RAISING DARWIN'S CONSCIOUSNESS: FEMALES AND EVOLUTIONARY THEORY

by Sarah Blaffer Hrdy

Abstract Early studies of primate social behavior were distorted by observational, methodological, and ideological biases that caused researchers to overlook active roles played by females in the social lives of monkeys. Primatology provides a particularly well documented case illustrating why research programs in the social and natural sciences need multiple studies that enlist researchers from diverse backgrounds

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When people first began seriously to study the behavior of monkeys in their natural habitats, attention of the researchers gravitated to the behavior of adult males. Among most of the group-dwelling terrestrial monkeys (those easiest to study), there were virtually always fewer adult males than females. These males were much larger than females, and their behavior was more boisterous. Male behaviors were more conspicuous, and males were easier to recognize as individuals. But there was more to this research than just a male-oriented focus, for the observational and methodological biases came linked to biases of much older standing—dating back to Darwin, to the nineteenth century generally, and to even older antecedents. Among other things, researchers were enthralled with a powerful theory: Darwin's theory of sexual selection. According to this theory, males actively compete for access to females. In the course of this competition, the stronger male prevails, dooming his rival to relatively fewer reproductive opportunities that the winner will enjoy. Competition

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between males then led to selection of bigger and more muscular males, so that in the famous example of the Hamadryas baboons, males evolved to be nearly twice as large as females belonging to the same species. Male hamadryas baboons are not only bigger but far flashier in appearance, endowed with an intimidating mane of hair and a face the color of raw beef steak—as different from the mousey grey-brown females as if they belonged to two different species (figure 1). Male-male competition was half of Darwin's theory of sexual selection; the other half had to do with female choice, the notion that females by nature will seek to select the single best male as a breeding partner from out of a panoply of competing suitors. As a matter of fact, this part of the theory does not apply very well to monkeys, and particularly not the hamadryas baboon due to certain peculiarities of its breeding system. A female hamadryas baboon is adopted while still a juvenile by an adult male on the make. The male will herd her about for the rest of her life, nipping her on the neck to assure her proximity (figure 2). But forget those details for a moment, and focus on the central assumption, that males play the more active role. For the male hamadryas baboon, with his lion's mane and his muscular and domineering disposition, provides the perfect model of a modern sexually selected male. It also happens, however, that the hamadryas case is virtually unique among primates, the only case out of some 175 extant species of primates where we can actually find any sort of clear-cut dichotomy between competitive males and passive females! Instead of the partriarchal hamadryas case, we could just as easily have focused on any of a number of lemur species, species in which females rather routinely dominate males. We could have decided to make an example of the shy and nocturnal owl monkey (*Aotus trivirgatus*), where males and females cooperate in child care with the male playing the major role in carrying and protecting the infant (Wright 1984), or we could have focused on the gentle South American monkeys known as "muriqui" (*Brachyteles arachnoides*), who specialize in *avoiding* aggressive interactions (Strier 1988), or any of a host of other primate species in which we now know that females play an active role in social organization. But the history of primatology did not unfold that way. Instead, until very recently, a hamadryas-like stereotype was taken as the primate norm.

In retrospect it is remarkable that we ever could have believed that selection primarily operated on only one sex, and yet that is precisely the assumption that until recently did underlie many conclusions about primate breeding systems. Consider the treatment of nonhuman primates in a recent textbook in sociobiology. The author describes how male monkeys, such as rhesus macaques, compete

