

Is Sociobiology Amendable? Feminist and Darwinian women biologists confront the paradigm of sexual selection

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After having long been excluded from scientific activity, or relegated to minor roles as “invisible technicians” (Shapin 1989), victims of “hierarchical segregation” (Rossiter 1982) in different fields of biology, and in genetics in particular (Richmond 2007), women have laid siege to the professional and cultural field of science. They rival their male colleagues. They have analyzed the institutional organization of the laboratories. They have identified certain androcentric “biases” conveyed by science with regard to women and differences between the sexes (in particular, Bleier 1984 and 1986). Things have reached such a point that people have asked whether the entire edifice of modern science has not been fundamentally vitiated owing to an erroneous conception of nature and whether a radically alternative science, a “feminist science,” should not be proposed, relinquishing the desire to control and dominate, blurring the difference between subject and object and clouding all the oppression-laden dichotomies (nature/culture, masculine/feminine, human/animal . . .) (Merchant 1980; Fee 1981). These feminist criticisms could at times (but not always) be spurred by the will to improve science by freeing it from its worst errors. Thus, the Biology and Gender Study Group declared in 1988 that biology is not merely a special oppressor of women, but a co-victim of male social assumptions (*Biology and Gender Study Group* 1988: 61). So it is that the feminist critique has been able to present itself as being one mode, among others, of “experimental control,” a practice in keeping with the scientific spirit that helps biology avoid some detrimental biases.

But what is feminism’s claim to eliminate scientific “biases” based on? It seems paradoxical both to affirm the radical relativity of science rooted in a male point of view and to outline the possibility of overcoming this relativism by affirming another rival, and perhaps superior, female point of view. The feminist critique of science does not imply putting forward a feminine model for science. It is not a matter of setting

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an alternative Woman-the-Gatherer model against the myth of Man-the-Hunter, of charting out a division of labor where each would play a role appropriate to his or her "nature." There is no need to shift from one form of naturalism to another. Several philosophers of science have, each in her or his way, faced this difficulty and tried to provide a rationale for this "unbiased science": Sandra Harding with her "situated epistemology" and the concept of "strong objectivity"; Helen Longino by refusing to set "good" against "bad" science and stressing the "contextual value" of all science; or Donna Haraway by confronting four temptations (the constructionist, Marxist, scientific sirens or those of gender and race studies) and presenting primatology as science-fiction (Harding 1991; Longino 1990; Haraway 1989).

While feminism and biology can both derive benefit from a new alliance, the terms and issues must definitely be set out. For Evelyn Fox-Keller, "feminist science" means neither a rejection of objectivity as being "deep-rooted androcentrism," nor a radically new beginning for science. For, substituting a hypothetical "feminine science" for a debatable "masculine science" would ultimately come down to dissolving science into ideology and the political domain (Keller 1985: 178).

Rather than dealing with abstract entities – "Feminism" vs "Biology" – I would like to look at some strategies employed by biologists with regard to "impossible feminist sociobiology." Sociobiology is in fact often suspected of not being a science but a political theory and agenda, even "a new scientific sexism" (Bleier 1984: 46, Hubbard 1983: 57). Many Darwinian feminist biologists have found themselves faced with this situation, suffering double rejection by sociobiologists *and* feminists.

I. The theoretical framework of behavioral ecology (1871–1972)

Rather than the controversial word "sociobiology," there would rather be talk of behavioral ecology. This discipline's conceptual framework was developed on the basis of the work of G. C. Williams against group selection (1966) and of William Hamilton on kin selection (1964). These main contributions led to the "problem of altruism": if the selection level is individual, how does one explain behaviors that do not lead to a greater frequency of the genes of the individual in question? Two books by E. O. Wilson (*Sociobiology*, 1975) and Richard Dawkins (*The Selfish Gene*, 1976) expanded upon this question. Each in its own way played a determinant role in recasting the framework of what was ethology and in structuring the study of animal behavior around the idea of genes maximizing the production of copies of themselves.

