

V. Reynolds and J. Kellert (eds.)
Mating and Marriage (OUP, Oxford, 1991)

2

The Biological Basis of Human Patterns of Mating and Marriage

VERNON REYNOLDS

INTRODUCTION

Mating and marriage are very different kinds of things. Mating is a kind of behaviour, and is found in all animal species. Marriage is a social institution and, like other such institutions, is found only in human society.

I shall begin by discussing mating rather than marriage, and this will be mainly in the context of non-human primates rather than humans. Secondly, I shall look at human mating patterns in relation to the structure of the human body, and critically assess some scenarios of the original condition of man. Thirdly, I shall look at human marriage patterns and the phenomenon of marriage itself in relation to mating. Fourthly, I shall attempt some reconciliation between the principles of systems of marriage and systems of mating, and try to see whether marriage itself is comprehensible in biological terms. Finally, I shall look at the question of how and why marriage came into existence at all, and try to draw some conclusions.

DEFINITIONS

Before beginning, a few definitions are in order. 'Mating' is copulation, a kind of behaviour that occurs in animals and humans. 'Marriage' on the other hand is a legal or jural institution, and is exclusive to humans. 'Mating patterns' is a complex idea and will be discussed below. Next, we have the knotty problem of usage of the terms 'monogamy' and 'polygamy'. These terms rightfully belong to social anthropology, or at any rate the human social sciences. They describe forms of marriage. The Greek root '-gamy' means marriage, not mating or copulation. Since marriage is an exclusively human institution these words clearly present problems if used for other species. However, it is a fact that they are used by students of animal behaviour to describe things animals do. This usage is now endemic in zoology and is something that social anthropologists must learn to live with. We could distinguish between human and non-human monogamy, etc., but

this would be impossibly long-winded. Instead, I think we have to muddle through. When used of humans, 'monogamy' refers to a form of marriage in which one man marries one woman at a time; when used of non-humans, it refers to situations in which one male pairs up and mates with one female at a time. 'Polygamy', for humans, refers to the marriage of one man with several women (polygyny) and also to the marriage of one woman with several men (polyandry). In the non-human literature the word 'polygyny' refers to one male with several female sex partners, while the word 'polyandry' refers to one female with several male sex partners.

There are other terms that will be used later and need to be defined here. 'Promiscuity' is a term that, used of humans, means rather depersonalized sexual activity, moving rapidly from partner to partner, by men or women. Of animals, it means much the same, except that in some species it is the norm rather than the exception. 'Matrilineage' is a term that belongs to social anthropology and refers to a particular mode of inheritance and succession through the maternal line; it is sometimes used of non-humans but the word 'matriline' is preferable and should be used to describe the animal cases.

PRIMATE MATING PATTERNS

Before we can compare mating 'patterns' in different species we have to be sure what we mean. Can individuals have mating patterns? Presumably they could, i.e. if one mated only by night and another only by day. But that is not what is meant here. The term 'mating patterns' as used here refers not to individuals but to groups, populations, or whole species. In the case of individuals, it is better to talk of mating 'habits'. At any one time, individuals may have one or more mates, and over a lifetime they have a mating history or a series of matings. If one takes two individuals who have very similar mating histories, then this might suggest that there is some kind of mating pattern. But a moment's reflection reveals that a mating pattern can also exist where individual mating habits differ. Let us say the mating pattern of a population is polygamy. Some males will then have multiple mates but others will have no mates, and doubtless some will just have a single mate, because they are at the point in their life trajectory where they are just starting to accumulate a harem. Thus in seeking the mating pattern of a population, it is no good looking for the norm or average mating habits of a number of individuals. If the adult sex ratio is around 1:1, and the mating pattern of the population is polygamy, then the distribution of mates between individual males can vary from the case in which one male has all the females to that in which one half of the males have two females each or to that in which some males have one mate, others two or three or more and

some none at all. Of these three possibilities, the last is the commonest in polygynous primates, for instance in geladas (Dunbar 1984).

On the other hand, in the case of monogamy it is the very fact that each adult male has one and only one adult female mate that leads to the use of the term in species such as gibbons, or *Callicebus* monkeys. Here therefore it seems possible to argue that the mating pattern is not a property of the population but an outcome of genetic tendencies of individuals themselves. Are individuals preferring single partners and actually rejecting opportunities for obtaining multiple mates? Maybe, but how can we be sure? Even if gibbons are preferentially monogamous all over their range (and they extend over many hundreds of thousands of square miles), in addition they all share a common adaptation to arboreal living in tropical rainforests and are in fact very specialized primates. It may be that this adaptive specialization includes a one-male, one-female territorial social unit and that in other circumstances a male gibbon would tolerate several females and even several males in the group. Thus even if all males share a common mating practice we still cannot assume that it is the direct outcome of innate programming.

We have established that mating patterns are characteristic of populations, while individuals have mating practices that may be common to all the members of a population or may differ drastically from one member to another. We have also claimed, though not proved, that the patterns found in populations may be adaptive, and it follows that the inter-individual variance is an outcome of that adaptation. If, as in gibbons, the species' adaptation to its habitat consists of tight-knit little groups holding exclusive and defended territories, then at the individual level adults will engage in activities and strategies that involve obtaining a mate, setting up a territory, and defending it. Mate competition itself will not be severe, though finding a mate may take time, and finding a territory likewise. If, on the other hand, the species' adaptation to its habitat consists of large groups of all ages and both sexes, as for instance in baboons or macaques, then at the individual level adults will engage in competition with other members of their own sex to attract the attention of possible mates, and some will be more successful than others.

Here we can return to the question of causation of behaviour at the individual level. It is now apparent that we are attributing causal status to the environment in relation to the adaptation of the species—the environment (food distribution mainly) sets the parameters in which the species can remain viable over time. Group size and composition are features of the adaptive response of the species. Both vary from place to place according to the richness of the environment. For instance, where environmental conditions permit, e.g. on Cayo Santiago, rhesus monkeys live in large groups with extensive development of matriline, whereas where the food supply is meagre no such development occurs. When I said earlier, therefore, that mating patterns were environmentally induced, this is what I

meant—that they were a part of the local adaptation. Environmental factors interact with individuals in each generation to produce a given mating pattern. But what kind of interaction is this? It seems unlikely that individuals make cognitive decisions in the light of a careful appraisal of the environment. However, we know from the fact of intra-species variation in mating patterns that flexibility exists, for example in langurs, in which multi-male groups in the north of India give way to one-male groups further south (Yoshida 1968). How this is achieved we do not know.

We do not even really know what factors make for continuity in the mating patterns of primate populations. There would seem to be two possible mechanisms. The first is learning. This implies that animals learn from observation of their parents or others what the prevailing pattern of mating is, and how mates are obtained. A second mechanism exists, however—behavioural epigenesis, or facilitated learning. This includes an innate component, which however does not determine the outcome, but predisposes it. Thus in the case of gibbons, if monogamy has been prevalent for a very long time, it is entirely possible that innate neural components have evolved that tend to favour the one-male, one-female relationship. Such components could consist of tendencies for male-male intolerance and female-female intolerance, and one or both of these kinds of intolerance do indeed seem to operate in many species (see e.g. Eisenberg *et al.* 1972). Likewise in the case of polygamous species where polygamy has been a successful strategy for many generations, selection may have favoured male-male intolerance but female-female tolerance. Such components underlying the mating patterns we see seem entirely reasonable and we have the glimmerings of proof that they do exist.

This comes from some experimental work done by Hans Kummer and colleagues (1968) on *Hamadryas* baboons living in the wild in Ethiopia. *Hamadryas* baboons have a polygamous mating pattern, adult males being in competition with each other for females, while adult females tolerate each other's company non-competitively. Adjoining the range of the *Hamadryas* live groups of common baboons. These are not polygamous but females and males form partnerships which last a longer or shorter length of time. Kummer and his coworkers released individual *Hamadryas* baboons, male and female, into common baboon groups and observed the results.

Normally, *Hamadryas* males 'herd' their females, that is they chase after any female belonging to the harem who has wandered off and bring her back by a ritualized attack, consisting of a bite on the nape of the neck. This ensures that such females will not be mated by other males. This did not happen to the *Hamadryas* females who were liberated into a common baboon group, and as a result they rapidly took to moving freely around. In the case of male *Hamadryas*, there was no integration: the males stubbornly attempted to neck-bite females until eventually they were chased off.

Of even greater interest were the results of doing the experiment the other

way, by releasing common baboons into Hamadryas groups. In this case, the introduced females who had never been herded before, suddenly found this happening to them, but they rapidly accepted this male possessiveness and joined the polygamous groups into which they were forced by the owner males. Male common baboons did not, however, adopt the Hamadryas method of herding females, neck-bites etc., and so obtained no mates.

What these examples show is that new kinds of behaviour and thus new mating patterns can emerge quite rapidly in new circumstances, and that in the case of these two baboon species the female seems to be much more flexible than the male; more precisely, biting females on the neck is obligate behaviour for Hamadryas males, following males facultative behaviour on the part of females.

Mating decisions

We have now distinguished the mating patterns of groups from the mating habits of individuals, and we can approach the question of mating decisions. The fact that we are able to talk of mating habits indicates that there are regularities in the mating behaviour of individuals, but we need to ask what underlies these regularities. Why should not individuals seize any and every opportunity to mate, so that matings are randomly distributed? We have already mentioned ecological constraints and innate compulsions. But there is a much stronger and more immediate set of forces that act on group-living individuals, namely the activities of other group members. In view of the fact that reproductive competition is an inevitable concomitant of group living, no individual is ever going to be free to mate when and where he or she likes. Natural selection will inevitably favour any physically heritable components of patterns of behaviour in members of each sex that lead to the production of more viable offspring. And if such patterns of behaviour are learned, then it will favour those who learn best, selecting for rapid comprehension of whatever it takes to plan and execute the necessary steps to secure mates.

Mating decisions are typically rather tension-ridden, because of two difficulties. First, the mate, whether male or female, must somehow be induced to co-operate, for there are few if any species in which mating can be brought about without a lot of careful co-operative posturing by both partners, and this is true of fish, insects, birds, and mammals. Secondly, there are the competitors in the group who may intervene in subtle or unsubtle ways.

Let us take a simple case, that of the stickleback. As anyone who has kept these little fish in a tank knows, the male, who sports a red belly, makes a complex nest for the female to lay her eggs in. He then courts the female, who has a large but plain-coloured belly, and his courtship consists of a special kind of zig-zag swimming that leads her towards the nest. When she finally decides it is a nice nest and lays her eggs in it, he follows behind and

deposits his sperm on them, thus bringing about fertilization. A territorial male with his nest is aggressive to competitors and chases them away. However, an alternative morph has evolved, the male with a pale belly, who looks like a harmless female. He hangs about near a courting couple and darts in just when the female lays her eggs and deposits his milt on them before the rightful male can do so (see Trivers 1985, p. 406).

The behaviour patterns just described, involving courtship, aggression, and deception, are rather rigidly prescribed, species-specific and innate, under the control of hormones acting on neural circuits in conjunction with particular external sign stimuli. They are flexible within limits, and the limits have been explored by ethologists who have manipulated both environmental features and the fish themselves, by the use of painted models etc. When we talk of the mating decisions of a male and a female stickleback, we are talking about the kind of decisions that are embedded in a complex linked series or 'chain' of events, some within and some outside the organism. In primates, including humans, mating decisions likewise involve evolved neural pathways and sensitivity to stimuli exhibited by the partner and other environmental factors, but there is additionally a new process, namely what can be called 'social thinking' or 'social cognition', which is a feature especially seen in group-living forms.

Primate social thinking in relation to mating

In the case of primates, including humans, social activity takes place in the context of the individual's understanding of the social relationships of the group in which he or she lives. This understanding is the result of many years of learning. As the young primate matures, it learns to recognize not just the physical but the mental characteristics of its fellows, and in particular which individuals are dominant and which subordinate, and who can be counted on for support in interactions with other group members. Early mating decisions are not real mating decisions at all, but just playful mounting and presenting, sometimes of other juveniles, sometimes of adults. Real copulation does not occur at this stage, but copulatory movements do. Young primates also take a considerable interest in matings by the adults in their group, and interference or 'harassment' is common, so that for instance a young chimpanzee will tug at a male who is mating, or trying to mate with, its mother. In terms of sociobiological theory, the juvenile is performing an action that will tend to delay the appearance of a rival sibling, and the situation is full of parent-offspring conflict, since it is in the adults' interests to reproduce but in the offspring's interests to delay this. Whatever the outcome in terms of conception by the female, the young primate learns about sexual activity by observation and imitation.

