

SOCIAL ORGANIZATION OF THE SOUTH AMERICAN MONKEY, *CALLICEBUS MOLOCH*: A PRELIMINARY REPORT

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ABSTRACT

Callicebus moloch ornatus, a small diurnal South American monkey, was the subject of an 11-month field study. Groups usually consist of an adult pair and one or more young, and each group occupies a definite and fixed territory. Adjacent groups often meet, usually in the early morning, in specific locations at the boundaries of their territories. As opposing pairs approach, each animal draws closer to its mate. Male and female then sit with sides touching, facing the opposing pair a few meters away. There follows an elaborate vocal exchange in which all animals participate. Calling is accompanied by tail-lashing, arching, piloerection, and short rushes which may develop into a chase. One animal rarely overtakes another during a chase and even when this occurs, fighting is not severe. Mateships appear to be stable, although animals will occasionally copulate with members of adjacent groups, especially during the seasonal peak of sexual activity. Arrival of young had no obvious effect on the pair bond. In one group in which reliable identification of sexes was possible, the male carried the infant at virtually all times, except when it was being nursed.

I. INTRODUCTION

Few New World primates have been studied intensively from a naturalistic point of view and little systematic information is available on the forms and varieties of social organization in these monkeys. Of the more than 15* genera of platyrrhine monkeys, only one, the howler monkey (*Alouatta*) has been the subject of a major field investigation (Carpenter, 1934). Groups of howler

monkeys on Barro Colorado Island in Panama averaged about 18 animals, with an upper limit of 35. Observations of red spider monkeys (*Ateles*), indicate that they are frequently found in small subgroups, but join with others in larger groupings of as many as 40 individuals (Carpenter, 1935). More limited observations on *Cebus*, *Lagothrix*, and *Saimiri* suggest a similar tendency in these primates toward the formation of large groups (Bates, 1944; Fooden, 1963; Kuhlhorn, 1939).

All New World monkeys, however, do not conform to this pattern. Moynihan (1964), for example, notes that Panamanian night monkeys (*Aotus trivirgatus*) are most often found in pairs or in small family units, and the same characteristic is suggested for marmosets (Hampton, 1964; Stellar, 1960). However, there have been no systematic field studies of any South American primate which displays a tendency toward a small, "family unit" type of social organization. Such a tendency was strongly evident in *Callicebus moloch*, the subject of the present report, and was a major consideration in the selection of this species for study in the field.

II. RANGE AND PHYSICAL APPEARANCE

The range of Amazonian and Orinocoan species of *Callicebus* extends north from the upper Rio Paraguay basin in Mato Grosso, Brazil and Paraguay into Colombia, Venezuela, and extreme northwestern Brazil; and it extends west from Rio Tocantins in the state of Pará, Brazil into parts of Bolivia, Peru, Ecuador, and to the base of the Andes in Colombia (Hershkovitz, 1963).

Callicebus is a small monkey, comparable

* Authorities differ somewhat in number of genera assigned to platyrrhine monkeys.

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in size to *Aotus*, the night monkey, but strongly diurnal in habit. A Colombian form, *Callicebus moloch ornatus* (Hershkovitz, 1963) is the subject of this report. This subspecies is distinguished by deep auburn fur covering the throat, chest and forearms, and by a striking white band across the forehead which contrasts sharply with the dark face and chestnut red crown. The appealing and colorful aspect of these animals is enhanced in some individuals by white gloves and ear tufts. Males and females are similar in size and coloration and it is only after close association with specific groups that reliable identification of sexes is sometimes possible.

III. STUDY SITE

The study site was in the llanos or plains area of eastern Colombia, near the town of San Martin. The region consists of natural grassland and additional thousands of acres of artificial pastures which have been cleared in recent years. In spite of this, a substantial number of forested areas remain as narrow galleries along the rivers and in the form of groves surrounded by savannah. Many of these tracts contain stable populations of *Callicebus* and other monkeys (*Alouatta*, *Aotus*, *Cebus*, *Saimiri*).

Three groves, ranging in size from approximately 3 to 17 acres, were selected for study. At one time all were part of the same large tract, but they were isolated from each other around 1950 when large sections of

the forest were cleared. The study areas were left as a water conservation measure, and the monkey population had apparently been undisturbed for more than 14 years. The largest of the three forests, Socay, was studied intensively from May 1964 through March 1965. The only resident monkeys in this forest were *Callicebus*. The present report is a preliminary description of the social organization and behavior of these monkeys.

