field there are many advocates of nonexperimental evidence, for example, Braude (1986). Finally, the field is small enough that dialogue of the type fostered by the Parapsychology Foundation in this setting can actually result in productive change.

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DISCUSSION

WHITE: Thank you very much, Jessica. I'd like to save your paper. I don't think it's from the kindergarten; it's one from the firing line and it's both practical and visionary, and very stimulating.

UTTS: Thank you.

SCHLITZ: I would like to comment on the interesting juxtaposition between the two uses of the herd metaphor. It suggests to me that we should stay walking our own independent path rather than joining any herd because either side doesn't seem so good to me. In reading some of the historical feminist literature about medicine, for example, there was a lot of criticism of women as the object of investigation, a lot of challenge to the idea that the male gaze scrutinized female behavior, as in the hysteria literature and things that Nancy will touch on. And now this recent turn, say the AIDS controversy, over women not being the object of research. It's an interesting paradox. The idea of more women coming in and being role models for other women involves a danger of reproducing the same problems. Given the very facts that you noted, women publish less, they have less incentive to participate in some of the competitive games that we know are established. And I wonder how we can get around that? You know, I had the experience myself in graduate school. I had a woman adviser, and she wasn't writing her book, wasn't getting grants or publishing papers, and I switched advisers to a man who gave me a much harder time but who I think ultimately was a better role model. Now, how do we deal with these inherent complexities in order to overcome these obstacles?

UTTS: Well, I think one way, as I said, is that we won't really get around to it until there is a critical mass. And, in some of my reading, for example, I found that primatology is one area where there has been a critical mass of women researchers, and I think this might happen in parapsychology. Once the women get together and start discussing things among themselves, they realize that they don't have to be one of the boys. I think that is what it will take. I think that if women continue to follow the same structure, then we won't see these changes. And so it's going to take discussions like these to get women to realize that they don't have to follow that structure. As you have pointed out to me, in my own writing as recently as this spring, before I did all this reading, I was definitely taking that approach, I mean, the hierarchical approach that the nonexperiential evidence is the only kind that can really be believed. And so, I have already had my eyes opened to the extent that I'll change at least some of the tone of my writings in the future. So, I do think it's a critical mass, and it is the interactions that are going to be important.

ZINGRONE: There are two things going on in your paper. You say that parapsychology may be a particularly fruitful place for us to pursue the restructurings of methodology and the redefinition of what it is to do science, but it may in fact also be a particularly unfruitful place to try and renegotiate professional roles for women. The thing that I'm struck by in terms of my own experience and the experience of other women in the field and the knowledge of how the field is structured in general is that professionally the field is collapsing. There is not enough room for the men, much less the women, and unfortunately, we are that second clause, you know, in a sense. Having been a historian, I have read a lot about the civil rights movement, which was a precursor to the women's movement, primarily because the women who worked in civil rights gave birth to a whole new idea of equality but had no equality whatsoever inside the civil rights movements themselves. And I personally would hate to give birth to a movement that then grows up and rejects me. So I think we need to be less optimistic about parapsychology itself as being an easy place in which to solve those professional and structural kinds of questions.

UTTS: Well, I do think that if parapsychology is to survive it is going to have to undergo a pretty significant transformation anyway. And I think, along the lines that Beverly suggested, that we need to examine different questions and examine them in a different way. I think

that surveys continue to show that by and large the public supports the kinds of phenomena that we are studying but not the way in which we study them. And I think if we are to regain support from the public, it is not going to be through the experimental methods that we have been using. And it is support from the public that drives funding ultimately. It does eventually get to that. So, I think there is going to have to be a restructuring anyway along the lines I'm talking about.

