

SPERM WARS

Infidelity, Sexual Conflict and Other
Bedroom Battles

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day that many people assume marks the peak of a woman's fertility. However, the woman's body easily outsmarts such simple arithmetic: a predictable menstrual cycle is a rarity rather than the norm, and only occasionally does a woman ovulate on day 14. The key to her body's strategy is variability, and hence unpredictability.

The total length of the menstrual cycle, from the beginning of one period to the beginning of the next, can be anything from about fourteen to forty-two days. This variation occurs not only from woman to woman but also from cycle to cycle for the same woman. Moreover, the part of the cycle that varies most is the part that would be most useful to the male — the number of days from the beginning of menstruation to ovulation. Far from being a predictable fourteen days, this phase can vary in length from about four to twenty-eight days in any normal, healthy woman. Neither the man nor the woman can predict the most fertile day of her cycle simply by counting forward from the beginning of her previous period.

Of course, confusing the partner requires a female to do more than vary the day of ovulation and avoid developing a tell-tale crusty bum and red vulval lips. Even without these attributes, a woman would still give the game away if she showed an interest in intercourse only when she was most fertile. She avoids this danger through a sophisticated veneer of subconscious changes in mood and behaviour. First, her body is prepared to allow her partner to inseminate her at any time during her menstrual cycle, both when fertile and when infertile. Secondly, her body shows an erratic succession of genuine, false and take-it-or-leave-it interests in sex throughout her cycle. If she does show a day or two of sexual interest when she is most fertile, it is well hidden amongst decoy phases of interest interspersed with genuine periods of coolness. Finally, and most sophisticated of all, she confuses her partner well because she also confuses herself. It is no accident that a woman is not naturally conscious of when she is most fertile. The uncoupling of her conscious mind from her body's fertility is

as important a part of her body's strategy as all the other elements.

In the face of such a powerful and effective female strategy, the man has no chance of being able to predict the best time to inseminate. As a result, the only subconscious strategy open to him is to try to maintain a continuous sperm presence in his partner. Hence the advantage of routine sex to him as well as to her. If a man manages to routinely inseminate his partner about every two or three days, he should always have fertile sperm inside her — in which case, his chances of fertilising her egg in any given month will be about one in three. One missed insemination, however, could be critical, and in Scene 2 it was. The man failed to fertilise his partner's egg.

When he ejaculated inside her this Saturday, it was a week since he had last done so, and his last sperm would have lost their fertility on Wednesday. His partner ovulated on Thursday night and, although a few sperm had still been alive inside her on Friday, when her egg was still alive, those sperm had been infertile. She did not conceive, and in two weeks' time her next period will begin. Most likely she will begin to bleed on the Saturday of that week. We can predict this with some certainty because, unlike the number of days from the beginning of one period to ovulation, the number of days from ovulation to the beginning of the next period is a fairly predictable fourteen days, varying only from about thirteen to sixteen.

When she does begin to bleed, the couple will almost certainly see their failure to conceive this month as a joint one. However, there is an alternative interpretation — that the woman's body actually engineered the situation to avoid conception this month, at least via her partner.

We saw earlier that women confuse men by seeking or allowing intercourse erratically throughout their cycle. But this is not the whole truth. The incidence even of routine sex does vary a little during the menstrual cycle.

First, both women and men are less disposed to have sex while the woman is menstruating. Some human cultures even

hair that is in the way and separate the main lips so that you can see the entrance to her vagina. The chamber just inside is the vestibule. If your eyesight is good and you separate the vulval lips well enough you will see, opening into the top of the vestibule, the urethra through which she urinates.

Next, you slip two fingers between the vulval lips into her vagina and gently push them as far as they will go. First, note that the vagina is in contact with your fingers all the way round. This is because, when there is nothing inside it, the vagina is not a tunnel but a slit, with the two walls pressed together. And not only is the vagina not a tunnel, it is not even a throughway. The popular image of it as a tube leading straight into the womb through the cervix is quite wrong. It is also quite wrong to imagine that dead-eye dicks can actually shoot their ejaculate through the cervix straight into the womb. Both of these images are false because the vagina is, in fact, a dead-end. Of course, there *is* an exit into the womb, but it is not straight ahead; to find that exit requires virtually a right-angled turn.

Without withdrawing your fingers, turn your hand so that its back is on the bed and your palm is facing upwards. The womb, which is pear-shaped, is balanced on top of the far end of the vagina, probably just beyond your fingertips. The narrow end of the pear is the cervix and it is the cervix that penetrates the roof of the vagina, projecting through by a couple of centimetres. If your fingers are long enough — many aren't — their tips can feel the cervix sticking through the vaginal roof. The cervix has a narrow channel running through it, and it is this channel which connects the vagina to the inside of the womb and through which the sperm must pass on their way in. It is also through this channel that, in a phenomenal feat of engineering and elasticity, a baby must pass on its way out. For the moment, though, let's concentrate on the narrowness of the channel and on sperm going in.

The channel through the cervix is not empty. It is filled with mucus and, if you leave your fingers inside this woman long enough, some cervical mucus will flow out on to them. This

is the woman's main contribution to the flowback and it has a starring role in this book. To understand much of human sexuality, we need to appreciate the beauty of a woman's mucus and the amazing things she does with it. She has complex requirements of her cervical mucus. On the one hand, it is her last defence against the bacteria and other disease organisms which are forever trying to invade her cervix and womb. On the other hand, she needs it to allow passage to sperm on their way in and to her menstrual flow on its way out. In other words, she needs it to function as a two-way filter. Most people think of mucus rather contemptuously as a messy, amorphous substance, probably because their main contact is with the mucus that comes out of their noses. Cervical mucus may look and feel like nose mucus, but it is in fact very different. It is wonderful stuff with an immaculate structure and is absolutely vital to a woman's health, safety — and sexual power. It contains fibres and is permeated by channels. Most of these channels are very narrow, some only the width of two sperm heads side by side, but they are none the less the highways through which sperm swim as they migrate from the vagina to the inner regions of the cervix and beyond.

Cervical mucus is secreted continuously, primarily by glands in the top half of the cervix, furthest from the vagina. After being secreted, it slowly flows in glacier-like fashion down through the cervix, eventually dripping into the vagina. The rate of flow of this cervical glacier is slow compared with the speed of a swimming sperm but fast compared with the speed of invading disease organisms. Bacterial and other invaders are carried out of the cervix back into the vagina before they can take hold. In the vagina, they are killed by the acidity of the vaginal juices. During menstruation, the menstrual flow simply adds to the mucus flow. The double flow makes it even more difficult for disease organisms to invade — especially important because during menstruation the raw lining to the womb makes it particularly vulnerable.

Scene 4

Topping Up

Over the next two weeks the couple became quite active, sexually. The coolness of the woman's fertile week evaporated. Both partners went through a phase of anticipating and enjoying their sexual activity more than they had for about a year. After making up on the Saturday night, they had sex twice on the Sunday, once in the morning when they first woke and again in the afternoon at about three o'clock. Half an hour later they even tried again. He had an impressive erection but, despite ten minutes of intermittent thrusting and encouragement, he eventually had to accept that he wasn't going to ejaculate. Then they missed a few days. Wednesday night was the woman's weekly night out with girlfriends; Thursday night the man's weekly night out 'with the boys'. On both nights, when the reveller eventually crawled into bed, the partner was asleep, or at least pretending to be. On Friday night, however, they had sex and did so again on both Saturday and Sunday. The next week followed a similar pattern, until the woman's period began on the Saturday morning. Then they abstained until the following Saturday, by which time her menstrual bleeding had finished.

Few couples have their routine sex at absolutely fixed intervals. In the four weeks we have been following this couple, they have had penetrative sex ten times and the woman has been inseminated nine times. But the time interval from one intercourse to the next has varied from as short as thirty minutes (albeit without ejaculation) or seven hours (with ejaculation) to as long as seven days.

Men get a fairly rough deal in this book. Our story will be one of men's bodies forever trying to make the best of a bad job, while the woman's body outsmarts and outmanoeuvres them at almost every turn. But this at first sight uninspiring scene does give us an opportunity to watch men doing something fairly impressive. A man may not look particularly sophisticated at the moment of ejaculation, but something remarkable is, in fact, taking place. Each time he has intercourse during routine sex, he introduces no more sperm than are needed to 'top up' his partner. How does such restraint help him in his pursuit of reproductive success? To understand what the man is trying to do, we have to follow further those sperm we last saw swimming through the channels in the woman's cervical mucus.

A small proportion of these sperm, the vanguard, swim straight through her cervix into the womb. Except when she is pregnant, her womb is roughly pear-sized as well as pear-shaped. As with the vagina, the walls press closely together, so there is little space inside. Once in the womb, sperm swim close to the walls and are helped by the womb to reach its top, the widest part of the pear: in effect, they surf-board, carried on the crests of muscular ripples passing along the womb's walls. At the top of the womb on each side (where horns would be if the pear shape of the womb were a bull's face) is the opening to a narrow tube, the oviduct. Although there are two oviducts, only one will contain an egg during any given menstrual cycle. Once out of the womb, the sperm swim a short distance along an oviduct until they reach a rest area. Here they cease swimming, settle down, and await developments.

Back in the cervical mucus, another set of sperm swim along more diagonal channels and stream into tiny crypts in the wall of the cervix. These sperm also, once in the crypts, cease swimming, settle down, and conserve their energy. Over the next four to five days they will gradually wake up and re-enter the cervical channel. Then they, too, will complete their journey through the mucus, surf-board through the womb, and head for the rest area in the oviducts.

The final set of sperm simply stay in the cervical mucus. They

of sperm begin to make their way up the oviduct towards the fertilisation zone. It is now a race, or rather an obstacle race because there are still killers in the oviduct, mainly from the lover. The partner's sperm, particularly those few which have just arrived straight from the insemination, are actually fastball than the lover's - if all else were equal, the partner could still win the prize of fertilisation.

But all else is not equal. One after another, the partner's egg-getters run into the lover's killer sperm. As the egg reaches the zone of fertilisation in the oviduct and the first sperm arrive, the odds against the partner have reduced to five to one, but that is not enough. The first three sperm to arrive are all from the lover, and one of these claims the prize. An hour later, with the partner's sperm now overwhelming the lover's at all points in the woman's tract, the odds in the oviduct swing heavily in the partner's favour. But it is too late. The lover has made it and the woman's daughter, to be born in nine months' time, will not have been sired by the man she will call her father. But nobody will ever know.

Counting the Cost

SCENE 8

Doesn't He Look like His Father?

As the man drifted back into consciousness, he painfully turned over his left hand which had been resting, palm down, on the bed. His partner reached out and placed her hand in his, distressed by the coolness of his skin. As their eyes met, she shook her head, answering his mute question.

The man knew that death wasn't far away, but he couldn't die yet. He had set himself one last task and had to live just that little bit longer. Despite the drugs and the pain, panic rose within him that he might fail and die too soon. His son was on his way, flying from the other side of the world, and the man desperately wanted to see him just one more time. Nothing else would make his last moments peaceful.

His eyes closed and he drifted off once again into semi-consciousness. Scenes from the past opened and closed so vividly he could swear he was actually there. He walked into the room where he met his lifelong partner and saw her for the very first time. He saw the blood and water as his son shot that last short distance out into the world. The midwife picked the baby up, identified his boyhood, and in the next breath remarked how much he looked like his father. Then he was wrapped and placed in his father's arms, his tiny, wizened face pointing upwards, bottom lip quivering as he sucked at a

the reproductive repercussions for a man of being unknowingly tricked into raising another man's child.

