Sexism: Strategies of Reproduction, or When Is Beeswax Like a Ferrari?

Generations of Tom Sawyers and Huck Finns set out on their boisterous adventures and come home covered with mud, while we chuckle indulgently. Little girls, though, are made of sugar and spice. "Boys will be boys," we're told, but "nice girls don't do that." "Vive la différence," echoes the French Parliament. La différence is one of sociobiology's most important concerns.

There has been no human society that has not distinguished the sexes, by their anatomies and by their behavior. But we tend to focus on the superficial differences—dress, hair length, body shape—and most of us don't really know what makes a woman female and a man male.

We all know how a human male differs physically from a female. Likewise for male and female chimpanzees, elephants and lions. But how do we differentiate birds, for example, which generally lack a penis or vagina? And what about oysters? Not much visible there, but biologists, at least, are absolutely confident in distinguishing the sexes. What is the underlying biological meaning of male and female?

The answer is quite simple. In almost all living species there are two different kinds of sexual individuals. One kind, the female, produces a relatively small number of large sex cells, called eggs. The other kind, the male, produces a relatively large number of rather small sex cells, or sperm. In many cases, the difference between male and female sex cells is dramatic. Birds may lay eggs that weigh 25 percent or more of their total body weight, while their mates produce only a few drops of sperm. Mammals seem to be exceptions to this, since their eggs are quite small; a human egg is only about the size of a pinhead. But the sperm are even smaller; a single male ejaculation produces enough of them to fertilize every woman in North America. Zoologist Richard Dawkins points out that the exploitation of women by men probably began very long ago, when the smaller, more active sperm began to take advantage of the rich food reserves present in the larger, less active eggs.

The biological consequences of fertilization and pregnancy are immense, falling only on the woman. Eggs are fertilized by sperm, not vice versa. And women become pregnant, not men. It is the woman who must produce a placenta and nourish her unborn child; who must undergo the metabolic and hormonal stresses of pregnancy; who must carry around an embryo that grows in bulk and weight, making her more and more ungainly as her pregnancy advances; and who, when the child is born, must nurse it.

Because women become pregnant, they simply cannot produce as many children as can men. We may regret this fact, glory in it or simply accept it, but it remains, nevertheless, an indelible part of our biology. Although Priam's wife Hecuba, the queen of Troy, was said to have had more than twenty children, twelve or so is a more realistic maximum for one woman, and in most societies, six or seven children is considered quite a few. By contrast, there is little in their biology that limits the number of children that men can produce. For instance, Ismail, a seventeenth-century king of Morocco, is reported to have fathered 1,056 offspring.

In some ways, Western society is a great equalizer. By our promotion of monogamy, we have narrowed the reproductive gap between men and women. We are even less likely to tolerate a modern-day Ismail than a Hecuba, and, with the exception of successful sperm donors, most men today really have little opportunity to father more children than women have to mother them. However, we are still perfectly good mammals, and the biology of maleness and femaleness continues to apply to us, just as it does to a mouse or a monkey. There is good reason to believe that we are, in fact, primed to be much less sexually egalitarian than we appear to be. We may not be entirely comfortable with la différence, but we had better try to understand it.

The biological difference between men and women is absolutely crucial to comprehending sociobiology's arguments for the behavioral differences between them. Natural selection dictates that in-
individuals will behave in ways that maximize their fitness, so, clearly, different strategies will be appropriate for the two sexes, given their dramatically different biological characteristics.

Sperm are cheap. Eggs are expensive. Accordingly, females have a much greater stake in any one reproductive act. Biologist George C. Williams points out that in virtually all species males are selected to be aggressive—sexual advertisers—while females are selected to be choosier—comparison shoppers. Again, these behaviors follow directly from the biology of what it is to be male or female. For males, reproduction is easy, a small amount of time, a small amount of semen, and the potential evolutionary return is very great if offspring are produced. On the other hand, a female who makes a "bad" choice may be in real evolutionary trouble. If fertilization occurs, a baby is begun, and the ensuing process is not only inexorable but immensely demanding. In certain species of flies, copulating with a male from the wrong species results in the death of the female. The male, however, loses little. Among birds, a comparable error by the female in choosing a mate can lead to the production of sterile eggs—a potential wastage of one-fourth of her body weight. She may also be unable to breed again for a full year. The cost to the male? Again, little, if anything. Small wonder that females in virtually every species are more discriminating than males in the choice of sexual partners.

