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## Changing Images of Primate Societies<sup>1</sup>

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Women scientists are widely considered to have played a major role in the historical shifts that have taken

I. © 1997 by The Wenner-Gren Foundation for Anthropological Research. All rights reserved 0011-3204/97/3804-0008\$1.00. The conference participants, their affiliations, and (where appropriate) their paper titles were as follows: Pamela Asquith (Department of Anthropology, University of Alberta), "Japanese Constructs of Primate Societies"; Richard Byrne (Department of Psychology, University of St. Andrews), "The Role of Imitation in Primate Cognition"; Linda Fedigan (Department of Anthropology, University of Alberta), co-organizer, "Theory, Method, and Gender: What Changed Our Views of Primate Society?"; Stephen Glickman (Department of Psychology, University of California at Berkeley),

place in our interpretations of primate society. Primatology is a young science, having fully emerged only since the end of World War II, and during this short period, interpretations of primate behavior and society have changed considerably (see Strum and Fedigan n.d.). To some observers, primatology appears to be an excellent example of a science that has been "feminized." But to what extent is the prevalent popular image of the woman primatologist in the field a recent creation of the American media? And what are the relative contributions of variables other than gender to shifts in perceptions about primate society, among them changes in theory and methods, changing societal concerns, and the interaction of science and society? How might we bring empirical evidence to bear on these issues? Have analogous shifts in the interpretation of social life occurred in related disciplines (sociocultural anthropology and archaeology, psychology, ethology and animal behavior) and in other national traditions of primatology (Japanese, Brazilian, British)? It was to begin to address these questions that Shirley Strum and Linda Fedigan

"Disciplines, Subdisciplines, and Cultural Influences: A View from Comparative Psychology"; Donna Haraway (History of Consciousness, University of California at Santa Cruz), "Morphing in the Order: Flexible Strategies, Feminist Science Studies, and Primate Revisions"; Robert A. Hinde (St. John's College, Cambridge), "Primate Society Had Multiple Sources"; Sarah Blaffer Hrdy of California at Davis), "Raising Darwin's Consciousness: Female Sexuality and the Prehominid Origins of Patriarchy"; Alison Jolly (Department of Ecology, Princeton University), "The Bad Old Days of Primatology"; Evelyn Fox Keller (Science, Technology, and Society, Massachusetts Institute of Technology), "Women, Gender, and Science: Some Parallels between Primatology and Developmental Biology"; Hans Kummer (Switzerland), "Lost Topics in Primate Research" (in absentia); Bruno Latour (Centre de Sociologie de l'Innovation, Ecole des Mines), "Primate Relativity: Reflections of a Fellow-Traveler"; Gregg A. Mitman (Department of History of Science, University of Oklahoma), "Life in the Field: The Nature of Popular Culture in 1950s America"; Brian Noble (Department of Anthropology, University of Alberta), "Leaky Visions of Gender, Nature, and Apes in 1995: The Persistence of Fossey's Mist"; Naomi Quinn (Department of Cultural Anthropology, Duke University), "Women Theorizing Gender: The Case of Cultural Anthropology"; Thelma Rowell (West Chapel House, Chapel-le-Dale, Ingleton via Carnforth, England), "A Few Peculiar Primates"; Craig Stanford (Department of Anthropology, University of Southern California at Los Angeles), "Chimpanzees, Bonobos, and Human Origins: Empirical Evidence and Shifting Assumptions"; Karen Strier (Department of Anthropology, University of Wisconsin), "Diversity, Demography, and Population Variability"; Shirley Strum (Department of Anthropology, University of California at San Diego), co-organizer, "Theory, Method, and Gender: What Changed Our Views of Primate Society?"; Robert Sussman (Department of Anthropology, Washington University), "Pitdown Man: The Father of American Field Primatology"; Hiroyuki Takasaki (Laboratory of Anthropology, Okayama University of Science), "Traditions of the Kyoto School of Field Primatology in Japan"; Zuleyma Tang-Martinez (Department of Biology, University of Missouri), "Expensive Eggs, Cheap Sperm, and Sexually Passive Females: A Paradigm in Transition"; Alison Wylie (Department of Philosophy, University of Western Ontario), "The Engendering of Archaeology: Reconfiguring Feminist Science Studies"; Maria Emilia Yamamoto (Universidade Federal do Rio Grande do Norte), "Brazilian Primatology: The Last Ten Years." Representing the Wenner-Gren Foundation were Sydel Silverman (President), Laurie Obbink (Conference Program Associate), and Mara Drogan (Program Administrator)

