

Parturition in Rhesus Monkeys (*Macaca mulatta*)

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ABSTRACT. During five years of birth season fieldwork, we observed two births and three peri-birth instances of behavior of free-ranging rhesus living in Kathmandu, Nepal. These constitute the first two recorded free-ranging rhesus births, and we compare them to the behavior which has been observed in captivity and expected in the wild. The free-ranging parturition behavior was characterized by a general lack of contact with other troop members and by overall inconspicuousness. In the first birth we observed, the troop moved about 70 m up the hill, leaving the laboring female behind on an open hillside. Two males, a female and a juvenile returned and rested about 20 m from the delivering female. During the second delivery, the female stayed with the troop and seemed to participate normally in most troop interactions, although she avoided physical contact with other troop members. We propose that this near-normal behavior may help to assure successful parturition by allowing the female the needed social isolation and inconspicuousness without any loss of troop protection. It may also partly explain why births have not been observed during previous studies. Observations of rhesus parturition behavior reported from studies of captive monkeys and reports from other free-ranging primate studies are compared with our data.

INTRODUCTION

Observations of parturition in monkeys are rare in captivity and almost lacking among free-ranging primates. Little is known about social interactions surrounding pregnant monkeys as they give birth. Of all primates, parturition behavior in rhesus (*Macaca mulatta*) has been best studied, although this has been almost exclusively in laboratory situations. In this report, we present the first two scientific observations of parturition among free-ranging rhesus, and compare the expectations derived from laboratory based literature and other observations recorded in free-ranging primates to the behavior we saw.

During five years of fieldwork on the free-ranging rhesus monkeys in and around the temples of Kathmandu, Nepal, we collected approximately 1,000 hr of behavioral data during the birth season months of April, May, June, July and August. In addition, frequent censuses of the 12 troops were conducted. A total of 531 live infants were recorded during our study periods. In spite of the large number of births which took place, we only observed two births, one of a normal healthy infant and one of a breech stillborn infant. In addition, we noted three still-wet infants, thought to be newly born. This infrequency of observed births might easily be attributed to births occurring when we were not there, either at night or during periods of non-observation. However, it might also be that our expectations of identifying

behavior for parturition were predicated on reports from captive monkey parturition studies in which the female's behavior is clearly unusual and easy to notice. The events surrounding the two observed births and to a lesser extent the near-observations, provide some insight into the social dynamics surrounding parturition and suggest some possible reasons why few births are ever seen.

Unusual behavior is normally obvious, but quiet disappearance from the group, unless a focal animal under observation is involved, is often missed. Since the circumstances in which we observed the births were so unexpected, we present these data with two possible hypotheses. First, that we observed only the unusual births, and hence they are unrepresentative, or second, that the seemingly casual behavior we observed is normal, which makes births inconspicuous.

METHODS

Both births were seen when the troops were visited at non-observation period times of day, and in both cases, many people visiting the temple were present on nearby paths. We recorded descriptive observations of the events and photographed the births. The near-observation of births were recorded during normal observation periods.

STUDY SITE

The monkeys live in two temples on opposite sides of Kathmandu city in Nepal. There are approximately 600 monkeys, in 12 troops, 5 of which live at Swayambhu temple and 7 at Pashupati temple. Now separated from the forests of the Kathmandu valley by extensive agriculture, they subsist primarily on food offered at the temples as part of worship, food given directly to them, garbage from the adjacent villages, and occasionally from raidings in the nearby fields. There are also some natural foods available, primarily grass, fruit and leaves. In general, the temple grounds are more park-like than forested. The monkeys have probably co-existed with the worshippers at the temples for hundreds if not thousands of years. By both secular and sacred law, the monkeys are protected from overt harassment or commercial trapping.

RESULTS

The first near-observation of a birth was observed in the late afternoon on August 8, 1974, when a female in advanced pregnancy disappeared, seemingly alone, into the undergrowth of a garden, reappearing shortly with a new infant.

The second near-observation was recorded in the early afternoon on June 16, 1975, when a single female left some nearby bushes, carrying a wet newborn infant. She approached two adult females, soliciting grooming by lying down first in front of one and then the other and was ignored by both.