IV. POPULATION CHARACTERISTICS

The first census of Socay Forest, completed on August 2, 1964, indicated that there were 28 monkeys living in nine small groups of from two to four animals each. In the three- and four-animal groups it was clear in most cases that only two of the animals were fully mature. In December 1964 the first birth was noted and five additional animals were born in the next three months. However, owing to the presumed death of one infant and the disappearance of two subadult animals, the total population had increased to only 31 by March 1965. No new groups were formed, but as the result of births, mean group size rose from 3.1 to 3.4. The results of the first census and the final census are presented in Table 1.

V. GROUP ACTIVITIES AND INTERGROUP RELATIONS

Throughout the study period each group occupied a definite and fixed area which

TABLE I
Population and Group Composition, Socay Forest

Group	First Count	May-August 1964		March 1965	
		Composition	Total	Composition	Total
1	5/23/64	2A,J, (I ₂) *	3	2A,I	3
2	5/27/64	2A,J,I ₂	4	2A,2J	4
3	5/25/64	2A,I ₂	3	2A,J	3
4	6/25/64	2A,J	3	2A,J (I*)	3
5	7/ 3/64	2A,J	3	2A,J,I	4
6	6/25/64	2A	2	2A,I	3
7	8/ 2/64	2A,1J?,1J?	4	2A,J,I	4
8	5/25/64	2A,I ₂	3	2A,J	3
9	6/27/64	2A,I ₂	3	2A,J,I	4
			28		31
		mean/grp	3.1		3.4

A = adult

J = juvenile or subadult

I₂ = late infant, no longer carried, considered J in March census

* = died or presumed dead

J = presumed to have left forest

? = age class uncertain

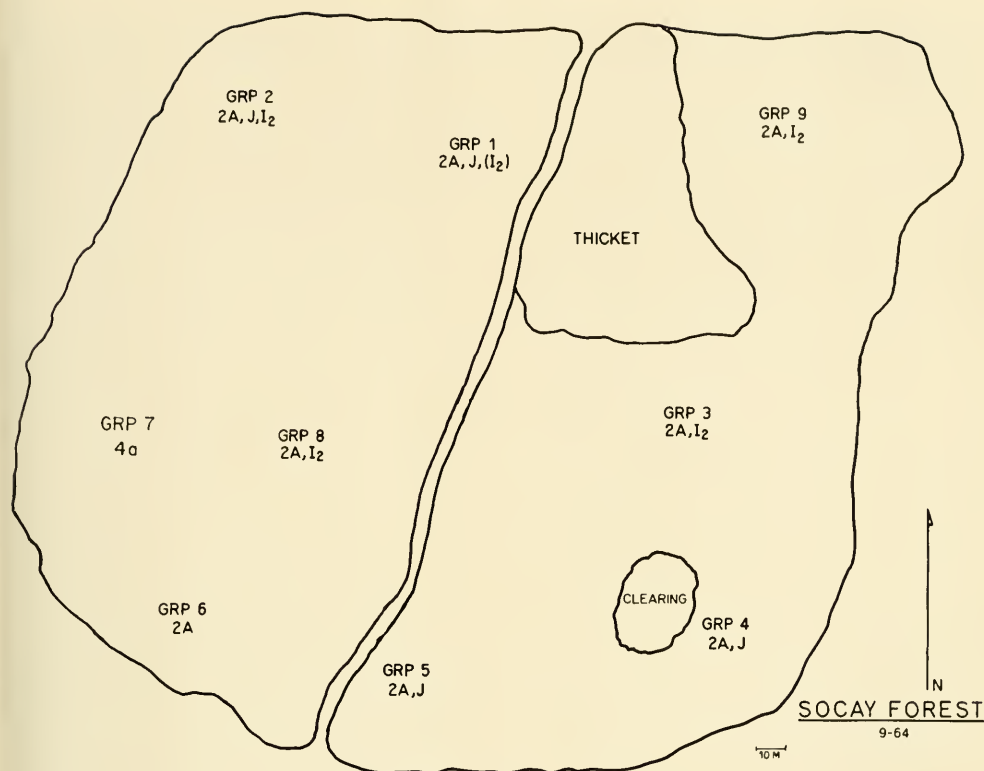


Figure 1. Location of groups in Socay Forest. Group composition at completion of first census, August 2, 1964. A = adult, J = juvenile or subadult, I₂ = late infant, no longer carried. Age class of animals in group 7 was uncertain.

contained its food and lodge trees. The approximate location of groups is shown in Figure 1. The nine groups making up the population of Socay Forest constitute a community in which each group has frequent contact with its immediate neighbors. Furthermore, even those groups which are seldom if ever in visual contact may communicate directly by means of the elaborate vocalizations which play such a prominent part in the social life of *Callicebus*. The most interesting social relations, however, are the face-to-face encounters between neighboring groups.