The comments that people make when they are first confronted by a new-born baby show a surprising preoccupation with seeking a resemblance between the baby and the presumed father. It is not known how often such comments and comparisons are accurate. In Scene 8 the midwife was wrong, but the man would have found it reassuring none the less. But, as life turned out, it might have been better if he hadn't — he might have been more likely to retrieve his situation, reproductively.

In his generation's cruel competition to pass on its genes, the young man was a reproductive failure. For him there were no descendants; no dynasty. He had been outmaneuvered in life's mating game by his partner and a man he never even knew — the man who was the real, genetic, father of his son. Between them, the two had tricked him into dedicating all of his reproductive effort to raising a child who wasn't his, just like the small bird that is tricked into raising a monstrous cuckoo chick.

Had he not been duped in this way, there was in principle nothing wrong with his strategy of having just one child. Recent studies have shown that, all else being equal, increasing one's wealth and investing more into each child can increase reproductive success just as much as having more children. It does so because each child then has a greater chance of survival, grows to be healthier and wealthier, and so becomes more likely to attract the opposite sex. Eventually, such a child should produce more grandchildren or great-grandchildren than a child who received less investment from his or her parents.

Sons, in particular, make good investments (Scene 18). Wealthier, healthier sons have more opportunity to inseminate girls before they choose a long-term partner, are more likely to obtain an attractive, fertile and faithful partner, and are more likely to have the opportunity for infidelity. Even apart from the grandchildren such a son might produce through his long-term relationships, he is also more likely to produce 'satellite' grandchildren via other women, often in the process

tricking other men into raising his children as if they were their own.

The greatest reproductive success is achieved by people who strike the best balance between the pursuit of wealth and status and the production of children. This principle applies just as much to an African cattle-herder as it does to a Western industrialist. It also applies to other animals. A male bird, for instance, has to strike a balance between gaining a better territory and feeding its young on the one hand, and finding opportunities to mate on the other. The best balance, of course, can be elusive. Spend so long accumulating resources to invest that you never actually find time to reproduce, and your strategy will fail. Spend all your time having children and none accumulating resources, and your strategy again fails. Your children may die of malnutrition or become so unhealthy and disease-ridden that they become unattractive or infertile.

The single-child strategy, which is the ultimate in investment, can be successful as we have seen — but it can also fail. Moreover, when it does fail, it does so spectacularly. If that child dies through accident or disease or is infertile through some misfortune of genetics or infection, the single-child strategy is a total failure. Or, if your situation is like that of the man in Scene 8, the single-child strategy is again a total failure.

For the woman in the scene, however, the strategy worked wonderfully. She produced a son who survived and avoided major diseases. Moreover, through his receipt and use of the higher-than-average family wealth, he was able to achieve a status in terms of health and wealth that made him a popular target for attractive and fertile young girls (Scene 18). For all his mother knew, her son might have produced children with some of these other women. He might even have tricked other men in the same way that his genetic father had tricked the man who had just died. Even apart from such potential satellite children, her son had successfully produced five children with his long-term partner. Had the woman had more than the one child, the reduced investment in each could have led to her

Still standing under the light, the woman fingered her cheek bone. The tenderness had nearly gone, but she knew it wouldn't be long before the bruises were back again. She took a deep breath, braced herself, and walked the remaining distance to her front gate. She had hoped he would be in bed by now, but as she went up the path she could see that the sitting-room light was still on.

Her partner didn't look up when she walked into the room, his gaze staying firmly fixed on the TV screen. There was a can of beer in his hand, and a further eight crushed empty ones littering the floor. She recognised the atmosphere only too well, and knew she had to be careful. For a while she busied herself with minutiae tidying up the debris of his evening at home with their two children. In the end, she could stand the silence no longer and asked, as calmly as she could manage, if the children had gone to bed without fuss. Without looking at her, he spat out a reply. *Her children had gone to bed fine. He didn't have any.*

She knew better than to contradict him. Both of the children were in fact his, but recently he had decided they were not. Since then, he hadn't missed an opportunity to voice his new-found doubts — to her, to the children, to the neighbours, in fact to anybody who would listen. She sighed more aggressively than she intended, then said that if he was going to start that again, she was going to bed.

'Come here,' he ordered.

She hesitated, a familiar fear rising inside her.

'Come here,' he repeated, even more forcefully, still not looking at her.

She knew she had no choice. Running away only made him worse. She walked over and stood in front of him. He remained seated.

'You've been with him again,' he said flatly, staring through her stomach at the television behind.

She said she hadn't been with anybody, only her sister. There wasn't anybody. He should phone her sister if he didn't believe

her. He didn't need to phone her sister, he said — he *knew*. She told him he was drunk and crazy, that there was no talking to him any more, and that she was going to bed. Now, for the first time since her return, he looked up at her face and told her to stay where she was. She saw the wild look that always came into his eyes before he attacked her. At he demanded to know who she had been with, fear gripped her. He said he knew she was screwing around. She had always screwed around. He just wanted to know who it was, so that this time he could kill him.

As he staggered to his feet, she backed away, pleading with him not to hurt her again. He demanded even more loudly to know who she was screwing. She half cried, half shouted that there was nobody. Ignoring her, he yelled back that whoever it was he wasn't going to have a free ride. He told her to take off her clothes and accept what was coming to her. She whimpered 'No', but it was no good. His fists and hands were everywhere as he manhandled her to the floor. As new bruises were added to old, the pain was familiar but more intense — so intense that it was almost a relief when he stopped beating her to tear off her underwear. Then he unzipped his trousers and entered her, thrusting vigorously and painfully.

Almost as soon as he had inseminated her he stood up, telling her that if he ever found out who she was seeing he was a dead man. If she was lucky, he might let *her* live. Now, he was going to bed and she could sleep on the floor where she belonged.

The next day she packed her and her children's belongings and walked out, taking her sister's advice and moving in with their mother. Over the next few weeks, she considered legal action for violence and rape but eventually decided that her best option was to have nothing further to do with him. She never saw him again, and he never tried to contact her or the children. Later, she heard that only two weeks after she had moved out, a girl of about nineteen had moved in. A year later, he was dead, murdered by the nineteen-year-old's father.

The woman stayed with her mother far longer than either

the more pups in the litter will be sired by the first male. Speed is everything.

It is for this reason that rats, monkeys — and men — become sexually excited by the sight of another couple having intercourse. The male's penis becomes erect and he may even load his urethra with sperm. Along with almost all other aspects of human sexuality, the appeal of hard-core pornography owes its existence to behaviour shaped for success in sperm warfare.

Men seek to avoid the costs of their partner's infidelity by being vigilant for signs, minimising opportunities, and threatening desertion or retaliation. If signs of infidelity are detected, then guarding and threats are escalated. Only if infidelity actually occurs, however, are the threats usually carried out. Even then, a man may decide that his long-term prospects for reproduction are far better if he stays with his current partner than with anyone else — in which case, the threats are curtailed.

In Scene 9, separation was costly to both the man and the woman. Their son, at least, may have suffered reproductively as a direct consequence of the separation. The daughter, too, may have done so, though her fate is unknown.

Had the violent man actually been correct in claiming that neither child was his and that the woman was being unfaithful, his extreme behaviour might still have been advantageous. Starting again with a new and younger partner could have been a better strategy than staying with an unfaithful older partner. But he was wrong and, as it happened, his misjudged violence reduced his reproductive success in two ways: first, via the two children he *had* sired; secondly, by leading to his early death it robbed him of the chance of producing further children.

Although deserting her first partner was costly to the woman through its effect on her children, she probably made the best of a bad job — in so far as her reproductive survival was concerned, anyway. Had she stayed with him any longer, his violence could have been so physically damaging that she might have been unable to have more children. He might even have turned on her children, acting on his mistaken conclusion that

he was not their father — in which case, their prospects would have been no better or worse with their real father than with a stepfather. Given her situation, the woman was always going to be in danger of achieving few or no grandchildren via her first family. However, by leaving her violent partner when she did, she at least managed to produce a second family, this time with every chance of having grandchildren.

SCENE 10

Licking Infidelity

In the first few moments after it was over, they felt awkward. Having picnicked in the sun in a secluded hay-field, they had been carried by sexual excitement to the brink of infidelity. But she had resisted and in the end, with her encouragement, he had simply ejaculated on to the grass. Now, as passion and frustration subsided, so did the awkwardness. She promised there would be other occasions and better moments. Soon they began to relax.

They stayed in the field for another half-hour, him stretched out in the sun, her sitting in the shade and occasionally talking. Reluctantly, they eventually packed up and drove back to their home town. He dropped her in the car park at work, and then they drove home separately to their respective partners.

As soon as the man walked through his front door and exchanged greetings, he sensed a strangeness in his partner's mood. The phone rang, but when he answered the caller hung up. Over dinner, his partner showed no interest in his day. He told her where his business had taken him and who had gone with him, but got no reaction. All evening, she busied herself, spending scarcely any time with him. On the few occasions they spoke, she hardly looked at him. When asked how her day had been, she shrugged and said it had been normal.

away his cyclist's sweat while she prepared what food she could from a temporarily thin larder. He waited until they were in bed and becoming aroused before breaking the news to her that he'd had no chance to buy or borrow any condoms. She protested that the last thing she wanted at the moment was a baby. He said it would be all right because he would withdraw before he came. Maybe it didn't matter anyway, she said, because her period was due any day.

He didn't withdraw, either then, first thing in the morning, or again in the early afternoon. An hour later he was gone, cycling the three-hour journey back to his barracks and imminent relocation. Even as he cycled, one of his sperm was entering his partner's egg, and by the time he saw her again she was experiencing pregnancy sickness. A few months later, during the hottest week in March, for twenty years, his son was born.

Fifty years later, the woman would have seven grandchildren, the soldier six-one from his daughter, and five from the son conceived when he was home for that day in June.

Each of the three scenes in this chapter deals with a situation in which a different woman appears in some way to fail. Yet in failing, each actually benefits — as if her failure were strategic. In Scene 15 we encounter a woman who is apparently convinced that the last thing she wants is to conceive. However, not only does she fail to avoid conception, but her body goes to some lengths to make sure that she does. Fifty years later it is clear that her body had engineered a very successful failure — a real bonus in her pursuit of reproductive success.

The conscious reason that this woman allowed unprotected sex, even though she didn't want to conceive, was because she thought conception was unlikely. Her spur-of-the-moment reasoning was that it was so long since her last period that her next must be due any day. But as we noted in Scene 2, and as she soon discovered, the human menstrual cycle is nowhere near as predictable as many people think.

Just about the only reliable element in the cycle is that once a woman has ovulated she will menstruate fourteen days later (but see below). Everything else is highly variable, as her body contrives to make itself unpredictable to men. Particularly crucial to her strategy is the tremendous variation in the number of days from the end of menstruation to ovulation. This variation (which we shall soon discuss further), however, is only one element in her unpredictability.

Another less well known feature is that even apparently normal cycles are by no means always fertile: a woman experiencing such cycles may not in fact be ovulating at all. Scattered among her fertile cycles, every healthy, fertile woman routinely also has infertile ones.

There are at least three different types of infertile menstrual cycle — and most women experience them all. In the first type, a woman neither menstruates nor produces an egg. In the second, she menstruates normally, but still does not produce an egg. In the third, she both menstruates and ovulates, but curtails (from fourteen days to about ten) the normally consistent interval from ovulation to menstruation. This curtailment prevents a fertilised egg from implanting.