The third near-observation was recorded at 7:30 a.m. in mid June 1975. A high ranking female was seen asleep in the middle of a troop of monkeys, holding a placenta in one hand. A wet newborn infant was asleep on her abdomen. Although the monkeys around the new mother were grooming, none groomed the new mother.

The first actual birth was observed in the parkland adjacent to Swayambhu temple, in the mid-afternoon of June 15, 1976. A troop was searching through the litter along the road for food. *Bina*, a multiparous middle ranking female was in the middle of the troop. Standing on all four legs, she contracted her arms and arched her body in a horizontal squatting position with her abdomen almost touching the ground. Her perineum appeared wet. *Ajax*, the second ranking male, came over to her, displaced her, sniffed the ground and then led the troop up the slope away from *Bina*. *Bina* and her 2-year-old juvenile walked slowly up the open slope above the road, onto a grassy knoll. Her juvenile stayed with her, briefly groomed her and slept. After 45 min, the juvenile also left. The troop leader *Agamemnon* returned, and sat about equal distance between *Bina* and the troop which was scattered among the trees and bushes some 30 m higher on the slope. The third ranking male walked below *Bina*, and sat about 20 m away from her, between *Bina* and us. A young mother, *Sarita*, walked up to *Bina*, looked and walked away. *Bina* moved to the base of a tree. Five minutes before the actual delivery, as *Bina* was experiencing increasingly intense contractions, a cow walked past her, paused to sniff, and then moved down the hill. After a series of rapid contractions, the hand of the infant appeared. Standing on three legs, *Bina* reached for the arm and pulled it towards her at the same time as the rest of the infant was delivered. *Bina* ignored the infant, who clung to *Bina*'s abdomen, and began to lick her fur clean. The birth had occurred 1 hr after we first noticed her contractions, and 15 min after the last monkey had left her side. The only sound during the birth had been a single cry by the infant a few minutes after being born. When the placenta was delivered 8 min later, *Bina* ate it immediately. *Sarita* returned, looked and sat nearby, grooming herself. *Bina*'s juvenile also returned, looked at *Bina*, and then joined *Sarita*. Fifteen minutes later, *Bina* began to move slowly towards *Agamemnon* and the rest of the troop, pausing often to lick her fur and eat the umbilical cord. It was not until she was mostly clean, 28 min after the actual birth, that she began to clean her infant. As they joined the troop, almost 1 hr later, *Bina*'s juvenile walked up, briefly groomed *Bina*'s tail, and then moved away. *Bina* moved towards the center of the troop and slept.

We first noticed the second fema'e in labor at 6:35 in the morning on June 13, 1978. *Patience*, a high ranking, multiparous female in a different troop at Swayambhu, was first seen having active contractions, with the inert legs of a dead fetus already protruding from her vagina. She was next to the main path to the Swayambhu temple, with people passing within 3 m of her. By 9 a.m., the contractions had stopped, although she continued to pull unsuccessfully at the fetus during the day. During the next 12 hr, we observed her eat, initiate aggression, sleep and defend a troop male in an aggressive encounter. She generally avoided contact with the other troop members, appearing to wince when touched. Twice we saw a juvenile groom her for a few minutes. A few of the other troop members came near, sniffed the fetus and moved away. *Patience* was often in the middle of the troop, and except for her half-expelled fetus, was unremarkable within the troop, either by appearance or by behavior. The next day, we saw her walking slowly at the rear of the troop, with no evidence of the fetus.

DISCUSSION

In many instances, we observed troop members giving support to an injured or sick troop member similar to the support given *Bina*. No human could approach a sick monkey without being threatened, but neither did other adult monkeys approach. In several instances, mon-

keys would approach the victim within a few feet, sniff and then back away. Occasionally a juvenile would stay with its mother, grooming her if she were sick. Both females giving birth as well as the three near-observations of births were characterized by similar non-hinderance and non-contact care as that given to sick and injured monkeys.