Activity begins at the first hint of dawn. Usually, the initial signs of life are faint stirrings in the lodge tree, the sounds of urination and defecation, followed by one or two moaning vocalizations. Frequently, these lead into a longer series of calls in which both adult and immature animals may participate. The call is elaborate and the arrangement of its several components

varies from one occasion to the next (Moy-nihan, in press). Calling often begins with a series of moaning u-ah notes which increase rapidly in tempo and intensity. At the end of each note there is a sharp chuck or squeal. This form of calling may continue for a minute or more and is often terminated by a series of rather slow, emphatic O-O-O-O sounds. All vocalizations may cease at that point or the entire sequence may be repeated. In anywhere from a few minutes to half an hour after the first call, the group leaves the lodge tree and begins to feed on fruits and berries, which form the bulk of the *Callicebus* diet.

Groups from neighboring areas frequently meet as they move toward food trees. These are not chance encounters, nor do they seem to be merely the result of attraction to a common food source. The animals actively converge toward each other and usually meet in the same areas at the boundaries of their territories day after day. As

the opposing pairs approach, each animal draws closer to its mate. Characteristically, male and female sit with sides touching and face the opposing pair in an adjacent tree. One of the animals (male?) begins to make the same low-pitched moans that were heard as the day began. As he vocalizes he presses against his mate and often looks toward her or touches her lightly with his hand; she, together with the members of the opposing pair, may join with him in a sustained call. During vocalization both animals stand and face the opposing pair. Often they seem to swell to half again their normal size as the result of arching their backs, stiffening or bowing of the arms, and piloerection. The animals shake vigorously with the effort of calling and the impression of tension and agitation is enhanced by the rhythmic tail-lashing that often accompanies the call.

The vocal interchange may continue without pause for five minutes or longer. At times only one monkey or one pair will call; often, however, all animals call in concert. The volume of sound is unexpected in view of the relatively small size of the animals; on a quiet day one can hear the sounds from a mile away.

While they call, the opposing pairs often edge closer together; individual animals leap forward or up a few feet, then suddenly, with no apparent forewarning, one monkey dashes toward the opposing pair. It may withdraw at once whether there is a counter-rush or not, or the rush may develop into an extended chase in which the males are probably most often involved. During a chase the customary pathways are abandoned and the monkeys race across the tops of the trees, make perilous crossings, descend to a few feet from the ground, and sometimes fall or leap to the forest floor where pursuit continues until the fleeing animal scampers up a vine or slender tree. Rarely is an animal caught, and even when this happens the consequences are not severe. There is no extended fight; the pursuer pushes and slaps at its victim, may bite him once or twice, there are a few squeals and it is over. The chase is not an invariable climax to the meeting between groups. At times one or more of the participants seem to lose interest and begin to feed, or simply sit quietly. Sometimes both members of a pair sit side by side with their tails twined. This pattern is more often seen, however, during rest

periods and is especially common in the evening when the animals settle down for the night.

Another response which is sometimes associated with the interchanges between groups is chest rubbing. *Callicebus* has a small patch of glandular tissue over the chest which is probably implicated in this response. The animal grasps a branch with its hands and draws or pushes itself slowly forward dragging the chest along the surface. Often it pauses at the end of a stroke and sniffs or mouths the area it has just rubbed. Frequently, the chest is rubbed with the hands alternately in slow, downward strokes. Inasmuch as chest rubbing seems to occur most frequently after an encounter between groups, it might be assumed to constitute a form of territorial marking. The response does not always occur in boundary areas, however, and no animal has been observed to react to a limb rubbed by another.

The entire episode from the first meeting of the groups until they resume feeding may occupy less than five minutes to as much as half an hour or more. After the early-morning face-to-face encounters have ended and the animals have returned to their respective areas, there sometimes occurs a remarkable vocal pattern. This is a short call, sounding from a distance very much like the gobbling of a turkey. Its most interesting feature, however, is not its sound quality, but the fact that it is given almost simultaneously by several groups. Typically, one animal or a single group begins the call and within a fraction of a second it is taken up by other groups and passes rapidly through the forest as a kind of chain reaction. Each burst of calling ends abruptly in less than 10 seconds, but the call is usually repeated at frequent intervals for five minutes or more. Preceding and following each call there is a series of brief, high frequency, whistling notes.