Within this model, natural selection concerns not only the survival of the individual, but above all its reproductive success, which "sexual selection" indicates.¹ On the basis of Charles Darwin's work (1871), two mechanisms were put forth under this heading: male competition and female choice, that is, one an *intrasexual* component and the other *intersexual*. This framework stresses over and over the male fight to "possess" or "obtain" females. Sexual selection appears to result from competition for sexual access to females, engendering more or less pronounced sexual dimorphism and the development of armaments or ornaments in the males. The latter are described as enterprising and not very discriminating, the females as shy or reticent, "coy."

These experimental principles seemed to find experimental “confirmation” in the work of Angus Bateman (1948) on *Drosophila*. Bateman found that male reproductive success increases with the number of partners, but not that of females. He concluded from this that females do not therefore have an “interest” in copulation and that the males, on the other hand, compete to fecundate females, considered as a “limiting resource.” These results were used by Robert L. Trivers (1972) to explain why certain individuals have more reproductive success than others. For him, the sex that invests the least in raising the young (usually the males) displays the greatest amount of variation in reproductive success, while the sex that invests the most becomes limiting for the other sex. Slight parental investment by males determines the intensity of sexual selection, as in the peacock, where males can inseminate without much remission time and females can be selective: the more aggressive or more attractive male prevails, and intensity of selection creates a marked dimorphism in the species. But other examples exist. In magpies, since the male invests in rearing the brood, reproductive success is almost identical among the males, and as a result there is little sexual dimorphism in the species. On the other hand, among phalaropes, the males see to incubation and the essential part of parental investment. They therefore constitute the limiting resources and it is then the females who are colored and aggressive and who defend the territory.

Geoff Parker’s work (1970) on spermatic competition also played a determinant role in the conceptual development of behavioral ecology. It showed that the capacity of a male’s sperm to fertilize a female’s eggs can be diminished by the simultaneous presence in her genital passages of sperm coming from other males. Spermatic competition therefore concerns competition among the ejaculations of different males for the fertilization of the eggs of a single female. This concept drew attention to “multiple copulation” and the diverse postcopulatory mechanisms: adaptations that enable males to evacuate the sperm of rivals stored by the females, or that impede remating and future ejaculations.

Extended to the human species, this conceptual context has aroused abundant criticism that was not – far from it – only the doing of feminists. Very early on, Gould and Lewontin condemned excessive adaptationism, which they call “Panglossian” (Gould and Lewontin 1979). Anthropologist M. Sahlins (1976) discussed the models of competition and investment. Others accused sociobiology of reductionist “genocentrism” (in particular, Jablonka and Lamb 2005). Would feminism’s specific contribution be limited to qualifying science as “sexist”? And if so, what does that mean?

The originality of the studies that we wish to present here consists in the fact that they are internal to the sociobiological paradigm that they try to amend. Certain feminists have in fact endorsed the general criticisms of sociobiology, but others have instead found them excessive. They have judged the debates about the “adaptationism” or the supposed “genetic determinism” of behavioral ecology to be old disputes that deserved to be definitively closed (Waage and Gowaty 1997). Can one then be a sociobiologist and improve this science from within by making it less “sexist”? This epithet enables one to reflect on the questions that scientists raise and on subjects that claim their attention. Then, it concerns biases that enter into science through the language, metaphors, analogies and examples proposed. Finally, these biases can

show up in the moral assessments or metaphysical implications contained in scientific propositions (Ruse 1981: 220–222).

Actually, the simplified theoretical framework that we have just depicted displays a certain number of these gender-linked biases. Females are not always taken into account in it, except as “resources” that males seek to possess. Likewise, spermatric competition takes place between the male gametes within the female, deemed a passive substrate. Darwin or Parker showed less interest in the battle between the sexes than the battle within the male sex. Trivers, while leaning on the concept of “resources,” suggested other perspectives: the concept of “parental investment” enables one to understand that it is not the biological sex that determines the intensity of sexual selection and, consequently, the extent or modalities of sexual dimorphism. Nonetheless, his studies have been abundantly cited in support of the “fact” of male aggressiveness and female passivity: the species with “sex-role reversal” being here but a particular case anticipated by the rule.