In the short term, phases of infertility are an important method by which a woman's body subconsciously seeks to do two things: on the one hand, to confuse men; and on the other, to organise the number and spacing of children over a lifetime. Only if such infertile phases persist for long periods, such as several years, might they indicate a problem. Even then, they may still be part of a woman's natural subconscious ability to plan her family.

The proportion of cycles that *are* fertile varies in a fairly predictable way throughout a woman's life. Obviously, she does not ovulate during childhood, though she may ovulate before having her first period. And even once she has begun to have periods, few cycles are fertile. By the age of twenty, a normal, healthy woman produces an egg in fewer than half of her cycles. Even at her peak, when around thirty years old, still only about 80 per cent of cycles are fertile. After thirty, the proportion begins to decline, slowly at first, then rapidly after she reaches forty.

SPERM WARS

By fifty, women more or less cease to ovulate, though there are unconfirmed reports of women giving birth up to the age of seventy.

What seems to happen in each cycle is that in the days after the beginning of a period, a woman's body goes through a series of hormonal changes. These changes prepare her body to produce an egg but, about one or two days before ovulation can occur, her body goes on hold. Whether she eventually produces an egg or not depends on the events of the following few days, or even weeks. This holding period is an opportunity to collect sperm, perhaps just from her partner, perhaps not — perhaps just from one man, perhaps from two or more. In part, whether or not she ovulates will depend on how her body feels about the man or men from whom she has collected sperm. Most of all, however, it will depend on how she feels about trying to produce a baby in the current circumstances.

The woman in Scene 15 thought her next baby must soon be due because it was so long since her last one. She was wrong. Her body was on hold. In the absence of her partner for the foreseeable future, it had momentarily considered collecting sperm from another man. But when it collected sperm from her partner, it responded by producing an egg. Consciously, the woman thought it was a bad time to conceive, but her body knew better. Given that it was eight years since she had last conceived and that her ability to have and raise a third child would soon begin to decline, now was precisely the time to conceive — especially as it was June.

Many mammals, such as squirrels, sheep and bears, breed only at a particular time of year. This way, their bodies can time giving birth and raising young to coincide with the best weather and the greatest availability of food. In contrast, most of the larger monkeys and apes, living in more uniform tropical environments, will breed at any time of year. Nevertheless, conceptions and births are not evenly spread throughout the seasons: more still occur in some months than in others. Humans are just the same.

SUCCESSFUL FAILURE

At the latitude of Britain and Canada, more babies are born in early spring (February and March) than at any other time of year. There is a second, smaller peak in early autumn (September). At the latitude of Central America, more babies are born at the coolest time of year (December/January). In the southern hemisphere, the birth seasons are the same as in the northern. But the months, of course, are half a year different.

Just as these seasonal birth peaks reflect peaks of conception nine months earlier, so do these peaks of conception reflect peaks of ovulation. Suppose Scene 15 was set in Britain. There, women are more likely to produce an egg in May/June and December than in any other month of the year. If the scene had been enacted in October rather than June, the outcome might have been very different. In October, even if the woman's body had been on hold, she might not have responded to intercourse by ovulating. But it was June. Moreover, she was thirty-four years old, it was eight years since she last conceived, and her body rarely had the chance to collect sperm. Despite what her brain might have thought, her body decided on that summer day that it was actually a very good moment to conceive — and it was right.

Fifty years later, her son had not only survived, he had given her five grandchildren. The average number for women living at her time and in her society is likely to have been four. Without her son, she would have had only two grandchildren, half the average. Because she had had her son, she achieved seven grandchildren in all, nearly twice the average, giving her every chance that her descendants would be present in the generations to come.

The man, of course, did not fare quite as well as the woman from their partnership. But he still fared quite well, and for him the son was even more important — without him, he would have had only one grandchild. Then there would have been a very real danger that accident or infertility would rob him of all descendants within a generation or two (Scene 1). Because he had had his son, he too achieved an above-average number of grandchildren. So from the point of view of his reproductive

success it had been a good decision to take on this woman, despite the cost of raising her daughter from another man. It had also been a good decision to take on a three-hour cycle ride in the heat of that June day.

SCENE 16

The Stress of It All

As the woman fingered the piece of paper in her hand, tears began to roll down her cheeks. Ironically, only yesterday she had thought that things couldn't get any worse.

Seven years ago, when she and her partner had first started living together, the future had looked bright. But, somehow, it had all gone wrong. Maybe they shouldn't have overstretched themselves financially with their first house. Maybe they shouldn't have spent so much on holidays and entertainment in the first few years together. Maybe they should have seen the danger signs earlier and drawn in their horns when they began to slip into debt. But her partner had insisted they could manage. Promotion and solvency were always just around the corner. But now, seeing this final demand, she realised things were never going to get better. As she sobbed, it seemed to her as if life had been one long chapter of stress and unhappiness.

It had begun ten years ago. In her late teens she had become involved with a brilliant young man. But their relationship was fraught. He had been continually critical of her body and general appearance and had refused on principle to use, or allow her to use, any forms of contraception other than rhythm and withdrawal. Haunted by the fear of pregnancy and obsessed by the fear of becoming fat, she had lapsed into anorexia. After a year of despair, she finished with him, counselled herself out of her eating problems, and eventually qualified with distinction for the career she had always wanted. Two years later, she

met her current partner and they began living together almost immediately.

For four years, they had always been able to find an excuse to wait 'just another month or so' before having a family. More than anything, they were waiting for his promotion — but it never came. Eventually, despite their financial problems, they decided to wait no longer. Part of her motivation had stemmed from her secret hope that a family would draw them back together again — because as their debts had mounted so their relationship had deteriorated. More and more frequently, irritability had begun to give way to open hostility.

To her dismay, she hadn't conceived. Month after month went by, and she began to worry that she was infertile. As it turned out, her fears were unfounded. But it took nearly a year of unprotected sex before, relaxing on a holiday they couldn't afford, she eventually conceived. Then, nearly three months later, her partner lost his job and within a week she miscarried.

From that tragic moment, their lives had gone from bad to worse. The house was repossessed and they were forced to move from one rented accommodation to another. With each move, as they struggled to manage on her income, they lowered their sights and their standard of living. Their current flat was cramped. Although pleasant enough in summer, it was cold, damp and mouldy in winter. Eventually, her partner had got another job, less well paid than the first but at least with prospects. By then, however, they were so far in debt they had no choice but to stay in their cheap flat, waiting for financial recovery.

During the worst of their deprivations they rarely had sex, and whole months sometimes passed without intercourse. With her partner's new employment, however, their sexual interest in each other returned. But it was now two years since her miscarriage, and still she had not conceived. Their finances were slowly improving, but their standard of living was still far worse than they had originally expected it would be by now. They still

will be a size of family which will give her the greatest number of grandchildren. If she has a smaller family than this, she will naturally have fewer grandchildren. Equally, if she tries to have a larger family, she risks an overcrowded household and spreading herself and her resources too thinly. The resulting disease and infertility again mean that she ends up with fewer grandchildren. The challenge that faces every woman is first to identify the optimum family size for her circumstances, then to ensure that she has that number of children. Another factor that influences the number of grandchildren a woman may have is how she times her conceptions. Life is a mosaic of situations. Health, wealth and circumstances vary with time, and some periods in a woman's life are better for having children than others. Those who time their conceptions to coincide with the good times will produce the most grandchildren.

It is not just the children who may suffer from being conceived when times are bad — the mother may suffer also. An untimely conception may damage her health and situation so much that she may never again be able to conceive. If the woman in Scene 16 had produced a child during any of the most stressful phases in her relationships, she could have suffered irrevocable damage (the demands of a child when a couple can scarcely maintain themselves may even be fatal). Under such strained circumstances, there is an increased risk of ill-health and subsequent infertility. Hostility also increases, making physical abuse or even murder more likely. The woman in the scene, by delaying her first child until circumstances improved, managed, eventually, to have three children for whom she had the space, time and resources. In the end, she also had the support of an able partner. Had she tried to reproduce earlier, she might not only have failed but might also have forfeited her chances of conceiving in the future.

The best method of avoiding conception is, of course, sexual abstinence, and the woman and her partner did indeed have spells without sex in their most stressful days. This happened not because they consciously wanted to avoid conception — on

the contrary — but because they lost interest in each other. At times, they even felt hostile. Their bodies were manipulating their emotions to reduce the chances of conception. Rarely, however, did they give up routine sex for long. This is because abstinence is in general disadvantageous as an overall contraception strategy — for the following reasons.

As we discussed in Scene 2, the primary function of routine sex is not conception: it is for the woman to confuse the man — and it is for the man to protect himself against his partner's infidelity by maintaining a sperm army inside her. Since neither partner can afford to give up routine sex for too long, both men and women have mechanisms other than abstinence which, despite continued sexual activity, reduce the chances of conception when the situation is unfavourable.

Women in particular have a wide range of such mechanisms. One of these is widely known: the influence of lactation on ovulation. If a woman breast-feeds her baby for a few months after giving birth, she is unlikely to ovulate during that time. This is the case even if she resumes her periods. Absence of ovulation is one of the main ways in which a mother spaces the conception of successive children.

However, most of the ways in which she avoids reproducing at inappropriate times involve stress. In Scene 16, not only did the woman avoid conception during her most stressful phases, she also miscarried, then later threatened the life of her new-born baby, in response to stress.

The stress reaction manifests itself in many ways. In the scene, faced with a difficult relationship during adolescence, the woman lapsed into anorexia, as do 1 per cent of girls between sixteen and eighteen years of age. The physiological stress caused by such near-starvation is contraceptive — ovulation, and often menstruation, are inhibited. Usually the situation is temporary. Although a few anorexics (5-10 per cent) die as a result of their behaviour and a few more (15-20 per cent) continue to be anorexic throughout their lives, the majority (75 per

cent) emerge from the condition to live a normal, healthy and eventually reproductive life.

Most contraceptive reactions are less extreme than anorexia. Even so, the more a woman is stressed the less likely she is to ovulate (Scene 15). She is also less likely to help sperm reach the egg or to allow a fertilised egg to implant in her womb. Finally, she is more likely to miscarry, particularly during the first three months of pregnancy.

It is estimated that, whereas most fertilised eggs survive to reach the womb, on average about 40 per cent fail to implant and of the remainder, about 60 per cent die before the twelfth day of pregnancy. Even then, about 20 per cent are miscarried during the next three months. All of these figures are higher if a woman is stressed, lower if she is not. The death of a partner, a partner's infidelity, or the outbreak of war, for example, are all shown to increase the chances of miscarriage. During the first few months, miscarriage is also more likely if there is anything wrong with the baby, either genetically or developmentally.

At first, it might seem odd that a woman has so many different ways of avoiding having a child. Certainly, if any one of these systems were efficient, there would seem no need for others. But this apparent excess of responses is not an error in female programming. Circumstances change, often quickly, and a woman's body needs to respond equally quickly. For example, circumstances may be favourable when she ovulates but no longer so by the time the egg reaches her womb. So she will ovulate, but then avoid implantation. Or circumstances may be favourable at the time of implantation but may become unfavourable a month or so later. So, having become pregnant, she miscarries.