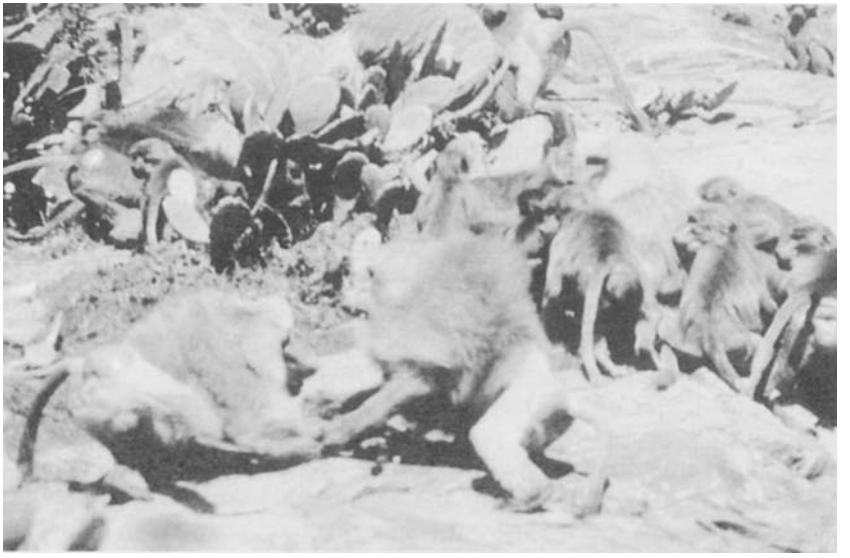

Fig. 1. Hamadryas baboon males from two different groups fight while the females huddle in the background. These baboons are one of very few primate species that actually do live up to the old stereotypes of aggressive males and passive females! (Photo courtesy of Joseph Popp, Anthro-Photo.)

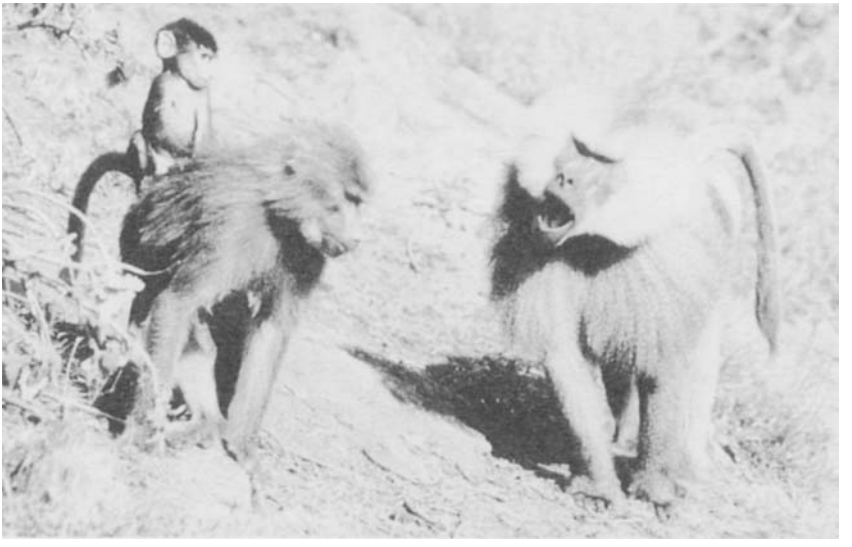

Fig. 2. Hamadryas baboon male herds a female. The males are roughly twice the size of the females. (Photo courtesy of Joseph Popp, Anthro-Photo.)

among themselves for access to females so that only 20 percent of males are responsible for 80 percent of the breeding, while *all* the females that come into estrus tend to be impregnated. "These data make it clear that only males are directly involved in differential selection among rhesus [monkeys] and probably all the terrestrial and semiterrestrial primates" (Freedman 1979:33).

A cluster of biases, then—methodological, ideological, and theoretical—contributed to an extraordinary phenomenon: an intellection formulation of primate social organization that lasted for over twenty years and that—based on what we know today—was totally unsupportable (Hrdy 1981). This of course is not the first time that social preconceptions have caused scientists to seriously misinterpret nature, but it is one of the more clear-cut and better documented examples.

To continue this story, but still keep it simple, I will stick to baboons. Let us shift then from the patriarchal hamadryas to a closely related cluster of species known as savanna baboons, which instead of living in harems, live on African savannas in large, multimale troops. These savanna baboons were the first monkeys to be extensively studied, and they were depicted as having a social structure that in many respects was the mirror image of the kind of organization then found in American universities and corporate structures. There was a central male hierarchy in which competing adult males formed alliances with other males in order to maintain high status. Female baboons were viewed as pawns in this game, and sexual access to females was the reward for males successful in maintaining high rank. Whereas males were thought to have almost nothing to do with infants, females were thought to be so absorbed in child care that they had almost no impact on the social structure of the group. What was missing, of course, was any empirical description of the full range of activities of either sex. Lionel Tiger summed up the prevailing opinion: "Primate females seem to be biologically unprogrammed to dominate political systems, and the whole weight of the relevant primates' breeding history militates against female participation in what we call 'primate public life' " (Tiger 1977). Yet once we begin to examine the actual evidence, few statements could have been further from the truth for any species, except just possibly the hamadryas baboon.