II. Complementing the Darwinian picture by changing the focus

1. Have females “evolved”?

In a book entitled *The Woman That Never Evolved*, the primatologist Sarah Blaffer Hrdy questioned this paradigm (1981). She emphasized that the Darwinian division of sexual selection into male competition and female choice has caused a certain amount of blindness regarding different natural phenomena. To begin with, the history of the concept of female choice is a convoluted one (Milam 2010) before it reaches full status in Trivers’ work, but the problem actually goes beyond that. As Antoinette Blackwell had observed as early as 1875, the function of the two Darwinian factors is to evaluate differences in reproductive success *among males*, while that of all females is assumed to be the same. In other words, it is assumed that females never evolved, or evolved *less*. According to her, Darwin explained with “great wealth of detail . . . how the male has probably acquired additional masculine characters; but he seems never to have thought of looking to see whether or not the females had developed equivalent feminine characters.” As for Spencer, he developed a theory of arrested female development. Thus, “Spencer scientifically *subtracted[ed] from the female,*” just like “Mr Darwin has scientifically *add[ed] to the male*” (Blackwell 1875: 16–19). By wishing to base the hypothesis of evolutionary equality on the nature of the sexes, Blackwell was as guilty as her macho contemporaries of committing a naturalistic sophism consisting of drawing political and social lessons from what biology teaches us. This questionable theoretical position additionally led her to miss the meaning of Darwinian evolutionism and to reintegrate the perspective of intelligent design. Be that as it may, Blackwell’s historical significance lies in having observed the way biology looks upon its objects and thus having denounced the exclusion of females from the field and an exclusive focusing on males and their will to mate.

The lesson that Hrdy drew from this (1981: 13) is that Blackwell’s informed dissension was drowned out by the wave of popular adhesion to Social Darwinism. “Her contribution to evolutionary biology can be summed up in one phrase: the road not

taken." After Blackwell, Hrdy is astonished that in the classical evolutionist conception, only male characteristics are taken into consideration as having "evolved." Having gone off to observe the langurs of Hanuman, Hrdy describes them within the framework of sociobiology and in a dramatical scene full of emotion illustrates the hypothesis of infanticide: how it is to a male's advantage to kill a rival's offspring so as to put the female more quickly into estrus. Acknowledging competition among individuals, Hrdy simply intends to remind people that females are also actors and to describe the modes of competition or collaboration among them. The work done on langurs showed how females, far from being coy, actively sought coitus, behavior which can be used to sow doubt as to the identity of the father and so have the effect of lowering the rate of infanticide (Hrdy 1977; Bleier 1986: 119–146).

2. The battles of sexes

Male competition and female choice explain how males evolved in such a way as to take control of female reproduction potential. Inversely, females multiplied strategies to maintain their reproductive autonomy, while males developed behaviors of sexual constraint in such a way as to eliminate the "female choice" factor (anti-choice forces, that is, sexual constraint).

Once the female role was reintroduced into the perspective of behavioral ecology, the problem of sexual constraint arose. Different studies, like those of Barbara Smuts or Thornhill and Palmer on "rape" were the first to deal with the "battle of the sexes." Such a conception corrects the bias about the sexes collaborating harmoniously in view of reproduction and copulation taking place for the "good of the species." Patricia Adair Gowaty has also called upon behavioral ecology to take into account the reality of the battle of the sexes for control of resources, which are particularly essential to female reproduction. In particular, male competition is possibly only a derivative process subordinated to competition between males and females. The Darwinian paradigm of sexual selection wrongly concentrated on two factors that need to be complemented today. For Gowaty, female access to reproduction is fundamental, including for male reproduction, a fact involving a series of selective forces, among them: female competition for resources; female choice of partners; male behaviors opposing female choice, such as sexual coercion; female resistance to this coercive control; male competition for coercive access to females; competition between males and females for control of resources essential to reproduction; male competition for resources (Gowaty 1992: 233).