Even if circumstances remain favourable throughout early pregnancy, they may yet deteriorate before the baby is born. The last three months of pregnancy are often associated with marked changes in a woman's psychology. First, there are the well known spells of 'nest-building' — strong urges to prepare the environment into which the baby will be born. Also there are spells of

intense reappraisal — primary targets are her partner, home and general environment. These spells often manifest themselves as phases of worry, depression and irritability. Finally, there is often a preoccupation with the future. Any major deterioration in a woman's circumstances at this time can lead to pathological depression and the later rejection, or even abuse, of the baby.

Postnatal depression as an irresistible urge to abandon, abuse or even kill a new baby is widely recognised. So widely, in fact, that many legal systems around the world accept that a woman may not be responsible for her actions in the phase immediately after giving birth.

Throughout human history infanticide has been, and still is, one of the major forms of family planning employed by women. In hunter-gatherers, people who live by hunting and foraging rather than by cultivation, about 7 per cent of children are killed by their mother. According to the World Health Organisation, infanticide was the most prevalent form of family planning in late-nineteenth-century Britain.

Such behaviour is not restricted to humans. Like all the other forms of natural family planning, we inherited infanticide from our mammalian ancestors. Anybody who has kept pets such as rabbits, gerbils, hamsters or mice will know that if the mother is at all stressed soon after giving birth, she is likely to kill, even eat, some or all of her litter. Such infanticide is not pathological: it reflects the mother's subconscious decision not to raise the litter in the current circumstances. She opts instead to delay her attempt until circumstances improve.

So far, we have concentrated on family planning from the woman's viewpoint. But men, too, have many of the same problems. They direct a large part of their reproductive effort into preparing an environment for their children. During hard times, a man should want to avoid raising children just as much as his partner.

Most of the time, a couple's interests coincide. The woman's body will plan their family to their mutual benefit. But there are times when their interests do not coincide. Then, a man needs

He wasn't really a stranger. When he wasn't at his apartment in the city, he lived in a virtual mansion in their home village. Her father worked for him as a gardener cum handyman, helping to maintain his house and its grounds. Although for years she had seen him driving around, she had never really met him before. All she knew was that he was about fifty years old, very rich, and apparently had no children, despite having lived with the same woman for about twenty years. She had heard her parents talk about infidelity and children by other women. She had also heard them talk about infertility and women's problems, but had taken little interest.

On the journey home she had been struck by his friendliness. At fourteen, she was well developed and already attractive, with a maturity and self-confidence that would have graced a twenty-year-old. During the journey she found herself doing most of the talking. She liked and felt comfortable with this man and had no hesitation, a week later, in accepting another lift from him when he drove past her at the school bus stop. After that, he drove her home with increasing frequency. Her schoolfriends teased her a bit about it, but it didn't bother her.

The following summer, during the long vacation, she lost her virginity. Her lover was a boy of seventeen whom she and her friends had worshipped from a distance for months. After the trauma of their first intercourse, she began to enjoy their sexual activities. She became the envy of her friends as she described in great, though sometimes imaginary, detail her sexual adventures with this young idol.

That autumn, she resumed her journeys home from school with her father's employer. She was in his car the day before his partner was diagnosed as having terminal cancer. After that, she didn't see him for several months as he and his partner moved to the city for her to be treated. He did not reappear until a few weeks after his partner's death which, she discovered later, had been the day after her fifteenth birthday. From then on, whenever he wasn't in the city on business, he made a point of picking her up from school. Soon, they

actually discussed which days he could do so, and she would wait for him.

Winter cut down on the sexual activity with her boyfriend until he passed his driving test and acquired a virtually derelict car. Then, they became adept at cramped sex on the cold and badly sprung back seat. She began to fantasise about doing the same with her father's employer in the luxury of his car. It would be like being in bed. Now, stretched out in the sun by the side of her swimming pool, the woman still remembered clearly the move that changed her life. On their way home from school, waiting at traffic lights, she had put her hand on his thigh and leaned across to kiss him on the cheek.

They never did have sex in his car. But within a week of that kiss she was in his bed, experiencing for the first time the difference between sex with a man of fifty and sex with a boy of seventeen. Throughout that spring and summer she had sex at least twice a week, more or less alternately with her boyfriend and the older man. Neither knew of the other's existence. It was autumn before she and her mother realised she was three months pregnant.

She refused to discuss paternity with anyone except her parents and her father's employer. Her parents were told that the father was the young boyfriend who had just left for college and whose parents had now moved out of the area. Her father's employer was told that the baby was his, as well it might have been. He feared conviction for having sex with a fifteen-year-old girl. But he also felt genuine affection for her and for the child he believed was his. Explaining to her parents that he would do the same for any employee who was in trouble, he offered to help with the child's upkeep. On the strength of this extra income, her parents volunteered to look after the child, a girl, while their daughter finished her education.

When, despite the distractions of motherhood, she performed well in her examinations, the man again offered to help. This time he provided money for her to have a college education. During her two and a bit years at college, she had about ten

have just witnessed is the first of four in which we shall explore two matters — the problems that people, particularly women, face when selecting a mate; and the methods they employ in solving those problems.

Here the central character successfully cleared all of the obstacles to reproductive success that women normally encounter when choosing a mate. First, through her choice of long-term partner, she engineered an environment conducive to the easy and successful raising of children (from the point of view of being in a position to offer them every opportunity, anyway). Secondly, she managed to collect some of the most sought-after male genes in her vicinity. As a result, she produced children with the looks and ability to make the most of the comfortable environment into which they were born. Her strategy was risky, but in the end, it was on her side. She made the most of her talent and cunning, her composure and good looks, and successfully walked the tightrope of disease, discovery and desertion.

In choosing a man or men with whom to share her life, a woman has two major issues to consider. On the one hand, she needs a man who can help her raise her children. On the other, she needs genes that in combination with her own will produce attractive, fertile and successful children. The better the environment and the better the assistance, the more fully each child will achieve his or her genetic potential.

A woman's difficulty is that she has a much wider choice of men to provide her with genes than she has of long-term partners. She could probably persuade many men of her choice to give her their genes — it takes only a few minutes of sex, after all. Her options for a long-term partner, though, are much more limited. Most men in most societies have not the time, the energy nor the resources to help support more than one woman and her children at any one time. Her choice of long-term partner is therefore restricted to those men who are unattached, ready to desert their current partner, or who have so much time, energy or wealth that they can support more than one family.

An equally difficult problem is to identify which of the few available men would make the best long-term partner. The most reliable way would be to look at past performance, but inevitably the best long-term partners are already paired to other women. Much of the woman's choice, therefore, is limited to young and unattached men who have not yet proved themselves as long-term partners. All she can do is look for signs of potential, and hope that her judgment is accurate.

Surveys of many cultures around the world consistently show that, in looking for a long-term partner, women prefer men who have, or have the potential of, wealth, status, stability and durability. In the past, in all cultures, the children of women paired to men at the top of the scale for these qualities had a far greater chance of survival, health and subsequent fecundity. The same holds true even in today's industrialised societies.

The preferences are clear, but for most women a level of compromise is necessary. One man may be wealthy but uncaring; another may be of high status but unstable; yet another may be poor, but stable and caring. So, inevitably, a woman has to opt for the best compromise. Of course, she does not have to stay with her first partner. Again, studies show that when a woman leaves one partner for another, she invariably moves up the scale to a better compromise.

In choosing a man to help raise her children, a woman is only secondarily impressed by looks, whereas in choosing a short-term partner for sex, looks are much more important. The features she finds most attractive are clear eyes, healthy skin and hair, firm buttocks, a waist that is about the same in circumference as his hips, shapely legs, broad shoulders, quick wit and intelligence. She is also attracted by symmetry in his physical features. These various qualities are all reasonably reliable indicators of genetic health, fertility and competitiveness. As such, they imply a genetic constitution that would also be desirable in her children.

Since women are seeking different attributes in short-term and long-term partners, but have more choice of short-term

SCENE 20

Tasteful Display

By chance, their business trip coincided with the first hot day of summer. The man had engineered the visit and they had been looking forward to it for days. The weather was a real bonus.

The woman had made a point of telling her partner where she was going and who she was going with. The last thing she wanted was to make him suspicious. He was steady and reliable, both as a partner and as father to their two children, and she didn't want to lose him. But, at the same time, she felt that she needed some excitement in her life, and the man with her in the car could be it. He was a challenge, and he was attractive. She enjoyed teasing and flirting with him — she even enjoyed arguing with him, which she did often.

In contrast, the man had not bothered to tell his partner. It was not that unusual for him to go on such a journey or to take somebody with him. In fact, his partner no longer seemed to care what he did and appeared to welcome his days away. Secretly, he had decided she was having an affair. Not that it bothered him much — in fact, he would almost have welcomed her infidelity, taking it as a licence to pursue infidelity himself.

As they drove the two hours to their destination, he pondered their budding relationship. After a year of platonic acquaintance, they knew a lot about each other. Enough, for example, to know that there was no way they could live together. Yet, somehow, even this incompatibility was attractive. Recently, they had begun to touch each other as they spoke. On a few occasions, like today, they had even greeted each other with a friendly kiss. He was sure they had an unspoken understanding. One day they would have a proper affair, snatching and engineering sex when

they could. And, as he drove, he had high hopes that today might mark the beginning of that affair.

Their business completed by mid-day, they decided to enjoy their freedom and the weather and to buy food and drink for a picnic. As they drove into the country, passing field after field and wood after wood, she began to tease him. He was looking for somewhere secluded. She pretended not to realise and kept pointing out roadside verges, open fields near houses — suitable for a picnic, but nothing else. Eventually, growing hungry, she decided she had teased him long enough. When he pointed out a small, secluded field, she accepted. Rows of freshly mown hay lay silver-green in the intense sunlight. He thought it looked perfect. She said it would do.

There was a large blanket in the car which they took and stretched out in the corner of the field, part in dappled shade, at her request, and part in sun, at his. She was wearing a loose cotton dress and, knowing from the minute she got up in the morning she could engineer a picnic, had brought a straw hat with her. He had started the day wearing a suit and tie but within minutes of finishing their business meeting he had taken off his jacket and unbuttoned his collar. Even so, sitting there in the field in the heat he looked uncomfortable. Knowing he was no stranger to nude sunbathing, she began to tease him again, challenging herself to persuade him to take off his clothes. The denouement came when she accused him of having something to hide.

Interpreting her teasing as a sexual overture, he was becoming aroused. Even so, he felt slightly silly as he removed his shoes and socks and even sillier when he stood up, took off his shirt, then in one movement pushed down his trousers and pants. Now naked, he stood there, penis half erect, wondering what he should do next. Avoiding any reaction to his nakedness, she simply commented that he would be much more comfortable now and busied herself with the picnic. Still standing, he suggested that she, too, should take off her clothes. She shook her head, saying that she would burn, even in dappled shade.

had the opportunity to be unfaithful, then while I was away so too has my partner.' In the case of the man in the scene, this possibility was in fact a reality — his partner had been unfaithful in his absence (Scene 10). So, when he inseminated her later that day, he had the inseminate he needed. It was the young, aggressive and fertile inseminate appropriate to immediate sperm warfare, not the defensive, low-fertility sort appropriate to routine sex. Once a man enters a phase of infidelity, therefore, similar ejaculates become appropriate for both his partner and his lover. Having sex with two women does not prevent him from producing an ejaculate suitable for both — no matter how often he has sex with either.