At maturity, however, the adolescent male primate finds that the adult males that had tolerated his earlier experiments are no longer friendly. They

now recognize him as a threat to their enjoyment of sexually receptive females. Dominant mature males in many species attack maturing males, who then retire to the social and sometimes, as in Japanese macaques, the spatial periphery of the group, feigning a lack of interest in the females (Kawai 1958). From the adult females' point of view, this may be a pity, and as a result clandestine copulations occur when the big males are out of sight, but the situation is fraught with risk for the maturing male and more often than not, after peripheralizing, he emigrates. This leads him to spend quite long periods of time on his own, wandering in search of another group, a process seen in many species including gorillas (Schaller 1963), baboons (Rowell 1966), and macaques. Having located another group, the young adult male surveys it very carefully indeed. At this point he is probably as interested in the presence and whereabouts of big resident males as in nubile females. Smuts (1985) gives a graphic account of the care with which an incoming male scrutinizes a new group, finally locating a female who is not in the possession of a big male, and then making careful and sensitive moves to attract her attention and eventually engage in eye contact with her.

At just what point we ought to consider that the baboon is making a 'mating decision' or is even engaged in the process of mating at all is a matter for debate. Why did the male emigrate from his relatively secure natal group in the first place? Was it a mating urge, frustrated by his seniors? We cannot know how strong a monkey's urges are, so this kind of question is futile. We do know that he is punished at home for approaching females sexually, that he subsequently leaves the group, that he enters a new one, and that in some cases after forming a relationship with a female in the new group he ends up mating with her, not just once but over a long period of time, so that, from close observation, it is clear that he is the father of the subsequent offspring of the female. Clearly, from what has been said, his actions, like those of the stickleback, are goal-directed in some sense. Whether he 'knows' what he is about is another matter. Do humans know what they are about, for instance when as teenagers they set out on a Saturday night for the local disco? They may have a good time dancing and end up mating, but they may not have planned the mating. We too, like baboons, probably take things step by step, and in fact by comparison with the baboons described by Smuts, modern teenagers at a disco are if anything less circumspect and more inclined to rush into sexual relationships than are the baboons.

That, of course, might just mean that we are more like chimpanzees than baboons. Chimpanzees, unlike baboons, do not live in bounded co-residential groups that keep within visual contact of each other all the time. They do live in bounded communities, which may be quite hostile to other communities, but within such a community groups are characterized by a social system that can be called 'fission-fusion', with individuals meeting up, staying together for periods of hours or sometimes days, and then splitting up and going their various ways to form new groupings with other

individuals. In this situation, males quite often come across females who are sexually receptive and then they just as often mate with them. If several males are present at once, all are likely to mate, taking turns, with a receptive female. As in the case of the baboons, the female must be willing or mating cannot occur. But unlike the baboon situation, matters are relatively relaxed for wild chimpanzees (though not once they are held in captivity—see de Waal 1982). An exception to the above does however occur in the case of so-called 'honeymoon couples' in chimpanzees. Tutin (1979) observed that some male-female pairs travelled together for some days, travelling and mating as a pair, and it was in this context that the female conceived.

If we revert to the human example of teenagers in a disco, we can now see that the situation is not as free and easy as that in the case of the unpaired chimpanzees. Some teenagers will of course go along with a steady partner and not be looking seriously for a mate. Others will perhaps be more inclined to spend their time with members of their own sex and avoid contact with the opposite sex. But many will go alone or with a same-sex friend or two, with a view to making the acquaintance of a person of the opposite sex, and some will probably do that strange and perhaps uniquely human thing and 'fall in love', becoming absolutely fixated on each other. None of this is very like the chimpanzee's behaviour, but it is not very like that of the baboon either. It is, of course, human, and is one among many variants of the range of human mate selection practices that are known to exist, from the nose-rubbing of Eskimos, to the passionate secret affairs of the Marri Baluch, to the protracted rituals of chaperoned Victorian British upper-class encounters, to the love-ins of California in the 1960s.

Female perspectives

In the example of the emigrant male baboon we looked at things from the male's perspective, but the days of androcentric primatology are over now and it has become clear that a full understanding of the mating habits of individuals and the mating patterns of groups can only be achieved once the perspective of females is considered too, and that in fact the female's responses rather than the male's may be decisive in determining mating outcomes. In mammals, it is the female who invests most heavily in reproduction. She it is who, after conception, has to ingest food sufficient for her fetus as well as herself, and who after birth has to provide milk and have the energy to carry the ever-growing offspring around for a year or two or longer until it is independent. Thus it is that in most mammalian species, the female tends to be more choosy than the male (but see Chapter 1, this volume, for examples of male choosiness), and to prefer males who contribute either indirectly by the provision of resources, territory, and social support, or in some cases directly by the provision of food or transport for her offspring. Despite this general rule, male choosiness also exists and later

in this chapter we shall see evidence that such selectivity on the part of males has been a feature of human mate selection during our evolution.

Going back to our example, from the point of view of the female in the group who subsequently accepted the immigrant male, his appearance on the group's periphery may initially have aroused her interest because she herself was without an accompanying male. It is here that Smuts' account (1985) is interesting, because she shows clearly that the initial relationship between a newly formed pair is not sexual, nor is it sexual for long periods once established. Hence her use of the term 'friendship'. A female may see a newly arrived male as a potential ally or 'friend'. Close analysis of the subsequent behaviour of male friends of females shows that, once their partnership is established, the male will come to the rescue of the female if she is threatened or attacked by other females, or if she is the object of unwelcome advances by a resident dominant male whom she fears. She has only to let out a shrill call and her partner male will come running to her aid. Further, when she subsequently has an infant, the male friend pays a lot of attention to the infant and stays nearby so that if there is any danger he is able to deal with it. So there are advantages to a female in forming a lasting relationship with a male.

Nevertheless, such pairs do not last for ever. After a time, females and males drift apart and find new partners. As Smuts shows, this happens particularly in cases where the female does not have an infant fathered by her male. There is thus a slow changeover of mates, and at the same time there is continual immigration and emigration, as well as the inevitable loss of friends through death from disease and predation.

Captivity

There is often a kind of uneasiness about talking about data from captive primate groups in the same context as field studies. Doubtless the field data are to be preferred for most purposes. But as has often been pointed out, captive groups can yield very exact data about the details of personal relationships between individuals. We need, however, to bear in mind that in the unnatural ecological circumstances of captivity the behaviour we see in such detail may be to some extent a distortion of what is natural for the species in question. Thus we cannot expect to see proper foraging behaviour in a primate group that gets its food once or twice daily from a zoo-keeper. More importantly for students of behaviour, the degree of food competition may be vastly exaggerated in captivity, leading to rigid status hierarchies and consequent social complications.

Take for example the case of the chimpanzees studied at the Arnhem zoo by de Waal (1982). Much of the carefully described behaviour of the males concerned access to the group's sexually receptive females. From his observations of the subtle and often devious manoeuvring of the adult

males, their rivalries and threats to each other, it is clear that in these chimpanzees access to the females was a matter of constant competition between the group's three large adult males, Yeroen, Nikki, and Luit. This group was housed in a large enclosure, with a moat round it, and several trees on it. Thus conditions were good by captive standards. As a result a rich and varied social life was enjoyed by the apes. But in respect of male-female relations, there were tensions and an accent on social status not seen in truly wild chimpanzees, where, as already described, males are very tolerant of each other's sexual adventures and are less status conscious when it comes to mating. This is, in fact, a good example of a change in the mating pattern of a group in different environmental circumstances.

I want next to describe a captive situation in rhesus monkeys that I observed myself (Reynolds 1962), and which bears closely on the present theme. It shows how in such conditions partnerships between males and females can be fraught with tensions, and just how individual and unique particular relationships are. The close study I made of these monkeys many years ago taught me that humans are not the only primates who can lead tormented lives as a result of relationships that do not work out.

The group I observed lived in a reasonably spacious enclosure at Whipsnade Zoo, dominated by a particular male, Henry. His mating partner when I began my study, Anne, was a temperamental female who frequently involved herself in fights with other adult females. This did not endear her to Henry, who, while normally peaceful and supportive to Anne, chased and bit her when she got involved in these inter-female fights. After one very severe bite, the zoo's vet decided that she must be destroyed, and he had her shot.

This set the stage for a very protracted and fascinating series of events leading up to the establishment of a new mating partner for Henry. Prior to Anne's death, the second-ranking female, Malvolia, had enjoyed quite a good relationship with Anne, in which Anne groomed her and she groomed Anne, but Anne was always closer to Henry than Malvolia, as much by Henry's actions as by Anne's. With Anne's death, after a few days in which Malvolia did nothing much in respect of Henry, she began following him around. She persisted in sitting near him and grooming him, even though he moved away from her quite often and appeared not to relish her attentions. He threatened her and then took to chasing her away. However, she persisted, and this brought on her some quite savage attacks from Henry, including the occasional bite. This did not deter her, however, and after some weeks she was looking scruffy, her hair was displaced and poorly groomed, and her eyes narrowed, possibly a result of a mixture of frustration and physical pain. Even at this point, a month after the death of Anne, she persisted in approaching Henry.

Henry himself during this time had developed a liking for another female in the group, Blondie, who was the lowest ranking of five adult females.

Blondie had always kept clear of the quarrelling of the higher status females, and was frightened of Henry's attentions as seen from her facial expression when he approached her, the fear grimace or teeth baring with lips withdrawn. Henry persisted in following Blondie and grooming her, and slowly she got used to his attentions and showed less fear.

Malvolia, who was already under attack from Henry, became hostile to Blondie, chasing and attacking her, though not severely, perhaps out of fear of Henry. I was able to observe the moment of status reversal between Malvolia and Blondie. Blondie was sitting in a low branch of the tree in the middle of the enclosure when Malvolia happened to sit just below her. Blondie took this opportunity to jump down on top of Malvolia, taking her completely by surprise, and biting her. From that time on Blondie was dominant to Malvolia and Malvolia, after a short confused stage, became subordinate to Blondie. Blondie additionally became fully established as Henry's mating partner, and not only engaged in sexual activities with him but chased away other females who came near him, incurring attacks from him just as Anne had done before.

This chapter is about the biological basis of human mating and marriage, and in this section we have been focusing down from the group level, in which we saw mating patterns, to the level of strategic decisions by individuals, and now finally to an individual case study. And at this basic level we find all sorts of anomalies that do not fit neatly into a picture of monkeys sensibly pursuing rational strategies. Much of Malvolia's behaviour does not appear rational or sensible. It would have been rational and sensible from her point of view to have given up the chase much earlier on, and settled for the second-ranking male (which she eventually did).

Primates may, however, pursue strategies that can be called 'strategies' and which are nevertheless neither rational nor sensible. Mistakes can and do occur—Malvolia is a case in point. Just as happens to some humans, she got caught up in a pattern of doing just the wrong thing with furious deliberation. She got her cost-benefit calculations seriously wrong. But it was some such calculation that drove her on. Generalizing, what we are in effect saying is that animals will tend to act in ways that would, if successful, enhance their fitness, and that this biological criterion is more critical than any other for understanding their behaviour.

BODY STRUCTURES AND MATING PATTERNS

We have now looked at primate mating patterns and the factors that influence mating decisions in primates. The theme for this chapter as a whole is the biological basis of human patterns of mating and marriage. In this section we take up a new theme, namely the way in which the structures of the human body can give us an indication of the kinds of mating behaviour that characterized our species in bygone times.

This approach is made possible by the fact that comparative studies of other species have shown that wherever male-male competition is intense, there evolve over time secondary sexual characters that lead to dimorphism of size and shape between the sexes. For instance, the fact that male baboons or gorillas are bigger than females is due to the fact that in both species males compete directly with each other for females and those with greater ability to display, bluff, or actually defeat others in direct combat have achieved greater reproductive success than their smaller fellows, and their offspring have received the genetic basis for these size-enhancing male characteristics. Overall size seems to be a primary sex-linked character in sexually dimorphic species, but there are many other characteristics of both males and females that result from competition between members of the same sex.

Besides this same-sex competition, there is differential selection of individuals as a result of mating choices, or sexual selection. If females prefer larger males as mating partners then large size will be selected for in males. Let us look at some examples of sexually dimorphic characteristics in primates.

Large canine teeth are characteristic of many primate males. Hamadryas baboons and olive baboons (*Papio anubis*) have a good-sized mane. Male gorillas have a large bony sagittal crest, which helps to make their head look much larger than it in fact is. Male orangs have a beard and a large throat pouch. Mandrills have very bright red and blue facial coloration in the male only, while vervet males have bright blue hair and skin round the scrotal area, which they exhibit as part of a blue and red penile threat display.

