**CHAPTER 4.**

**WRONG TIME FOR LOVE.**

**The Evolution of Recreational Sex.**

**Section 2.**

There's a simple reason why most other animals are sensibly stingy about copulatory effort: sex is costly in energy, time, and risk of injury or death. Let me count the reasons why you should not love your beloved unnecessarily:

1: Sperm production is sufficiently costly for males that worms with a mutation that reduces sperm production live longer than normal worms.

2: Sex takes time that could otherwise be devoted to finding food.

3: Couples locked in embrace risk being surprised and killed by a predator or enemy.

4: Older individuals may succumb to the strain of sex: France's Emperor Napoleon the Third suffered a stroke while engaged in the act, and Nelson Rockefeller died during sex.

5: Fights between male animals competing for an estrous female often result in serious injury to the female as well as to the males.

6: Being caught at extramarital sex is risky for many animal species, including (most notoriously) humans.

Thus, we would reap a big advantage by being as sexually efficient as other animals. What compensating advantage do we get from our apparent inefficiency?

Scientific speculation tends to center on another of our unusual features: the helpless condition of human infants makes lots of parental care necessary for many years. The young of most mammals start to get their own food as soon as they're weaned; they become fully independent soon afterwards. Hence most female mammals can and do rear their young with no assistance from the father, whom the mother sees only to copulate. For humans, though, most food is acquired by complex technologies far beyond the dexterity or mental ability of a toddler. As a result, our children have to have food brought to them for at least a decade after weaning, and that job is much easier for two parents than for one. Even today it's hard for the single human mother to rear kids unassisted, and it used to be much harder in prehistoric days when we were hunter-gatherers.

Now consider the dilemma facing an ovulating cave-woman who has just been fertilized. In any other mammal species, the male who did it would promptly go off in search of another ovulating female to fertilize. For the cavewoman, though, the male's departure would expose her eventual child to the likelihood of starvation or murder. What can she do to keep that man? Her brilliant solution: remain sexually receptive even after ovulating! Keep him satisfied by copulating whenever he wants! In that way, he'll hang around, have no need to look for new sex partners, and will even share his daily hunting bag of moat. Recreational sex is thus supposed to function as the glue holding a human couple together while they cooperate in rearing their helpless baby. That in essence is the theory formerly accepted by anthropologists, and it seemed to have much to recommend it.

However, as we have learned more about animal behavior, we have come to realize that this sex-to-promote-family-values theory leaves many questions unanswered. Chimpanzees and especially bonobos have sex even more often than we do (as much as several times daily), yet they are promiscuous and have no pair-bond to maintain. Conversely, one can point to males of numerous mammal species that require no such sexual bribes to induce them to remain with their mate and offspring. Gibbons, which actually often live as monogamous couples, go years without sex. You can watch outside your window how male songbirds cooperate assiduously with their mates in feeding the nestlings, although sex ceased after fertilization. Even male gorillas with a harem of several females got only a few sexual opportunities each year; their mates are usually nursing or out of estrus. Why do women have to offer the sop of constant sex, when these other females don't?

There's a crucial difference between our human couples and those abstinent couples of other animal species. Gibbons, most songbirds, and gorillas live dispersed over the landscape, with each couple (or harem) occupying its separate territory. That pattern provides few encounters with potential extramarital sex partners. Perhaps the most distinctive feature of traditional human society is that mated couples live within large groups of other couples with whom they have to cooperate economically. To find an animal with parallel living arrangements, one has to go far beyond our mammalian relatives to densely packed colonies of nesting seabirds. Even seabird couples, though, aren't as dependent on each other economically as we are. The human sexual dilemma, then, is that a father and mother must work together for years to rear their helpless children, despite being frequently tempted by other fertile adults nearby. The specter of marital disruption by extramarital sex, with its potentially disastrous consequences for parental cooperation in child-rearing, is pervasive in human societies. Somehow, we evolved concealed ovulation and constant receptivity to make possible our unique combination of marriage, coparenting, and adulterous temptation. How does it all fit together?

Scientists' belated appreciation of these paradoxes has spawned an avalanche of competing theories, each of which tends to reflect the gender of its author. For instance, there's the prostitution theory proposed by a male scientist: women evolved to trade sexual favors for donations of meat from male hunters. There's also a male scientist's better-genes-through-cuckoldry theory, which reasons that a cavewoman with the misfortune to have been married off by her clan to an ineffectual husband could use her constant receptivity to attract (and be extra-maritally impregnated by) a neighboring caveman with superior genes.