The early-morning encounters and vocal chain reactions are similar to the territorial disputes that have been so carefully described for birds. But factors other than the defense or maintenance of territory are definitely involved, and this is particularly evident when the female is sexually receptive. Under these circumstances instead of fleeing from the onrush of the opposing male, as she usually does, she may sit quietly as he ap-

proaches, or even approach him. Mutual genital inspection may follow or they may copulate without preliminaries—or at least attempt to do so before her mate countercharges and interrupts the act. At the same time that the female is showing obvious interest in neighboring males she may be indifferent to the sexual advances of her own mate. During a long episode I observed, the male repeatedly solicited the female. He reached toward and manipulated her genitals, sniffed or licked them, and frequently attempted to mount. In spite of his persistence, the female did not accept him. She fled twice, but each time was overtaken before she had joined the male of a neighboring group. On this and other occasions the male was observed to place himself between his mate and the intruding male, or to restrain her as she attempted to move away from him.

Although it is possible that a female may remain with a neighboring male indefinitely, it seems more likely that such associations are brief. In one instance a female stayed with the male of a neighboring group for several hours before returning to her mate. This was the longest liaison of this type I observed. More often, extra-pair associations last only a few minutes, as in the following episode: A male and female of neighboring pairs approached each other near the boundaries of their territories, copulated, then separated, the male moving off while the female returned to her customary partner. Although her mate had twice rushed the pair during copulation, he showed no unusual reaction to the female upon her return. On other occasions, however, mild aggression has been observed.

VI. THE PAIR BOND

In spite of the sexual attraction of both male and female to opposite-sexed members of neighboring groups, there are many indications that the bond between mates is strong and enduring. Although most animals could not be identified individually, for those pairs in which it was possible, partners remained together from the first contacts until observations terminated as much as 10 months later. Ordinarily, the members of a pair follow each other closely and the animals are usually found within a few meters of each other during feeding, traveling, and resting periods. Generally speak-

ing, the attraction is mutual. Either sex may follow the other and leadership changes frequently throughout the day. Often when one animal has finished feeding it will sit at the edge of the food tree and wait until its mate approaches before moving on. Grooming, nuzzling, gentle grasping, and sitting for long periods of time with sides pressed together and tails twined, provide further evidence of the breadth of social ties. When the animals become separated and lose contact there are various signs of distress, particularly whining vocalizations which, if ineffective, may lead to more elaborate calls.

The arrival of infants has provided additional information on the relationship between mates. In a single pair which I was able to observe intensively and at close range it was clear that the male almost always carried the infant except when it was being cleaned or nursed by the mother. At times the transfer seemed to be accomplished by the infant while the adults sat in contact. On many occasions, however, I saw the mother remove the infant from the male's shoulders, lick its genitals (which stimulates urination), and place it on her ventral surface. When nursing was completed the infant climbed to the mother's shoulders from which it moved to the male or was removed by him. In groups of three and four monkeys, I suspect that immature animals also carry the infant occasionally, but the burden probably devolves chiefly upon the adult male.

VII. FACTORS REGULATING GROUP SIZE

Socay Forest is a relatively small area and most of the available space is utilized by the present occupants. One might ask how this spatial limitation will affect social organization as the population becomes more numerous. One possibility is that group size will increase. This may have occurred in the two smaller forests which were included in the study. One of these contained five *Callicebus* monkeys and a single male *Saimiri*; the other contained at least five and possibly six *Callicebus* monkeys. In both forests the animals were organized into a single group. Animals were sometimes scattered throughout the forest during feeding, but moved together on some occasions and appeared to occupy the same lodge tree at night. It seems likely, however, that five or six ani-

mals is approaching the upper limit for *Callicebus* groups, even though the factors that determine this limit are imperfectly understood. Pressure by mature adult on subadult and young adult animals probably is important. In at least three groups in Socay Forest there were definite indications that young adult or near-adult animals were the occasional targets of adult aggression. In one of these groups (Group 1) a young male disappeared from the parental group several months before the end of the study period and was not seen again. This occurred well in advance of the birth of an infant into the group. In another case (Group 7) a young adult remained with its group, which included a sibling, until the birth of an infant, then disappeared. In a third group of four animals (Group 2) a young adult was the object of sporadic adult aggression extending over a period of several months, but was still closely associated with the group when the study ended. These observations suggest that there is no single factor, such as the arrival of infants, which plays a critical part in forcing young adults from the natal group, but rather that the process of separation occurs slowly, over a period of several months.

There is no indication of what has become of the animals in Socay Forest which have left the natal group. It seems unlikely that they could have remained in the forest undetected. One possibility is that these animals have moved across the savannah to other, less crowded, forests. Although there is no direct evidence for this hypothesis, I have on several occasions seen *Callicebus* for brief periods on the forest floor and local residents claim that migration of individual animals across the savannah does occur.

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