Let's take a closer look, then, at the species which has become anthropology's "type case" for a male-dominated social order. What happened when we identified females as individuals and monitored their behavior over time? The picture changed radically (Altmann 1980).

The main difference between savanna baboon males and females is not that males are active and females passive, but the fact that females stay in the troop of their birth while males are transients. A male moves every four or five years, and within the troop, his status is in perpetual flux. Typically, a young male leaves his natal troop about the time he matures, and attempts to enter another through a gradual process of insinuating himself into the group. Sometimes a male does this by first forming a friendship with a troop female, who serves as a sponsor for his membership in the group. Male-female friendships are not so much based on dominance as on mutual interactions, such as grooming, in which either sex may take the initiative. That is, not all males are fighting their way into the troop by allying with and defeating other males. Indeed Barbara Smuts, who describes male-female friendships in detail in her recent book *Sex and Friendship among Baboons* (1985), tells a wonderful anecdote about a female who enters a neighboring troop to lure back with her a particular male to which she seems to have taken a fancy, initiating his entry into her own troop (figure 3).

Earlier studies that focused on male-male competition for breeding access to females gave us a very skewed picture indeed.

Fig. 3. Recent studies of savanna baboons reveal highly developed longterm relationships between females and males as between these two *Papio anubis* "friends." (Courtesy of Barbara Smuts, Anthro-Photo.)

Invariably, researchers focused their attention on things like counting the number of copulations for the males so that male-female interactions were usually only recorded when the female was in heat. Instead, Smuts focused on females in all stages of their reproductive cycle. Her analyses revealed that females select and preferentially stay near one or two of the eighteen or so adult males in the troop, and these relationship remain constant through pregnancy and lactation.

Not only are male-female relationships much more reciprocal and complex than previously realized, but there is also much more involvement by males with infants. Once a female baboon gives birth, one or several of her male friends provide various babysitting services for the mother. In terms of actual time spent with the infants, it's rather like the human case: not much. That is, if you are standing on the savanna watching a troop of baboons, you'll see about one male-infant interaction once every nineteen hours (Taub 1984). However, the protection offered just by the proximity of these males may be critical for infant survival—particularly for discouraging attacks on the infant either by incoming males who are unfamiliar with the infant's mother, or harassment of the infant and mother by females from competing lineages in the troop.

Once we understand the importance of male involvement with infants, the internal politics of a baboon troop take on new dimensions. Female baboons, for example, actively engage in forging for themselves a network of alliance with different males. In short, there is much more going on than simply males competing with other males. Males are maneuvering for access to females, while females themselves are busily building alliances with males. Both sexes of course are also preoccupied with survival, keeping safe, staying fed, and this leads to another very important set of female activities. Females cooperate with their relatives, their mothers, and grandmothers, in order to compete with females in other matrilines belonging to their same troop. Competition is for such things as resources and what might be called "living space" or freedom from harassment. The resulting structure from these various female preoccupations turns out to be remarkably persistent and stable.

When two females of different social status approach each other (a dominant female approaches a subordinate or vice versa), you are likely to witness a remarkable performance. The subordinate female greets a dominant female by presenting to her; giving an exaggerated "fear grin," lifting her tail, and jerking a foot back. Even more remarkable is the fact that in an episode like this we can be fairly certain that the main reason this female is dominant is because her mother was (Silk 1987).

Not only does there exist a stable hierarchy among females, but it is a very conservative hierarchy, predictable from one year to the next and even one generation to the next. This is not to say that rank is heritable in any genetic sense, for indeed when circumstances permit, females, or groups of female allies, may strive to improve their relative rank status. Occasional "rebellions" of this nature are now well documented. What it does mean, though, is that in order to understand primate social structure, long-term relationships must be taken into account.