co-organized a conference sponsored by the Wenner-Gren Foundation for Anthropological Research and attended by 23 scholars from eight countries.<sup>2</sup> The workshop, entitled "Changing Images of Primate Societies: The Role of Theory, Method, and Gender," was held June 15–23, 1996, in Teresopolis, Brazil. It represented the first major attempt to bring primatologists of a variety of ages, nationalities, and schools of thought together with scientists in related behavioral disciplines and with scholars in feminist, science, and popular culture studies. Particularly noteworthy is that this was the first sustained encounter, at least in the North American context, between scientists and those who study them.

To facilitate a collaborative examination of the issues just identified, we first circulated a position paper on changing ideas in North American primatology from 1920 to the present. Focusing on primate field studies and on evolutionary interpretations of behavior and society, primarily by American scientists, we asked the primatologist participants to address aspects of the history of the discipline emphasizing either a particular stage or an issue that had changed through time.

Primatology occupies a unique position in the history of science, having developed from traditions within at least three different academic disciplines (anthropology, psychology, and zoology) and having flourished within several different national/cultural settings, including those of North America, Britain, continental Europe, Brazil, and Japan. We tried to put North American primatology in context by asking whether shifts in our interpretations of primate society are unique or part of larger trends that can be documented elsewhere. Thus, experts from other fields and cultures were asked to describe developments in related disciplines and in other national traditions over the same period.

It is also important to place changing ideas in primatology within a larger context of science and society. We called on a variety of analytic expertise for an examination of the scientific process and how knowledge is constructed, an assessment of the impact of the women's movement and the role of women scientists, and insights about the interaction of popular and scientific cultures, especially the role of the media. We asked the experts in science, feminist, and popular culture studies to address questions such as the relationship between changing ideas in science and changing facts, the effects of the woman's movement and the presence of women practitioners on the nature of various sciences, and the role of the media in creating images of women, of scientists, and of nature.

The discussions were divided into three parts: (1) Changing Factors within Primatology—Method, Theory, and Gender, (2) The Comparative Perspective, and (3) The Larger Context. We had understood our guiding questions to be multifactorial, but in the early days of the conference we came to realize that the issues were even more complex than we had previously thought. Each of the major factors that we had identified—method, theory, and gender—turned out on closer in-

spection to be heterogeneous, interdependent, and controversial. There was disputation among the participants over how to define these factors, how to measure their influence, and even what words to use to talk about them. We had deliberately invited representatives of many schools of thought and had expected several opposing forces (e.g., pro- and antisociobiology, pro- and antifeminism), but we had not fully anticipated that the scientists and those who study them would hold such different views of what science is. Apparently representatives of the two groups had never been brought face to face to discuss science with enough participants to create two critical masses. As a result, the two "sides" were initially suspicious of each other, and this barrier to communication only slowly dissolved.

The opening session of the first part of the conference was intended to be a discussion of the impact of methods on the way we think about primate society. Instead, it was greatly taken up with issues of communication as participants from different disciplines struggled to find common linguistic and epistemological ground. Some time was spent trying to sort out the differences between methods, methodology, and techniques and to determine whether it is possible to separate method from theory in any general sense. For example, methods may, on the one hand, be driven and constrained by the theory that frames the study, while on the other hand they may be envisioned as expanded through the inclusion of instrumental factors such as the antimalarial drugs and rapid air travel that greatly changed the practices of primatologists. In addition to communication and definitional issues, substantive methodological matters were discussed, among them the benefits of experimental versus observational techniques, the lack of methods for dealing with stochastic processes, and the potential of new noninvasive techniques for collecting biological samples. There was much discussion of whether the observational work of Japanese primatologists was truly method-free. We began to realize that methods are inevitably situated in cultural, disciplinary, and historical contexts and therefore questions about the impact of methods on primatology are best answered when so situated.

