CHAPTER 2. Section 1.

THE BATTLE OF THE SEXES.

In the preceding chapter we saw that our effort to understand human sexuality must begin by our distancing ourselves from our warped human perspective. We're exceptional animals in that our fathers and mothers often remain together after copulating and are both involved in rearing the resulting child. No one could claim that men's and women's parental contributions are equal: they tend to be grossly unequal in most marriages and societies. But most fathers make some contribution to their children, even if it's just food or defense or land rights. We take such contributions so much for granted that they're written into law: divorced fathers owe child support, and even an unwed mother can sue a man for child support if genetic testing proves that he is her child's father.

But that's our warped human perspective. Alas for sexual equality, we're aberrations in the animal world, and especially among mammals. If orangutans, giraffes, and most other mammal species could express their opinion, they would declare our child support laws absurd. Most male mammals have no involvement with either their offspring or their offspring's mother after inseminating her; they are too busy seeking other females to inseminate. Male animals in general, not just male mammals, provide much less parental care (if any) than do females.

Yet there are quite a few exceptions to this chauvinist pattern. In some bird species, such as phalaropes and Spotted Sandpipers, it's the male that does the work of incubating the eggs and rearing the chicks, while the female goes in search of another male to inseminate her again and to rear her next clutch. Males of some fish species (like seahorses and sticklebacks) and some amphibian males (like midwife toads) care for the eggs in a nest or in their mouth, pouch, or back. How can we explain simultaneously this general pattern of female parental care and also its numerous exceptions?

The answer comes from the realization that genes for behavior, as well as for malaria resistance and teeth, are subject to natural selection. A behavior pattern that helps individuals of one animal species pass on their genes won't necessarily be helpful in another species. In particular, a male and female that have just copulated to produce a fertilized egg face a "choice" of subsequent behaviors. Should that male and female both leave the egg to fend for itself and set to work on producing another fertilized egg, copulating either with the same partner or with a different partner? On the one hand, a time-out from sex for the purpose of parental care might improve the chances of the first egg surviving. If so, that choice leads to further choices: both the mother and the father could choose to provide the parental care, or just the mother could choose to do so, or just the father could. On the other hand, if the egg has a one-in-ten chance of surviving even with no parental care, and if the time you'd devote to tending it would alternatively let you produce 1,000 more fertilized eggs, you'd be host off leaving that first egg to fend for itself and going on to produce more fertilized eggs.

I've referred to these alternatives as "choices." That word may seem to suggest that animals operate like human (Incision-makers, consciously evaluating alternatives and finally choosing the particular alternative that seems most likely to advance the animal's self-interest. Of course, that's not what happens. Many of the so-called choices actually are programmed into an animal's anatomy and physiology. For example, female kangaroos have "chosen" to have a pouch that can accommodate their young, but male kangaroos have not. Most or all of the remaining choices are ones that would be anatomically possible for either sex, but animals have programmed instincts that lead them to provide (or not to provide) parental care, and this instinctive "choice" of behavior can differ between sexes of the same species. For example, among parent birds, both male and female albatrosses, male but not female ostriches, females but not males of most hummingbird species, and no brush turkeys of either sex are instinctively programmed to bring food to their chicks, although both sexes of all of these species are physically and anatomically perfectly capable of doing so.

The anatomy, physiology, and instincts underlying parental care are all programmed genetically by natural selection. Collectively, they constitute part of what biologists term a reproductive strategy. That is, genetic mutations or recombinations in a parent bird could strengthen or weaken the instinct to bring food to the chicks and could do so differently in the two sexes of the same species. Those instincts are likely to have a big effect on the number of chicks that survive to carry on the parent's genes. It's obvious that a chick to which a parent brings food is more likely to survive, but we shall also see that a parent that forgoes bringing food to its chicks thereby gains other increased chances to pass on its genes. Hence the net effect of a gene that causes a parent bird instinctively to bring food to its chicks could be either to increase or to decrease the number of chicks carrying on the parent's genes, depending on ecological and biological factors that we shall discuss.

Genes that specify the particular anatomical structures or instincts most likely to ensure the survival of offspring bearing the genes will tend to increase in frequency. This statement can be rephrased: anatomical structures and instincts that promote survival and reproductive success tend to become established (genetically programmed) by natural selection. But the need to make wordy statements such as these arises very often in any discussion of evolutionary biology. Hence biologists routinely resort to anthropomorphic language to condense such statements—for example, they say that an animal "chooses" to do something or pursues a certain strategy. This shorthand vocabulary should not be misconstrued as implying that animals make conscious calculations.