Gowaty hopes her studies can encourage more feminists to take an interest in the contributions of evolutionary biology and more biologists to recognize and respect the contributions of feminism. It must be noted that this ecumenical message invites people to work in two directions. On the one hand, one must pursue the feminist criticism of androcentric biology, work within the biological community to show the pertinence of this criticism and ask, for example, why the co-evolutionary battles between the sexes have been stressed appreciably less in evolutionary biology than the co-evolutionary battles within each sex. But, on the other hand, the time would also have come for feminism to take its turn and integrate the lessons of biology

and make use of them. Having defined feminism as the movement that wishes to put an end to sexist oppression, Gowaty indicates how the spirit of Darwinism can foster feminist struggles through its critique of essentialism and the emphasis placed on variation. Both feminism and evolutionary biology have underscored the importance of controlling female reproduction and therefore gain from reflecting together. This is the type of feminist analysis attempted, for example, in Priscille Touraille's research (2008) on the dimorphism of size in the human species. Analyzing certain myths of paleoanthropology like that of "original division of labor" leading to the formula "sex for food," she wants to show how gender structures and modes of social organization, particularly as concerns the distribution of proteins, have been able to act as a kind of selection and be recorded in bodies in such a way as to create "big men" and "small women."

III. Biology amended or biology exploited?

1. *A special women's perspective?*

Females, previously reduced to their uteruses and looked upon as resources or receptacles, have become actors in their own right that biology should take into account. The work to overcome biases thus proceeded by proposing new theoretical objects. Feminist biologists have contributed to filling out the impoverished picture of the two principles (male competition, female choice) by taking other phenomena into consideration: competition among females, choice of the male, sexual constraint and response to this sexual constraint. But is this a matter of a "women's perspective"?

Many male biologists are indignant at the manner in which feminists tell the history of the different disciplines. It is all as if, for example, the history of primatology could be cut into two periods: a "pre-women" period, when science was still in the grips of the dark forces of racism, sexism and colonialism; and a "post-women" period, when science, becoming emancipated, advanced towards the light (Rodman 1990). Annoyed, Tim Birkhead has noted (2000: 20) that it is important to recognize that overcoming gender biases was not just a female prerogative. Several male behavioral ecologists actively advanced the female perspective.

William Eberhard's work (1996) on female cryptic choice contributed to rectifying excessively simplistic views of male activity and female passivity, by drawing attention to the phenomena that take place *after* mating. In contrast to Parker, who underscored the variety of modes of male intromission, Eberhard stresses the female side of these postcopulatory processes and his work examines a set of observational biases or phenomena to which behavioral ecology pays little attention. Besides "gender provincialism" ("male" bias), he emphasizes unsuccessful copulation, failed fertilization, unreceptive females, sperm rejection . . . He was thus able to find fault with his colleagues and reproach them for falling into "inadvertent machismo" (Eberhard 1990). Can such work be called *feminist* if not *feminine*? Eberhard does not in any case display any theoretical commitment in this regard.

This brings us to certain remarks made by Hrdy in a preface added to her *Woman That Never Evolved* (1999), where she maintains that the greatest strength of science

is its power to correct itself. While women have contributed to this, it is needless to bring up the naturalizing tendencies of ecofeminism. Hrdy considers that if women have modified biology's conceptual field, is not owing to their different sensibility or their distinctive "worldview," but because they were predisposed to pay attention to the unexpected. Their feminist commitment that made them reticent with regard to authority and their marginal institutional position undoubtedly played a role in this. Therefore, the thesis that females are active in evolution is not a victory "for science" or "for feminism." That's not the right issue: science stands to gain once error is refuted (Birkhead and Cunningham 1997).