The second session, on the influence of theory on primatology, generated less heat over the meanings and uses of terms across disciplines, but even here there were disputes. By the end of the session participants had used the term "theory" in at least 13 different ways, and it became obvious that, as with methods, theory must also be situated in time, space, and context. For example, sociobiology, ethology, group selection, and behavioral ecology had different histories and connotations for primatologists from different national/cultural traditions and even for primatologists from different institutions within North America. How and when does a theory such as sociobiology "travel" across disciplinary and cultural boundaries, and what makes it transportable? Is it the criterion of testability or the perception that it is useful and productive in advancing research in a localized setting? One factor that surfaced

repeatedly in our discussions was the overriding importance of institutional location in determining how a theory or a researcher's work is received, tested, communicated, and transformed.

We had another set of definitional and conceptual issues to address in the session on the impact on primatology of gender, namely, the meanings of "gender," "female," "woman," and "feminism" for participants from different backgrounds. Keller presented a helpful distinction between three types of analyses of women, gender, and science: (1) the study of women in science (historical, biographical projects), (2) the science of gender (studies of how science has contributed to myths of gender), and (3) gender in science (study of the symbolic role of gender in science itself—the way in which dominant views of gender shape our expectations and inform science). One point raised in this session was whether some of the scientists present were making the mistake of essentializing gender to mean sex (i.e., "biologically female"). Gender, all finally agreed, is a cultural construct not identical to woman or female. Several of the feminist scholars pointed out that gender has proved surprisingly unstable in time and space. Whereas the science scholars argued that gender is not a permanent property of an individual but rather varies across contexts and cultures, several of the scientists continued to insist that it is, and must be, possible to measure and generalize about gender within a given culture and time frame. Otherwise we are just talking about an infinitely variable phenomenon with no reference point. The deeper issue in this discussion was finding widely acceptable ways to talk about, study, and understand science.

The second part of the conference dealt with comparisons across related disciplines. The three subdisciplines of anthropology that were compared (sociocultural, archaeology, primatology) seemed to have had, for example, quite different histories with regard to women's issues. Quinn argued that in sociocultural anthropology (unlike primatology) the feminism of the 1960s and 1970s was displaced by postmodernism in the 1980s. Wylie noted that gender issues entered archaeology much later (in the 1980s) than in sociocultural anthropology or primatology. Silverman noted that the different subdisciplines have differed in the extent and timing of the inclusion of women in their ranks. Discussion in this session also touched on why primatology has had so little influence on the other subdisciplines of anthropology and whether it is correctly located in the larger discipline. Although, as noted by Sussman, primatologists bring an important component to the study of human variability and universals, they are not well accepted by their anthropological colleagues, in Strier's view, once they adopt biological methods and theory.

Interestingly, there seemed to be more similarities between primatology and psychology or primatology and animal behavior than among the subdisciplines of anthropology. For example, according to Glickman, the history of sexual behavior studies in rats parallels some

of the developments in sexual behavior research in primates, and the history of hyena field studies exhibits some similarities to that of primate field studies. Further, according to Tang-Martinez, the changing view of the female mammal (especially the female ground squirrel) in animal behavior studies is similar to the changing view of the female primate. Both have involved a move from passive to active females, from socially unimportant females to female-bonded societies, and from asymmetrical terms such as "harems" to terms that recognize the central significance of females in their societies.

The third part of the conference opened with a session examining different national traditions of primatology. Hinde, Rowell, and Kummer argued that British and continental European primatology grew directly out of classical ethological research, even though the earliest practitioners in Britain worked and trained students in departments of anatomy, psychology, and anthropology. Unlike the Washburn school of primatology in North America, British primatology did not grow out of a desire to use primates as models for human evolution. However, Byrne suggested that Hinde and Rowell were presenting the "view from Madingley" and that British primatologists from other institutions would present a different history. He argued that all primatologists are fundamentally interested in learning more about humans. Brazilian primatology, according to Yamamoto, was at first focused on establishing and maintaining captive colonies of primates for biomedical use, but in the past 20 years conservation has been the major impetus for field studies of primates and most young Brazilian scientists studying primates are trained as conservationists. Brazilian primatologists do not yet have the impact that they desire on an international front, and in some respects their concerns (marginalization, difficulties in publishing and being cited) parallel the women's issues in North American and European science. Asquith argued that just as "gender" and "woman" are categories that are heterogeneous and do not stand still, so Japanese primatology is not a monolithic, static enterprise. She noted that many vital insights into primate society in Japanese publications were missed by Western scientists because these findings were couched in terms that we regard as anthropomorphic and overly descriptive. Takasaki described the Kyoto school's approach to primatology with highly evocative metaphors—they do "primatography" rather than primatology; their way of doing science produces both gems and pebbles; they regard the Western insistence on the primacy of theory in science as "extracting the nutrients from food and eating them as pills."