Then again, there's the anti-contraceptive theory proposed by a woman scientist, who was well aware that childbirth is uniquely painful and dangerous in the human species because of the large size of the newborn human infant relative to its mother as compared to that ratio in our ape relatives. A one-hundred-pound woman typically gives birth to a six-pound infant, while a female gorilla twice that size (two hundred pounds) gives birth to an infant only half as large (three pounds). As a result, human mothers often died in childbirth before the advent of modern medical care, and women are still attended at birth by helpers (obstetricians and nurses in modern first-world societies, midwives or older women in traditional societies), whereas female gorillas give birth unattended and have never been recorded as dying in childbirth. Hence according to the anti-contraceptive theory, cavewomen aware of the pain and danger of childbirth, and also aware of their day of ovulation, misused that knowledge to avoid sex then. Such women failed to pass on their genes, leaving the world populated by women ignorant of their time of ovulation and thus unable to avoid having sex while fertile.

From this plethora of hypotheses to explain concealed ovulation, two, which I shall refer to as the "daddy-at-home" theory and the "many-fathers" theory, have survived as most plausible. Interestingly, the two hypotheses are virtually opposite. The daddy-at-home theory posits that concealed ovulation evolved to promote monogamy, to force the man to stay home, and thus to bolster his certainty about his paternity of his wife's children. The many-fathers theory instead posits that concealed ovulation evolved to give the woman access to many sex partners and thus to leave many men uncertain as to whether they sired her children.

Take first the daddy-at-home theory, developed by the biologists Richard Alexander and Katharine Noonan of the University of Michigan. To understand their theory, imagine what married life would be like if women did advertise their ovulations, like female baboons with bright red derrieres. A husband would infallibly recognize, from the color of his wife's derriere, the day on which she was ovulating. On that day he would stay home and assiduously make love in order to fertilize her and pass on his genes. On all other days, he would realize from his wife's pallid derriere that lovemaking with her was useless. He would instead wander off in search of other, unguarded, red-hued ladies, so that he could fertilize them too and pass on even more of his genes. He'd feel secure in leaving his wife at home then, because he'd know that she wasn't sexually receptive to men and couldn't be fertilized anyway. That's what male geese, seagulls, and Pied Flycatchers actually do.

For humans, the results of those marriages with advertised ovulations would be awful. Fathers would rarely be at home, mothers would be unable to rear kids unassisted, and babies would die in droves. That would be bad for both mothers and fathers, because neither would succeed in propagating their genes.

Now let's picture the reverse scenario, in which a husband has no clue to his wife's fertile days. He then has to stay at home and make love with her on as many days of the month as possible if he wants to have much chance of fertilizing her. Another motive for him to stay at home is to guard her constantly against other men, since she might prove to be fertile on any day that he is away. If the philandering husband has the bad luck to be in bed with another woman on the night when his wife happens to be ovulating, some other man might be in the philanderer's bed fertilizing his wife, while the philanderer himself is wasting his adulterous sperm on another woman unlikely to be ovulating then anyway. Under this reverse scenario, a man has less reason to wander, since he can't identify which of his neighbor's wives are fertile. The heartwarming outcome: fathers hang around and share baby care, with the result that babies survive. That's good for mothers as well as fathers, both of whom now succeed in transmitting their genes.

In effect, Alexander and Noonan argue that the peculiar physiology of the human female forces husbands to stay at home (at least, more than they would otherwise). The woman gains by recruiting an active coparent. But the man also gains, provided that he cooperates and plays by the rules of his wife's body. By staying home, he acquires confidence that the child whom he is helping to rear really does carry his genes. He needn't be fearful that, while he is off hunting, his wife (like a female baboon) may start flashing a bright red derriere as an advertisement for her imminent ovulation, thereby attracting swarms of suitors and publicly mating with every man around. Men accept these ground rules to such a degree that they continue to have sex with their wives during pregnancy and after menopause, when even men know that fertilization is impossible. Thus, in Alexander and Noonan's view, women's concealed ovulations and constant receptivity evolved in order to promote monogamy, paternal care, and fathers' confidence in their paternity.