The evolutionary mechanism should be clear. Genes that allow females to accept the sorts of mates who make lesser contributions to their reproductive success will leave fewer copies of themselves than will genes that influence the females to be more selective. Accordingly, genes inducing selectivity will increase at the expense of those that are less discriminating. For males, a very different strategy applies. The maximum advantage goes to individuals with fewer inhibitions. A genetically influenced tendency to "play fast and loose"—"love 'em and leave 'em"—may well reflect more biological reality than most of us care to admit.

According to Zorba the Greek, God has a very big heart, but "there is one thing that He will not forgive—when a woman calls a man to her bed, and he will not come!" Presumably, had the situation been reversed and a man called a woman to his bed, and she demurred—that He would forgive. Sociobiology helps us understand why this should be so.

In a well-known custom of medieval Europe, when a serf got married, the lord of the manor had the right—the droit du seigneur—to spend the wedding night with the new bride. Intolerable to today's morality, perhaps, but it probably did wonders for the lord's fitness. And why was it the lord who slept with the bride and not the lady of the manor who slept with the groom? Such a practice would probably not have helped milady's fitness and, not surprisingly, there never was a droit de la madame.

When we introduce a female mammal to a sexually-aroused male, there is a flurry of copulation, which eventually subsides. If we remove that female and replace her with another, copulation frequency rises again, only to subside once more. The coupling keeps occurring until male sexual performance finally "exhausts" (to use the apt scientific term). This phenomenon, known to psychologists as the "Coolidge effect," probably occurs in humans as well. According to pioneer sexologist Alfred Kinsey: "Among all people everywhere in the world, the male is more likely than the female to desire sex with a variety of partners." Clearly, this preference is also consistent with natural selection, since males can enhance their fitness with each new copulation while females are unlikely to do so.

Of course, evolution does not simply favor utter profligacy by males. Their sexual activity may be limited by other demands on their time, such as defending territory, feeding themselves and offspring already produced, or simply recovery from their exertions. Most significantly, they are limited by the activities of other males, with whom they compete for access to females. Nonetheless, sociobiological theory predicts dramatically different reproductive strategies for males and females. The differences are nearly universal. Primitive turbellarian worms are hermaphrodites, meaning that each individual is simultaneously both male and female, each having

President and Mrs. Coolidge, according to the story, were given separate tours around a model farm. The First Lady noticed a large group of chickens in a yard and commented: "That rooster must be kept quite busy." She suggested that the fact might be mentioned to the President when he came by. Later, when the presidential motor arrived, the guide explained, "Mrs. Coolidge wished me to point out that our rooster must copulate many times each day." "Always with the same female?" asked Coolidge. "Well," said Coolidge, "tell that to Mrs. Coolidge." Hence, the Coolidge
both testes and ovaries. Yet the worms fertilize each other, not themselves, and the active individuals will force copulation with passive ones. Indeed, the same individual will eagerly and promiscuously inseminate others, but it will exercise more discretion when allowing others to inseminate it! These worms are active and aggressive when seeking to discharge their sperm, demure and discriminating when their more valuable eggs are at stake. Thus, a single individual has a “split personality,” depending on whether it is looking out for its maleness or its femaleness.

If you walk through a marsh during the springtime in the southeastern United States, and if that marsh contains bullfrogs, you may be in for a demonstration of sociobiology in action. The chances are good that you will emerge from the marsh with a male bullfrog tightly clutching the toe of your boot, perhaps one on each boot, in a posture known as “amplexus.” This grip is used by males to clasp females in the early stage of mating. Males will clasp almost anything that doesn’t clasp them first. Occasionally we even run across an amphibian ménage à trois, with a single ripe female clutched by two eager males, one behind and one in front. The male bullfrog’s sexual assertiveness is an adaptive part of its reproductive strategy: “If it moves, mate with it.” By contrast, a female bullfrog will only release her precious store of eggs when clasped in just the right way by the right species of male at just the right time. She is much fussier, and appropriately so.

A mule is a cross between a female horse and a male donkey. While it may represent a good investment for the farmer, it is also sterile, and therefore a total evolutionary loss for its parents. And this loss is not borne at all equally. It has cost the male donkey only a bit of time and energy and a few drops of semen, which can easily be replaced. But the mare has devoted nearly eleven months of her life to carrying the fetus; she has also had to nurse her offspring afterward, during which time she was not able to breed again. All for what? Her genes will not go beyond the sterile mule, who cannot pass them along any further. The mule is a bad deal for both its parents, but a much worse one for its mother.