These characteristics, all male, have doubtless evolved as a result of male-male competition and sexual selection as a result of female preferences. Primate females, like females of many mammals, are in most species less brightly coloured or endowed with special features than males, and it is in polygamous species that the most striking epigamic features exist. The species mentioned above are all ones in which a few males gather a number of females to be their mates, while others are less successful or unsuccessful. It is the variance in mating success that causes epigamic features to evolve. By contrast, females in such groups all mate since they are gathered by the males into their reproductive units. Thus, although there is competition between females for the most dominant or most attractive males, this has not led to physical features concerned with threat; females who lose in fights over access to dominant males may nevertheless reproduce with lower ranking males. Non-mating males are common in polygamous species, such as langurs, Hamadryas baboons, or geladas, whereas non-mating females are very unusual, almost non-existent.

There remains the question of whether females in non-human primates have evolved any morphological features as a result of sexual selection. Evidence for this seems to be lacking. That is not to say that males are indiscriminate in their choice of mating partners; as we have seen they are

meticulously careful over whom they choose. But the care exercised in the case of the immigrant baboon was concerned with female availability, as far as we could determine. Smuts (1985) does not mention any physical characteristics of females that appear to be attractive to males. This is an area we know little about, but as we shall see it is an important one in relation to our own species.

In monogamous species such as gibbons, siamangs, owl, monkeys, or titi monkeys, we see no development of male epigamic features. Apart from the genitalia, it is hard to tell a male from a female gibbon. There is no size difference, no difference in head shape, and there are no special features. Even behaviourally the two are codominant. They share a territory and share the task of defending it in vocal battles against neighbouring pairs.

Examination of the human body in the light of the above background can lead to interesting hypotheses about the extent of intrasexual competition, and the evolution of epigamic features as a result of sexual selection. Let us start with the size difference. Men are bigger than women, and they are bigger in particular ways. Differences are especially marked in the size of the head and particularly the lower jaw, the breadth of the shoulders, the length of the trunk and limbs, and the size of the hands and feet. All these features could be the result of male-male fighting for females. They give us the first of many clues that our history has been polygyny with some males being excluded from the mating process.

Men also have a number of epigamic features that do not bring direct advantages in male-male fighting, such as a deeper voice, caused by a change in the position and size of the larynx at puberty, extensive growth of facial hair and of hair on the chest and back, and a tendency to baldness. These features may perhaps have been sexually selected, but it is also arguable that they contribute to threat displays between males. Again, however, they support the notion of polygyny as the ancestral mating pattern.

One of the most interesting findings about humans in relation to other primate species concerns the size of the testes in relation to the body. Harcourt *et al.* (1981) showed that males in both polygynous and monogamous species had testes that were light (i.e. small) for body weight, whereas macaques, baboons, and chimpanzees, all of which were classed as multi-male species in which several males mate with each sexually receptive female, and heavy (i.e. large) testes in relation to body weight. They attributed this difference to the fact that where a male was able to exclude other males from mating with his females, the testes had evolved just sufficiently to be capable of inseminating the females, whereas in species lacking exclusive mate possession, males need much more sperm production in order to compete with other males inseminating the females also. Humans, in this analysis, just fell to the exclusive side of the line distinguishing the two groups, i.e. humans were closer to the polygyny/monogamy group.

There are a couple of points to be made before discussing these findings. First, as we have seen, it is not always the case that several baboon males inseminate any given female. In the careful and prolonged study by Smuts (1985) this was not the case; baboons pairs were exclusive. Secondly, in macaques there is considerable competition between males for sexually receptive females with the result that the idea of sperm from different males competing is weakened, for at the time of maximum susceptibility to conception the female is likely to be mating exclusively with a particular male, sometimes but not always the most dominant one. Baboons and macaques make up the bulk of the group of multi-male species. So it is really only the chimpanzee that qualifies as a promiscuous primate in which many males mate with a single female just around the time of maximum tumescence when she is most sexually receptive and likely to conceive.

Atypically, we have not made much reference to chimpanzees so far in this chapter. This is perhaps because their mating pattern is rather unusual for primates. In very few species are males tolerant about other males mating with females in which they also have a sexual interest. As we saw, even chimpanzees are intolerant of this in captivity. In the wild, however, where evolution has after all taken place, such tolerance exists, and perhaps even more so in the pygmy chimpanzee than in the common chimpanzee (Kuroda 1980). Large testes have evolved in such circumstances.

The fact that human testis size falls just to the 'exclusive' side of the line drawn by Harcourt *et al.* (1981) and that even some of the species they show on the non-exclusive side are, as we have just seen, in fact somewhat exclusive indicates that humans have to be considered with the genera that fall either into monogamous or polygynous mating systems. This fits the known facts of most human marriage systems, and the sexually dimorphic features already referred to above indicate an ancestral polygyny rather than monogamy. The conclusion that the hominid ancestral condition was polygyny was also reached by Symons (1979).

Female epigamic features

We come now to a rather more puzzling feature of human body composition in relation to mating system, namely the presence of female epigamic features. These include development of large breasts and buttocks in some females. Since it seems unlikely that these developments would be of direct use to females in competition against each other, it seems more likely that they have evolved as a result of sexual selection, i.e. through differential choice of mates by males. I refer to males and females here rather than men and women because it is unclear at what time these features may have evolved, but neither is found in chimpanzees or any other ape, implying that they have evolved since the pongid/hominid split. Nor do either breasts or buttocks seem functionally essential for a pregnant lactating primate with a

nine-month gestation period and a long period of juvenile dependence on the mother, since all the great apes share this maternal pattern, yet none shows the kind of developments seen in humans.

Let us consider these developments. In each case, what has evolved is a special concentration of fat cells. In both cases there is considerable variance both within any given population and between populations. If we take the buttocks and upper-leg region first, we know that a massive fat deposition or steatopygia may be quite an ancient condition since it is seen on the Upper Palaeolithic Venus figurines of Europe, dating back some 25 000 years or more. In modern times, such an extensive development is found occasionally in many parts of the world, but reaches its most marked form in the Bushmen of the Kalahari. The accepted explanation for this is the evolution of fat deposits in response to the harsh semi-arid conditions in which the Bushmen live, and in particular the need for a store of substrate for energetic and nutritional needs during pregnancy and lactation. However, it was noted by early visitors to the region that Bushman men found this condition attractive, and the term 'Hottentot Venus' was applied by whites to women showing marked steatopygia, to indicate the attractiveness of this condition to Bushman males.

What we see in its developed form in the Bushmen is found very widely and possibly universally on a lesser scale. At puberty, girls in our own and many other societies put on fat around the thighs and buttocks. In many societies this is seen as an attractive feature by men and is taken as an indication of suitability for marriage, or simply as a sexually attractive feature. The fact that this may not be the case in modern affluent societies has been explained as a kind of cultural reversal but this need not detain us here. What has evolved is a physiological doubling, tripling, or quadrupling of the number of fat cells in the region concerned and it is this that we have to explain.

If we come now to the development of breasts, this again shows a special increase in the number of fat cells around and underlying the areolae and nipples, to form distinct structures. The breasts are almost entirely composed of fat, together with numbers of milk-producing and secreting cells and ducts which expand during lactation but are quiescent during the pre-reproductive and non-reproductive periods. It is during the pre-reproductive period that breast development occurs, and it seems probable that men are attracted to young women showing prominent breast development in many if not most cultures, so that they may have evolved as a result of mate selection by males.

Why, however, should males have selected females with fatty breasts and buttocks in the first place? The most satisfactory answer is that males mating with fatter females would have enjoyed more reproductive success in times of food shortage, so that any preference for fat females would have been selected for. There are two points to be made in regard to this. First, the fact that these fatty deposits are not found in other primate females indicates that

there were particularly difficult environmental circumstances in human evolution, and it seems probable that these would have occurred in relation to savannah living with its occasional droughts, conditions not nearly so prevalent in more forested habitats. Secondly, it is not fat itself that was being selected for but localized fat deposits, so that we are called upon to explain why fat is deposited on the chest and on the buttocks and thighs rather than over the whole body.

First, there is the question of signal value. Localized fat deposits in the breasts are probably more effective as a signal than overall fat would be. As Cant (1981) has argued, breasts indicate a high potential parental investment (PI) to a male, and they do this in an unambiguous way. As he suggests, a fat belly might indicate malnutrition (or be mistaken for pregnancy?), while fat ankles or wrists would be inefficient biomechanically. The breasts in particular seem to provide an excellent indicator of a woman's nutritional readiness to engage in reproduction, and so a male preference for females showing breast development could be subject to runaway selection up to the point where breasts became so large that disadvantages began to accrue.

Secondly, there is the functional issue. Although it appears that the thickness of subcutaneous fat is not well correlated with environmental temperature in all cases (Schaefer 1977), there is no doubt that fat people get hot faster in hot conditions than do thin people. Thus in a hot environment such as the African savannahs, a general layer of body fat could be disadvantageous to women, forcing them to stay in the shade for much of the day and thus reducing the amount of time available for foraging. This again would promote localization of fat stores.

Having established that these fatty protuberances are indicators of high potential PI, enabling males to select good quality mates, we come to the question of what kind of mating system this implies. Under polygamy, there is male-male competition, females are attracted to successful males, all females are involved in reproduction, and such female-female competition as occurs is concerned with access to the more dominant, better quality males. Such female-female competition as we have encountered so far has been behavioural, consisting of threatening of some females by others to keep them away from their own preferred mating partners. Under monogamy, by contrast, the problem is mainly one of eligible males and females locating each other and establishing and maintaining a living space for themselves and their families, without any particular male-male or female-female competition. And finally, under promiscuity, a rare condition, there is no obvious reason for competition between individuals, though sperm competition may occur.

The existence of female epigamic features introduces a new element into all this. It suggests that males were competing for the best endowed females rather than for any and every female they could obtain and hold on to. It also suggests that some females would be subject to intense competition for their

favours and could thus select the male or males they most preferred, while other females would have had less choice about mating partners.

Concealed ovulation

This brings us to a final puzzle about the human body in relation to mating systems and reproduction: the so-called phenomenon of 'concealed ovulation' (CO) in women. This refers to the fact that human females, unlike their counterparts in other primate species, give no overt signs of the time when they are ovulating, i.e. at the mid-point of the menstrual cycle. Other primate species all have menstrual cycles much like that of the human female, but in each species it appears that there is some fairly clear signal, to which males respond, indicating ovulatory readiness. In rhesus macaques it has been shown experimentally that a pheromone is important in communicating sexual readiness to males (Michael 1975), and this species, together with many others, also shows some visual signs of ovulation, in the form of patches of reddish swollen skin around the ano-genital region. Such sexual swellings rise and decline in response to oestrogen level in the blood, as has been demonstrated experimentally. The swellings are most marked in chimpanzees, but are also very prominent in baboons, including *Hamadryas* baboons.

In the case of humans, a volume of work now exists to show that there are in fact both pheromonal and other signs of ovulation. These pheromones can in fact be detected by men in laboratory conditions, but whether men in any part of the world actually use them to determine the optimal time for fertile copulation (or avoid them to avoid pregnancy) is not known. Differences in the constitution of the vaginal mucus at the time of ovulation, or differences in body temperature, are again known to exist, but it is unknown what use is made of these, if any, in most societies other than our own to determine a woman's ovulatory state. It seems reasonable, in view of the known facts, to accept that women do not give the normal primate clues to males about their point in the menstrual cycle, and to ask, therefore, why this should be?

Burley (1979) has suggested that we need to start our explanation by assuming that evolving humans or hominids were intelligent and already understood the association between mating and child-bearing. Since child-bearing is energetically exhausting, dangerous, and painful, females would take steps to avoid it. This could most readily be done by avoiding sex at times of sexual swelling, or when the sex pheromones were detectable. Females practising avoidance thus under-reproduced relative to females who were less successful at detecting signs of ovulation. One good reason for failing to detect such signs would be that the signs were weak or non-existent in some females, and it would be such females who achieved greater reproductive success, so that there resulted a gradual loss of overt signs of ovulation.

This explanation has the virtue of being the sort of mechanistic evolutionary process that we know in general exists, but it seems to make certain demands on credibility. First, we have to assume a certain level of intelligence. Secondly, we have to assume that the connection between sex, or sex at peak tumescence or receptivity, and pregnancy, had been discovered. And thirdly we have to assume that females were afraid of or disliked some or all of the features of child-bearing. All assumptions are plausible, none are proven.

A more commonly held explanation of the evolution of concealed ovulation is that it 'helped to cement the pair bond'. This explanation holds that before the advent of CO, females demonstrated their sexual condition in some way, and males responded by mating. Just what the mating system was at that stage is less clear than what is was not: it was not a system based on pair-bonding, which implies exclusive monogamy. During hominid evolution, with the increase in the period of juvenile dependence, the change of habitat to new and unfamiliar conditions on the savannahs, and a gradual dietary shift towards the inclusion of more meat in the diet, conditions arose where it became advantageous for females to involve males in the rearing of their young. They could perhaps have done this communally, but in fact such communal arrangements are rare and male involvement was achieved by the evolution of an exclusive mating system within the wider co-residential group. It was in achieving this mating system that concealed ovulation became selected for.