So the man lost little, if anything, by ejaculating on to the grass — except, of course, that ejaculating on to grass does not fertilise eggs. He might have missed the chance of making his companion pregnant. But even that may not be as lost an opportunity as it might at first seem. If the woman didn't want him to inseminate her, there was a good chance that she was not in her fertile phase anyway. Since, as we saw in Scene 6, women are most likely to have sex with a lover during their fertile phase, a man has little to lose reproductively by leaving his mistress to decide when they should have sex.

The man's strategy was to be patient now in the hope of future rewards. In order for this strategy to pay off, his behaviour in the field today needed to increase his chances of gaining those future rewards. He didn't know it, but as the pair of them prepared for their picnic, his prospects were on a knife's edge.

The woman's body did not want his partnership, only his genes. In this new man her body saw qualities that would suit her next child, if she were to have one. She would commit herself to having his child only if these qualities out-weighed the potential costs of infidelity. The equation was finely balanced, not least because her potential lover had so far given no evidence of sexual potency. From her body's point of view, this afternoon was to be a test of his potential — the final collection of facts, the final balancing of the

equation. Subconsciously, she was not after sperm, but information.

First, there was his body. She had never seen him naked but, when she did, she found his body as good as she had expected. Like most men, of course, he assumed her main interest would be in the size of his penis and muscles. What in fact interested her most in his nakedness were his buttocks. The best indication of a man's health and hormones is the ratio between his waist and buttocks. Ideally, a tape round his waist should measure nearly the same (about 90 per cent or so) as a tape around his hips and buttocks. Firm, tight buttocks are a good, though of course not perfect, indication of his health and fertility.

Next, there was his ability to gain an erection and ejaculate. Not until he began to kiss her after the incident with the car was her body finally reassured that he was not impotent.

Finally, there was his sexual health. The best way to check for infection was to examine his penis closely. She looked closely, then licked and tasted him. Absence of rashes and sores and a reasonably pleasant taste are a good sign of health, and her body knew this. The ejaculate also gives away a great deal. A liquid, whitish ejaculate with a normal smell is a sign of health, whereas discoloration, particularly bright yellow or orange, or a bad smell, are often signs of infection. So, too, are traces of blood.

In those few minutes the woman collected an abundance of information about the man, much of which would have been hidden from her if she had simply had sex with him. As it happened, he passed all of the tests.

It is not only during her first encounter with a potential lover that a woman might gain from tasting a man's penis. From time to time, she may also gain from doing so during routine sex. Partners who were once healthy may become diseased. A woman benefits from being alerted to this change by seeing, smelling or tasting an unsavoury penis. She can also use oral sex to taste or smell infidelity (as can a man — Scene 10). Traces of a lover can remain on a man's penis for hours. Not only a man's

talking, sometimes drifting in and out of sleep. After a while, the girl began to feel restless. As she looked around, she could see that some of the men were also asleep. Sitting up and stretching, she nudged the other woman and pointed to the young stranger next to them. Fast asleep, his arms and legs were gently twitching. So too was his very erect penis. The girl whispered in her friend's ear. They smiled in anticipation, then went across on hands and knees to the man's side.

There, the girl watched and waited while the woman knelt by his head and bent forward to kiss him on the lips. He jumped, then jumped again when the girl kissed his genitals. As the two women kissed and stroked his body, every part of him relaxed — except one. And that grew even harder. After a few minutes, the girl sat astride his groin, massaging his body with her hands and gently massaging his penis with her vaginal lips.

By this time the other four men were awake. At first, they feigned an air of casual disinterest. Watching the women's antics only intermittently, they resumed their smoking and drinking, passing an occasional good-humoured comment on the stranger's progress. Eventually, however, their erections betrayed their true feelings.

The girl, still sitting astride her prey, finally initiated intercourse with him. No stranger to this position, she slowly but expertly rose and fell as if impaled on his erect penis. As she did so, her friend bent further forward to lick his nipples, resting one of her breasts on his face in the process. Her movement lifted her bottom in the air as if in display to the man sitting behind her. Throwing down his cigarette, he proclaimed he could stand it no longer. He moved quickly across to the woman and, with the minimum of foreplay, entered her from behind. For a while, the remaining three men watched, then moved closer to await their turn.

Because of their positions, the two women were facing each other. If they had bent forward, they could have kissed. But they didn't. Instead, as intercourse proceeded, they looked into each other's eyes, sharing each other's mounting sensations. The girl

was disappointed when, just as she was building to a climax, the stranger ejaculated inside her too soon and began to fade.

Having been left high on a plateau of sexual excitement, she moved off him and in one continuous movement sat astride the man lying next to her. Hardly had he penetrated her than she climaxed. He carried on thrusting, but once she stopped cooperating after her orgasm his movements became awkward. Thrusting as best he could, he was finding it difficult to build up to ejaculation. He was not helped by the man next to them who, waiting for his turn, complained he was taking too long. He was helped even less when the man put his hands round the girl's waist and tickled her ribs, making her laugh. Concentrating hard, his thrusting eventually brought him to the brink of ejaculation. Then, at the very last moment, he felt the girl being pushed to one side and his penis slipping out of her vagina. Still laughing, she fell on to her back on the sand and the other man collapsed on top of her.

The prostrate man was more than a little irritated. After all his hard work, all he had managed was to ejaculate on to his stomach. His annoyance grew when, with the girl still laughing, the man who had spoiled his fun entered her and began a long but gentle intercourse. He did his best to interfere in return, but the missionary position adopted by his usurper allowed him to resist being pushed off, especially once the girl wrapped her legs around him.

While the girl's third lover in ten minutes was slowly building to his climax, the events around her became a blur, even after she had stopped laughing. She dimly registered the previous man's attempts to interfere — and the fact that the other woman was still on all fours having sex with the same man. The one man who had not yet had intercourse seemed to be urging him to get off. He was refusing, saying he hadn't finished. Briefly, voices became raised. When her most recent lover had eventually inseminated her and removed himself, the last, frustrated, man left the other couple and moved over to her. She protested a little as he lay down on top of her and opened her

aesthetic. What most people don't realise is that there is more to its function than simply delivering sperm to the top of the vagina. The human penis is a very effective suction piston. Its shape is no accident, nor is the backward and forward thrusting that accompanies penetration. The penis has evolved its size and shape to remove any material that is already present in the woman's vagina. In humans, it is particularly effective at removing any seminal pool or any as yet unejected flowback that may still be present. As the penis pushes forward, with any foreskin now pulled back off the glans on to the shaft, the smooth, blunt tip of the glans pushes through any semen or mucus in the vagina. As it then begins to pull back, two things happen: any material behind the vertical flanges at the back of the glans gets dragged back down the vagina and any material ahead of the penis gets sucked further down the vagina, ready to be pushed through at the next forward thrust. Rapid backward and forward thrusting during intercourse thus sucks out any seminal material from a recent insemination. It may even help to remove some mucus and blocker sperm out of the cervix. The longer and more rapid the thrusting, the more the vagina is sucked clean of any previous insemination. The larger the penis, the more effective the removal.

As each man in Scene 21 tried to claim the prizes in front of him, success or failure depended in part on how he adjusted his behaviour according to his position in the queue for each woman's body.

The stranger, the first to inseminate the younger girl, was in pole position — the man with maximum opportunity to deploy his army and make life difficult for all who followed him. Even if he had a chance to inseminate the other woman later, his situation would be less favourable. More than any of the other men, he had most to gain from injecting more of his sperm now (say six hundred million), and saving fewer (say two hundred million) for later. Because he was in pole position, he also needed to ejaculate quickly. Any delay might have given another male the chance to physically oust him and deposit his own sperm inside

the girl first. It was because of this urgency that he ejaculated before the girl climaxed.

Having succeeded in being first to inseminate the girl, what the stranger should then have done, but didn't, was try to delay the next man as long as possible. That way, he would have given his army maximum time to leave the seminal pool and deploy itself. (The man who was first to inseminate the older woman succeeded in doing just that, despite triggering aggression.) The girl the stranger had inseminated, having failed to climax while he was inside her, had other plans. She moved immediately from the stranger to the next man.

This man needed to get his penis inside the girl as quickly as possible after the stranger had finished — the sooner he could do this, the sooner he could pursue his own best strategy. He would, of course, have been helped in his urgency by having watched the girl's previous intercourse. Like most men, he would have found the sight of a copulating couple sexually arousing (Scene 9). While he was waiting his turn his penis would have been erect and ready for action. Once inside her, in fact, he had a choice of strategy. He could have ejaculated really quickly, reducing as much as possible the stranger's head start, but the disadvantage of this option was that he would have shot his sperm straight into the stranger's seminal pool. So instead, he tried thrusting long and vigorously to remove that seminal pool first — and paid the price. Because of his delay, he was displaced and relegated from the possibility of being second to not inseminating her at all — at least, not in the first round.

Just as it is better to be first to inseminate a woman than second, so it is better to be second than third. Rather than wait his turn, therefore, the third man successfully engineered events to inseminate the girl second, not third. At the risk of aggression from the man he displaced, he moved in at just the right moment.

The fourth man then had no real alternative. Having been thwarted in his attempt to be the second to inseminate the other woman, he had to settle with being the third to inseminate

been considerate enough to concentrate on her until she had come, she would have been quite happy to have him inside her. But no, all he had wanted was to feel himself inside her, with no thought for her at all. She knew the second he stopped stimulating her and began to move into position that she would lose it. And by the time his penis had started to go in, she had. That fragile focus on her own sensations, which she needed if she was to climax, had simply evaporated. All excitement had gone and his interminable thrusting had killed it stone-dead.

She envied the women, and she was sure there were many, who needed only a few thrusts of a penis inside them to send them into multiple screaming, clawing climaxes. Sometimes she found herself looking at women in supermarkets wondering what their climaxes were like. This morning there had been a short, dark-haired wild-eyed woman who stood on her at the check-out as she had waited patiently for her own turn to pay. She had had this image of the woman, naked on a bed, hair streaming about her shoulders, having energetic intercourse and screaming in ecstasy. For her, though, intercourse was almost always a disappointment. If she did climax during intercourse itself, which happened once a month if she was lucky, it was always a fairly tame affair; nowhere near as powerful as those during foreplay or those she gave herself.

The truth was, she wasn't particularly bothered about trying to come during intercourse. If it happened, it was a mildly pleasant bonus, but not really worth agonising and making a big effort over. Especially as most attempts were doomed to failure and mild recrimination. She would much prefer her partner to give her an orgasm when she felt like it, *then* satisfy himself inside her. What she needed was a partner who was sensitive enough to her needs to be able to judge what she wanted and when she wanted it. Should she really have to tell him every time? The man next to her really wasn't measuring up too well at the moment.

Women differ considerably in their response to intercourse. Some nearly always climax during intercourse; some never do. These differences are an important part of the overall picture of human sexuality, and we shall explore them in Scene 36. Taking women as a whole, it is more common to fail to climax with a penis in the vagina than to succeed. On average, only just over 60 per cent of routine sex episodes (from the beginning of foreplay to ejection of the blowback) involve the woman having an orgasm. Even when they do, she usually climaxes during foreplay (35 per cent) or post-play (15 per cent), not during intercourse itself. In fact, only 10-20 per cent of routine sex episodes involve the average woman climaxing while the penis is in her vagina.

