



Creating the Nation's first BioPark

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Letter From the Desk of David Challinor  
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We, as humans, are primates and we have determined that we occupy the peak of mammalian evolution along with the four great ape species: gorilla, orangutan, and the two chimpanzees (Pan paniscus, the pygmy chimp, and P. troglodytes). It is hard for us to study our own behavior; our analyses are biased because we carry so much human "baggage." It would require an extra-terrestrial intelligent being to develop unprejudiced explanations of our behavior. We can, however, gain considerable insight into how and why we act the way we do by close study and observation of the great apes.

To insure that we (all primates) survive we have evolved mating strategies that vary both within the great apes and among human cultures. If our evolutionary goal is to produce healthy offspring that can survive a changing cultural and physical world, we should consider the strategic advantages and disadvantages of:

- monogamy -- a male and female breeding only with each other
- polygamy -- a male or female breeding regularly with more than one of the opposite sex
- polygyny -- a male breeding regularly with multiple females
- polyandry -- a female breeding regularly with multiple males

Almost all vertebrates and many invertebrates reproduce sexually. In other words, the reproductive cells of males and females must make contact with each other to produce eventually viable offspring. This is not new information, yet it is important to remember that there are numerous variations in reproduction. For example, there is a group of lizards living in the Yucatan, called whiptails, which reproduce parthogenetically -- that is the female lays eggs without male fertilization because there are no males. The young all hatch female and successfully perpetuate themselves, without the bother of courtship and the other impedimenta of sexual reproduction. This letter, however, will consider the positives and negatives of the strategies between male and female.

The great apes use all strategies save monogamy. No one strategy is necessarily better than another, and in some groups the strategies are mixed. Monogamy, however, is practiced by tamarins and gibbons, two highly arboreal primates.



Tamarin female and male bond and stay together to raise their progeny, usually twins. Both parents share in caring for their young, although in first litters often only one twin survives because of parental inexperience. The young cling to the fur of each parent, which requires considerable energy for these small primates as they forage in the tree tops. If the stress of climbing, fleeing predators and taking care of the infants is too great, the parents may not feed their offspring enough, and so weakened, the offspring lose their grip and fall to their death. This problem is partially solved when a second set of young are born, because the older siblings as well as the parents share the burden of carrying the newborns. Each tamarin troop, generally consisting of parents and sets of siblings (usually about six or seven animals), has its own territory. When two families meet at the boundary of their respective "turfs," there is a great deal of vocalization and display. Such gatherings provide the opportunity for sexually mature offspring from each family to pair off and start a new family; a behavior not so different from such practices of ours as mitzvahs, debutante balls, etc.

Gorillas are polygynous and their breeding strategy results in a dominant male at the head of a harem of three to six females and their young, which he has generally sired. Young males may leave the troop when they become sexually mature and live in bachelor groups until one can successfully challenge an aging or infirm silverback and take over from him. Another strategy is for a young male to stay in the group, support the leader, and eventually inherit it. Young males can also establish their own troop by luring young, sexually mature females from an existing band. Fighting and competition between males may allow females to assess their strength and fitness and thus choose the "best" ones as mates. The analogies to the human social scene are obvious.

Orangutans are polygamous, but adults seldom make contact with each other except to breed. They range widely for food. Estrus females may seek out males based on their size and long calls. Although fights between males for access to estrous females must occur, as evidenced by wounds on large males, such fighting has seldom been observed by humans. Females do not ovulate while nursing and weaning takes four to five years; thus females probably produce only four or five young during their lifetimes. When not actually breeding, females remain solitary with their nursing young. During courtship the male "sings," and as observed in zoos, it is a rather moving display.

Such affection (I am being anthropomorphic) is generally not evident in the great apes most closely related to humans -- the chimpanzees. Chimps have their own different breeding strategy. They live in groups of up to 20 animals. The males form loose coalitions of two to possibly four with one male usually being



dominant over the others, although such dominance has been seen to shift from one to another. The females, as in other primates, do not ovulate while nursing and thus only breed at multi-year intervals. When a female comes into estrus, however, her whole genital region swells and turns red. In this condition she chooses to breed with any one of the dominant males, but she will also accept as many as six or seven other males before and after peak estrus. Until recently, when genetic markers were recognized, it was difficult to determine which male was the father of a given offspring, but the female chimpanzee is probably indifferent as the male does not participate in raising the young.

One mating system is not necessarily better than the others, but each has certain advantages that seem parallel to those human cultures that follow the same three strategies.

The apparent advantage of monogamy, at least in tamarins, is the need for at least two adults to carry and feed the twin babies in the canopy. For humans, monogamy has the ideal advantage of assuring the offspring two parents of opposite sex who are ideally as committed to the child as they are to each other. Monogamy also offers males a degree of certainty of their paternity and thus may encourage them to invest substantially in raising their offspring.

Polygyny, as practiced by gorillas, has the advantage of having babies cared for by groups of females under the protection of one dominant male. An extreme example, not seen before in zoos or in the wild, occurred at NZP when a female gorilla gave birth to a young male and abandoned it. It was picked up by another female in the troop who was still nursing a one-year-old baby. She took the newborn and successfully raised it with her own. In human polygynous cultures, domestic duties are sometimes shared by subordinate wives. Multiple wives can usually be afforded only by rich, powerful men, as in the traditional harems of the Ottoman sultans. Economic security as well as a female support system are evident benefits to a wife in a polygynous household. The reports and letters we have from 19th century members of harems do not always paint a totally negative picture.

The advantage to females of polyandry is a little harder to understand. Polyandry is rare in human cultures, although not unknown among Inuit (Eskimos) a century ago and in a few nomadic societies today. Chimpanzees are, strictly speaking, polygamous with individual females and males each having more than one mate. They are thus technically both polygynous and polyandrous. I might speculate that by accepting multiple males while fertile should increase the odds of becoming pregnant. It may also allow the female to sample males and choose the most vigorous during ovulation. A disadvantage is that the female would not know

which male was the father, but that is probably unimportant to the female or even to the species.

Remember, as primates (prior to genetic testing) we humans could only be certain who our mothers were. That being the case, matrilineal societies such as those still functioning in Ghana make good sense. Maternal uncles are responsible for the education and well-being of their nieces and nephews because the male with this responsibility can be absolutely certain he had the same mother as his sister. The husband of the wife, who cannot be positive that he is the father of his wife's children, is therefore relegated to a secondary position. True genetic family responsibility in this case triumphs.

By confining myself to primates, I have only scratched the surface of mating strategies in the animal kingdom. Certain fish change from male to female as they mature. In a species of angler fish one or more small males bite into the flesh of the large female and their heads eventually fuse with the female so that they become mere appendages to her and function solely to fertilize her eggs when released. The variations and approaches to reproduction are endless and the evolutionary pluses and minuses are often unfathomable to the human mind.

Whether the American way of mating is the best for human survival has yet to be determined. With a divorce rate in our country almost equaling the marriage rate, we are moving toward sequential monogamy. I do not imply that the high divorce rate is a bad trend; it is just one more variation of an endlessly changing mating strategy that is culturally evolving in our midst. Because we are so much a part of it, it is hard to measure the rate of cultural change, but by studying behavior of our genetic relatives, the great apes, we can gain insight into our own reproductive strategies.

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