The process which led to this was the gradual replacement of a generalized signal of sexual receptiveness (and ovulation) by a range of more individualized signals operating between particular individuals. The traditional generalized signal, as seen in some other primate species, advertises a female's sexual condition to all males, and the extent to which she mates with them depends on their choices and hers, together with the degree of exclusiveness with which females are possessed by particular males. We know that females do not lose such sexual signalling even when they live in exclusive polygamous matings from the example of the *Hamadryas* baboon, in which possessiveness by the male could not be more rigid, and yet females show very marked sexual swellings. We also know that in monogamy, where mating is in any case quite infrequent because of pregnancy and lactational amenorrhoea, sexual signals are slight. But in normal monogamy the pair lives apart from potential rivals. How then could monogamy be achieved within the co-residential group of males and females? An answer can be found if we suggest that females eliminated their tendency to give sexual signals at the time of ovulation only and replaced it by other forms of sexual signalling that could be effective at any time of the menstrual cycle.

Thus we can find explanations for a variety of behaviours that replaced direct, oestrogen-induced signals with indirect, cognitively induced ones.

Such behaviours could include prolonged eye-contact with the partner, kissing, physical contact activities of a friendly kind, singing, and last but not least permanent or semi-permanent willingness to engage in sexual intercourse. Natural selection favoured those females who were best able to keep a male in tow and induce him to part with the occasional piece of meat that he had obtained, and in time females came to be provisioned by particular males who were attracted to them by their personal characteristics. Lovejoy (1981), whose scenario embodies some or most of the above ideas, additionally argues that the new system, once it came to fruition, involved a home base. Females gathered food and males hunted for it, each adult pair provisioning their children, and this led to a shortening of the birth interval and a great increase in the hominid or human population.

Like the proposals of Burley discussed above, the pair-bond hypothesis of CO makes certain unproven assumptions. First, it assumes that advantages would accrue to females who lost their overt sexual signals but it is hard to see how this process might begin, for males would not mate with them and would go on preferring those who showed swellings or produced pheromones. Secondly, it assumes that males would exclusively provision females who showed them constant sexual attention but this is not necessarily so, and all males might be more attracted to one or two females showing large breasts and buttocks, for example. Thirdly, the division of labour this scenario posits may be unrealistic, as it has been shown that meat is not very important in dietary terms, even for modern hunter-gatherers such as the Bushmen, while the gathering of nuts and other vegetable products is the main source of nutrition. It is therefore not clear why females should need to incorporate males so exclusively, and whether the cost of so doing in terms of loss of support from other males and females would be less than the benefits. Finally, the viability of these monogamous units would depend on the degree of paternity certainty, and unless this was high, cheats such as stay-at-home males or females mating with several males serially would tend to out-reproduce the monogamists.

So why has CO come about? Tanner (1981) has suggested a simpler and much more direct reason. She argues that with the adoption of upright posture, the female genitals became hidden between the legs and so the normal primate sexual swellings around them became disadvantageous. As for pheromones, they are still there vestigially, but in any case pheromones need to be accessible to male nostrils, and with the hiding of the female genitalia, the appearance of fatty buttocks, and upright posture they ceased to be a prominent feature of sexual signalling. This leaves only the question of the so-called 'permanent sexual receptivity' of the human female to be explained. Numbers of (mostly female) anthropologists have challenged this as a male myth, but even if it is true that women can mate on most days of their menstrual cycle, the same may be true of other primate species. It is just that in those species matings are confined to the peri-ovulatory period

because then excitement is at its peak. But if denied the opportunity to mate then, subordinate males will mate with females at sub-optimal times, as many studies of macaques and baboons have shown, and the females do not appear to be unwilling.

HUMAN MARRIAGE PATTERNS

In earlier sections we have been concerned with non-human primate and ancestral human mating patterns. It is now time to consider the variety of forms of marriage found in modern societies, and to try to link these to the biological considerations already discussed.

The point already made about mating patterns, namely that they are a feature of groups not individuals, is also true of marriage patterns. Use of terms such as 'marriage habits', 'marriage tendencies', and so on barely make sense, because of the fact that marriage is so much less frequent in the life of the individual than mating. Individuals marry, some more often than others, but only in exceptional cases can we talk about marriage as a habit. For many, it happens once or twice only in a whole lifetime.

Marriage, as stressed throughout social anthropology, is a process involving whole groups of kin, as well as other social groups, and the individuals concerned are often pawns in a game they barely understand. This is very much more the case in some societies than in others, and for some marriages than for others within a society. In general, close-knit societies where lineal links are strong and are responsible for much of the economic and political organization of the group make a big event out of marriage, which is characterized by a feast with hundreds of guests. By contrast, the isolation of the nuclear family in the mobile sector of middle-class Western society favours a small-scale marriage ceremony, for far fewer people are affected directly by the new social arrangements.

As regards definitions, we can use the terms 'monogamy' and 'polygyny' in the correct way when discussing marriage, and do not need to hedge this about with apologies. However, a new set of problems occurs because the exact forms and significance of monogamy or polygamy differ from place to place and time to time, so that in no sense do these terms, however clearly defined, tell us much about what is implied in social terms. Thus monogamy among Bushmen is very different from monogamy in Japan, and polygamy for a Lesuthu chieftain is not the same as polygamy for a Saudi Arabian merchant. Nor, again, should we fall into the simplification that monogamy is exactly the same for any two monogamous couples within a single society, and the same applies to polygamy. Monogamy as understood and practised by one couple may include an amount of infidelity, while in another case infidelity may be deemed sufficient to end the marriage. Likewise, polygynists may in addition take concubines in some societies while in others they do not.

Each marriage has its own particular history and is to that extent unique. Individuals feel their own marriages to be unique, and it is debasing to think of one's marriage as a standard package, identical to everyone else's. In fact, however, there is much more in common between the marriages in one culture than there is between the marriages of two different cultures. The Western marriage in which both partners work to pay off the mortgage has no counterpart in, say, the rural Middle East, let alone among the pygmies of the Zairean rainforest. Thus the marriage pattern typical of any one country or culture does contain certain regularities as well as all the differences between individual cases, and it is to the causes of these regularities that we shall turn first.

Causes of marriage patterns

Why should some societies be exclusively monogamous while others allow or even extol polygamy? Social historians tend to answer such questions by reference to key events in the history of the societies concerned. For example, if we take the Christianization of Africa, we know that among the changes wrought by the missionaries was an insistence on monogamy, and so, even if they could not eliminate polygamy quickly, through the agency of mission schools they could teach the young that monogamy was the only Christian kind of marriage and that polygamists would be consigned to hell. As a result many marriages are monogamous in Christian East and West Africa, but by no means all of them (Tanner 1967).

Every country and culture has its history. If we find the causes of the present in the past, in such events as conquest, revolution, social change, or invention, we may believe we have explained things satisfactorily. Certainly there is no need to seek other explanations if all we want is an historical account. But this is a bit short-sighted. There are other questions that can be asked. For instance, why is polygamy continuing among Christians in Dar-es-Salaam? Why is it apparently resistant to extinction? How has it been incorporated into Christian thinking? Why in such cases does the religion adapt to the prevailing institutions rather than eliminate them? Such questions are very interesting though equally difficult to answer. They open up the matter of history to theoretical analysis.

What kinds of theory could be applied to such cases? It seems there are at least two ways of thinking about marriage patterns in relation to the processes of history. First, there are the methods of the economic historians, who tend to analyse changes in institutions over historical time in terms of changes in the pattern of resource availability and resource distribution. Thus, if because of a series of ecological mishaps the price of essential commodities goes up, people may adjust by marrying later and some may not marry at all. This kind of analysis has been done successfully and in great

detail by the economic historians of pre-modern Europe (e.g. Wrigley and Schofield 1981).

A second theoretical approach is that of socio-ecology or sociobiology. This tries to show that human institutions, like the structures of animal societies, are adaptive, that is to say they result from the actions of individuals attempting to maximize their inclusive fitness (Caro and Borgerhoff-Mulder 1987). The question of whether marriage patterns constitute successful modifications to past environmental pressures which are found at the present time because they have been transmitted down the generations while unsuccessful ones have disappeared, is a difficult one to answer but demands serious attention.

We may as well tackle straight away the question of whether the transmission of institutions is supposed to be happening because of changes in gene frequencies, as is the normal case in natural selection. From the point of view of socio-ecological theory, it is neither important nor likely that marriage patterns such as monogamy or polygamy would require special genes or genotypes for their transmission. What is important is whether one or the other were better adapted to prevailing environmental circumstances during historical time, where 'by being better adapted' means that the individuals whose actions result in the prevailing patterns are able the more successfully to rear their offspring to maturity and transmit their ideas to them.

This is quite difficult to envisage, because we are used to thinking in terms of the spread or decline of genes at the level of individuals. If an individual reproduces, he spreads all his or her genes; if not, they do not spread. When we come to talk about marriage patterns, these are not the properties of individuals but of groups. How then do such patterns relate to the individuals composing them? One answer involves a consideration of what is called 'resource-based polygyny' and the idea of a 'polygyny threshold'. Here, in any social group, what matters is the distribution of scarce resources among males. If all the males in a group have more or less equal territory size and ownership of resources, then females will be best off pairing individually with individual males; each female thus obtains for herself an opportunity for successful reproduction. However, if as a result of competition, some males have few or no resources whereas others have very plentiful resources, as happens among red grouse or red deer, then it will benefit any reproducing female to share a successful male with other females rather to practise monogamy with an unsuccessful male.

Indeed, a historical slant can be put on this idea, to account for the historical evolution of polygamy from monogamy by the intermediary process of development of a system of class or caste. If, in the history of a society, a situation of, say, monogamous peasant farmers holding more or less equal amounts of land, is followed by the rise of a powerful class of

wealthy landlords then, other things being equal, it will be in the interests of peasant women, for their own and their children's sake, to marry the landlords, and upper-class polygyny will arise and flourish.

Resource-based polygyny does indeed seem to be the norm. Among the Australians described by Meggitt (1962) men were sometimes quite old by the time they had accumulated enough resources to marry a second, often much younger, girl. In many Moslem countries today, it is only the wealthy who can marry more than one wife. A well-documented case is that of the Kipsigis, among whom Borgerhoff-Mulder (1987) has shown the system of resource-based polygyny in action. Men who have land and cattle are much sought after by the parents or marriageable girls, who arrange their daughters' marriages. These men thus obtain more than one wife, whereas men who have few or no cattle and no land cannot obtain a wife and thus remain unmarried for life.

This case may be typical of many societies, and it is interesting for one particular reason—that it is the parents of the girl, and not the girl herself, who makes the choice of marriage partner. This fact, which would scarcely raise an eyebrow among social anthropologists, is fascinating to those with a biological orientation, and has been commented on by, among others, Dickemann (1981, p424) and Flinn (1988), who see it as a characteristically human way of increasing inclusive fitness. In animal species, it is individuals who make their mating decisions, and as far as I know their parents never do it for them, although it is true to say, and indeed important to understand, that mating decisions are always made in a corporate context in which constraints on choice of mating partner are exercised by other group members. The human case, in which parents act on behalf of their daughters, as they do all over India, much of the Middle East and Far East, and doubtless elsewhere, even in Western society to a certain extent, is of interest not only because it is unique in the animal world, but because it could be taken to imply that in the history of these societies parental choice of marriage partner has been more successful than individual choice by the partners themselves.

Such systems have been breaking down to some extent in recent decades, among the more urbanized, westernized members of Islamic countries, though by no means all of them (Nagi 1983). The reason for this is no doubt that where a girl meets a much larger number of men than in the traditional context, because of the breakdown of chaperoning and taboos in a city where she may be quite independent and perhaps earning her own living, she may do best for herself and her children by choosing her own marriage partner, or by allowing herself to be chosen by him directly without recourse to parental approval. In this way, she may marry a richer or higher status person than her parents would have been able to secure for her. She may also, of course, fall for a man who drags her into poverty and debt. The new pattern based on individual choice will perhaps only become established in so far as those

individuals practising it can rear their families successfully and only spread if they can do this more successfully than those practising the traditional marriage pattern.