There are several elements of interest in the scene we have just witnessed. The man's confusion is one, particularly his confusion over why an approach that stimulates his partner to orgasm on one occasion fails miserably on the next. Another is his observation that during his affair, his lover climaxed during intercourse much more easily than his partner. Yet another is why the man would have preferred his partner to climax during intercourse, not during foreplay. But these elements are the subjects of later scenes; for the moment, the main issue is the common lack of female climax during intercourse. Does it reflect some sort of failure? Or is it instead a successful part of a woman's subconscious strategy — yet another aspect of sexuality that actually increases her reproductive success?

When foreplay first begins, a woman's body will have carried out at least some advance preparation. The nature of this preparation has just been discussed (Scenes 22 and 23) in connection with nocturnal and masturbatory orgasms. Having these orgasms prepares her cervical filter in one way; not having them prepares it another way. Whichever option her body has taken, we know that she will settle down to intercourse with a certain level of protection against disease, a certain level of vaginal lubricant,

foreplay, she did the next best thing and avoided climaxing during intercourse.

At the beginning of the second sexual episode (Scene 25), the woman's needs were still the same — small numbers of young sperm at minimum risk of disease — but the circumstances had changed. Most importantly, her partner was now offering to give her a small inseminate rich in very young sperm — younger than any in his previous inseminate. This was just what she had wanted all along, and it was this offer that made her body interested in a second insemination. However, the first insemination had left her with two problems.

First, her cervical filter was now stronger than before because of the influx of blockers from the first insemination. If she delegated sperm retention to her new over-strong cervical filter, she would lose more of the young sperm in the second inseminate than she would like. Secondly, she still had the seminal pool from the first insemination at the top of her vagina. If she had an orgasm during foreplay now, she would bypass her filter with large numbers of older sperm from the first inseminate — just what she had gone out of her way to avoid during the first episode.

Her solution to these two problems was straightforward. What she needed was to get rid of the first seminal pool, then to use an intercourse orgasm to bypass her cervical filter. That way she would retain a large proportion of the very young and desirable sperm from the second seminal pool. So how could she get rid of the old pool, given that it probably hadn't yet decoagulated enough for her to eject it as a flowback? Her best option was to encourage the man to remove it with his thrusting penis (as described in other circumstances in Scene 21) before introducing his second ejaculate. Her body generated the necessary urges. First, she no longer felt like foreplay, but wanted a penis inside her as soon as possible. Secondly, she felt like an orgasm during intercourse. Once intercourse had begun, her body then timed its build-up so that she didn't climax until the old seminal

pool had been removed and her partner was nearly ready to ejaculate.

In this discussion we have, inevitably, considered only one specific sequence of events — the sequence relating to the woman in Scenes 24 and 25. And although we cannot, obviously, discuss every combination of circumstances and responses, there are some general principles worth noting.

First, a woman prepares for her next anticipated intercourse by having a nocturnal or masturbatory orgasm — or by *not* having a nocturnal or masturbatory orgasm — whichever is appropriate, as explained above. Secondly, if she has anticipated correctly, she should let the entire sexual episode proceed without orgasm and leave her filter to do its job. On the other hand, if she has not anticipated correctly, she should aim to correct her mistake by having an orgasm at some time during the episode.

In the latter situation she has two options, depending on what type of mistake she has made. The fact that orgasms during foreplay are more frequent than orgasms during intercourse suggests that a woman is more likely to err on the side of having too weak a filter than too strong. This could be strategic. It is easier to encourage a man to help her climax during foreplay (strengthening her filter) than to help her climax during intercourse (weakening her filter). Once she allows him to insert his penis into her vagina, she loses much of her control over what he does and when he does it. Even then, however, she has a fall-back strategy: orgasms after the man has withdrawn are a substitute for intercourse orgasms, permitting her to bypass her filter whenever she needs or wants to (again, as just described).

The best moment for a woman to climax (or not) during a sexual episode thus varies considerably from occasion to occasion. The best moment for her to climax as far as the man is concerned, though, varies much less. As we have already seen (Scenes 12 and 14), he also will have anticipated the intercourse and tailored his ejaculate accordingly. He will have masturbated or not, as appropriate, to suit his body's own best

concerned might desert her (Scenes 8 to 11, and 16). Moreover, conceiving via a man later proved to be genetically inferior could result in her raising a less successful child than if she had waited for a more suitable man (Scene 18). Together, these two dangers mean that an incautious, one-off intercourse can considerably reduce a woman's reproductive success. Her priorities need to be when (Scene 16) and with whom (Scene 18) she has one-off sex, rather than how often. Caution and selectivity are of maximum importance.

Of course, women are not always cautious. The primary situation in which a woman might abandon caution, though not usually selectivity, is when she has a one-off opportunity to collect sperm from a particularly desirable man. Usually, this is a man who she has already judged from a distance would make a good genetic father for her next child (Scene 18). In this book we have seen several women behaving in this way (Scenes 6, 17, 19, 21 and 26). Most often, as in those scenes, such behaviour is within the context of infidelity. Once a woman has a long-term partner, the costs of one-off intercourse are reduced as long as her infidelity remains undetected (Scenes 9 to 11). Her long-term relationship provides a springboard from which to exploit the genetic benefits of one-off sex with selected men without risking too much. She does not have this freedom, however, if she does not have a partner.

The result of these pressures is that women, like all female birds and mammals, are genetically programmed to be cautious and selective. In past generations, women who were not so were less successful reproductively than those who were. All women alive today are the genetic descendants of the more cautious of female ancestors, not their more reckless contemporaries. Men, on the other hand, are genetically programmed to be urgent and single-minded about one-off sex. In past generations, men who were not urgent and persuasive were less successful reproductively than those who were. All men alive today are the genetic descendants of the more urgent of male ancestors, not their more complacent contemporaries.

We can see, then, that there is a big difference between men and women in the potential costs and benefits of a one-off intercourse. This difference automatically means that the two sexes approach any potentially sexual situation with a conflict of interests.

A man can only satisfy his urgency if he can convince the woman concerned that she actually wants to be inseminated by him, now, rather than by him or somebody else, later. His only alternative is to try to force insemination whether she wants it or not. At first glance, it might seem that both of the boys in Scene 28 simply opted for the second course of action. Again, the situation is not that simple. The complicating factor is that male persistence in the face of female resistance can be a normal, mutually acceptable facet of courtship and foreplay. So, too, can aggression and a level of physical trauma. We are back to the way that women set men tests as an aid to mate selection — which brings us to the function of rough-and-tumble sex play.

This is an emotive issue — so emotive that it is probably best broached by first considering the courtship of animals Other than humans. For example, if we watch the courtship of dogs, we often see a clumsy male persisting and persisting with his advances despite rejection after rejection by the female. If we watch domestic cats we see females clawing, scratching and spitting at prospective suitors. If we watch mink, we see a male drawing blood as he tries to subdue the female's spirited resistance.

Witnessing such behaviour, it is difficult not to feel sorry for the females. At best they are being pestered, and at worst they are being physically damaged by males who refuse to take no for an answer. Yet, despite their resistance, female cats and dogs do eventually allow one of their persistent and aggressive suitors to mate. As for female mink, if they *do not* experience physical trauma at the male's hands, they do *not* ovulate. Their bodies are on hold, waiting for the right male to inseminate them before they produce an egg (Scene 15). In all of these

animals, female resistance is actually a test of male competence. Rough-and-tumble sex play in humans is similar.

On average, men who are physically able to overcome the final defences of a female and achieve insemination leave more offspring than those who are not. So women whose sons and grandsons also have this ability will enjoy greater reproductive success. One of the criteria (Scene 18) that a woman can add to her list when selecting a mate, therefore, is his ability to overcome her physical resistance — but how does she test such an ability?

Initially, she can simply watch him in competition with other males. The young men in Scene 28 spent much of their time chasing and wrestling with each other, doing their best to display their strengths and hide their weaknesses. But finally, the only real test a woman can set is whether a man can negotiate and overcome her own defences. To test this, she has to resist, first verbally, then physically. The stronger and more resistant her resistance, the better the test.

This is, of course, a dangerous game. Resist too little, and the test is meaningless. Resist too much, and the male may inadvertently cause real rather than superficial damage. The fact that courtship rough-and-tumble aggression rarely results in serious damage in cats, mink or even humans shows the accuracy with which this feature of sexual behaviour has been moulded by natural selection. Even in mink, the level of trauma that stimulates a female to ovulate is set at a level just high enough to test the male's ability to overcome her defences, but not high enough for her to suffer long-term damage.

In species such as humans which form long-term relationships, rough-and-tumble sexual behaviour is most important during the early stages of courtship. Once a woman has tested a man's ability to force himself on her, she need not do it often thereafter. But as in all such tests of male health and ability (Scene 20), even within a relationship a woman gains from occasional reappraisal of her partner.

Of course, in this as in most features of human sexuality,

people vary (Scenes 35 to 36). For some, rough-and-tumble sex play is indeed a minor and infrequent element in their relationship. For others it is an essential element even up to the level of sadomasochism, if they are to accept the other person as a suitable partner. The dark-haired couple in our scene clearly leaned in this direction. Their intercourse on that first afternoon was rough, painful and humiliating for the girl, yet through the experience she recognised the boy as a compatible partner. In the years that followed, their sex life was to continue in the same vein — even once he was her long-term partner, she tested his ability to force her on many occasions during routine sex.

We can now understand the decisions made by the two girls in the scene in the days and weeks that followed the writs by the river. The boy who forced the dark-haired girl into intercourse passed her tests. She was already attracted to him, as were most other women, and her body perceived that his qualities made him seem a good candidate for giving her reproductively successful sons and grandsons. These qualities included physical power and sexual competence, qualities that her own characteristics made her well suited to test.

In contrast, the other boy lost stature in his girlfriend's eyes at all levels as the afternoon wore on. In part, he suffered by comparison. Mainly, however, he failed in an absolute sense *DO* live up to his girlfriend's criteria for acceptability. There were probably two ways he *could* have passed her tests, but he failed in both. The basic cause of his double failure was inexperience. First, with more experience, he would probably have opted for restraint and might eventually have gained long-term benefits (as, for example, did the experienced man in Scene 20 who, when faced with a similar situation, opted for patience rather than force and six weeks later reaped the reproductive benefits (Scene 26)). Instead, however, he opted for force. Even then, with greater experience at intercourse he might still have cemented a longer-term relationship and hence won many future opportunities for insemination.

the girl was adamant about moving out and living with the baby's father.

For a time, the woman was ill with stress and loneliness. After losing her job, she began to feel suicidal. But then, in the depths of depression, she met a man who had just been deserted by his partner and family. They counselled each other out of their joint despair and within weeks were living together. A year later, she had his child — a daughter. Not long afterwards she was operated on successfully for cervical cancer, and from then on her life improved.

Once her son became independent of his father, he came to see her. Untainted by his father's homophobia, he quickly grew close to his mother and his younger half-sister and they became very much a family. Although the woman died relatively young, in her sixties, it was not before she had enjoyed fifteen contented years as a doting grandmother.

Having discussed the way that homosexual behaviour can aid men in their pursuit of reproductive success (Scene 30), it is relatively straightforward to do the same here for women. This is because there are many similarities between male and female bisexuality and relatively few differences.

Even those differences that *do* exist are largely just a matter of degree. For example, on average across societies there are fewer bisexual females than males — a trend that is also shown in most animals. In any given human society, there tend to be about a third to half as many women bisexuals as men. In large industrial societies, in which only about 6 per cent of men show homosexual behaviour, about 2-3 per cent of women do so. In societies in which all men show homosexual behaviour, about 30-50 per cent of women do so. This difference means that on average we should each need to go slightly further back in our family tree to find a female bisexual than to find a male. But the difference is only about one generation — back to about 1850 instead of 1875.