RUBIK: I just wanted to say that there are a few committees on women in science; there is the AAAS's subgroup called AWIS (Association of Women In Science); there's also the Committee on Women in Physics of the American Physical Society. It's very interesting that these two groups, which I'm well acquainted with, as I am a member of both, focus a great deal on the injustices in the world of doing science. But, about two years ago I tried to publish a very short essay that I wrote on a feminine perspective in science as a letter to the editor in both of the newsletters of these organizations, and both of them refused it. This essay addressed some of the ideas that Rhea brought up, that perhaps there is a feminine approach that has not yet been expressed in science. It struck me how it was refused without any explanation. I tried to get some understanding of why it was refused. Although I never got an explanation, what struck me was that these views of a more feminist way of thinking might be threatening to the women in these organizations "who had made it"; they had made it by imitating the men as much as possible in order to climb the academic hierarchy. So, any idea that a woman might have a different way of knowing or thinking about reality might be threatening to women scientists, and women themselves may be their own greatest obstacles within the system. So, I think we need to go very deep within ourselves in this meeting. This is what I hope will happen here. What I tried to do in my paper was not so much reflect on what other people said about women in science, but what I feel on the inside. I hope that we can do that here and make this message clear for other women in science, through the conference proceedings. I think it is very important that there may be another way of knowing that has not yet been expressed. But we may be our own greatest enemies in worrying about the image that that we will create if we let it out of the bag. I think we really need to be aware of that.

UTTS: I think you're right. There's a Women's Caucus in Statistics as well, and I was president of it a few years ago. The comments I got

from both men and women reflected exactly what you were saying. I encountered women who were completely opposed to the idea of there even being such a caucus, you know, who completely refused to admit that there should be any distinction or that we should even raise such an ugly idea. And I encountered men who trivialized the whole thing. The focus of the organization was on the inequalities and how we can change them. But that focus is actually starting to change. After all my reading, I went to the statistics meetings in August and started talking about this stuff. I discovered that other women had been thinking along these same lines. It's really nice.

BLACKMORE: I was made to smile by what Nancy said. I do agree with your fear about giving birth, but isn't that our biological lot, that we give birth to people who ultimately turn around and reject us? I hate you, Mommy.

I've had two very freeing kinds of experiences recently. One, being invited to this conference, which terrified the life out of me in the beginning, but I am slightly less terrified now; and having to think about these things and admit something to myself, that I think relates to what both Beverly and Jessica said. If I look at my own career, if you can call it that, I'm in a position that is typical for women in academic life. I don't have a proper job. I've never had a proper job. I'm paid a pittance at an hourly rate for giving high-level lectures that require 20 years of academic study. I've always said I've met no discrimination, of course not, no. I'm brave. Actually, though, I am in that situation. This discussion has made me look at that and admit it and wonder what the causes are.

The other freeing experience was reading a popular book called *Brain sex* (Moir & Jessel, Octopus, 1989), which was all about the biological reasons why men and women are different. It's full of hormone studies and injections of this and that and the effects they have on thinking and so on. Now, for the first few pages I was reading and snickering, but I have a son and a daughter who are absolute classic stereotypes. And the result of reading this and the quite compelling evidence in it was ultimately the opposite to what I expected—a kind of freeing feeling. Oh, ah ha, oh, so I've got a wider corpus callosum than men, that's why I integrate all these things. Oh, how interesting. Gosh, those hormones, that lack of testosterone I've had since age 13, that's why naturally I'm frankly not that fussed if I don't have enough money. I

can't actually get myself worked up about money and hierarchies and so on. The studies of children playing in playgrounds where the boys always play in hierarchies and the girls have loose-knit structures—I see them every day when I go to pick up my kids from school. I don't believe that is socially inculcated. I think women actually have a different way of relating to the world. Now, why then am I in this situation at the university? I think the answer may not be discrimination that needs rooting out by trying to make women equal to men. The answer may be, or part of the answer, may be that actually a lot of women don't have the motivations to be at the top. I don't want to be a dean, for goodness sake. I want to ask questions and do research. Now, if in our society the way to do that is to say, "Well, OK, I can't have the money, but at least I can do the research," then that is how we are going to end up. Now, I'm not saying it's right and equitable. And I haven't got an answer. I'm just flinging out a few thoughts there that the answer is not to make us all be like men and get equal numbers of deans, but somehow to integrate different ways of going about science and research.