Marriage and mating

We have so far been concerned with mating patterns in animals and marriage patterns in humans. Can we also talk of mating patterns in humans? Some might want to argue that this is what we really ought to be interested in—whether there are any regularities in the actual mating patterns of different societies, whatever their marriage patterns. In other words, could it be that both men and women actually have the same number of mating partners, on average, whether the marriage pattern is monogamy or polygamy? We could enquire how many partners the average man or woman has and what the variance is in different societies. Certainly answers can be and have been obtained to these questions (e.g. Kinsey *et al* 1948). But this is not our aim at present. I am concerned here to try to get at the nature of mating and marriage, and to explore the points of overlap and the differences between them. We can accept for present purposes that within any society there will be great variance in the number of mating partners for both men and women, and that there will also be differences between societies both in average and variance.

One of the main reasons for these differences between societies is the existence of different rules about and attitudes to mating between people who are not married to one another. In some societies men and women have more sexual freedom before they are married, in others after. It is necessary in each society to determine by ethnographic enquiry how far the rules and attitudes associated with marriage do in fact determine the amount of non-marital mating. If marriage is conceived of as an exclusive partnership, and adultery is so severely frowned on that it is cause for divorce, then this is bound to restrict the number of extra-marital diversions. If on the other hand marriage is more concerned with establishing paternity and rights of succession than sexual access, the opposite will be the case. Berreman (1963), describing the Paharis, or hill people of northern Uttar Pradesh, shows that there is a certain amount of adultery there, which is frowned on but is nevertheless cause for interested village gossip, and the same is true of the Buddhist Lepchas of Sikkim described by Gorer (1938). I suspect this is the case in many other groups too. Marriage, or rather the ideas surrounding it, thus has an effect on the distribution of matings but the extent of this effect differs from case to case.

There is, however, one big difference between them. Marriage is a rare event, but mating is common. After marriage, a couple focus their mating on each other. Thus the chief effect of marriage in respect of mating is its effect on mating decisions. It determines who the mating partner of a man or

woman will be for a long period in advance, in some cases for life. By so doing, it takes mating decisions away from married couples, and institutionalizes them. Particularly in the case of arranged marriages, it takes people's mating decisions away altogether, and they never have to decide who to mate with.

This point, absurdly obvious if we are considering human beings only, is perhaps the most important one when it comes to comparing humans and non-humans. As pointed out earlier, the matter of mate choice and obtaining a mate is the central focus of mating in non-humans. For males, other competing males have to be contended with. For females, the status of the male partner may be an important consideration. Thus, in animals, each individual is personally involved in its choice of mating partners, and the choice is never made by another animal, (though others may be involved in enabling an individual to obtain a mating partner, as in baboon coalitions, Packer 1977). It is this personal involvement that is reduced in human beings.

This is not intuitively obvious to us, living as we do in a society that emphasizes individual choice of marriage partner. In our case, the matter of choice of mating partner is fundamental at the outset, but once marriage has taken place, choice is severely limited. For animals, this never happens. If a mating partner is unsatisfactory, a replacement is sought. It may not even be that the first partner is unsatisfactory, he or she may be abandoned as a matter of course once copulation has taken place, or once the offspring have been reared, or once the breeding season is over. Different species have pair bonds of different lengths, from swans and geese who normally pair for life, to birds such as kittiwakes which stay together for several breeding seasons, to robins which pair up for a season, to domestic chickens and no doubt their wild ancestors in which, after mating, the male lets the female do all the incubating and moves on to find other mates.

To sum up the relationship between marriage and mating, it seems that the former is a restrictive and channelling institution, eliminating or greatly reducing mating decisions by individuals and ensuring that mating will occur primarily between the married partners. This restriction and channelling is brought about by social pressures of all kinds. It has certain distinct effects on the distribution of matings, i.e. the mating pattern of a community, and these we shall examine next.

Let us take first a monogamous society such as our own. One of the most remarkable features of marriage partner selection in our society is that it produces a high degree of homogamy. Homogamy exists with respect to social class, wealth, religion, IQ, race and nationality, political attitude, leisure interests, and other things. Of these, the most important are those relating to socio-economic status. People feel it is best to marry someone of equivalent or higher socio-economic status. Parents feel this about their children and courting couples take this into account themselves.

There is of course variation here as everywhere, and to some extent this variation is patterned. Thus there is a greater tendency for women to marry above their status than for men to do so. This is a case of hypergyny, and occurs because some women, though of relatively lower status, attract husbands with a high social status as a result of their physical beauty, shining personality, etc. That such marriages are not more frequent is probably due to the fact that few occasions exist for the rich man and the poor girl to meet each other. The social forces perpetuating homogamy are very strong, and set up barriers against heterogamy. For instance, a beautiful factory girl is unlikely to be admitted to a debutante's ball, and even if she did her accent would give her away, and she would be cold-shouldered by rival girls who could not compete with her in physical terms. If she were to stimulate marital intentions in a well-bred young gentleman, this would incur the wrath of his parents once they discovered her humble origins.

A parallel situation to homogamy appears to exist in non-human primate societies, but in fact it is very different. The parallel is that high-ranking males tend to have high-ranking females as mating partners. However, the mechanism whereby this comes about is different, and more like the hypergyny described in humans. As already described, female primates rise in status when selected as mates by dominant males. However, mate selection is done on the basis on the personal characteristics of personality and social skills. The difference in the human case is the extent to which the appurtenances of high or low status, such things as accent, dress, topics of conversation, demonstrable access to wealth, etc., all make a difference, in addition to the matter of parental approval mentioned previously.

Original causes of marriage

Why should marriage have arisen and spread in human beings? According to Lévi-Strauss (1974) it is an archetypal human institution, dating back to the time of formal prohibition of incest. It also made possible the first regular social links between groups, achieved by exchanging women in the form of cousin marriage. This theory, like the Durkheimian accent on social solidarity in general, sees marriage as a way of cementing bonds between different, rival, and potentially hostile human beings. Within the group, marriage between different lineages ensures group solidarity and controls the outbreak of fighting that could lead to group fission. Between groups, exogamy in the form of exchange of women reduces the likelihood of raiding or warfare.

These ideas are based on a concept of early man as the ingenious inventor of social means for enhancing group solidarity by forging links between lineages, links that would continue down the generations. We know that within macaque groups there is competition between matriline, and considerable intra-matriliné solidarity. Perhaps it was to counteract strife

between matrilineages that cousin marriage was invented. We know that when whole primate groups are threatened, they ignore in-group differences and act in concert to defend the group's resources (Holloway 1974). Marriage between lineages would bring about this kind of integration of the group without the pressure of an external enemy.

But the emphasis on group integrity misses entirely the more fundamental and everyday basis of primate interaction, which revolves around individual and matriline benefits. Perhaps marriage was invented and perpetuated by individuals or groups of kin for their own family benefits? This is indicated by the fact that marriage is not always evenly spread in a society. Marriage is always a more elaborate and socially important event in wealthier than in poorer families. In rural Jamaica, poor people do not bother to get formally married at all until quite late in life. The context is one of poverty and a migrant male population on the look-out for work, in which men have a number of female friends but do not settle down until their working life is over (Clarke 1957). In such cases, there seems to be no advantage to individuals in getting married, and when people do eventually marry it is again an individual decision with no implications for the group. Their parents are dead by then, so have no say in things. The couple have not usually acquired more than minimal possessions and may be living in poverty. And their children will be independent already. Why marry at all? 'Because the Lord don't approve of livin' in sin, and we all goin' to die sometime'. In other cases the family may be much more important. In the case of Indian arranged marriages, the family is paramount, in the Jamaican case it is insignificant, and in cases of homogamous marriage in countries such as Britain or the USA we can see both individual and family interests at work.

Ecological considerations

So far we have considered the similarities and differences between non-human and human mating and marriage patterns largely in terms of the processes of mate selection and mating and marriage decisions. As shown by Rees and Harvey (Chapter 1, this volume), ecological factors can be paramount in determining the mating patterns of animal communities. This was touched on earlier in this chapter in relation to primates, but it is now appropriate to look at human marriage patterns in relation to ecological factors.

Let us start with monogamy. Because it means so many different things in different social contexts, monogamy cannot be seen as a unitary phenomenon. However, in specific instances, a case can be made for its adaptive significance. For instance, if we consider the case of the serial monogamy found in hunter-gatherers such as the Hadza, we can make two points about its adaptiveness. First, monogamy rather than polygamy seems appropriate

in hunter-gatherers for reasons stated earlier, namely that in such peoples there is no massive accumulation of wealth by men, and so a woman's fitness is optimized with a single man who generally is the provider of meat, while a man's fitness is optimized with a single woman who provides the bulk of his diet in the form of nuts and other vegetable foods. Secondly, we can see the rather rapid turnover of marriage partners (I purposely avoid using the term divorce with its Western implications) an adaptive in the context of nomadic hunter-gatherers, for it will not pay a man or a woman in terms of fitness to remain with a spouse who is unsatisfactory as a provider or unpleasant to live with, and the way of life ensures that there is a constant supply of potentially more efficient or more compatible partners.

By contrast, if we consider the settled agriculturalists in which polygamy is found, we can make out a case for its adaptiveness. In agricultural societies, because of the good fortunes of some families and the bad luck of others, because of differences in soil fertility, because of the long time-span between planting and harvesting, and because of the relative lack of opportunity for opportunistic food-getting, there tends to arise over time the situation where some families have become rich and others are poor. Some of the poorest even have to give up land-holding altogether and become tenant farmers to the rich. In such conditions, polygamy is likely to arise out of fitness considerations, as families with daughters realize that only with a wealthy husband will their offspring be able to rear children successfully, while for rich men extra wives enhance their status and wealth as well as their fitness.

Polyandry

Finally, we have not so far considered polyandry, which is a very unusual marriage pattern. However, where it does occur, for example in the Himalayas, there is good reason to see it as a useful solution to the problem of how to survive on marginal agricultural land, where there is no further land to spread to. Such, for instance, seems to be the case where the commonest form of polyandry, fraternal polyandry, is practised. In such cases a woman is married to two, three, or four brothers. Inheritance is in the male line, and if each brother had a wife of his own the land would have to be parcelled up into smaller units, the system practised in surrounding areas where the soil is marginally more fertile or there is more land per family. An alternative to the problem of marginal land in mountain environments is the system of primogeniture, where only the eldest son inherits and the other sons emigrate to the nearest town. This is a commoner solution, found for example in some Alpine communities. But it is not found in the Himalayas, where its place is taken by polyandry, which has two effects. First, land-holdings are not subdivided but are transmitted to the male inheritors *en bloc*. Secondly, the number of reproducing women is much reduced, thus easing population pressure on the land. In regard to fitness, polyandry seems

to represent a compromise between the individual brothers, each of whom has a proportional share in their joint fitness, whereas alone each might have no fitness at all (see discussion in Crook and Crook 1987).

Polyandry shows very clearly, as described in an earlier section, how mate choice can be greatly affected by prevailing customs and institutions. Even if extra-marital affairs prevail, sexual intercourse does normally occur between a wife and her husbands within polyandry. The wife in a polyandrous marriage may not like all her husbands equally but their rights of sexual access to her are based on equal time rather than personal liking, which could lead to jealousies. The husbands, likewise, may not all equally like the wife and may wish for a wife of their own, but the system of polyandry binds them together and powerfully induces them to co-operate rather than act selfishly. In terms of reproductive success, the losers are perhaps those women who are not able to marry, but in many cases they leave the community and go elsewhere where they are able to obtain husbands, or, on occasions in the past, they have been sent to a patron in the lowlands or even sold to a wealthy merchant, thus achieving the married state, however unsatisfactory in some respects (details can be found in Majumdar 1962).

Late marriage

Apart from the marriage pattern, there is another way in which the institution of marriage can be made adaptive in poor or marginal environmental circumstances, and that is by adopting late marriage. Late marriage by both sexes has the effect of reducing the number of children born and thus relaxing population pressure. It is found, for instance, in Western Ireland, as described by Arensberg and Kimball (1940), in Swiss mountain valleys, e.g. at Kippel in Valais (Friedl and Ellis 1976), and in Basque settlements in the Pyrenees both now and in historical times (Hernandorena 1988).

Early marriage, by contrast, is found in environments where there are high levels of infant mortality. Especially early marriage of women is the norm of rural India, where children may be betrothed shortly after birth, and are married soon after puberty. In tropical Africa, in many societies described by anthropologists, girls are marriageable as soon as they have undergone their puberty rites and initiation ceremonies (e.g. Richards 1956). The apparent over-production of children does not, as far as can be ascertained, lead to population expansion because rates of infant and child mortality are so high. In any case, the existence of epidemics which can decimate populations periodically makes high levels of reproduction the optimal strategy for individuals.

In concluding this section, we can see that both the forms and the timing of marriage are relevant to an understanding of how human societies organize their customs and institutions in order to overcome environmental problems, and are also the outcome of environmental pressures such as

diseases which act in their own right to bring about social conditions that are outside human control. It is within these environmental constraints that marriage patterns arise and that marriage decisions are made, just as in the case of primates it is within particular environments that mating systems evolve, within which individual mating decisions are made.