In comparing free-ranging monkey behavior with captive monkey behavior, it is important to remember lighting conditions, space and food, as well as social grouping are all unlike natural conditions, and the behaviors seen under captive conditions may appear differently in the wild, or not at all. HARTMAN (1932) reported on 36 deliveries, JACOBSON and WINDLE (1960) collected data on 32 deliveries, ROWELL, HINDE and SPENCER-BOOTH (1964) mention 2 deliveries and MITCHELL and BRANDT (1975) reported on 12 filmed deliveries. VALERIO et al. (1969) provide some information on the timing of births. These studies have focused on using monkeys as a "natural" model for human labor and delivery. Time of day, position of the female in labor and her participation in the delivery have all been areas of interest. In addition, these observations have formed a model for expectations of parturition behavior in the wild. For instance, TINKLEPAUGH and HARTMAN (1930), in explaining the possible adaptive origin of manually assisted deliveries, suggested, "In the natural state manual cooperation undoubtedly serves two ends: it expedited delivery and it prevents the young from falling from the trees, in which presumably, parturition takes place."

Information on the timing of delivery is especially problematic when captive studies are examined. VALERIO et al. (1969) reported that less than 1% of all births occurred during the day, although the monkeys were caged in a building without windows. VAN WAGENEN (1972) noted, "...animals in labor have been observed to abruptly subdue uterine contractions when they focus their attention on the incoming food truck. Then again, a monkey may suspend labor to voice an opinion in a dispute in a neighboring cage and it is difficult to give up the belief that some animals being watched for the imminent birth of an infant can quietly, in turn, watch the personnel and retain the fetus until after the 5 o'clock locking of the animal quarters." The suggestion based on captive studies, that parturition takes place at night, and that the female appears to have some control over labor, supports our expectations that monkeys would control the timing of delivery to coincide with optimal conditions for seclusion. It therefore seems logical that most monkey births would be at night. Protection from both predators and the possible harassment by other monkeys, would be maximal during the night, when the female is sequestered safely in the branches of a tree. These human perceived advantages may not be those perceived by the monkeys, and the human expectations for night deliveries may have biased reports. Although several studies state the time of day as being predominately night for deliveries (TINKLEPAUGH & HARTMAN, 1930; JACOBSON & WINDLE, 1960; MITCHELL & BRANDT, 1975), none detail the actual lighting conditions of the cages, nor other concomitant variables such as the number of observers present.

Captive studies provide very limited information on troop social dynamics since generally the female was isolated from a group, housed either alone or with one other cagemate. TINKLEPAUGH and HARTMAN (1930) placed pregnant females in the same cage with an expectant mother. In two cases described, the other female ignored the delivery. One of the females, "even when drenched by the flow of amniotic fluid from her companion in the upper compartment... merely looked up through the screen floor and then moved to another corner" (TINKLEPAUGH & HARTMAN, 1930). One of these pregnant females was later placed with another delivering mother just prior to her own delivery, and this time as a cagemate, she avidly liked the blood and fetal fluids that fell into her lower cage, later stealing part of the placenta

and eating it as well (TINKLEPAUGH & HARTMAN, 1930). ROWELL, HINDE and SPENCER-BOOTH (1964) reported, "Early in labor the mothers usually kept away from the other animals in the group and were ignored by them. In the two live births observed, however, the mother was attended closely by another female in the final stages." MITCHELL and BRANDT (1975), based on three observations of cagemates of delivering females, noted intense curiosity, sexual arousal or nervous avoidance of the laboring female, as well as aggressive threats of these cagemates towards the human observers. It thus appears, based on limited data from studies done on captive rhesus, that cagemates have been reported to ignore or take an interest in a laboring female.

The silent labor of both *Bina* and *Patience*, when compared to studies of captive monkeys, appears typical. None of the investigators of captive monkey births reported female cries, although infant cries were noted. TINKLEPAUGH and HARTMAN (1932) made the further comment that, "...the monkey subjects gave no vocal expression of their pain or discomfort unless these were associated with contact or interference on the part of an observer." The mutual avoidance of contact with other monkeys that we noted, as well as the general lack of interest among troop members, may be related to the apparent rhesus response to pain which, in captivity at least, seems associated only with external stimuli and not with the birth process. If this is true, free-ranging monkeys would quickly learn to avoid a female in labor, for fear of eliciting her hostile response. Likewise, the delivering female would avoid other monkeys who might be associated with the source of her pain.

