Jared Diamond. Why is Sex Fun?

CHAPTER 1.

THE ANIMAL WITH THE WEIRDEST SEX LIFE.

Section 2.

The key to understanding human sexuality is to recognize that it is a problem in evolutionary biology. When Darwin recognized the phenomenon of biological evolution in his great book On the Origin of Species, most of his evidence was drawn from anatomy. He inferred that most plant and animal structures evolve—that is, they tend to change from generation to generation. He also inferred that the major force behind evolutionary change is natural selection. By that term, Darwin meant that plants and animals vary in their anatomical adaptations, that certain adaptations enable individuals bearing them to survive and reproduce more successfully than other individuals, and that those particular adaptations therefore increase in frequency in a population from generation to generation. Later biologists showed that Darwin's reasoning about anatomy also applies to physiology and biochemistry: an animal's or plant's physiological and biochemical characteristics also adapt it to certain lifestyles and evolve in response to environmental conditions.

More recently, evolutionary biologists have shown that animal social systems also evolve and adapt. Even among closely related animal species, some are solitary, others live in small groups, and still others live in large groups. But social behavior has consequences for survival and reproduction. Depending, for example, on whether a species' food supply is clumped or spread out, and on whether a species faces high risk of attack by predators, either solitary living or group living may be better for promoting survival and reproduction.

Similar considerations apply to sexuality. Some sexual characteristics may be more advantageous for survival and reproduction than others, depending on each species' food supply, exposure to predators, and other biological characteristics. At this point I shall mention just one example, a behavior that at first seems diametrically opposed to evolutionary logic: sexual cannibalism. The male of some species of spiders and mantises is routinely eaten by his mate just after or even while he is copulating with her. This cannibalism clearly involves the male's consent, because the male of these species approaches the female, makes no attempt to escape, and may even bend his head and thorax toward the female's mouth so that she may munch her way through most of his body while his abdomen remains to complete the job of injecting sperm into her.

If one thinks of natural selection as the maximization of survival, such cannibalistic suicide makes no sense. Actually, natural selection maximizes the transmission of genes, and survival is in most cases just one strategy that provides repeated opportunities to transmit genes. Suppose that opportunities to transmit genes arise unpredictably and infrequently, and that the number of offspring produced by such opportunities increases with the female's nutritional condition. That's the case for some species of spiders and mantises living at low population densities. A male is lucky to encounter a female at all, and such luck is unlikely to strike twice. The male's best strategy is to produce as many offspring bearing his genes as possible out of his lucky find. The larger a female's nutritional reserves, the more calories and protein she has available to transform into eggs. If the male departed after mating, he would probably not find another female and his continued survival would thus be useless. Instead, by encouraging the female to eat him, he enables her to produce more eggs bearing his genes. In addition, a female spider whose mouth is distracted by munching a male's body allows copulation with the male's genitalia to proceed for a longer time, resulting in more sperm transferred and more eggs fertilized. The male spider's evolutionary logic is impeccable and seems bizarre to us only because other aspects of human biology make sexual cannibalism disadvantageous. Most men have more than one lifetime opportunity to copulate; even well-nourished women usually give birth to only a single baby at a time, or at most twins; and a woman could not consume enough of a man's body at one sitting to improve significantly the nutritional basis for her pregnancy.

This example illustrates the dependence of evolved sexual strategies on both ecological parameters and the parameters of a species' biology, both of which vary among species. Sexual cannibalism in spiders and mantises is favored by the ecological variables of low population densities and low encounter rates, and by the biological variables of a female's capacity to digest relatively large meals and to increase her egg output considerably when well nourished. Ecological parameters can change overnight if an individual colonizes a new type of habitat, but the colonizing individual carries with it a baggage of inherited biological attributes that can change only slowly, through natural selection. Hence it is not enough to consider a species' habitat and lifestyle, design on paper a set of sexual characteristics that would be well matched to that habitat and lifestyle, and then be surprised that those supposedly optimal sexual characteristics do not evolve. Instead, sexual evolution is severely constrained by inherited commitments and prior evolutionary history.

For example, in most fish species a female lays eggs and a male fertilizes those eggs outside the female's body, but in all placental mammal species and marsupials a female gives birth to live young rather than to eggs, and all mammal species practice internal fertilization (male sperm injected into the female's body). Live birth and internal fertilization involve so many biological adaptations and so many genes that all placental mammals and marsupials have been firmly committed to those attributes for tens of millions of years. As we shall see, these inherited commitments help explain why there is no mammal species in which parental care is provided solely by the male, even in habitats where mammals live alongside fish and frog species whose males are the sole providers of parental care.

We can thus redefine the problem posed by our strange sexuality. Within the last seven million years, our sexual anatomy diverged somewhat, our sexual physiology further, and our sexual behavior even more, from those of our closest relatives, the chimpanzees. Those divergences must reflect a divergence between humans and chimpanzees in environment and lifestyle. But those divergences were also limited by inherited constraints. What were the lifestyle changes and inherited constraints that molded the evolution of our weird sexuality?