It may wound our vanity, but the reproductive biology of human beings does not differ dramatically from that of donkeys and horses—and perhaps even bullfrogs. It should surprise no one that women almost always are sexually coy relative to the more “available” men. This pattern holds cross-culturally, as well. Margaret Mead has observed of Polynesian societies:

It is the girl who decides whether she will or will not meet her lover under the palm trees, or receive him with necessary precautions in her house, or in her bed in the young people’s house. He may woo and plead, he may send gifts and pretty speeches by an intermediary, but the final choice remains in the hands of the girl. If she does not choose, she does not lift the corner of her mat, she does not wait under the palm trees. A mood, a whim, a slight disinclination, and the boy is disappointed.

It is no accident that female prostitutes greatly outnumber male prostitutes, or that “girlie” magazines are many times more popular than their “beefcake” counterparts. A recent study of sexual attitudes among American teenagers found that two-thirds of the males but only one-fifth of the females thought sex was “all right with someone known only for a few hours.”

In a similar study, three hundred unmarried West German workers were polled on their attitudes toward premarital sex. The results:

Of 20-year-old virgin women, the significantly most frequent opinion is that they’re waiting for true love, that they’re decent or living properly. Of abstinent males, however, it is held that they’re afraid, that they can’t find a girl, or that they’re not a real man. Women who have many coital partners are significantly more often criticized than promiscuous men as follows: they’ll get a bad reputation, no one will want to marry them, and they should be ashamed. Of promiscuous men, the opinion is significantly more often: they’re doing it right, they’re enjoying life, these are real men.

Women are choosier, it seems, and for good evolutionary reasons.

Almost invariably, throughout the animal world, it is the male that defends a territory. It is the male, too, who performs bizarre and eye-catching behaviors intended to intimidate other males and to attract females. Male birds sing, while females rarely do. Male elk bugle and grow large antlers, using them to frighten off and fight other males, and to entice females. Time after time, in species after species, males are nearly always more aggressive than females. The list is punctuated by only a very few exceptions, where the “typical” reproductive roles are switched.
Some animals will mate monogamously. This arrangement is especially true of many species of birds, whose nestlings grow so fast that both male and female are kept busy feeding their offspring. I recently pulled a nasty trick on some mated pairs of mountain bluebirds, a monogamous species of western North America. Interested in testing the proposition that animals act so as to maximize their fitness, I designed the following simple experiment: while the male was away getting food, having left his mate at their newly constructed nest, I attached a model of another male bluebird to the tree, close to the nest and to the female. I was curious as to how the male would respond when he returned and discovered the "adulterous" couple. In particular, I wanted to compare the male's behavior when he caught his female in flagrante during the breeding season with his response later in the year, once the eggs were already laid. Early in the season, when breeding was taking place, all hell broke loose when the husband returned; as expected, he attacked the dummy male quite aggressively. But—and this I found especially interesting—he also attacked his own mate, in one case even driving the suspected adulteress away. She was eventually replaced by another female, with whom he successfully reared a brood. What happened when males were presented with the identical situation after the eggs had already been laid? There were still attacks on the intruding male, but of much lower intensity, and no further aggression was directed toward the female.

The male bluebird's actions are an almost diagrammatic example of reproductive behavior having been finely honed by natural selection to maximize individual fitness. It is certainly adaptive for the male bluebird to respond aggressively to male intruders. They are always competitors for food, and, even more serious, competitors for access to his mate during the breeding season. It is also adaptive for the male to drive away his mate if he has reason to "doubt" her fidelity, as long as she can be replaced with someone more trustworthy. (Rephrased in gene language: genes that cause their bodies to drive away unfaithful mates and replace them with more reliable ones leave more copies of themselves than do those who are cuckolded.) However, later in the season, when his genes are safely tucked away in his mate's eggs, the defending male's fitness is no longer threatened by his female's dalliance, so there is no reason to drive her away. In fact, any male who did so would be unable to rear another brood, for the breeding season is very short in the bluebirds' mountain homes and there simply isn't sufficient time to start breeding again midway through the summer. The mountain bluebirds' strategy is clearly appropriate to maximizing their fitness; furthermore, it is a distinctly male strategy.

Compare these two situations: (1) you are a male animal, paired with a single female, and your "wife" goes around copulating with other males; (2) you are a female animal, paired with a single male, and your "husband" goes around copulating with other females. In which case is your fitness likely to be lower? In the first situation, if you (as male) remain faithful to your "swinging" spouse, she will eventually conceive offspring via other males, and you will have lost out in the evolutionary sweepstakes. However, in the second case, if you (as female) remain faithful to your mate, you can still breed successfully despite his philandering, provided he includes you among his girlfriends. This is the basic biology of the double standard: males are expected to be sexually less discriminating, more aggressive and more available than females. They are also expected to be more intolerant of infidelity by their wives than wives will be of infidelity by their husbands. Frankie may have killed Johnny because he "done her wrong," but that was only a song. As far as I know, in all human societies, adultery by the wife is much more likely to lead to violence by the "offended" husband than vice versa. Almost invariably, it is a mortal offense to seduce another man's wife. Not surprisingly, the cuckolded husband is often the object of pity or derision, and human males typically invest a great deal of time and energy trying to protect themselves against being cuckolded by another man. Even the likely origin of the word "cuckold" indicates its biology. The European cuckoo deposits its eggs in the nest of another bird, leaving the unwitting foster parents to further the fitness of the cuckoo, rather than their own offspring. For good biological reasons, we don't wish to be like the cuckoo's victim.