2. *Criticizing the lexicon*

The amendment of biology has come about through the broadening of the simplified Darwinian conceptual framework, but also through criticism of the lexicon of sociobiologists. While the human species must be considered, in many respects, and perhaps even through and through, to be a biological species, one can nonetheless question the unity of human categories of "rape," "harem," "monogamy" or "homosexuality" when applied indifferently to all animals (including humans). Ruth Bleier spoke in this regard of ethnocentrism which engenders unexamined assumptions, biased questions, a selective use of animal models, anthropomorphism in concepts and language (*machismo* of insects, *prostitution* in apes or birds, *homosexuality* of earthworms), as well as distortions and fallacious representations in the use of data (Bleier 1984: 4–5). One therefore stands to gain by replacing "emotionally suggestive" anthropomorphic jargon liable to engender semantic slips with a strictly descriptive vocabulary: for example, by using "cleptogamy" instead of "cuckoldry"; or "forced copulation" instead of "rape" (Estep and Bruce 1981; Gowaty 1982). It is a matter of questioning the metaphorical status of scientific concepts. Are all "colorful" terms to be excluded at all costs on the pretext that they may have emotional associations (Stuart 1983)?

The lexical problem already figured in Richard Dawkins' title. In what sense may one call an entity selfish, self-interested? Darwin himself had encountered this difficulty in speaking of "natural selection." Some accused him of divinizing nature. Darwin always found that astonishing. One should not, he wrote on several occasions, make more problems for natural selection than for the "elective affinities" of chemists. But certain terms, it seems, have a greater emotional impact than others.

Anthropomorphism claims for a logical shortcut for providing insight into certain phenomena, but the danger always exists of seeing our social representations transposed onto nature and thus "naturalized," of having them find a kind of natural justification of our forms of behavior (norms or deviance) (Maynard Smith 1997; Cezilly 2006: 37–40).

Moreover, the problem does not just lie there. Talk of "cuckoldry," for example, to designate females who seek "extra-pair copulation," is not only anthropomorphic, but especially also errs in approaching this reproductive tactic from the vantage point of male competition. Talk of "cuckoldry" glosses over the complexity of male–female interaction, the female capacity to store sperm or produce broods with multiple

fathers. One therefore definitely has a case in which the practical shortcut actually constitutes blinders (Lawton *et al.* 1997: 80).

3. Can feminism use biology?

What is a feminist use of biology? Biology has wrongly focused on males as being the only organisms worth studying, and it was important to correct that, but seeking to use science to feed a “feminist political agenda” is of no service to either one. For example, why look for examples of “liberated” female animals like the phalaropes, whose males care for the young, or seahorses whose males gestate? As Marlene Zuk notes, this would be yet another way of “twisting the natural world into an order that it does not show.” Behavioral ecology invites us to take an interest in the plurality of forms of social and sexual organization. The quest for a feminist bestiary that would establish cases of matriarchy in nature would be yet another way of blinding oneself to animal behavior in all its diversity, if not of wrongly focusing on contrasting males and females. We are here poles apart from ecofeminism and its belief in some mythical special relationship of women to nature. For Zuk, feminism

has more to offer biology than biology has to offer feminism. Feminism provides us with tools to use in the examination of ourselves and other species that can, if we apply them carefully, help us remove ourselves from the center of things and struggle to see past our biases to what animals are doing. (Zuk 2002: 4)

By its critical, alternative outlook, feminism could bring to light certain biases, but would have nothing to learn from biology.