The session on popular culture focused on the media's role in creating and disseminating both scientific ideas and cultural images of primates and of women studying animals. Mitman argued that scientists need to take the media very seriously because much is at stake, including funding and the transformation of field sites into tourist sites. Haraway described primatology as a "zone of implosion" where multiple factors con-

verge and entangle, resulting in a rich, thick complexity. Noble analyzed the representation of Goodall in *National Geographic* articles and Fossey in the film *Gorillas in the Mist* as images of women primatologists that influence the public and the next generation of students. Stanford described the making of the television documentary *The New Chimpanzees*, in which he participated, as an example of the way in which the producer/editor and not the scientist controls the message and the final product. Jolly argued that the threat of extinction of primates is changing primatology and described the positive role of the media in creating this shift. What we learned from this session is that we ignore the public realm at our peril and that we have social responsibilities as scientists to communicate with the public through the media. Participants concluded that because there will always be a powerful incentive to use science as represented in the media to reinforce cultural values rather than attempting to control the media after the fact it is best to include journalists and filmmakers from the start.

In the science studies session, we examined the production of knowledge in relation to different models of science with a particular focus on what happens during scientific practice rather than on the normative aspects. The resulting discussion was about how science really works, how to delineate good and bad science, whether there really is a "scientific method" and how important it is, whether scientific knowledge is cumulative, and whether there is a difference between what scientists do and what science is. Latour presented a model of science with five articulated horizons that demonstrated why the practice of science cannot and should not be viewed as isolated from the rest of the world, and participants discussed and suggested modifications to it. Mitman described the methods that historians of science use to understand how a given science has changed over time. Sussman discussed the problem of determining when we have enough data to support a theory and whether a question is answerable. Haraway helped those unfamiliar with science studies to understand the variety of work encompassed by the field by presenting three different ethnographic approaches to the study of science. There was particular interest in her presentation because her *Primate Visions* was the first and most extensive analysis of primatology from a science studies perspective. Participants concluded that the production and dissemination of scientific knowledge is a dynamic process that requires theories, methods, inscription devices, colleagues, allies, and public relations just to get started. We often assume that popularization of science is a form of dissemination and that scientists can or should control the media's reports of their work, but this diffusionist model and the scientists' assumptions about it may not be correct.

In a deliberate effort to return once more to the concrete, the penultimate sessions began with a round-robin question to participants: Had their ideas ever changed, and why? Many of the accounts were conversation tales in which a scientist began with a received

truth or a definite, clear idea and the behavior of the subjects themselves changed the scientist's mind, and many of the examples occurred early in the scientist's career.

The goal of this conference was to combine our diverse expertise to come to a better understanding of how and why our perceptions of primate societies have changed. We hoped to learn from the collective effort how to ask better questions and where to search for better answers. Thus we have no "results" in any standard sense to present. It was a historic and novel event in itself to assemble scientists and those who study them to discuss matters of science, in this case primatology. Although we did not get as far in terms of concrete "conclusions" as we might have with a homogeneous group of experts, we certainly can draw lessons from our discussions and point to the ways in which different ideas about science can generate mutual suspicion and barriers to communication that can be overcome with time and effort.

The three sessions in the first part of our conference were sobering in that they required us to define our terms and to acknowledge the complexity of the issues. We learned that it takes extra work to talk across disciplines but that cross-disciplinary communication opens up new ways of looking at familiar problems. We also realized that our initial question—theory, method, and gender, what changed our minds?—had to be carefully situated. Finally, we recognized the need for a method or set of methods for determining how primatology has changed that will be acceptable to both practitioners of science and those who study science. We came to the conclusion that studying the development of a science is as complex and multifactorial as studying the ontology of an individual and needs to account for at least as many levels of interaction.