In some polygynous societies, adultery is a civil crime, not a criminal one. Transgressors must give the "injured" husband set amounts of money, cattle and other goods, which he can use to obtain additional wives. It's all very civilized. To the sociobiologist, it also seems very fit.

In her book Against Our Will, Susan Brownmiller claimed that only human beings engage in rape. The facts are otherwise. Rape is com-
mon among the birds and bees, and is epidemic among the mallard ducks. In fact, large groups of drakes sometimes descend on an unsuspecting female and rape her repeatedly, often causing death, as the victim’s head may be held under water for a long period of time. What’s going on here? When mallards pair up for breeding, there often remain a number of unmated males, since there are more males than females in most such species (probably owing to the risks involved in defending eggs against predators). These bachelors have been excluded from normal reproduction, and so they engage in what is apparently the next best strategy: raping someone else’s female.

What about the victim’s “husband”? Clearly, his fitness is threatened when his mate is raped, and we would expect him to do something about it. He does, and once again his behavior is remarkably consistent with sociobiological theory. He tries to intervene, beating the attackers away with his wings. However, if his mate is the victim of a gang rape, his chances of success are low and the likelihood of his being injured in the attempt are high, so he usually just stands by. Furthermore, if the rapists indicate by their behavior that the rape has been successful, the victim’s mate does a most remarkable—and ungentlemanly—thing. He proceeds to rape the just-raped female himself! His mating is not quite as brutal as the initial violation of the female, but it clearly differs from the usual copulations of mated pairs, with their rather drawn-out courtship rituals. In this case the male simply forces himself upon his hapless and exhausted mate, without even the by-your-leave of “head pumping,” de rigueur in mallard boudoir etiquette.

Again, what is going on here? Once more, the mallard drake is maximizing his fitness. If he can prevent the rape, well and good. If he cannot, either because he is outnumbered or because he is simply too late, the next best thing he can do is to introduce his sperm as quickly as possible, to compete with that of the rapists. Of course, behavior of this sort does not require any awareness by the drake that

Some people may bridle at the notion of rape in animals, but the term seems entirely appropriate when we examine what happens. Among ducks, for example, pairs typically form early in the breeding season, and the two mates engage in elaborate and predictable exchanges of behavior. When this rite finally culminates in mounting, both male and female are clearly in agreement. But sometimes strange males surprise a mated female and attempt to force an immediate copulation, without engaging in any of the normal courtship ritual and despite her obvious and vigorous protest. If that’s not rape, it is certainly very much like it.

It may seem by now as if evolution—and human culture—have given males an overwhelming reproductive and personal advantage over females. Not so. Remember, whenever a given child is produced, it
is still a product of just one male and one female. The child is their triumph, their ticket to evolutionary success. When King Ismail of Morocco fathered 1,056 children, it was at the expense of 1,055 other Moroccan males. While he was reproducing, they weren’t. On balance, the two sexes are equally successful, always. However, individuals of the two sexes need not be and, in fact, rarely are. In most animal species, there is a rather large variation in the number of offspring that different males produce, that is, in their fitness. Some males (the King Ismails) father many children, while others (the eunuchs, either literally or figuratively) have few or none. Among females, however, there is much less difference between the most and the least fit. No woman could produce 1,056 children, but most women are successful in bearing a rather small number. Certainly, the difference between the “haves” and the “have-nots” is less significant than among males.

A useful theory of male-female differences bearing on this point has been developed by Harvard’s Robert L. Trivers, who has proposed the notion of “parental investment,” defined as any expenditure of time, energy or risk that a parent makes on behalf of its offspring. Every expenditure of this sort carries a cost along with it, and an element in this cost is a reduction in the ability of the investing parent to rear additional successful offspring. As with everything in life, investing in a child is a double-edged sword. Give a child food and you have less for yourself and your other children; defend it from a predator, and you run the risk of losing your own life, along with any chance of breeding again. It is clear that women (indeed, females of nearly all species) necessarily invest more in each child than do men, quickly reaching a point where they exhaust their potential and can invest no more. But men have the biological potential to do more, and evolution favors those who attempt to do so.