WHAT IS MARRIAGE?

Comparative and structuralist approaches

So far in this chapter we have considered some aspects of primate and early human mating patterns, and have discussed the prevalent systems of marriage in human societies today. In this section, we look at a number of theoretical issues relevant to an understanding of the significance of marriage.

Anthropologists have long been known for their tendency to ask silly questions, i.e. questions to which everyone knows the answer. They have established long since that such questions, however silly they may look, sometimes have unexpected answers. Malinowski (1922) was one of the first. He asked the question 'Who is a child's father?' and the answer turned out to be 'His mother's brother' (in the Trobriand Islands). This kind of answer is a product of the comparative approach in social anthropology. Each society has its particular features, and each differs from the others, including our own, in many, often unexpected ways. The task of the social anthropologist has often been conceived of as the demonstration of these differences. A question like 'What is marriage?' in the hands of a comparative social anthropologist, is capable of generating a very long answer indeed.

In 1959, in his Malinowski Memorial Lecture, Leach (1961) launched an attack on the comparative approach, which he dubbed 'butterfly collecting'. Instead, he emphasized a different way of approaching features of social organization, namely what he called a 'mathematical' approach, in which the object was to find the pattern underlying the surface features, the principles rather than the nuts and bolts of what was going on. To take an example, whereas the anthropologists he was attacking were making the greatest possible distinction between patrilineal and matrilineal kinship systems, Leach saw no difference between them in principle, both being examples of the tracing of descent down the generations through one parent rather than both. To trace descent through both would be a different principle.

As Leach (1961) says he was introducing to British anthropology the way of thinking that was pioneered by Lévi-Strauss, and has since come to be known as 'structuralism'. In this approach, instead of comparing the way one society does things with the way they are done in other societies, you

move on from there to lay out all the alternatives and seek patterns. He called it 'mathematical' because of the mathematical science of topology, likening the variations to be found in kinship systems, political systems, etc. to the changes in shape of a topological map drawn on rubber, if it is stretched in various ways. He refers to the use of such techniques in engineering; they have also been used in zoology in the study of allometry.

Evolutionary approaches

Leach (1961) was not concerned with the study of the origins of society, or of the patterns underlying its forms. Lévi-Strauss (1949), by contrast, was so concerned. One of the principal insights of his '*Structures élémentaires de la parente*' was the development of the idea that it was the prohibition of incest that led to the very earliest forms of woman exchange between social groups, and hence to systems of exogamy. How the derivation of the simplest kind of exogamous system might be envisaged is a problem that has been approached by Allen (1986) and we shall return to this in due course. For the moment, however, all we need to note is that Leach eschews the analysis of the problems of how systems may have evolved. In so doing he falls into place with the majority (though not all) of modern anthropologists, who regard evolutionary arguments as too speculative to be worth bothering about, and, worse, capable of generating invidious distinctions between 'higher and 'lower' forms of society. This latter fear is a hangover from the pseudo-evolutionary efforts of such earlier anthropologists as Morgan, McLennan, and Spencer.

Non-Darwinian social evolution

There are two evolutionary approaches to the study of social evolution, each of them almost entirely distinct from the other. These I will call the non-Darwinian and the Darwinian. The former, non-Darwinian approach, got off to a bad start in the late nineteenth and early twentieth centuries with its ideas of primitive savages living in promiscuous hordes evolving eventually into Englishmen wearing bow-ties to dinner. We can forget about that, but not about social evolution itself, a much neglected subject.

A notable modern exception is Hallpike (1987) whose book '*Social evolution*' is exceptionally clear about why he feels the Darwinian approach to the evolution of human societies is inappropriate and inadmissible. Before considering some Darwinian approaches, it is important to see what Hallpike means and take adequate note of his arguments.

First, he argues, societies are not like organisms. With this there can be no disagreement. The idea of 'society as an organism, was popular for a short time early this century, especially in Germany, but the weaknesses of this position have always been apparent to biologists, and in particular it is not a

position they would adopt because society, to students of animal behaviour, is the outcome of the interactions between organisms, not an organism in itself. But what, then, for Hallpike, is society? He writes that 'societies are primarily information systems and not held together by physical linkages as in the case of organisms and are thus immortal . . . continuity is not dependent on vital processes of a biological type' (p. 35).

This is interesting. As stated, biologists do not view animal societies as organisms. To some extent they might view them as information systems, but they could not agree, I think, that they are not held together by physical linkages, nor that their continuity is not dependent on vital processes of a biological type. On the contrary, animal societies are held together by the physical interaction of their members, and they are dependent on the vital processes of competition, co-operation, and reproduction. If Hallpike is correct, there is definitely something different between human and animal societies.

Hallpike continues at some length to give his reasons why Darwinian theory is irrelevant to social evolution, but this is not the place to go into the arguments. He returns to the attack later on the subject of adaptation, arguing that whereas biological systems depend on inter-individual competition, so that adaptation of the society to its environment is to be expected, the same cannot be said of human societies, in which the shape and forms of inter-individual competition are variously emphasized, and competition for status or for reproductive advantages cannot be assumed. Thus he titles one chapter 'The survival of the mediocre', calling this 'one of the fundamental principles of social evolution' (p 113). This is a direct attack on the idea that society is adapted to its environment through the competition between individuals.

By contrast, for Hallpike, human society is dependent on 'shared cognitive representations of reality', a 'common body of categories, rules, and values' (p 122). For example, humans may solve the urgent problems of everyday life by recourse to magic, and such solutions, though materially inappropriate, may continue down the generations as part of the cultural fabric. One thinks, for example, of Trobrianders calming the sea by incantations before setting out on a voyage, or reciting magic spells before planting seeds. It is certainly true that animals do not do these things, though the phenomenon of 'superstition', or irrelevant association, has been shown in laboratory rats. But Hallpike means far more. He is saying that while the social and cultural arrangements of humans are not frankly disadvantageous to the point of threatening survival, they are not materially optimal either. They are adequate solutions, and alternatives to them could exist, but for various reasons do not happen to have arisen. The main reason is that humans perceive the environment selectively in the first place, and then put it together in terms of logical, metaphorical, and symbolic relations. His conclusion is that 'the materialist belief that the environment simply causes

social adaptation is therefore quite unfounded . . . there are many different ways of accommodating to the environment' (p 207).

Is Hallpike's critique a telling one? There seem to be problems with it. First, no species has ever achieved a perfect adaptation to its environment; to this extent all adaptations are partial and (though I would not use the word) 'mediocre'. And second, though other species do not symbolize and are thus in more direct contact with their environments than humans are, they nevertheless perceive it selectively rather than in the one-to-one, materialist way described by Hallpike.

Darwinian evolution

Let us turn now to Darwinian evolution. The central tenet of Darwin's theory is the existence of competition between individuals for scarce resources. It is this that leads to the differential reproductive success that, in turn, brings about evolution. How could such a process bring about social evolution? Clearly, it could only do so if social evolution is an outcome of inter-individual competition. That is to say, the forms of society have to be a result of the strategies that evolve in response to individual competition for a Darwinian explanation to succeed. Nature provides us with some wonderful examples of the evolution of social systems. The finest examples can be found in insects, especially bees, wasps, ants, and termites. In all these groups, we can see at the present time some species with very simple social systems, others with more complex systems, and others with very complex systems indeed. Although it would be wrong to say that one system had evolved from another, each species having evolved independently, it is correct to say that we can infer the general lines of evolution of the most complex systems from the less complex ones, right back to the simplest.

There are two reasons why we can do this. First, organic evolution tends to go from simpler to more complex. And second, we know from phylogenetic studies that while each species has its own independent evolutionary history, it is also an offshoot from an ancestral species, and carries with it the genetic information of the ancestral form. Thus when the bee with the most complex known social system, *Apis mellifera*, the honey bee, evolved as an independent species, it started with the genes and the social behaviour of the ancestral lineage, which may already have been quite complex. And so on back to the original solitary bees, many millions of years ago.

What is marriage?

I shall argue that whereas reproductive competition continues to play an active part in human life and to underlie human mating and to some extent marriage arrangements, we need to introduce a new dimension into the analysis in order to understand what marriage is, and that this new

dimension, while not incompatible with Darwinian ideas, marks a definite new level of social complexity. New levels have been reached before, though not of the human kind. Certain insect species have achieved a new level of social complexity by an organic innovation: haplo-diploidy. This new arrangement, achieved by having one sex (males) diploid and the other (females) haploid, has led to the novelty in evolution that females are more closely related to each other and to their queen than they would be to their own offspring, so they have foregone reproduction in favour of being sterile servants of the queen and of co-operating with their sisters, the other females in the colony. While this is a novelty in evolution, it has been very successful, and the social systems it has produced continue to astound us by their complexity.

In the case of humans, there has once again been novelty. The growth of the hominid brain and its associated intelligence has added the dimension of self-consciousness and has enabled humans to intervene cognitively in their own social systems. They have proceeded down a very different path from the social insects. Instead of organic mutations leading, via social division of labour, to better adaptation and improved survival, they have invented and reinvented social forms and reified them. Though initially this process was powered by its adaptive success, this may no longer always be so, though we should not accept Hallpike's critique too readily. It still remains to be shown which aspects of society are commonly adaptive, and which are arbitrary. This may not be an easy project. Reynolds and Tanner (1983) for instance have shown that some aspects of religious belief and observance may be interpreted as adaptive to the prevailing environment, using the term 'adaptive' in the strict Darwinian sense, namely of tending to increase the reproductive success of individuals in a given environment. (They also showed that some religious observances were maladaptive, or could not be interpreted in these terms).

Marriage, as we have noted repeatedly, is a very different thing from mating, and its relation to reproduction is never to be taken for granted, but has to be established for every society, and for every individual. Just to remind ourselves of how true this is, let us consider the case of the Marri Baluch (see also Leach in Chapter 3, this volume), an arid-zone shepherd people who live a nomadic way of life in Pakistan. They are described in Pehrson (1966). Being an Islamic people, of a fundamentalist kind, women have almost no rights, and are virtually owned by their husbands. Adultery is punishable by death, both the woman and her lover being hung or stoned, preferably by the husband but failing him by a series of other specified agnatic relatives of the husband. Despite this, all women have lovers. Love itself is not for a husband and wife. Husbands and wives sleep together, and sexual intercourse takes place, but when husbands are away from camp lovers sneak in and illicit affairs occur. These have to be kept quiet, and normally those who know about them keep silent. Only when a story breaks

out into the public domain does this constitute dishonour for the cuckolded husband and then it can lead to punishment for the wife in the form of divorce or death.

A Marri wife is totally subservient to her husband, she does not eat with him and must obey him in all things. At her marriage she moves to live with him and his agnatic kin, he gains sexual rights over her, her children belong to his agnatic descent group. Yet this same society has an ethic of passionate love, and it is in the love relationship, which cannot by definition occur between husband and wife, that a woman finds equality of status with a man, together with 'a voluntary and mutually satisfying relationship' (Pehrson 1966, p 70). All children are regarded as belonging to the *pater* and his lineage, and furthermore he is regarded as the genitor of those children, and it would be an intolerable loss of honour for it to be suggested that any of his wife's children were not, biologically, his. Yet in view of the universality of adultery it must in fact be the case that many of a man's wife's children are not biologically his. This fact is of no consequence to the Marri, it seems. Not even the wife knows or, apparently, cares who the genitor of her children is. Love affairs are all, but their reflection in children goes unmentioned in the ethnography.

Marriage and recruitment: the case of cross-cousin marriage

Here we see clearly in action a phenomenon often referred to in the writings of social anthropologists—namely the fact that marriage sets up a method of establishing recruitment to a lineage. In the Marri case it is the father's lineage. When a woman marries, the man's lineage pays bridewealth to the woman's lineage, in exchange for her reproductive potential. This is the new level achieved by human society. 'Lineages' of a kind (more properly 'matrilines') are found in monkey societies of some species too. But only in human society are such lineages reified, given names, sometimes totems or other insignia, and then used as social units between which arrangements exist to ensure their future recruitment.

In order to make things clearer we need first to make them rather more complex, and to focus on one particular kind of marriage which is very widespread in small-scale societies, namely cross-cousin marriage. There are three basic possibilities, matrilineal, patrilineal, and bilateral, and I shall focus on the former, which is the commonest of the three. In matrilineal cross-cousin marriage, a man preferentially or even prescriptively marries his mother's brother's daughter (MBD). Leach (1961) has written about the three main varieties, the Kachin, Trobriand, and Kariera. He is mainly concerned with the Kachin type.