Competing with this view is the many-fathers theory developed by the anthropologist Sarah Hardy of the University of California at Davis. Anthropologists have long recognized that infanticide used to be common in many traditional human societies, although modern states now have laws against it. Until recent field studies by Hardy and others, though, zoologists had no appreciation for how often infanticide occurs among animals as well. The species in which it has been documented now include our closest animal relatives, chimpanzees and gorillas, in addition to a wide range of other species from lions to African hunting dogs. Infanticide is especially likely to be committed by adult males against infants of females with whom they have never copulated—for example, when intruding males try to supplant resident males and acquire their harem of females. The usurper thus "knows" that the infants killed are not his own.

Naturally, infanticide horrifies us and makes us ask why animals (and formerly humans) do it so often. On reflection, one can see that the murderer gains a grisly genetic advantage. A female is unlikely to ovulate as long as she is nursing an infant. But a murderous intruder is genetically unrelated to the infants of a troop that he has just taken over. By killing such an infant, he terminates its mother's lactation and stimulates her to resume estrus cycles. In many or most cases of animal infanticide and takeovers, the murderer proceeds to fertilize the bereaved mother, who bears an infant carrying the murderer's own genes.

As a major cause of infant death, infanticide is a serious evolutionary problem for animal mothers, who thereby lose their genetic investment in murdered offspring. For instance, a typical female gorilla over the course of her lifetime loses at least one of her offspring to infanticidal intruding male gorillas attempting to take over the harem to which she belongs. Indeed, over one-third of all infant gorilla deaths are due to infanticide. If a female has only a brief, conspicuously advertised estrus, a dominant male can easily monopolize her during that time. All other males consequently "know" that the resulting infant was sired by their rival, and they have no compunctions about killing the infant.

Suppose, though, that the female has concealed ovulations and constant sexual receptivity. She can exploit those advantages to copulate with many males—even if she has to do it sneakily, when her consort isn't looking. While no male can then be confident of his paternity, many males recognize that they might have sired the mother's eventual infant. If such a male later succeeds in driving out the mother's consort and taking her over, he avoids killing her infant because it could be his own. He might even help the infant with protection and other forms of paternal care. The mother's concealed ovulation will also serve to decrease fighting between adult males within her troop because any single copulation is unlikely to result in conception and hence is no longer worth fighting over.

As an example of how widely females may thus use concealed ovulation to confuse paternity, consider the African monkeys called vervets, familiar to anyone who has visited an East African game park. Vervets live in troops consisting of up to seven adult males and ten adult females. Since female vervets give no anatomical or behavioral signs of ovulation, the biologist Sandy Andelman sought out an acacia tree with a troop of vervets, stood under the tree, held up a funnel and bottle, collected urine when a female relieved herself, and analyzed the urine for hormonal signs of ovulation. Andelman also kept track of copulations. It turned out that females started to copulate long before they ovulated, continued long after they ovulated, and did not reach their peak sexual receptivity until the first half of pregnancy.

At that time the female's belly was not yet visibly bulging, and the deceived males had no idea that they were utterly wasting their efforts. Females finally ceased copulating during the latter half of pregnancy, when the males could no longer be deceived. That still left most males in the troop ample time to have sex with most of the troop's females. One-third of the males were able to copulate with every single female. Thus, through concealed ovulation female vervets ensured the benevolent neutrality of almost all of the potentially murderous males in their immediate neighborhood.

In short, Hardy considers concealed ovulation an evolutionary adaptation by females to minimize the big threat to their offsprings' survival posed by adult males. Whereas Alexander and Noonan view concealed ovulation as clarifying paternity and reinforcing monogamy, Hardy sees it as confusing paternity and effectively undoing monogamy.

At this point, you may be starting to wonder about a potential complication in both the daddy-at-home theory and the many-fathers theory. Why is human ovulation concealed from women as well, when all that's required by either theory is for women to conceal ovulation from men? For example, why couldn't women keep their derrieres the same shade of red every day of the month to deceive men, while still remaining aware of sensations of ovulation and just faking an interest in sex with lusty men on non-ovulatory days?

The answer to that objection should be obvious: it would be hard for a woman convincingly to fake sexual receptivity if she felt turned off and knew that she was currently infertile. That point applies with particular force to the daddy-at-home theory. When a woman is involved in a long-lasting monogamous relationship in which the partners come to know each other intimately, it would be hard for her to deceive her husband unless she herself were deceived as well.