Trivers’s theory of parental investment emphasizes that, because of the high cost of offspring to women, they are limited in how many they can produce. During the nine months that she is pregnant, a woman cannot reproduce again—she is already occupied. A man continues to produce perfectly good sperm during that period. Furthermore, after the child is born, a woman is biologically primed to nurse it, often for several years. Her parental investment is “taken” and will not be available to her husband again for quite a while. In most animal species, therefore, the best reproductive arrangement for males is that they be mated to many females. As long as the females are also fulfilling their reproductive potential, this arrangement is satisfactory to their fitness as well.

Biology dictates that women provide more initial investment in their offspring than do men, and in the technical language of sociobiology, the sex investing more becomes a limiting resource for the sex investing less. For human beings, this means that men will compete with other men for access to women much more often than will women compete with other women for access to men. After all, the reproductive success of men is limited largely by the number of women they inseminate—more wives or lovers, more children. The reproductive success of women, however, is only rarely limited by the number of men with whom they copulate. For a man to be successful in making his sperm an evolutionary success, he must obtain, at a minimum, a woman’s investment of an egg and placenta not already in use. This may not always be easy. What a woman needs to project her genes into the future is only a small contribution from the opposite sex, and it is unlikely that she will be unable to find a man willing to oblige.

The difference between male success and failure is likely to be enormous, resulting in strong selection for competition among males, for whom the payoff is so great. Because the payoff for females is much less, competition is also much less. As might be expected, this difference has wide-ranging consequences for the behavior of males and females.

Certain animal species exaggerate male-female differences with particular clarity. Among elephant seals, sea-going mammals that breed off the California coast, the adult males are truly elephantine, weighing about three tons, while the females are less than one-quarter of that size. Typically, these seals breed in large harems, presided over by one or a few adult males. If the harem is a small one, fifty females or so, a single male, the harem master, usually does most of the breeding. In larger harems, because a single male is hard-pressed to service all his females and also to defend them from the advances of other males, several other males may also father some pups. A successful harem master may well father 150 pups in a single year, a phenomenal evolutionary achievement.

Of course, success by the harem master is balanced by failure among the other males; harems make for many bachelors who do not
father any offspring. There is no payoff for being such an evolutionary failure and males therefore engage each other in titanic battles with high stakes and high mortality. Adult females do not fight. As with the males, their fitness is maximized by breeding, but, unlike the males, they are virtually guaranteed the opportunity to do so. Their successes, of course, are more restrained. There is simply no such thing as an evolutionary jackpot for females, who do well to produce a single pup every year. Since she may live twelve to fifteen years, a female can hope to produce no more than 12 offspring or so during her lifetime. (Compare that ability with 150 offspring in a single year for a successful harem master.)

Burney LeBoeuf, a biologist at the University of California, Santa Cruz, has recently begun observing the behavior of elephant seal pups during their month-long nursing stage. Male pups, he finds, grow faster than females, nurse longer, and are larger when weaned. Even among the newborns, males and females behave differently. For one thing, males may attempt “milk thievery,” stealing milk from adult females other than their mothers. Since these other females have their own pups to nurse, and since there is no evolutionary return in nourishing an unrelated pup, we can expect strong resistance to such theft. Being a milk thief is, in fact, quite risky, as females bite and may seriously injure or even kill larcenous pups. But the payoff is also high, since obtaining extra milk almost certainly increases the chances that the thieves will not only survive the coming winter, but (and this is especially important for males) that they will eventually be large enough and strong enough to compete successfully with other males and perhaps even be harem masters someday.

Female pups do not attempt milk thievery. The return for them isn’t worth the risk. Being female guarantees that they will breed, which is not the case with males, who are born into a system in which they might fail utterly and which therefore rewards risk taking. Interestingly, male pups do not develop canine teeth as early as females. Of course, by the time they are needed for fighting other males, these teeth are well in place. But milk thieves are better off without canines, since if they are gentler on a female’s nipple—rather like the light touch needed by a good pickpocket—they are less likely to be discovered and attacked.

Occasionally pups die before they are weaned. This situation frees a large potential source of milk—the bereaved and still lactating mother—for any pup willing to run the risk of getting it. Mothers who lose their pups will generally permit other pups to nurse, but the procedure is a delicate one for the pup. The foster mother will often attack would-be nursers, sometimes quite viciously, before she comes to accept them (mistakenly) as her own. However, the return for the pups is high. Such successful pups are, in LeBoeuf’s colorful terminology, “double-mother-suckers,” and they will go on to be “super weaners,” weighing almost twice as much as their age mates who received milk only from a single mother.