Leach summarizes Lévi-Strauss's four main theoretical propositions with respect to cross-cousin marriage. First, it expresses a positive social necessity to marry out rather than just a means of incest avoidance. Second, it is an

inter-group transaction. Third, it involves reciprocity between groups, the items exchanged being goods and women. Fourth, there are three kinds of exchange: goods for goods, women for women, and goods for women. Kachin cross-cousin marriage involves the exchange of goods for women.

Leach now makes two observations about the situation among the Kachin. First, because of the exchange of goods for women, goods going one way and women the other between lineages, there should ideally be a circle of lineages involved in the transactions, and Kachin both say and believe there is such a circle, but empirically Leach found there was not. Second, related to the above, there was in fact a hierarchy of lineages, and there was competition for wives, in which men from higher lineages were able to be polygynists, as owing to greater lineage wealth they were able to obtain more wives than those from lower ranking lineages. There was thus hypergamy.

This is an opportune point at which to revert to a Darwinian perspective. In the midst of the 'novel' human marriage process is what looks like the evolutionarily ancient process of inter-individual competition. This is not at all incompatible with the success of the lineage itself; just the reverse. The fact that men from higher lineages set up polygynous households increases the recruitment rate for those lineages, at the expense of other lineages. This fact does not alter the competitive basis for polygyny. Only some, not all, men become polygynists; by so doing they gain status within the lineage. Thus both the lineage gains, and the individual men gain.

Let us compare the competition that has been shown to exist between monkey matrilines. In langur monkeys matriline members support each other against the members of other matrilines in fights over territorial ownership of good food sources (see illustration of this in Trivers 1986). By safeguarding their food sources they help to ensure the survival of their offspring, thus effectively ensuring a good rate of recruitment. Female monkeys in dominant lineages with assured food supply can also expect to attract males for mating purposes, and to rear offspring successfully. As a result, dominant matrilines grow in size.

In the case of Kachin polygynists from senior lineages, we can see this same process in human form. The lineage recruits children through its wives. The lineage benefits from wealth, by being able to support polygynous men. A variety of benefits go to the lineage, the named, reified part of social structure. Let us assume, as in the Marri case (a sort of 'worst case' for biology) that no one knows the actual physiological paternity of the lineage's children. Now we can see clearly the difference from the monkey case. For in the monkey case, the lineage is a matriline, and the offspring of the females making up this matriline are the biological descendants of those females and the co-resident males, so that the effort put into defending the territory does go towards benefiting the group's own genetic offspring. But in the case of the Marri the lineage is a patriline, and the offspring may not be sired by the lineage males, so that genetically one side of the parental input is unknown.

However, there is still the other side. Although the incoming wives of a patrilineage belong to another patrilineage, their offspring do not. Genetically, therefore, a human patrilineage, in a 'worst case' situation, is constantly losing out on the genes of its own men, and perpetuating the genes of its wives and their lovers. However, this is an extreme case. To the extent that children are the biological offspring of their *patres*, the degree of genetic congruity between a lineage and its recruited members becomes more synonymous. In a 'best case' situation, where all the lineage men were polygynists and there was zero infidelity, lineage recruitment and genetic continuity would be identical, and the lineage would be growing as an entity with both biological and social identity.

The above discussion of lineages followed from the observation that monkey matriline members support each other. In the monkey case, the matrilines are genetic lines too, though only through the females. Some sociobiologists (Alexander 1979) have argued that in man, societies tend to be matrilineal in cases where there is a high degree of paternity uncertainty, but as we have seen, the Marri example goes the other way. Thus we do have very strong, solidary patrilineages in some societies where the degree of genetic contribution to the offspring by the lineage men is perhaps quite small. In other words, human lineages are not based on genetic similarity, and we cannot call on genetic principles to explain why lineage members should support each other or make sacrifices for each other.

However, in the human case, this matters not a whit (cf. Alexander 1979, 176-191). Whereas in many non-human species the behavioural characteristics that are transmitted down the generations are to a greater or lesser extent innate, in primates and especially humans they are learned. It thus does not matter if a human patrilineage lacks genetic continuity, because the cultural traditions passed on down that lineage are transmitted by teaching and learning, and lineage solidarity is based on common learned traditions, totemic allegiances, etc. Any genes capable of learning these are selected for.

Marriage is a part of the cultural tradition, based on a cognitive structural classification of social phenomena and accompanying sets of rules. (In relation to such rules, I accept much though not all of what Fortes (1983) has to say in his magnificent paper about the emergence of human society. Social processes have over time become cognized and reified, and now everywhere different ways give people their sense of social identity. It is in this sense that humans have reinvented their societies, and have reconstructed themselves (Reynolds 1980, Berger and Luckmann 1966). It is within this culturally reconstructed kind of society that human competition occurs.

For there remains, even in this new kind of society, a Darwinian process still at work. Evidence for this has been slow to emerge because biologists have until recently not turned their attention to human society, and because even in the field of animal society it is only recently that real progress has been made. There are two lines of evidence for this Darwinian process, one

of which I will mention only briefly, the other at slightly greater length.

Briefly, it does seem that in some cases at least, the methodology that has succeeded in relating animal societies to their environments can succeed in the case of humans. As an example, we can take Crook and Crook's (1987) study of polyandry in Tibet. They show, on the basis of carefully collected quantitative data, that those individuals who engage in polyandrous marriages in the context of the low-grade and spatially restricted landholdings of Ladakh, achieve on average a greater reproductive success (children and grandchildren are considered) than those who engage in either monogamy or polygyny (the latter is very rare). This demonstration calls in question Hallpike's dismissal of the idea that human social systems are adaptive, and shows that they at least can be, even if this is not always so.

The Darwinian process is further demonstrated by Chagnon (1987) concerning the manipulation of kinship classifications by the Yanomamo Indians of Venezuela. Among the Yanomamo the only form of marriage permitted is cross-cousin (matrilateral or patrilateral). Because men are expected to marry at about 20 years of age and girls at about 13 years of age, and because a person is always expected to marry someone in his or her own generation, there is often a shortage of marriageable girls, and this is compounded by the practice of polygyny. Yanomamo are considerably inbred, as a result of which any given person is related to any other person in a variety of ways. In this genealogical tangle, by fudging the relationships somewhat, men can place girls they might want to marry into a cross-cousin category even if they are not obviously in such a relationship. Chagnon posed this as a hypothesis (i.e. that they would in fact do so) and set out to test it in a number of ways.

His results showed that men were faster at naming their kin than women, and that they consistently classified relatives who were in non-wife categories into wife categories. This was done particularly by taking younger women out of the categories of niece, daughter, and sister and placing them into a wife category. Older women such as mothers or mothers-in-law were not so categorized. He thus concluded that account was being taken of a woman's youthfulness (and hence her reproductive value) in doing the manipulations. Men were consistently more inclined to do these manipulations than women.

In doing this study, Chagnon, in line with earlier work (e.g. Chagnon 1979) is emphasizing that human beings, like other species, are concerned to maximize (or optimize) their reproductive success or their inclusive fitness. A number of other studies (see Chagnon and Irons 1979, and Betzig *et al.* 1987 in particular) concur. This dimension has not yet been fully incorporated into social anthropology, but it needs to be. From the perspective of this chapter, that is something to be welcomed. At the same time, we cannot expect the application of a Darwinian approach to provide all the answers to the differences between different human patterns of social organization and to all the subtle complexities of culture. Nearly all of that has been invented

by humans themselves, and Darwinism is perhaps best suited to trying to find the constraints within which human inventiveness can flourish, the ground rules for building human societies.

Marriage—how and why?

Finally, we can ask how and why marriage was invented. There are two reasons for asking. First, thinking about the invention of a marriage system from a pre-existing mating system is challenging, because it forces one to crystallize what would be the essential steps towards instituting a marriage system. Second, it attacks a fundamental issue in evolutionary biology, namely what would be the advantages of a new way of doing things?

Let us take the second point first. Unfortunately, I do not think we have a proper answer. The answer given by Lévi-Strauss (1949) was that it would eliminate incest achieve a new level of social integration. These are not really biologically adequate answers. Incest is already eliminated in all known species of mammals, by a great variety of patterns of out-mating coupled with innate sexual avoidance of close kin. The improvement in social integration, while a self-sufficient answer in sociological terms is no explanation at all in biological terms, since it lacks the necessary indication of how marriage would improve the reproductive success of marrying individuals or kin lines. However, if it were the case that individuals and lineages that set up marriage arrangements between each other were then assured of a more regular supply of mates than individuals who failed to join in the 'lineage game', this would cause the spread of marriage, assuming it were inter-lineage marriage.

The move from a mating system to a marriage system has been explored by Allen (1982, 1986) whose solution to this problem is what he calls 'tetradic theory'. Tetradic theory argues that the most elementary logical structure for a marrying society is that it should consist of four sections: ego's section; ego's father's section; ego's mother's section; and ego's spouse's section. Such a system can continue indefinitely, individuals always marrying into the section 'opposite' their own, never into their own section (which contains siblings), their father's, or their mother's section. (These sections are illustrated in Allen 1982, Fig 2, p 93.) In this system, the spouse comes from the section that includes cross-cousins. As Allen points out, the system could be carried out without language, e.g. by body painting or hair-styles, each section marking itself with a distinct pattern.

Allen (1982) was trying to depict a bygone scenario, involving dancing, copulation, and excitement. In the second paper (Allen 1986) he looked at the origin of marriage as an abstract, logical problem. We can glean from this study some idea of what is involved in the development of a marriage system from a mating system. Clearly of central importance is the designation of four segments of society, which can be distinguished from each other by some kind of social market or label. This goes beyond what occurs in the

matrilines of primates, where recognition is on an individual basis rather than on a symbolic basis. It involves the process of allocating individuals to the correct sections of society. The rules for this are simple. If the mother is section A, the child is section B; if the mother is section B, the child is section A; if the mother is section C the child is section D; and if the mother is section D the child is section C.

Thus the basic features of the novel human invention that brought about marriage may have been the sectionalizing of society (followed by the reification of the sections) and the systematic allocation of marriage partners between the sections. When you can do those things you can have a marriage system.

CONCLUSIONS

Edmund Leach, in the course of correspondence while I was preparing this chapter, wrote 'At present I do not understand your position'. The reader may share this view. What exactly is the argument? In response I refuse to come out with a one-line inaccuracy. Leach's own position is nice and clear: sociobiology has nothing to contribute; it is an obfuscation. My position is far more agnostic and inquisitive. The study of non-human primates leads to the conclusion that humans as a species are very remarkable. Marriage is one of the most remarkable things about human society. For a social anthropologist concerned exclusively with humans, marriage itself can be taken for granted, and it is the differences between marriage systems that call for description and, perhaps, explanation, whereas the more evolutionarily oriented student sees marriage itself as calling for explanation. So far as I am aware, no satisfactory explanation or even theory exists. My 'position', in so far as it exists is that of the evolutionary biologist who is aware of a peculiarity in the species studied, and is casting about for ideas that may be relevant to a solution, in the certain knowledge that the solution will be complex. The best analogy is again the case of the social insects; no one had the faintest idea how enormously complex the solution to honey-bee society would be until it began to be unravelled by von Frisch, Hamilton, Wilson, and others, and there is still much to be discovered.

The 'conclusions' to be reached at this stage are thus necessarily tentative, but some are in order none the less. Non-human primate society is, as we have seen, very much the outcome of competitive strategies between individuals. Matrilineal exist, and within them we see co-operative behaviours that correspond with shared genetic kinship. Such matrilineal compete with each other. For mating, a male or a female (usually a male) migrates to another group, where he carefully selects a mating partner, who is likely to be just as choosy about him as he is about her. He is also careful in his choice not to upset resident males (unless he goes for a take-over). Mating

partnerships may last for a short or a long time depending on many factors, both phylogenetic and environmental. Reproductive success varies between individual males and between individual females. Those who achieve the largest number of surviving offspring, grandchildren, and close relatives transmit most genes to the next generations, and these genes may either programme behaviour directly or be programmable by learned behaviours. Where environmental conditions have been stable for long periods, innate tendencies to form particular kinds of mating partnerships may exist; gibbons, for instance, seem committed to some kind of monogamy, though as Quiatt (in press) points out it is probably serial monogamy. In less stable conditions, species have variable social systems, with facultative monogamy, polygyny, or promiscuity. The more persistent the polygyny, the more likely we are to see this reflected in sex differences of size, shape, colour, and other characteristics that have a display function.

With regard to our ancestors, we saw that in view of the existence of such sex differences in man, we can assume a long and pervasive history of polygynous mating. This should not, however, lead us to assume that other mating systems are unnatural for humans. We know that many humans are capable of sustained celibacy or monogamy (i.e. 'effective' monogamy in the sense of Brown and Hotra 1987). Of all primates, humans are the most flexible in their social arrangements, because of the extension of the cognitive control of behaviour already seen in non-human primates.