For a long time, evolutionary biologists thought of natural selection as somehow promoting "the good of the species." In fact, natural selection operates initially on individual animals and plants. Natural selection is not just a struggle between species (entire populations), nor is it just a struggle between individuals of different species, nor just between conspecific individuals of the same age and sex. Natural selection can also be a struggle between parents and their offspring or a struggle between mates, because the self-interests of parents and their offspring, or of father and mother, may not coincide. What makes individuals of one age and sex successful at transmitting their genes may not increase the success of other classes of individuals.

In particular, while natural selection favors both males and females that leave many offspring, the best strategy for doing so may be different for fathers and mothers. That generates a built-in conflict between the parents, a conclusion that all too many humans don't need scientists to reveal to them. We make jokes about the battle of the sexes, but the battle is neither a joke nor an aberrant accident of how individual father or mothers behave on particular occasions. It is indeed perfectly true that behavior that is in a male's genetic interests may not necessarily be in the interests of his female co-parent, and vice versa. That cruel fact is one of the fundamental causes of human misery.

Consider again the case of the male and female that have just copulated to produce a fertilized egg and now face the "choice" of what to do next. If the egg has some chance of surviving unassisted, and if both the mother and the father could produce many more fertilized eggs in the time that they would devote to tending that first fertilized egg, then the interests of the mother and father coincide in deserting the egg. But now suppose that the newly fertilized, laid, or hatched egg or newborn offspring has absolutely zero chance of surviving unless it is cared for by one parent. Then there is indeed a conflict of interest. Should one parent succeed in foisting the obligation of parental care onto the other parent and then going off in search of a new sex partner, then the foister will have advanced her or his genetic interests at the expense of the abandoned parent. The foister will really promote his or her selfish evolutionary goals by deserting his or her mate and offspring.

In such cases when care by one parent is essential for offspring survival, child-rearing can be thought of as a cold-blooded race between mother and father to be the first to desert the other and their mutual offspring and to get on with the business of producing more babies. Whether it actually pays you to desert depends on whether you can count on your old mate to finish rearing the kids, and whether you are then likely to find a receptive new mate. It's as if, at the moment of fertilization, the mother and father play a game of chicken, stare at each other, and simultaneously say, "I am going to walk off and find a new partner, and you can care for this embryo if you want to, but even if you don't, I won't!" If both partners call each other's bluff in that race to desert their embryo, then the embryo dies and both parents lose the game of chicken. Which parent is more likely to back down?

The answer depends on such considerations as which parent has more invested in the fertilized egg, and which parent has hotter alternative prospects. As I said before, neither parent makes a conscious calculation; the actions of each parent are instead programmed genetically by natural selection into the anatomy and instincts of their sex. In many animal species the female backs down and becomes sole parent while the male deserts, but in other species the male assumes responsibility and the female deserts, and in still other species both parents assume shared responsibility. Those varying outcomes depend on three interrelated sets of factors whose differences between the sexes vary among species: investment in the already fertilized embryo or egg; alternative opportunities that would be foreclosed by further care of the already fertilized embryo or egg; and confidence in the paternity or maternity of the embryo or egg.

All of us know from experience that we are much more reluctant to walk away from an ongoing enterprise in which we have invested a lot than from one in which we have invested only a little. That's true of our investments in human relationships, in business projects, or in the stock market. It's true regardless of whether our investment is in the form of money, time, or effort. We lightly end a relationship that turns bad on the first date, and we stop trying to construct from parts a cheap toy when we hit a snag within a few minutes. But we agonize over ending a twenty-five-year marriage or an expensive house remodeling.

The same principle applies to parental investment in potential offspring. Even at the moment when an egg is fertilized by a sperm, the resulting fertilized embryo generally represents a greater investment for the female than for the male, because in most animal species the egg is much larger than the sperm. While both eggs and sperm contain chromosomes, the egg in addition must contain enough nutrients and metabolic machinery to support the embryo's further development for some time, at least until the embryo can start feeding itself. Sperm, in contrast, need contain only a flagellar motor and sufficient energy to drive that motor and support swimming for at most a few days. As a result, a mature human egg has roughly one million times the mass of the sperm that fertilizes it; the corresponding factor for kiwis is one million billion. Hence a fertilized embryo, viewed simply as an early-stage construction project, represents an utterly trivial investment of its father's body mass compared to its mother's. But that doesn't mean that the female has automatically lost the game of chicken before the moment of conception. Along with the one sperm that fertilized the egg, the male may have produced several hundred million other sperm in the ejaculate, so that his total investment may be not dissimilar to the female's.