The pattern is clear. Female elephant seals enjoy a high probability of modest reproductive success and, even as pups, they refrain from behavior that is risky, even if potentially rewarding. Most males, on the other hand, will be reproductive failures, but those who succeed will really strike it rich. Their strategy, therefore, is one of blatant fitness maximization—striving, despite heavy risks, to be super weaners and evolutionary stars.

People aren’t elephant seals, of course, but we do share the same mammalian reproductive biology. And there may be reason to suppose that, through most of our evolutionary history, we ourselves were harem makers and that even today we carry indelible signs of this heritage in our bodies and perhaps, as well, in our behavior.

It is recognized increasingly that there are real differences between little boys and little girls, behavioral differences that begin early in life and that derive at least in part from our biology. For example, boys tend to be more active and more aggressive than girls. Girls accidentally exposed to testosterone, the male sex hormone, while still in their mother’s uterus were found to be “masculinized” as children. They often developed into tomboys, favoring rough-and-tumble outdoor play, and were generally more active than other, “normal” girls, even though their parents seemingly did not treat them any differently. In fact, the parents of such children were so disturbed by their daughters’ “boylike” behavior that the children were brought to a doctor—the basis of the discovery of the testosterone exposure.

The biology of male-female differences suggests a reason why little boys are more likely than girls to climb trees, get into fights, get
covered with mud and wander far from home. Their behavior is more risky and more flamboyant. Natural selection and parental investment theory make intelligible much of what seems to be going on.

There are many possible predictions of differing male and female behavior that can be made and that would be worth testing. For example, male-male competition is likely to be greater when harems occur than when all of a group's members are monogamously mated. The reasoning is that harems are likely to leave some males sexually disenfranchised, but in situations where every male gets mated, there is little call for sexual competition. We also expect, and find, a greater male-female difference in behavior in harem-forming species, since reproductive success in males requires fighting success as well. It would be interesting to learn whether male-female differences in children's play are greater in polygynous than in monogamous societies. Such findings would not necessarily suggest a genetically influenced difference between males in the two types of societies, but if risky, aggressive behavior is more valued and more rewarded in one society than in another, we might expect that that society would be the polygynous one.

It has been observed that infant boys seem to be more "colicky" than girls. Perhaps they have more gastrointestinal distress, or simply a greater "need to cry," but whatever the cause, one result is that they receive greater parental attention, perhaps even more food and nursing. Such behavior can be risky, since it may backfire and anger the parent, but, as with the elephant seals, boys have probably been selected to take such risks.

Bizarre it may be, but homosexual rape is a fact of existence in some animal species. Moreover, this behavior seems to contribute to fitness maximization, by means of male-male competition. Consider a bug with the revealing scientific name *Xylocaris maculipennis*. In this species, males rape other males, even while the victim is himself copulating with a female. As a result of the rape, the victim's sperm storage organs are filled with the sperm of the rapist, so that the next time the victim copulates, he transfers the rapist's sperm, in a sort of fitness maximization by proxy. The adaptive significance and the evolutionary mechanism should both be clear. In another example, we might look at certain acanthocephalan worms, parasites that live in the intestines of vertebrates, including rats. Males of this species copulate with females within the close and untidy confines of their host's gut. Following normal copulation, males secrete a cementlike substance, known as a copulation plug, which they insert in the female's vagina. This plug serves a dual purpose, keeping the sperm from leaking out and preventing that of other males from getting in. The plug is important in male-male competition, but there's more to come. When a male worm gains an advantage over another male, the aggressor applies his cement gland to the victim's sperm opening and cements it closed. The victim is thus made effectively sterile, and a potential competitor is removed. The rapist has increased his fitness by making it more likely that he, and not another male, will be able to copulate with available females. Such antisocial but clearly adaptive behavior is obviously not a case of mistaken identity by the attacker. When males copulate with females, sperm are always transferred first, followed by the plug. But, when males subjugate other males, only the plug is transferred, with no sperm. Evolution "knows" exactly what it is doing! And so does this peculiar beast, despite its scientific name, *M. dubius*.

If the significance of homosexual rape is not yet clear, ask yourself why female dubius worms don't treat other females the way males deal with their male competitors. Remember, the best evolutionary deal that a female can make for herself is to insure that all her eggs get fertilized, which, of course, can be easily accomplished by a high-quality male. Females that went around plugging up the vaginas of other females would probably waste a great deal of time and energy without greatly increasing their own evolutionary suc-
cess, since the biological nature of male and female virtually guarantees that each female will have all of her eggs fertilized. As a result, females simply aren’t very competitive, and they lack the structures that would allow them to “rape” other females. (Of course, if there were a danger that males could not fertilize all available females, selection would doubtless favor female-female competition for access to males. In this circumstance, one of the possible adaptive mechanisms might include putting other females out of commission.)