A major difference between the births we observed and those seen in captivity was the unusual behavior of the female. The lying down and restlessness noted could be artifacts of a caged environment in which monkeys get little exercise, resulting in possibly weaker contractions hindering delivery. Restlessness may also have been the result of the intense human interest exhibited during the monkey's delivery, which even in captivity was unusual.

There have been three other descriptions of free-ranging primate births, and one other near-observation of a free-ranging primate birth. OPPENHEIMER (1976) described the birth of a langur, in which the pregnant female and two other females descended to the ground for 21 min prior to the birth, remaining there 19 min after the birth. KUMMER (1968) and ABEGGLEN and ABEGGLEN (1976) each described a birth of a hamadryas baboon. Both births occurred at dusk, in the sleeping cliffs. KUMMER described a female who gave birth alone, 2 m from her group. ABEGGLEN and ABEGGLEN noted that the unit leader male accompanied the female they saw give birth. The only indication of outside interest noted by ABEGGLEN and ABEGGLEN was that another more peripheral one-male band moved around the laboring female, leaving her and her male leader on the edge of the sleeping group. LINDBURG (1971) observed a rhesus female in labor. She came to the ground, appeared to strain during contractions clutching a sapling, and between contractions repeatedly cleared the leaves away from her. Then, evidently scared by some troop stragglers, she disappeared, rejoining her troop 2 hr later with a newborn infant. LINDBURG noted that none of the other troop members appeared to give the female any special attention during her labor contractions. In addition, he too described several mothers with hours-old infants, usually seen in the morning, as well as one still wet infant being carried by its mother at midday. These reports of other free-ranging primates are similar to ours in that they are characterized by apparent lack of general interest among the other troop members. Also, the births noted all took place during the day, and on the ground, unlike what TINKLEPAUGH and HARTMAN (1930) had postulated, in a tree.

CONCLUSIONS

The rhesus monkeys in Kathmandu may be unusual in the ever-constant presence of people and other monkeys, as well as relatively little available ground cover. Both observed births occurred during the day, in open, unsecluded areas with people and other animals nearby. In neither of the births we observed did the mother seek cover. They were both vulnerable to people on nearby paths, cows in the vicinity, avian predators and other monkeys. Most unexpected was the lack of apparent concern or close contact with other members of the troop, either during the birth or at the appearance of a new infant. Our report of rhesus peri-birth and birth behavior suggests that proximity of troop members may be important. A troop context requires monkeys to stay within hearing distance of troop members for protection, and giving birth appears to require social distance. By avoiding contact, yet staying with the troop, *Patience* achieved relative social isolation. *Bina* maintained spatial distance, and attracted some social attention from the troop males and one troop female, as well as her juvenile. These births may have been unusual, which is why we could observe them, or they may have been normal parturition behavior which is adapted to being unobtrusive. Silent, inconspicuous births may be evolutionarily adaptive and provide survival advantage. By comparing parturition behavior of rhesus in captive and free-ranging conditions, we can better understand the plasticity of rhesus behavior, modifications which have arisen in captivity, and some of the human interpretation and expectations of non-human primate behavior.

Acknowledgements. We thank L. CORTESI, M. COUNTRY, S. SHRESTHA, G. SHRESTHA and R. SHRESTHA for field assistance in Kathmandu. Dr. R. UPRETY, D. D. BHATT, K. R. PANDEY, B. PRADHAN, B. N. UPRETY, H. R. MISHRA, G. CAMPBELL and T. ACKER for logistic assistance in Nepal. M. G. SMITH, J. HESS, B. BISHOP, E. SNIDER, J. FISHER, E. CANEY, P. PIERCE and B. ROSBOROUGH for their support in the United States. The work in Nepal was supported by grants from the National Geographic Society and the Earthwatch program of the Center for Field Research in Belmont, Massachusetts. The work in the United States was partially supported by the Rockefeller Foundation grant to the Interdisciplinary Programs in Health at the Harvard School of Public Health, in Boston, Massachusetts.

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—Received November 4, 1980; Accepted March 30, 1981

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