The point of view of using biology has nonetheless been proposed, in particular by Griet Vandermassen (2004 and 2005), who holds that Darwinian feminism is possible. She aims to show that “feminism throws away a valuable tool for understanding sexism by denouncing an evolutionary approach to the human mind.” While she readily acknowledges that a “male bias” has long distorted behavioral ecology, she considers that this has largely been corrected, owing in particular to the role played by women (and feminist) biologists. Vandermassen revives the contrast between *proximate* causes of sexism and patriarchy that, for example, sociology supplies, and the *ultimate* causes that sociobiology studies, which alone can “explain why the same gender differences are reliably found all over the world.” Evolutionary biology proposes a unifying framework to feminism. She is, for her part, predisposed to admit the relevance of certain old ideas about men and women, that she considers sufficiently renovated and supported by the Darwinian paradigm, such as: the fact that men, on the average, are attracted to the youth and beauty that are important markers of fertility, easily sexually aroused by visual cues, prompter to infer sexual intent and quicker to engage in sexual intercourse, more actively seek short-term sexual partners, etc., while women are more nurturing, more devoted to caring for their children; more attracted to men slightly older than themselves who enjoy a high social status or sufficient economic resources, but also who are disposed to invest in their offspring . . . (Vandermassen 2004: 20).

This point of view is widely contested, both within and outside of sociobiology. A number of specialists in behavioral ecology consider the “natural” qualities that Vandermassen admits are contingent upon culture. Why therefore should feminism integrate these still crude views (Ah-King 2007)? Vandermassen is mistaken about the modalities of an alliance between biology and feminism when she proposes to use biology as the basis of a new naturalism. The criticism is carried on both outside behavioral ecology and within it.

IV. Is behavioral ecology amendable?

1. A capitalistic framework?

Behavioral ecology has modified certain concepts and become more gender-balanced: active female choice is an accepted hypothesis, male competition is no longer the sole factor determining reproductive success. Ecologists also study choice exercised by males and competition between females for access to males. Just as cooperation has been taken just as much into account as competition, forced copulation has come into this discipline’s field of vision, as well as aggression initiated by females (Lawton *et al.* 1997). But is this enough? For certain critics, it is the very foundations of this discipline that are in need of reworking.

Finally, the question is whether the concepts of behavioral ecology are not intrinsically vitiated, no matter what corrections or complements are brought to bear. Many critics suggest that it constitutes a hyper-capitalistic conceptual framework, where the biopolitics of reproduction is finally reduced to competition, almost to war, in which the genes that produce more copies of themselves end up taking over and replacing the others. In this regard, these critics consider that one must stay away from behavioral ecology. “Feminist sociobiology” or “Darwinian feminism” would be impossible, because no reform would solve this problem. The account structuring this discipline would be patriarchal, competitive and economic – therefore ideologically oriented. The very concept of “resource” could thus be accused of bringing mating down to reproductive success, neglecting the pleasure tied to sexual activity and not taking into account the field of homosexuality in the animal kingdom (Bagemihl 1999). An article by Snyder and Gowaty (2007) which reexamines Bateman’s founding studies seems to authorize challenging them.

Finally, objections of genocentrism or adaptationism are raised over and over again and divide both feminists and ethologists as a whole. By focusing on the presumably “ultimate” genetic level to the detriment of “proximate” causes, the theoretical model of behavioral ecology is accused of delighting in the dream of a simplistic, and ultimately pernicious, ecological determinism. Ethologists contest whether principles of kin recognition and the subsequent hypotheses of altruism or infanticide are well established. Bernard Thierry, for example, emphasizes that behavior like forced copulation, rare in nature, occurs more frequently in captivity, when the physical (dimorphism of size) and social (relative isolation) conditions permit it, without its being useful or relevant to appeal to genetic or adaptationist hypotheses (Thierry 1997, 2007, 2008).

Feminist biologists reflect this divide. The 1997 volume edited by Gowaty called *Feminism and Evolutionary Biology* testifies to the persistent resistance to admitting the possibility of feminist sociobiology or “Darwinian feminism.” While the papers by Zuleyma Tang-Martinez or Caitilyn Allen suggest a radical contradiction, the volume’s editor openly distances herself from them and states that, as for her, the “dragon of determinism” has been slain. Behavioral ecology focuses on the relationship between environmental variation and phenotypic variation. By talking about a “gene” for behaviors, one is finally only pointing to their “heritability” (Gowaty 1997), that is to say that portion of the differences between individuals that is passed down to descendents (Danchin *et al.* 2005: 34).