Don’t be misled; these examples have nothing whatsoever to do with human homosexuality. I have described them because they reveal so starkly how evolution generates male-male competitiveness. Most people are already familiar with such male-male competition as the titanic battles of grizzly bears, antler clashing among bull elk, and dramatic mid-air head butting among mountain sheep. However, male competition is sometimes a good deal more subtle. Chimpanzees, for example, live in large, loose social groups consisting of many adult males and many females. They display very little male-male aggression and virtually no sexual rivalry; males will literally wait their turn while a female in heat copulates with them all. But this does not mean that male chimps don’t compete. They do compete, but not by fighting. Their competition consists of producing larger amounts of sperm. Chimpanzee testicles are six times larger than those of a gorilla, even though their bodies are only one-third the size.

Male gorillas, as with the males of most harem-forming mammalian species, are much larger and fiercer than females, and compete vigorously with other males for control of the females. Gorilla social groups consist, typically, of one adult male, perhaps one or several younger males, and several females and their young. The older male is the undisputed leader of his harem, for once he has achieved dominance, gorilla social structure assures that he will be the only one to mate. He has no need for oversized testicles; he has competed successfully by using other parts of his body.

It is interesting that, while chimps can mount, thrust, ejaculate and dismount in about seven seconds, gorillas are much more leisurely, and may take up to twenty minutes to do the same. By the time copulation takes place, the dominant adult male gorilla has already succeeded in eliminating the competition. He did so when he originally gained control of the group—and its females.*

Sociobiology demonstrates that male-female behavioral differences are consistent with the basic biology of maleness and femaleness. Because they make such a small investment in their sex cells, males are generally selected to be less fussy and more promiscuous than females, and to compete with other males for access to females. This disparity explains why male elephant seals seek to be double-mother-suckers, why male M. dubius rape other males, why chimpanzees have large testicles while gorillas have small ones, and why, on the whole, men are generally more aggressive than women.

Before the spread of Western ways began the present homogenization of world culture, more than 70 percent of the world’s people were polygynous. This does not mean that men were harem keepers like the elephant seal, or even like King Ismail. Human harems were more modest, in fact, with most men remaining monogamous. At the highest levels of society, older and particularly successful men had several wives, in many cases accumulating them over time as they accumulated wealth and status. As a result, many younger men remained bachelors. Polygyny, in some cases, reached spectacular extremes, creating a social milieu that probably led to especially strong selection for competitive traits among males, suiting their greater sexual availability.

Among the South American Yanomamo, a single headman, Matakuwa, had 42 children, one of whom fathered an additional 33. Some 45 percent of the population of 10 Yanomamo villages were descended from Matakuwa’s father. Given the vigorous male-male competition this sexual oligopoly suggests, it should be no surprise that the Yanomamo were intensely warlike, calling themselves “the fierce people.” Matakuwa regularly incited his followers to raid other villages and carry off additional women. Many similar instances have been reported. A chief of Brazil’s Xavante Indians fathered 23 offspring, who comprised one-fourth of all the children in the village. An able and elderly hunter among the Anaktuvuk Eskimos of Alaska

*In some species, males compete largely by copulating for a very long time. Dogs, for instance, form mating “locks” which may last for hours, during which time they cannot be pulled apart. The great mammalogist R. F. Ewer once observed a marsupial mouse, which arose in heat one night and copulated for twelve hours with a single male. The next night the same pair performed for eight hours straight.
contribution one-fifth of the total living population of his tribe. Anthropologist Weston LaBarre comments quite explicitly on the extensiveness of this pattern:

When it comes to polygyny . . . the cases are extraordinarily numerous. Indeed, polygyny is permitted (though in every case it may not be achieved) among all the Indian tribes of North and South America, with the exception of a few like the Pueblo. Polygyny is common too in both Arab and Negro groups in Africa and is by no means unusual either in Asia or in Oceania. Sometimes, of course, it is culturally-limited polygyny: Moslems may have only four wives under Koranic law—while the King of Ashanti in West Africa was strictly limited to 3,333 wives and had to be content with this number. The custom of concubinage, official or unofficial, or the taking of secondary wives and concubines, is also very widespread in both Asia and Europe and elsewhere.