Marriage itself, the explanandum, is very different from mating. Leach makes the point that those who marry each other are not necessarily those who mate with each other, and that marriage is a bond between social groups rather than individuals. This gave us a clue as to how to describe the distinctive feature of marriage in a biological way. By analogy, we can see that haplo-diploidy, the invention-by-mutation of some social insects species, was a breakthrough in raising the level of social co-operation to new heights. Humans seems to have achieved their breakthrough in a different way, by cognizing and reifying segments of society, and by setting up rules of conduct between them. What the pressures were that led to this we do not know.

The advantage of marriage to lineages, it seems, is that it ensures recruitment. Lineages of some kind, matriline perhaps (though patriline following a chimpanzee model are a possibility), pre-existed marriage. Such lineages would already have been in competition with each other. Studies of primates conducted over many years, e.g. the studies of the rhesus monkeys on Cayo Santiago, have shown that lineages wax and wane in numbers, some doing well, while others die out completely. The advantage to a regulated pattern of recruitment would be the long-term survival of the lineages involved. This remains the case today in societies where such arrangements exist. Where they do not, in Western society for instance, lineages tend to be short-lived. Such marriages are made in heaven and not negotiated by

families that expect to exchange children with each other for their mutual advantage.

Marriage thus enables things to happen that would not happen otherwise. By committing lineages or other segments of society to each other, it establishes a reciprocity that leads on to other social ramifications such as the exchange of goods. There are certainly fitness considerations present here. Individuals are said to make 'good' marriages, meaning that they have married into plentiful resources. Whether or not marriage is sociocentric rather than egocentric, both the parents and the spouses have a variety of material concerns. Besides recruitment, therefore, which is the sociocentric side of marriage, there is the allocation of available resources to individuals. Bridewealth, where the wife's services are highly valued, and dowry where the husband's are, both not only express family relationships but actually remove real resources from one set of individuals and give them to another set in other family.

And finally, there is the thorny issue of reproductive success. It is a mistake to think genetically here. It does not matter whether the *pater* is the *genitor* or not. Transmission of all that matters for survival and competition is achieved in humans by learning, and offspring are equally able to learn their parents' characteristics whether they are their genetic progeny or not. In fact, children do nearly always share genes with their *mater*, and quite often with their *pater* too. The overlap between social and biological paternity is perhaps small in the Marri Baluch, but it is great in the Pitcairn Islanders (Brown and Hotra 1987) or the Kipsigis (Borgerhoff-Mulder 1987). But this seems unimportant in a species in which behaviour is almost wholly learned, and marriage is very much the invention of such a species.

REFERENCES

- Alexander, R.D. (1979). *Darwinism and human affairs*. University of Washington Press.
- Allen, N.J. (1982) A dance of relatives. *Journal of the Anthropological Society of Oxford*, 13 139-146
- Allen, N.J. (1986). Tetradic theory: an approach to kinship. *Journal of the Anthropological Society of Oxford*, 17, 87-109.
- Arensberg, C.M. and Kimball, S.T. (1940). *Family and community in Ireland*. Harvard University Press, Cambridge, MA.
- Berger P. L. and Luckmann, T. (1966) *The social construction of reality*. Penguin, Harmondsworth.
- Berremen, G.D. (1963). *Hindus of the Himalayas*. University of California Press.
- Betzig, L.L., Borgerhoff-Mulder, M., and Turke, P. W. (1987) *Human reproductive behaviour : a Darwinian perspective*. Cambridge University Press.
- Borgerhoff-Mulder, M. (1987) On cultural and reproductive success: Kipsigis evidence. *American Anthropologist*, 89, 617-34.

- Borgerhoff-Mulder, M. (1988). Resources and reproductive success in women with an example from the Kipsigis of Kenya. *Journal of Zoology*, **213**, 489-505.
- Brown, D.E. and Hotra, D. (1987). Are prescriptively monogamous societies effectively monogamous? In *Human reproductive behaviour: a Darwinian perspective*, (ed. L. Betzig, M. Borgerhoff-Mulder, and P. Turke). Cambridge University Press.
- Burley, N. (1979). The evolution of concealed ovulation: *American Naturalist*, **114**, 835-8.
- Cant, J.G.H. (1981). Hypothesis of the evolution of human breasts and buttocks. *American Naturalist*, **117**, 199-204.
- Caro, T.M. and Borgerhoff-Mulder, M. (1987). The problem of adaptation in the study of human behavior. *Ethology and Sociobiology*, **8**, 61-72.
- Chagnon, N. (1979). Is reproductive success equal in egalitarian societies? In *Evolutionary biology and human social behavior: an anthropological perspective* (ed. N.A. Chagnon and W. Irons). Duxbury Press, North Scituate.
- Chagnon, N. (1987). Male Yanomamo manipulations of kinship classifications of female kin for reproductive advantage. In *Human reproductive behaviour: a Darwinian perspective*. (ed. L. Betzig, M. Borgerhoff-Mulder, and P. Turke) Cambridge University Press.
- Chagnon, N. and Irons, W. (eds) (1979). *Evolutionary biology and human social behavior: an anthropological perspective*. Duxbury Press, North Scituate.
- Clarke, E. (1957). *My mother who fathered me*. Allen and Unwin, London.
- Crook, J.H. and Crook, S.J. (1988). Tibetan polyandry: problems of adaptation and fitness. In *Human reproductive behaviour: a Darwinian perspective* (ed. L.L. Betzig, M. Borgerhoff-Mulder, and P. Turke). Cambridge University Press.
- de Waal, F.B.M. (1982). *Chimpanzee politics*. Harper and Row.
- Dickemann, M. (1981). Paternal confidence and dowry competition. In *Natural selection and social behavior* (ed. R.D. Alexander and D.W. Tinkle). Chiron Press, New York.
- Dunbar, R.I.M. (1984). *Reproductive decisions*. Princeton University Press.
- Eisenberg, J.F., Muckenhirn, N.A., and Rudran, P. (1972). The relation between ecology and social structure in primates. *Science*, **176**, 863-74.
- Fedigan, L.M. (1986). The changing roles of women in models of human evolution. *Annual Review of Anthropology*, **15**, 25-66.
- Flinn, M.V. (1988). Parent-offspring interactions in a Caribbean village: daughter guarding. In *Human reproductive behaviour: a Darwinian perspective* (ed. L. Betzig, M. Borgerhoff-Mulder, and P. Turke). Cambridge University Press.
- Fortes, M. (1983). *Rules and the emergence of society*. Royal Anthropological Institute Occasional Paper, no 39.
- Friedl, J. and Ellis, W.S. (1976). Celibacy, late marriage and potential mates in a Swiss isolate. *Human biology*, **48**, 23-35.
- Gorer, G. (1938). *Himalayan village*. Michael Joseph, London.
- Hallpike, C.R. (1987). *The principles of social evolution*. Clarendon Press, Oxford.
- Harcourt, A.H., Harvey, P.H., Larson, S.G. and Short, R.V. (1981). Testis weight, body weight, and breeding system in primates. *Nature*, **293**, 55-7.

- Hernandorena, A.R. (1988). *Mating patterns and fertility in a Basque shepherding community, 1800-1975*. D. Phil. thesis, Oxford University.
- Holloway, R.L. (ed.) (1974). *Primate aggression, territoriality and enophobia*. Academic Press, New York.
- Kawai, M. (1958). On the system of social ranks in a natural group of Japanese monkeys. *Primates*, **1**, 11-48.
- Kinsey, A.C., et al. (1948). *Sexual behavior in the human male*. W.B. Saunders, Philadelphia.
- Kummer, H. (1968). *Social organization of Hamadryas baboons*. Karger, Basel.
- Kuroda, S. (1980). Social behaviour of the pygmy chimpanzees. *Primates*, **21**, 181-97.
- Leach, E. (1961). *Rethinking anthropology*. Athlone Press, London.
- Lévi-Strauss, C. (1949). *Les structures élémentaires de la parenté*. Presses Universitaires de France, Paris.
- Lovejoy, C.O. (1981). The origin of man. *Science*, **211**, 341-50.
- Malinowski, B. (1922). *Argonauts of the Western Pacific*. Routledge, London.
- Majumdar, D.N. (1962). *Himalayan polyandry*. Asia Publishing House, London.
- Meggitt, M.J. (1962). *Desert people*. Angus and Robertson, Sydney.
- Michael, R.P. (1975) Primate sexual pheromones. In *Olfaction and taste* (ed. D.A. Denton and T.P. Coghlan). Academic Press, New York.
- Nagi, M.H. (1983). Trends in Moslem fertility and the application of the demographic transition model. *Social Biology*, **30**, 245-62.
- Packer, C. (1977). Reciprocal altruism in olive baboons. *Nature*, **265**, 441-3.
- Quiatt, D. (in press) Household structure in a group of gibbons (*Hylobates lar*).
- Reynolds, V. (1962). *Social behaviour of a colony of rhesus monkeys (Macaca mulatta)*. Ph.D. thesis, University of London.
- Reynolds, V. (1980). *The biology of human action* (2nd edn). Freeman, Oxford.
- Reynolds, V. (1984). Social changes in a group of rhesus monkeys. In *The meaning of primate signals* (ed. R. Harré and V. Reynolds). Cambridge University Press.
- Reynolds, V. and Tanner, R.E.S. (1963). *The biology of religion*. Longmans, Harlow.
- Richards, A.I. (1956). *Chisungu: a girl's initiation ceremony among the Bemba of N. Rhodesia*. Faber and Faber, London.
- Rowell, T.E. (1966). Forest living baboons in Uganda. *Journal of the Zoological Society London*, **147**, 344-64.
- Schaefer, O. (1977). Are Eskimos more or less obese than other Canadians? *American Journal of Clinical Nutrition*, **30**, 1623-8.
- Schaller, G.B. (1963). *The mountain gorilla: ecology and behavior*. University of Chicago Press.
- Seyfarth, R.M. (1984). Comment. In *The meaning of primate signals* (ed. R. Harré and V. Reynolds). Cambridge University Press.
- Smuts, B.B. (1985). *Sex and friendship in baboons*. Aldine, Hawthorne, New York.
- Symons, D. (1979). *The evolution of human sexuality*. Oxford University Press.
- Tanner, N. (1981). *On becoming human*. Cambridge University Press.
- Tanner, R.E.S. (1967). *Transition in African beliefs*. Maryknoll Publications, Maryknoll, New York.
- Trivers, R. (1985). *Social evolution*. Benjamin Cummings, Menlo Park, California.
- Tutin, C.E.G. (1979). Mating patterns and reproductive strategies in a community of

- wild chimpanzees. *Behavioral Ecology and Sociobiology*, 6, 29-38.
- Wrigley, E. A. and Schofield, R. S. (1981). *The population history of England, 1541-1871: a reconstruction*. Edward Arnold, London.
- Yoshida, K. (1968). Local and intertroop variability in ecology and social behavior of common Indian langurs. In *Primates: studies in adaptation and variability* (ed. P. C. Jay). Holt Rinehart and Winston, New York.

3

The Social Anthropology of Marriage and Mating

EDMUND LEACH

MATING OR MARRIAGE

While preparing various drafts of this essay in collaboration with Dr Vernon Reynolds it has become obvious that although biosociologists often use terms which are also used by social anthropologists, they use them in quite a different way. Two such terms are 'mating' and 'marriage'. A third term, 'descent', which has not so far come into the argument hangs in the background. I am a social anthropologist and I use these terms in a social anthropological way. So let me start by explaining what that way is. For me, mating and marriage are totally different concepts, as different as chalk from cheese.

Mating is a matter of biology: who copulates with whom? Infringements of mating rules are sins, usually committed in secret—for example, committing incest or adultery, or engaging in homosexual relationships or bestiality.

Marriage is a public matter: who lives with whom, who can claim paternity over a woman's children? Infringements of marriage conventions, for example, bigamy in English society, are breaches of the law. Descent comes into it because it is through marriage and paternity that the children born to a woman are recruited to a particular unilineal descent group, if such exists.

Such distinctions are sometimes difficult to grasp. In some societies the fact of living together in public is itself treated as evidence of marriage; in other societies this is not the case. Homosexuality does not always rate as sinful; sometimes it features in male initiation rites as a ritual requirement. Ian Hogbin called his 1970 monograph about religion in Wogeo, New Guinea, *The island of menstruating men*; things are that mixed up!

Mating and marriage among the North Burma Kachins

A fairly detailed account of the rules about mating and marriage from a society which I know well will illustrate some of these points.

First, mating. Among the North Burma Kachin (Jinghpaw)' restriction on