Thus, it is interesting that a critique internal to behavioral ecology is attempting to develop models freed from two-sex systems. These criticisms reproach the paradigm of sexual selection for not taking into account gender diversity in nature (the role of hermaphrodites in particular) and also for always leaning solely on a set dichotomy of male/female roles. Gowaty and Hubbell (2005) have developed a model of gender-neutral flexible sex roles and refuse to assign any specific role (“choosy,” “competitive,” “indiscriminate”) to males or females in advance. Roughgarden *et al.* (2006) have proposed replacing the concept of “sexual selection” by one of “social selection” and having cooperative rather than competitive game theory models. The question then arises as to whether such a proposal broadens the theoretical framework of behavioral ecology, renews it completely, or rather underscores certain possibilities already implicitly present within this framework (cf. the letters to the editor published May 5, 2006 and entitled “Debating Sexual Selection and Mating Strategies”, *Science*, 312: 689–697 and Clutton-Brock 2007).

2. What to do about anisogamy?

Another controversial main concept is that of anisogamy. This difference of size between male and female reproductive cells has aroused much commentary relating to the metaphysical implications of scientific theories. In their classic work, Patrick Geddes and Arthur J. Thomson (1889) saw in this the very expression of maleness and femaleness. There, adopting a critical perspective with regard to the Darwinian concept of sexual selection, they pointed to a fundamental contrast between two types of metabolism: anabolism, a conservative state which consists in storing energy, and catabolism, a disruptive, energy-expanding state. For Geddes and Thomson, the determination of sex depends on the type of metabolism that prevailed during the formation of the individual: catabolism tends to produce males (shorter life, greater activity, smaller size), anabolism females (deemed conserving in energy, more passive, vegetative). The same contrast between two metabolisms is found on the level of gametes, between nourishing eggs and active sperms and on the level of the behavior of individuals of different species, a correspondence between microcosm and macrocosm that raises the question as to which of these levels the terms “males” and “females” really apply to.

Wrongly used for a long time to naturalize the difference between the sexes and to make it into a destiny written into our reproductive cells, anisogamy today enters

into behavioral ecology as the rationale behind the two behavioral strategies of males and females. Two strategies have been retained as being advantageous: the rare big gametes but with nutritive resources; the small, but numerous, parasitical gametes (Birkhead 2000: 112). Here again, feminists hesitate as to the strategy to be adopted. Certain of them, like Ruth Hubbard, ask whether it really takes more *energy* to generate the one (or few) egg(s), or a large quantity of sperms. Others defend the approach in terms of cost provided it is sufficiently well worked out and sophisticated. S. B. Hrdy (1981: 205) has denounced the "American supermarket mentality" that overlooks the difficulty organisms sometimes have in mobilizing the resources necessary for the production of gametes. And many studies have actually taken issue with the idea that sperm would be in "limitless" quantity and "cheap" (Birkhead 2000: 74–75).

Certain feminists have therefore accepted extended anisogamy, including the cost of gamete production and parental care as a whole. Donna Haraway (1989: 349) derides these attempts to amend sociobiology. For her, such efforts illustrate well the overlap between biology and feminism, and to a certain degree, beyond the oppositions, the "complicities with the structures it seeks to deconstruct, and incommensurable languages, as well as its shared conversations, unexpected alliances and transformative convergences". There is no use. The edifice of behavioral ecology remains alien to feminism all the while joining in its efforts: one can play with the great myth of "Woman the Gatherer," providing one does not make it the basis of a new "naturalism."..

So it is that Marlene Zuk (1993) delighted in an exam subject Robert Trivers gave his students. In it, Trivers proposed an account of *Genesis* inspired by the lessons of the theory of evolution. The creation of the world consisted first of posing the principle of natural selection, then of bringing into existence a first creature named "Eve." In this story, it is Adam who was created from Eve's rib. The female was the original category and the male was only a parasite who appeared for obscure reasons. Zuk comments that the "question illustrates how use of feminist principles can expand conceptual possibilities for biology students."