UTTS: But I think that part of the rooting out of the discrimination is to change the reward system. At my own university, as I noted in my paper, it has finally been recognized that there has been far too much emphasis on what would be called discovery research and not nearly enough on what they call integrative research, which women are more likely to prefer. In my own case, when I started working in parapsychology, and that's almost exclusively what I've been doing since I got tenure, I recognized the fact that I was going to have to slow down my progress by doing so. But now I think the university is catching up with me. You see, I do believe that the reward system is starting to change. The task force that's defining this discovery versus integrative research is headed by a woman who recognized what was going on, and I think we may see more of that. But, you are right that I don't think that women do have the same priorities in academia or in research in general. It is to be hoped that we can get the reward structure to change.

BLACKMORE: Right, right. And that would change our self-esteem, because it may be a lot of women don't want the rewards for themselves in that hierarchical sense. But the trouble is that because you don't have them and you see them being flaunted everywhere, your self-esteem drops, and that seems to me much more crucial than the actual number of people.

ZINGRONE: I was going to say that there have been a number of discussions in the editorial pages of *Chronicle of Higher Education* and elsewhere over the last several years about the notion of macho scholarship and macho science. Some of the articles have been written by men who are very tired of not having the time to be with their families and being expected to be a 90-hour-a-week person and live by a value system that does not reflect in any way, shape, or form their own values. They are also pressing for change in the reward system and for a kind of backing off of this notion that the only way that you can be dedicated to science is to be a workaholic and to exploit someone else somewhere so that you are able to be free to do your research. And I see this as very positive, as being indicative of a wider restructuring of science and scholarship.

HEINZE: I hope I will be able to say in brief words what I want to say. I definitely want to add to the gloom intentionally because I think we should be alarmed that parapsychology courses have been discontinued at John F. Kennedy University in California. People are not able to teach parapsychology at all. The establishment attempts to downplay parapsychology. If we are not fully aware of this trend, we will lose the sense of urgency. We have to be aware of it because we have to create a critical mass. To start with, I think a common language is very important, because even here we are using a lot of mechanistic language and we have to become much more sensitive to how we express ourselves. We have to clarify immediately what we are talking about.

I went back to the university when I was 45. I had to take a vow of silence. It was necessary because I could not believe what these people were telling me. I just could not believe it. So I went through college and made it because I wanted a degree, but I suffered very much from duplicity. We have to be much more sensitive to language. I think physics is offering us some possibilities—the implicate and the explicate order, for example, and the Heisenberg principle. I think we should not look for stepping stones across the river. I think we should stay in the middle of the stream, and not hold on to too many superseded terms; then we are in a much better position to react and counteract. It sensitizes us to the moment, being aware we move more intuitively. It gives us a big advantage over other people who are holding on to superseded systems. I leave it at that. I have more to say, but...

SCHLITZ: Just a quick comment in response to Sue and Ruth. I agree that there clearly are genetic differences between the sexes. Nobody can argue with that. I think we should not underestimate the power of culture, however. There is an interesting book by Deborah Tannen, *You just don't understand* (Morrow, 1990), and she's also written some very good scholarly works on sociolinguistics. Her argument in this book is that men and women are brought up in different cultures. We can all be born in England or in the United States, but we are in different cultures. Jessica touched on it so nicely in her paper that if a woman says to a man, "I understand you're feeling stressed," the man immediately sees that as a power play, that this woman is attempting to circumvent him, or undermine his own self-confidence by making him feel vulnerable or exposed. Tannen shows in countless examples how this kind of polarity of power relations exists at fundamental levels. I think that to recognize the difference in cultures and to recognize the differences in cognitive sets is important for understanding how we can attempt to get around our gender differences. I think it's important to remember that we really are brought up in different cultures and that there are biological differences, but there are very definitely cultural differences that we can work at.

HEINZE: I think that is a very important point. We all speak different languages. You have to speak the language of your partner, not your own, because men become immediately defensive if you speak your own language. So you have to gain their trust, showing that you know their language, and they may then eventually listen when you come in with your own views. You have to rephrase what you want to convey in their language.

SCHLITZ: And men of women, too.

WHITE: I would just like to add one note on the subject of genetic versus cultural sexual differences: in the latest issue of *Science* there is a summary of the research on this question, and it is still open, according to this article.