Several lessons also emerged from the second part of the conference. First, we found that even subdisciplines housed within the same academic department (such as anthropology) might have quite disparate histories and that members of these subdisciplines might have little awareness of the theoretical and methodological issues that interested their colleagues. Second, we discovered that there was disagreement over whether and when primatology had achieved independence from its parental disciplines of anthropology, psychology, and ethology/animal behavior. And finally, we learned once again that we must be more specific about the variables in any comparison of primatology with other disciplines because the fields of anthropology, psychology, and animal behavior are large and heterogeneous and are practiced differently in different nations and even in different institutions within North America.

During the final part of the conference, several useful suggestions were made as to how to further research on our topic; a "team approach" involving different techniques and types of expertise was one such suggestion. Participants recognized the danger of falling into the "science wars" trap, in which practitioners and science studies scholars or scientists and the media are seen as

adversaries. It was concluded that addressing complex issues requires collaboration.

A number of challenges remain: formulating questions about changes in primatology in such a way that the rich history of local events is not lost, determining what will constitute the evidence for change and how it can be gathered, and encouraging the relevant experts to communicate and collaborate across disciplinary boundaries. Several conclusions can also be drawn. First, this conference opened up several new ways of thinking about the science of primatology; participants suggested both new avenues of research and new constraints on how we ask and answer questions. Second, although some of the participants felt that we spent too much time discussing questions of science, it was clear that we cannot understand specific patterns in any aspect of primatology without a general framework for what science is. This conference focused upon what has happened in the past, but an understanding of what has gone before will also allow us to move forward in the future. And everyone was concerned about the future: the future of primates, of primatology, of the other disciplines, and of science. We have formed an e-mail list or chat group to continue the discussions begun in Brazil. A book based on revisions of the conference papers, continuing discussions among the participants, and our emerging understanding of how "science" and "gender" issues are embedded in our perceptions of the history of primatology is in preparation.

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## Contraception in Three Chibcha Communities and the Concept of Natural Fertility<sup>1</sup>

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The decline in the fertility rate of the population of Europe at the beginning of the 19th century—the so-called fertility transition—has been the subject of many studies attempting to understand its causes. Fundamental contributions have been made by Henry (1961) in dis-

tinguishing pre- and posttransitional regimes and Bongaarts (1978) in revising the intermediate variables of fertility identified by Davis and Blake (1956) and suggesting that the total fertility rate of a population can be calculated by combining its proximate determinants.

Reviewing studies of European populations, Henry (1961) identified two different patterns of fertility. In the pretransition stage, fertility was high and independent of the number of previous offspring, while in the posttransition stage fertility was low and dependent on the number of previous offspring. Henry was trying to obtain a baseline representing the fertility of populations that did not practice birth control with which to compare the fertility rate of contemporary societies (Landers 1990), but to his surprise he found that the marital fertility of pretransition societies was quite variable. This led him to reject the concept of physiological fertility in favor of the new concept of natural fertility. Although the concept of natural fertility was first used by Pearl (1939), the exact definition comes from Henry (1961):

We can term as natural the fertility which exists or has existed in the absence of deliberate birth control. . . . control may be said to exist when the behavior of the couple is bound to the number of children already born and is modified when this number reaches the maximum which the couple does not want to exceed.

Given this definition, natural fertility would have been characteristic of the pretransition period, in which the human population was characterized by high birth and death rates (Handwerker 1983, Hassan 1981).

Bongaarts (1978) considered the independence of the number of previous offspring characteristic of the pretransition period a function of two of the proximate determinants he identified: (1) the proportion of married women and (2) the mean duration of the infertile period following birth. Furthermore, he considered the dependence of this variable characteristic of the posttransition period a function of these same proximate determinants and of (3) the effectiveness of contraceptive methods and (4) the rate of abortion. Thus, the transition from natural fertility to controlled fertility is reflected in the increase of contraception and abortion as ways of preventing births.

The decline of fertility has thus been interpreted as a shift from natural fertility to controlled fertility, and this change is attributed to the introduction of contraception or, as Henry put it, the entry of rationality into the sphere of reproductive behavior. This point of view, as well as the more explicit one advanced by Knodel (1977), suggests that the deliberate and prolonged control of fertility within a marriage is itself a consequence of modernization (Landers 1990). Thus modernization is understood as the agent of change in the fertility transition. The empirical patterns of fertility in some populations deemed "traditional" (in Latin America, Asia, and Africa) are considered pretransitional, and therefore

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