But Trivers, very far from hailing any possible new alliance between his work and women's causes, issued a stern warning which came down to distancing biological "science" and feminist "ideology" in no uncertain terms. Trivers (1994) declared in substance: "I would rather derive my feminist principles from evolutionary biology, than my evolutionary biology from feminist principles." His text compared feminism to various political ideologies that would dictate to science its research agenda, making it obvious that for many biologists feminism and its corollary "political correctness" are no more than ideologies, as pernicious for science as Marxism was able to be when it adopted Lyssenko's form of proletarian biology. Feminist "ideology" against sociobiological "ideology," Marxism against capitalism? Debate would come to an end, block would be set against block.

Conclusion

“Feminist sociobiology” attempts to amend the paradigm of behavioral ecology from within science and from within feminism – which secures for it a dual expertise capable of fostering a new outlook. “Darwinian feminists” attempt to avoid two dead ends: a paradigm can amount to putting on blinders, but the lack of any paradigm blinds. It must be noted that the union is yet to be deemed acceptable and that feminism has not finished its critique of (socio)biology, even though a large number of biologists (often women) engage in this back and forth between the scientific community and the reception of this discourse in the public arena. Of course, feminism is not alone in criticizing behavioral ecology and its concepts: challenges emanate as much from the field of ethology in general as from within behavioral ecology itself. As for the use of biology by feminism, this strategy seems to me to be very much subject to caution. Since Antoinette Blackwell (1875), the idea of basing feminism on nature or on a naturalistic use of a “feminist bestiary” has been a dead end much like macho biology. However, it is clear that feminism, but also *queer* theory (Roughgarden 2004), in their encounter with biology, help to create awareness that certain gender biases handicap science in its search for models and principles explaining natural phenomena. They are contributing to making science a “human” enterprise, not just a “male” one (Keller 1985: 178).

These analyses propose two different ways of anchoring our thoughts and therefore two ways of putting them into perspective or of integrating them into situations.

On the one hand, all knowledge has its historical context. But that does not mean that it reduces to the rendering of the prejudices of the person, male or female, conveying it or those of its era. One may legitimately hope that there are not only contingent points of view that only commit the person proclaiming them. In other words, shared knowledge remains possible that is not a mere expression of the relationships of sociopolitical forces constituting its underpinnings or infrastructure. Saying that Darwin’s natural selection does not explain anything because it echoes, shifts and, to a certain degree, recycles concepts borrowed from classic political economics amounts to not understanding anything about the basic ways in which science functions. All scientific concepts are in the first place metaphors: Darwin himself acknowledged this. That means that concepts must be handled with care, but it does not in any way rob them of their relevancy as explanatory processes or as ways of displaying phenomena. Evolutionary biology is a scientific discipline, *that is to say* a human cultural, practice. Analysis of the metaphors underlying scientific discourse has today become the object of a substantial amount of work by the human sciences. By stressing one metaphor, one means to display the ideological presuppositions and better understand the sociopolitical consequences of this.

On the other hand, all thought has biological moorings. All the ideas we form are permitted by our body in which they have an organic basis, just as they are compatible with the fundamental laws of physics and have their place in nature. One can legitimately hope, nonetheless, that not all thought is necessarily coded as such in our genes of which it would be merely the pure expression or transcription. In other words, an idea, though developed in a body, need not for all that answer to some biological preformationism. We write because we have, among other things, hands,

we speak because we have, among other things, a tongue, but neither hands nor tongue are properly speaking organs whose function would be writing or language. Likewise, the female orgasm was able to appear to be a simple by-product, a derivative accessory product of evolution. Though it does not necessarily have a function in an individual's reproductive success, that is to say it does not appreciably increase the chances that an individual's genes will produce copies of themselves, orgasms remain nonetheless an essential component of the life of certain primates, humans or bonobos (Lloyd 2005).

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Translated from the French by Claire Ortiz Hill

Note

1. The concept has nowadays evolved to designate success in access to reproductive partners.

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