Not only are there fewer female bisexuals than male, but on average they begin their homosexual (lesbian) activities a little later in life. Only 50 per cent of bisexual women have had their first homosexual experience by the age of twenty-five, and only 77 per cent by the age of thirty. Some do not have their first lesbian experience until they are in their forties.

Another difference between male and female bisexuals is that bisexual women do not have as many homosexual partners as bisexual men. Only 4 per cent of bisexual women have more than ten homosexual partners in their lifetime compared with 22 per cent of bisexual men. Similarly, women are more likely to have longer-lasting 'monogamous' relationships with each other than are men. A common pattern, shown by the girl in the scene, is for a woman to stay in a homosexual relationship for one to three years before moving on to a heterosexual relationship. Also as in the scene, older women often 'fit in' a stable homosexual relationship between successive heterosexual ones.

Compared with these minor differences between male and female homosexual behaviour, there are many important similarities. For example, most women who show homosexual behaviour are bisexual. Fewer than 1 per cent of women in any society are *exclusively* homosexual throughout their lifetime. Over 80 per cent who show lesbian behaviour also show heterosexual behaviour, as did both women in Scene II. All human societies contain bisexual women; moreover, female bisexuality is genetic and inheritable. And, like all of the characteristics we have discussed, female bisexuality is widespread among different species of mammals, birds and reptiles. In fact, there is one species of lizard which consists only of females. These will not develop eggs unless they are first mounted in a pseudo-copulatory act by another female. They take it in turns to mount each other and to stimulate each other's egg production.

The many similarities and few differences between male and female bisexuality are significant enough to justify a similar Interpretation of the two types of behaviour. When we compare

SCENE 32

The Tenth Tonight

The doorbell rang. It was uncanny the way she could tell something about the person at the door just from the way he rang the bell. The previous ring had been aggressive and persistent, but this one had a tentativeness about it. She got up off the bed and pulled on her bath robe over her underwear. Young, she thought to herself — or a vicar.

On her way down the stairs, she did some quick mental arithmetic. It had been a busy night. This would be the tenth — maybe she should also make it the last.

When she saw him standing there, she smiled to herself — he was young, not a vicar. And he looked distinctly uncomfortable. Diffidently, he asked her how much. She told him, then pointed out that it was more if he didn't want to use a condom. Taken aback partly by the price and partly by her appearance, he hesitated, then agreed. She stood back to let him in, told him to go on up, and closed the door. Before following him, she took her 'Model - first floor' notice out of the window.

Once in the room, she asked him which it was to be, condom or no condom. He said it would have to be with a condom because he didn't have enough money to pay for it without. 'Money first,' she told him.

The youth looked very nervous. To settle him she told him her name, or rather *a* name, and asked for his. He told her his family name. Despite herself, she laughed. She asked him if he was in the army. Embarrassed, he explained he was a student, that he had only just left school and couldn't get out of the habit of giving his family name when asked. She told him to relax, then asked if it was his first time. When he said it

she asked if it was his first time ever or just the first time he'd paid for it. It was the first time he had paid and might be the first time ever, he said. He wasn't sure. He had got close a couple of times but didn't know if he really had or not.

She didn't ask him to elaborate — just told him to relax and leave it to her. Then she took off her bath robe and knickers, lay down on the bed, and told him to take off his trousers and pants and join her. She didn't react at all when she saw that his penis was limp and small, as if it had been hiding under his clothes. With difficulty, she put a condom on him, then did her best to encourage an erection. It was many minutes before she felt any reaction on his part, despite her soothing talk and practised hand. Then just as he began to stiffen and she thought she might be able to help him after all, he ejaculated, long before she could try to put him inside her. His look of dejection and embarrassment touched her. She told him not to worry and, as he hurriedly dressed to leave the scene of such humiliation, tried to reassure him that he would be fine next time. It was just nerves. She saw it happen all the time, she said.

After he had gone, she dressed. As she reckoned up her night's earnings, five with a condom and five without, the thought crossed her mind that maybe she should become a sex therapist when she retired. A few minutes later she was walking out of her front door and on to the street. Hailing a taxi, she set off for home.

As she watched the familiar route unfurl, her thoughts drifted back to the student and she marvelled at the way education seemed to slow down a person's sexual development. Not that being a student had hindered her. In fact, it was when she was at college, about fifteen years ago, that she had started on her career. Nobody could deny it had been profitable, even if it hadn't been the career she had envisaged when she left home. Short of money, as were many of her fellow students, she had exploited her looks and joined an escort agency. Tempted by the financial offers she received, she had begun to spend the occasional night with those clients she found most attractive. By

for being permitted to carry on living in what is now his territory. The female is intent on living in a particular territory and is prepared to mate with any male who successfully lays claim to that territory in order to do so. In principle, this is still prostitution — the trading of sex for resources — even though it is taking place within a monogamous relationship. As such it is little different from the behaviour of the majority of women around the world, few of whom would consider themselves to be prostitutes.

Men, also, of course can prostitute themselves. The young gardener in Scene 18 is an example. In most circumstances, however, it is much more difficult for a man to find a woman who is prepared to pay, in whatever sense, for sexual access to his body. Most men are only too willing to have sex with a woman without any reward other than the sexual opportunity itself. In contrast, for all the reasons we have discussed in this book (see particularly Scene 28), women have much more to lose from any single sexual encounter than men and usually need some sort of pay-off to balance the potential cost. Only when a woman is eager to collect a particular man's genes might she be prepared to pay in some way for the privilege.

However we define prostitution, though, the woman in Scene 32 is clearly at the 'empid fly' end of the scale we have just described rather than the 'bird' end. For her, prostitution is a way of life. Biologically, it is also a strategy for reproduction — and, moreover, a highly successful one. By her mid-thirties she had had four children and had earned more than enough money to give them a comfortable and healthy environment in which to live. Each child had a different father, at least two of whom could have been men of status. What all of the fathers had in common was that they produced very competitive ejaculates: sperm armies able to defeat those of many other men. The woman's sons, her grandsons, and any later male descendants should also have an above-average chance of producing competitive ejaculates. In later generations, many people in the population

would inherit her genes because of the competitive success of her male descendants.

This advantage of prostitution as a reproductive strategy is the same advantage gained by any woman who promotes wholesale sperm warfare in her tract (Scene 21). It is just that prostitutes exploit this technique more often than any other category of women in the population. Few other women, except those who suffer gang rape (Scene 34) or who seek out group sex (Scene 21), are ever likely to contain the sperm from as many different men at the same time.

The success of prostitution as a reproductive strategy means that most of us will contain the genes of a prostitute among our ancestors. On average, we should each need to go back through our family tree no further than the 1820s (seven generations) before finding an ancestor who was born to a prostitute (assuming, conservatively, that only 1 per cent of the population is conceived by overt prostitutes).

As a way of life, however, prostitution has many risks. First and foremost, as we have discussed on numerous occasions, there is a high risk of contracting sexually transmitted disease. This factor alone can condemn a prostitute to early infertility and death. Many try to reduce the danger by using condoms but are forever fighting against male aversion (presumably for reasons discussed in Scene 29). Prostitutes report men trying surreptitiously to remove the condom that they have agreed to wear. Even since the advent of AIDS, the majority of clients prefer not to use a condom. So strong is the male body's preference for insemination that, like the woman in Scene 32, many prostitutes are prepared to settle for simply exploiting the situation by charging more for intercourse without a condom.

There is also the danger of being injured or killed by a client. Prostitutes attempt to reduce this risk by gathering together in a brothel or massage parlour, by paying a man or men to watch over them and provide protection, or simply by having a chaperon (often their mother or father). By far the biggest danger to prostitutes, however, is drug

success via male descendants who inherit the same potential for success. Since we decided for rapists that, on balance, they do indeed have above-average potential, it should be no surprise to find that when a woman's body has a one-off opportunity to collect a rapist's genes, it often does so.

This conclusion does not mean, as people often assume, that a woman should therefore seek to be raped. On the contrary, it is reproductively important to the woman that her body collect genes from only the most successful of rapists. If she conceives to an inept rapist, doomed quickly to be caught and to suffer social retribution and incarceration, her male descendants will inherit unsuccessful characteristics. As we discussed earlier (Scene 28), a man needs to pass certain tests if his genes are to be acceptable to a woman. The only way a woman's body can select out the most successful of rapists is to do everything possible to avoid being raped. She should avoid risky situations and take full advantage of the protection offered by her partner, by other individuals, and by the wider society. Whether she should also try to fend off the rapist physically will depend on her assessment of the danger of being physically damaged. Unlike the tests set by women during rough-and-tumble sex play (Scene 28), she may often be better advised to follow the example of the girl in Scene 33 and not resist. A woman who follows this overall strategy is unlikely to fall victim to any but the most cunning, determined and competent of rapists. The result is that only a minority of women are ever raped, but those who are may then respond by conceiving.

Our discussion should not end here. If rape can be a successful alternative reproductive strategy for men, and if conceiving via the more competent of rapists can be a successful reproductive strategy for women, we need to ask why rape is not more common. In particular, we need to discuss whether rapists are a genetic minority, like bisexuals (Scenes 30 and 31), or whether all men are potential rapists. This question will be examined in Scene 34.

The only remaining question to answer here is why the rapist in Scene 33 was the winner of the sperm war inside his victim's body. In fact, the contest was very one-sided. First, the girl's boyfriend, because he normally used a condom, failed to enter an army until it was too late. The fertilisation trophy had already been claimed. Secondly, all week her holiday partner had also been using a condom. So when the day of our scene began, the girl contained no sperm. On the night of the rape, her holiday lover actually inseminated her. But this made little difference because his body, unable to allow for having used a condom previously (Scene 29), will have calculated that few sperm were needed to top her up, it being only a day since they last had sex. In addition, he had just inseminated another female and, as it was their first intercourse, he would have given her a large inseminate. The result was that the victim received from her holiday lover only a small inseminate, one rich in young killers and egg-getters but relatively low in immediate blockers. In addition, she had ejected the flowback from that intercourse before being raped.

The overall result was that, when the rapist inseminated the girl, his seminal pool had her vagina to itself. Moreover, his sperm were confronted with only a minimal cervical filter and a small army of killers. He will have injected a large army, full of killers and egg-getters. Admittedly, the holiday lover had an hour or so's start, but ovulation was still two days away. It is likely that by the time the egg-getters in her oviduct encountered an egg, they will virtually all have been from the rapist. Another set of rapist genes will have been passed on to the next generation.

who may or may not have been his. In addition, he may or may not have produced other children with other women. The man with small testes was raising one child, which was certainly his (according to his partner). The latter male has greater certainty, the former has greater potential. On average, however, the two types of men should produce equal numbers of children.

In between these two extremes of testis size and reproductive strategy lie the majority of men — those with testes of intermediate size. These employ a 'mixed' strategy by which they try to strike the best compromise between mate guarding and sperm warfare but specialise in neither. The presence in the population of this 'mixed' majority might seem to complicate the picture, but in fact the conclusion remains the same — their proportion is also fixed at the level at which on average their reproductive success is no better and no worse than males with smaller or larger testes. In effect, as long as a man pursues a reproductive strategy appropriate to the size of his testes and his rate of sperm production, he should on average do just as well as other men with different-sized testes.