There is even direct evidence from our anatomy and physiology suggesting that polygyny is the biologically “natural” state of Homo sapiens. Except for our genitalia, the physical differences between men and women are much more associated with fighting than with copulating. Among animals, monogamy is almost invariably found among those species that have little difference in size between the sexes. Foxes, coyotes, eagles, geese, swans, ducks, sparrows, bluebirds and warblers all tend to be monogamous, with males and females growing to approximately the same size. If we consider some polygynous species—elephant seals, deer, elk, moose, gorillas—the typical social system is one male mating with several females, and, not surprisingly, the males are considerably larger than their consorts. Among human beings, although some women are larger than some men, there is no question that, on the whole, men are the larger sex.

It is also instructive to compare the age of sexual maturation: among polygynous animals, males mature later than females. Actually, we might have expected the opposite to be true. Given that reproduction places greater stress on females than on males, it seems appropriate that females delay breeding until they are large and strong enough to do it well. However, male-male competition, it appears, overrides any tendencies to early male maturation. Polygyny, as we have seen, requires this sort of competition, and it’s the

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larger, wiser males who tend to win. Strength and experience come with age, though, so it should be no surprise that, while elephant seal cows begin breeding at two or three, the bulls don’t mature until they are at least five. Below that age, the bulls are simply unable to compete with the battle-scarred, veteran behemoths who control the harems. They are better off lying low until they are big enough, wise enough, and tough enough to “make their move.” Consider that in our own species girls reach puberty several years earlier than boys. Sociobiology finally makes sense out of this undeniable fact of our biology.*

Monogamy is a rarity among mammals, and for good reasons. Since female mammals have breasts which produce milk, they are uniquely adapted to nourish their own young. Males are not particularly important as parents and may even constitute undesirable competition for food that would otherwise go to the mother and, through her, to the offspring. It is understandable, therefore, that among some mammals, such as bears and hamsters, the female chases the male away after mating. In other situations, notably the large hoofed mammals such as buffalo, antelope and zebra, males do contribute to their own fitness by defending the group against predators, but, even here, a prolonged bond between male and female is not adaptive and is rarely found.

Some carnivorous mammals, such as foxes and coyotes, are, in fact, monogamous. In these cases the males are useful as providers, bringing meat to their females. Meat, it should be pointed out, is a concentrated nutritional source. It would be very inefficient for an animal to carry grain or vegetables back home to eat, and I know of no cases where males of a vegetarian species bring plant food to their families. Males either bring home the bacon, or nothing at all.

To sum up our observations thus far: monogamy is rare in mammals, almost unheard-of in primates, and, despite our Judeo-Christian fondness for the “nuclear family,” it appears to be a relatively recent invention of certain human cultures. Our biology may permit

*At this point, my editor asked me, “Can’t little men fight with each other?” Of course they can, but under the conditions of our evolutionary past they were likely to be defeated by the older and larger men. Genes finding themselves in a male body were more fit if they caused it to mature later, when that body was big and experienced enough to make it likely that those genes would be passed on to new bodies in future generations.
Consider the following question from the viewpoint of any adult mammal: Will I be more fit if I produce boys or girls? In general, either sex is an equally good evolutionary investment. Suppose we have a population of 20 individuals, consisting of 10 males and 10 females. If the society is monogamous, males and females are both equally successful as reproducers. But, surprisingly, the same overall result is found even if the society is highly polygynous. If we suppose that only one male mates with all 10 females, the other 9 males will remain disappointed bachelors. Since every female breeds successfully, parents that originally produced these females receive a guaranteed evolutionary return, with each set of parents neither more nor less successful than another. Any given set of parents that produced male offspring stand a 90 percent chance of losing out in the evolutionary lottery, since 9 out of their 10 male children don’t breed at all. However, any given male also has a 10 percent chance of being wildly successful—10 times more so than any female. On the average, it all balances out. It is an equally good strategy, overall, to produce males as to produce females, although the former choice is a much riskier way to play the game. This may be another way of understanding why males often engage in “riskier” behaviors.

Parents are therefore equally fit producing males or females, so long as they have no idea whether their offspring are likely to be successful in competing with others. Any advance information they may have does change the situation a great deal, and there is every reason to suspect that parents can, in fact, “estimate” the likelihood of their offspring’s success, even before it is born. For example, a child born to a socially dominant female is more likely to be dominant than a child born to one who is retiring and deferential. This might be due to the particular genetic characteristic of the parent, the social advantages enjoyed by the child, or some combination of the two. In any event, offspring of different sets of parents are not likely to be equally successful as adults. Another example: offspring born to a mother who is strong, healthy and in good physical condition will probably be strong, healthy and in good physical condition themselves, and, as a result, are likely to be more successful socially.