The collection of data on female behavior from a wide range of species (such as tamarins, lemurs, and woolly spider monkeys) has caused us to revise our notion of female nature to encompass creatures that *are* nurturing—but that are also aggressive, competitive, cooperative, and a wide range of other things. Such data have also forced us to reinterpret the behavior of males.

We have been forced to expand our theoretical constructs to incorporate the full range of selective pressures on both sexes. The assumptions underlying such revised theory are very different from the earlier formulations. For example, by shifting our focus from the production of infants to the survival of infants, we are forced to take account of a whole range of male and female activities that have drastic repercussions on the survival of offspring.

So much for raising of Darwinian consciences. What about the scientific endeavor generally? I have documented just one example of how, for over two decades, researchers in my own field completely misconstrued primate breeding systems because of such bias. The real question is, Just how damaging is this?

It seems to me that documenting these biases and starting to look at the world from a female point of view has been terribly valuable in revising history, literature, and even primatology; but it has also contributed to a growing cynicism about science generally, and especially social science. By pointing out the pervasiveness of preconceptions and biases in virtually all scientific and scholarly endeavors, feminist scholars have contributed to a general and quite fashionable challenge currently hurled at science. Given that all scientists are embedded in their cultures and that all research is inevitably informed by cultural bias, the question they ask is: "Can we really *know* anything?"(e.g., see Haraway 1989).

Clearly, it is unacceptable to permit old biases, once discovered, to persist. It is undeniable that most fields, including history, psychology, and biology, have been male-centered; but the noteworthy and encouraging thing is how little resistance there has been to revisionist enterprises once begun. On the contrary, in fields like sociobiology,

there has been something more like a small stampede to study female reproductive strategies so that there exists a real danger that we will now merely substitute a new set of biases for the old ones. According to one emerging revisionist dogma, for example, it is now finally acceptable to say that men and women are different, provided we also specify that women are "cooperative, nurturing, and supportive," not to mention equipped with unique moral sensibilities. Entering the fray from a different perspective, various religious sects would also like to benefit from the current disarray to inject their agendas. Yet there can be no advantage for any scholarly enterprise to specify what can or cannot be found.

In spite of its limitations, scientific inquiry as currently practiced, with all of the drawbacks—including reductionist models, underlying assumptions that have been influenced by cultural context, domination of disciplines by males, and so forth, all the things that gave us several generations of male-biased primatology—science with all these drawbacks is better than such unabashedly ideological programs that have become advocated in certain religious as well as in some feminist research programs (such as those advocating "conscious partiality"—the notion that since we can't help being biased, let's be biased in an ideologically correct way).

Needless to say, I reject such programs. I accept that the best we can do is to try to remain intellectually independent, to invite multiple inquiries, and to encourage restudies and challenges to current theories. Essentially, then, this is science as currently practiced—inefficient, replete with false starts in need of constant revision—but still better than any of the alternative programs being advocated.

REFERENCES

Altmann, Jeanne. 1980. *Baboon Mothers and Infants*. Cambridge, MA: Harvard University Press.

Freedman, Daniel. 1979. *Human Sociobiology*. New York: Free Press.

Haraway, Donna. 1989. *Primate Visions*. London: Methuen.

Hrdy, Sarah Blaffer. 1981. *The Woman That Never Evolved*. Cambridge, MA: Harvard University Press.

Silk, Joan. 1987. "Social Behavior in Evolutionary Perspective." In *Primate Societies*, ed. B. Smuts et al. Chicago: Univ. of Chicago Press.

Smuts, Barbara. 1985. *Sex and Friendship in Baboons*. New York: Aldine.

Strier, Karen. 1988. "Subtle Cues of Social Relations in Muriquis." Paper presented at 87th Annual Meeting of American Anthropological Association, Phoenix.

Taub, David. 1984. "Male-Female Mating Strategies in Baboons and Macaques: A Critique and Re-evaluation." Paper presented at Annual Meeting of American Zoological Society, Philadelphia.

Tiger, Lionel. 1977. "The Possible Biological Origins of Sexual Discrimination." In *Biosocial Man*, ed. D.W. Brothwell. London: The Eugenics Society.
Wright, Patricia. 1984. "Biparental Care in *Aotus trivirgatus* and *Callicebus moloch*. In *Female Primates,* ed. Meredith Small. New York: Alan Liss.