The sperm war specialist in Scene 35 had a large penis as well as large testes, whereas the mate-guarding specialist had a small penis as well as small testes. This should not be surprising, given that the penis does have a role in sperm warfare — the removal of any seminal pool from the vagina (Scene 21). On the whole, however, a large penis is not as consistent a feature of sperm war specialists as large testes — because, compared with testis size, penis size influences the outcome of sperm warfare far less often. After all, penis size is important only on those rare occasions when a man has sex with a woman very soon after another man — so soon that the latter's seminal pool is still at the top of her vagina. In contrast, testis size, via sperm number, is *always* important in sperm warfare.

This explains why there has been much more pressure on sperm war specialists to have larger testes than to have a larger penis, but it does not explain why any man should have a small penis. There is, of course, a lower limit to penis size — that

below which a man cannot introduce sperm far enough up the vagina. There is also an upper limit — that beyond which a man would be unable to thrust without damaging the woman. Within (his range, though, why should any man have a penis smaller than the upper limit? The answer is that within this range there is no real disadvantage to a smaller penis (other than being an infrequent handicap for sperm warfare) and there may even be an occasional advantage.

On the one hand, a smaller penis is no disadvantage in terms of sperm retention. First, it is not particularly less efficient at delivering a seminal pool to the top of the vagina. This is because even when a penis of below-maximum size withdraws after insemination, the vaginal walls close behind it (Scene 3), effectively pushing the seminal pool to the top of the vagina. Secondly, penis size has no influence on the probability of a man's partner having an orgasm during intercourse.

On the other hand, a smaller than maximum penis may even be an advantage, particularly during routine sex. Everything depends on the costs and benefits of a man removing *his own* seminal pool whenever he inseminates a woman twice in rapid succession, say within thirty minutes or so (Scene 25). On these occasions, a smaller penis will be an advantage if the previous seminal pool is better left in place. If the pool is better removed, a smaller penis can still do the job — it just takes longer. In many ways, therefore, a smaller than maximum penis endows a man with greater flexibility than does a larger one. It is also less likely to be accidentally damaged.

Testis size and penis size vary not only between males *within* a population, they also vary *between* populations and races. On average, even relative to body size, Negroes tend to have larger genitals than Caucasoids, and both have larger genitals than Mongoloids. The number of sperm inseminated during intercourse varies accordingly. It has been claimed that these differences between populations reflect different balances in sexual strategy, just as they do between men within populations. In other words, populations with larger genitals (on

average) should contain more men pursuing sperm warfare than populations with smaller genitals (on average). Although this claim has not been tested for different populations within the human species, it has been tested *between species*.

In some species of primate, such as chimpanzees, females often mate with several males and nearly every conception involves sperm warfare. In others, such as gibbons, females rarely mate with a male other than their partner and conception rarely involves sperm warfare. Linked with this difference, chimps have much larger testes relative to their body size than do gibbons. Humans, with 4 per cent or more of children conceived in sperm warfare (Scene 6), are intermediate between the two, both in terms of warfare risk and testis size.

Not only primates but many other groups of animals have been shown to have testes of a size proportional to the risk of sperm warfare. From butterflies to birds and from mice to men, the more likely a male's sperm are to engage in conflict, the larger his testes relative to the size of his body.

SCENE 36

Exquisite Confusion

His moment had come. It was a year since his second partner had left him, a year of celibacy, anticipation and nothing but masturbation. But, unless he did something totally stupid, it looked as though this was going to be it.

It wasn't the first party he had thrown since she had left. It was an easy way of filling the house with lots of young women (and a few men). But it was the first at which he had managed to keep anybody's attention for more than about ten minutes. He had targeted this young girl, nearly thirty years his junior, the minute she walked in the room. A friend of a friend, she stole his attention immediately. He had waited until she looked

drunk, then moved in. They had been talking for hours. Even when she had gone to the toilet, always a dangerous moment, she had come back to him. For the last hour, their conversation had been about sex. With an honesty born out of drunkenness, they had traded increasingly personal details, such as how often (they each masturbated) and how many partners they had each had. She was well into double figures and sometimes despaired of herself, she confessed, but she could never really think of a good reason to say no.

She began to look sad and emotional. He said she shouldn't think badly of herself. Without her experiences, she wouldn't be the person she was now: so worldly, so relaxed and so attractive. Those past sexual experiences had surely helped her become the person that he, for one, was now finding so irresistible. With that, he had stroked the side of her face with the back of his fingers. She leaned her face against his hand and small tears appeared in her eyes. She smiled and apologized as he wiped the tears from her cheeks. Then, as he continued gently to touch her face, tracing his fingers round her eyebrows, nose and mouth, she looked him in the eyes with an expression he recognized from a previous lover - she wanted sex. There were still people in the room, but the pair of them were now oblivious. He moved his hand from her face to her neck, then back again, stroking with his finger tips. Then he moved down and traced round the edge of her low-cut dress, briefly slipping his fingers inside so that they brushed over an erect nipple. She made a tiny noise in her throat. His moment had come. He took hold of her hand and suggested they go somewhere more private. Unhesitatingly, she let him lead her.

As he led her upstairs to his bedroom he congratulated himself. Maybe, at last, he was becoming competent at the sexual arts. The thrust of the conversation he had just used to interest this girl had been almost identical to the one he had used when he first seduced his last partner, ten years ago. In fact, apart from this girl's relatively tiny breasts, she could almost *be* his last partner.

realistic chance of paternity. The nearest he got to a child with a further woman was with his second mistress. Eventually, her body allowed him to fertilize one of her eggs. But it took him a year of missed opportunities, and that was just too long. Had he impregnated her earlier, he might successfully have deceived her partner into raising another's child. Then the baby might never have been miscarried and his reproductive success might have been 33 per cent higher than eventually it was.

His failure to capitalize on opportunities to reproduce with these seven women was due in every case to some combination of surprise, shock and misjudgment. He did what he could, but he was confused by the sheer variety of female sexuality. As he moved from woman to woman he tried to extrapolate from his past experiences. He assumed that techniques of seduction, stimulation and insemination that had been successful in the past would be successful in the future. To some extent, his approach worked - his gradual accumulation of experience with different females slowly increased his awareness and competence in the sexual arts. But, even after encounters with eight very different women, he still failed to inseminate a ninth.

In some species, experience gained by a male with one female can readily be extrapolated to another. In other species, however, such extrapolation is less successful - and it is least successful in those such as humans in which the underlying female strategy is the confusion of males. Then, not only do individual females confuse their partner through unpredictable swings of mood and behavior (Scene 2), but also the female population as a whole manages to confuse through variety. As was clear from Scene 36, a woman gains in three main ways from being as different as she can be from other women.

First, she can set each man a much more challenging test of experience and competence (Scene 27). From this she can quickly learn whether he has a little or a lot of experience of other women. Because women are so different, a man will only have encountered her type before and thus know how to treat her if he has had a lot of experience. If her priority is to avoid

disease or to find a faithful partner, she may actually prefer a naive man. On the other hand, if her priority is to find a man who is genetically more attractive (Scene 28) she may prefer someone whom many other women have found attractive (Scene 27).

Secondly, she has more initial control at each sexual encounter with a new man, which lasts for as long as it takes the man to fathom the best way to relate to her. The result is that she has more time to assess the man as a long-term partner. In Scene 36, three women tested the main character sexually, but managed to avoid being inseminated before rejecting him. One took longer to decide how she felt about him, but was able to keep both the number of inseminations and sperm retention down to a minimum in the process. Two others managed to avoid insemination for nearly a year while they made up their minds. One finally rejected him, and the other conceived but later miscarried.

Thirdly, after accepting a man as a partner, she can still educate him in her needs without facilitating his infidelity. In the scene, two of the women (his first mistress and his second long-term partner) evidently found the man's other qualities attractive enough to tolerate his initial sexual incompetence. They then began the relatively long process of educating him in helping them to climax (Scene 27). This could have been self-defeating, if his increased competence had made it easy for him to seduce other women. Of course, it did help him a little, but not as much as it would have done if women were more similar. His first partner pursued the ultimate version of such a strategy. By not having orgasms herself, she could not educate him at all. As a result, she made him miss one opportunity for infidelity and slowed him down in taking advantage of another.

Although it is not difficult to see that women can benefit considerably from being different from one another, there has to be a limit to this range of possibilities. Different though women may be in their individual sexuality, therefore, we can nevertheless still recognize a number of broad categories. These categories are probably genetic, are probably in some sort of

It is interesting to speculate how a world of child support agencies and paternity tests might change sexual strategy and the role of sperm warfare.

The main repercussions are twofold. First, men will find it more difficult to have sex and run (Scenes 13 and 29). No longer will it be as easy to deny paternity and leave child-raising to the woman. Secondly, women will find it much more difficult to trick men into raising children who are not theirs (Scenes 6, 8, 13, 16, 17, 18, 26, 31, 33 and 35). It is not difficult to envisage a future in which men will routinely pay for (or even be entitled to!) a paternity test at the birth of each child they may be legally forced to support.

Although these two ancient strategies will become much less successful, alternative strategies, uncommon today, will become more successful. For example, women will become much freer to have children by several men, not only might they gain genetically, they might also gain from obtaining long-term financial support from a number of men (Scene 18). In the process of having children by several men, women should still seek to promote sperm warfare so that their male descendants will have competitive ejaculates (Scene 21). But no longer need women risk dependence on meager support from the state as a result of their strategy. They will, of course, find it more difficult, if not impossible, to hide their actions from any partner, but then they will have less need to do so. In fact, they will have less need for a partner at all. Even if they have a partner, his desertion need not be as crippling as in the past. In their turn, men could exploit this potential earning power of women. No longer need they fear being tricked into raising another man's child - if they take on such a child it will be knowingly, having judged that they have more to gain than to lose (Scene 15). Often, they may even calculate that the extra income their partner could generate through having other men's children could actually help them to raise their own children more successfully.

Although such behavior by men and women could make long-term relationships less common - and will certainly change

their nature - such relationships will probably still happen. Men will still try to avoid sperm warfare by guarding a mate (Scene 9) and women will still try to recruit a partner to help with all the other, non-financial, aspects of raising their children (Scene 18). But the financial arrangements for child-raising and the ability to identify paternity could well shorten such relationships, removing as they do two of their main functions. The reproductive life of both men and women will centre on a succession of relationships, each lasting just long enough to produce one or two children.

As far as men are concerned, the balance of reproductive success is likely to swing even more strongly in favor of those of wealth and status than at present (Scene 18) - subconsciously, this may even be why child support legislation appeals to the law-makers! Only wealthy men will be able to afford to have children with a number of women, and hence only such men will be targeted by many women. Poorer men, when they do get a chance to inseminate extra women, will be under pressure to make themselves even more untraceable than at present.

Some things, of course, will never change. Nothing - short of castration, brain surgery or hormone implants - can remove a person's subconscious urge to have as many grandchildren as they can. So, nothing will remove a man's subconscious urge to have as many children with as many women as his genes and circumstances will allow. Similarly, nothing will prevent a woman from subconsciously trying to collect the best genes and recruit the best support for her children that *her* genes and circumstances will allow.

The coercive 'one-family, one-child' legislation in China has neatly highlighted how basic reproductive strategies adapt to social change. The legislation has successfully reduced the mean number of children (to 1.6 per woman). But in so doing it has also changed the sex ratio (through selective abortion and infanticide - Scene 16) to 1.6 boys for every girl. Why? Intrinsically, the coercion impinges more on a woman's potential reproductive success than a man's. A successful man