

Tanzania as follows:

- 1) In the Kasakati Basin, Izawa and Itani^{4,5} heard a single young chimpanzee (7–8 years, sex uncertain) giving loud calls. When they reached the site an hour later, the chimpanzee was shaking vines and still calling out as a leopard rested in a tree 25 m away. Upon noticing the observers, the chimpanzee ran off.
- 2) In the Mahali Mountains, Nishida⁶ observed an adult male chimpanzee silently throwing down twigs and shaking branches from a tree. The male descended to the ground, and a leopard 40 m away moved into the undergrowth. Other chimpanzees were present in the area.
- 3) In the Ugalla Hills, Kano^{7,8} found a group of chimpanzees driven up trees by a young adult lion. They were “screaming in a most unusual manner.” The lion charged by and hit Kano, growled, then ran off.
- 4) van Lawick-Goodall⁹ reported two incidents at Gombe National Park. Once a juvenile peered into a ravine and screamed intermittently for 5 min. Its mother, who was carrying a small infant, glanced down, then continued feeding. Subsequent evidence showed that a leopard had been present. On another occasion, a leopard vocalized about 50 m from a group of chimpanzees feeding in trees. They made no apparent response.

OBSERVATIONS

On Nov. 18, 1974, I was alone observing six chimpanzees from the Kahama Community, which range in the south of Gombe National Park^{10,11}. The group consisted of the following individuals:

Charlie (CH), adult male (approximate age, 26 years);

Willy Wally (WW), adult male with a partially paralyzed leg (ca. 26 years);

Sniff (SF), adult male (ca. 16 years);

Madam Bee (MB), old female with a paralyzed arm; mother of LB and HB (ca. 35–40 years);

Little Bee (LB), nulliparous female with a “clubbed” foot; full estrous swelling at the time of the observation (ca. 14 years);

Honey Bee (HB), adolescent female with a small sexual swelling (10 years).

The chimpanzees left the nest site at sunrise (06.28 hr) and began to walk south through woodland toward Kahama Stream. HB and SF led as the group foraged along the ground. A troop of redtail monkeys (*Cercopithecus ascanius*), 350 m south of the nest site, was “alarm-chirping”¹² from trees (5 trees, ca. 15 m high) surrounding a dense thicket (10–15 m diameter), in which a full-sized leopard of unknown sex was concealed.

At 06.52 HB climbed into a tree near the redtails, stared at the leopard below, and “wraaahed” (long call indicating danger⁹). MB immediately climbed into the tree near HB and began to wraaah too. LB ascended a nearby tree. WW (who had been in close proximity to LB since sunrise), proceeded southwest around the thicket, stood with hair erect, and peered into the undergrowth. SF glanced back with hair erect at CH, climbed onto a large rock (2 m high, 10 m east of the thicket), and sat down staring toward the thicket. MB and HB wraaahed persistently from the tree above. CH scanned from the rear,

An Encounter between a Leopard and a Group of Chimpanzees at Gombe National Park

Ann H. Pierce

Primate Research Group, Department of Psychiatry and Behavioral Sciences, Stanford University Medical Center, USA

INTRODUCTION

There has been considerable speculation concerning the influence of predators on chimpanzee (*Pan troglodytes*) populations^{1–3}. This paper reports a complete observation of an interaction between a leopard (*Panthera pardus*) and a mixed group of chimpanzees and summarizes all previous documented responses of chimpanzees during encounters with leopards and lions (*Panthera leo*). These field observations are currently limited to sites in western

moved with hair erect slowly by the thicket, climbed quickly up the rock, sat down in contact with SF, and faced the concealed leopard.

At 06.54 the leopard rustled in the tangled vegetation and appeared to lunge within the thicket toward SF and CH. The chimpanzees wraaahed and “waa-barked” (loud, single-syllable bark given in threat⁹). The leopard’s movements subsided. CH climbed down the rock, walked with hair erect beside the thicket, and sat down by WW. CH then stood bipedal within 10–15 m of the leopard and peered into the vegetation. SF leapt with hair erect into vines near the females and stared at the leopard below. Violently shaking vines for several seconds, SF wraaahed, charged away from the thicket, and sat down in the fork of a large tree. Following this display, CH climbed silently to the top of a slender tree nearby and the leopard left the thicket headed south through dense ground cover.

HB stared at the leopard as it moved away, broke off a branch, and threw it into the thicket below. She descended to the ground and followed the leopard at a distance of 15–20 m, with WW close behind. WW remained at the base of the tree as HB charged up the trunk, slapping and stamping on the branches above the leopard. HB wraaahed and ran through the trees following the leopard as it returned along the ground. During this pursuit, MB and LB climbed through branches and stared toward the leopard and HB. HB joined her family as the leopard passed beneath them and lay down at the base of the tree.

At 07.00 the family stood close together, persistently stamped on the branches, and wraaahed as the leopard rubbed its forepaw against the ground. The males remained silent and alert.

At 07.05 the leopard stood up and walked with a slight limp toward riverine forest of Kahama Stream. The chimpanzees descended, stood on the ground, stared at the leopard, and gave “hoos” (soft, low-pitched, single-syllable sound often elicited in response to strange stimuli⁹). SF, HB, and MB followed the leopard at a distance of 25 m, as it moved out of sight.

At 07.10 CH directed a charging display at MB. She stepped aside submissively as CH moved ahead. WW and LB followed in the rear of the progression. At 07.12, CH, travelling south with the others in the direction of the leopard, began to forage along the ground.

DISCUSSION

To my knowledge there is no direct evidence from any study that large felines prey upon chimpanzees; however, the behavioral ecology of these predators has not been systematically studied at any site. Furthermore, increasing human activity may have altered the ranging patterns and reduced the number of large felines existing in these areas. For example, leopards were considered common at Gombe National Park only 15 years ago¹³. In the early 1960s, two leopards ranged within Kakombe Valley, later the site of the banana feeding station¹⁴. With the expansion of the Gombe Stream Research Centre, leopards were no longer observed in the central valleys. In 1967, a small ranger station was built 4 km south of the research centre on the lake. Occasionally a leopard came down to the beach at night (pers. obs. and rangers), and in 1975, a leopard and its

offspring were observed in the nearby forest (Swai Saashiha, pers. comm.). A small population of leopards apparently exists in the southern area of the park. Two old male lions once roamed within the reserve (Esilom Mpongo, pers. comm.).

There is evidence from a trapping project that a leopard killed an infant chimpanzee in the Idambo region of Zaire in 1966¹⁵. Rahm reported that her scouts brought a freshly-killed infant male aged about 5 mon to camp. His whole lower abdomen had been torn open, the intestines were visible, and the skin of his thighs and right forearm were slashed. The scouts reported that after hearing noises of fighting chimpanzees, they surprised a leopard attacking a female carrying the infant. A large male chimpanzee in the group snatched the infant, carried it aside, then took a stick and attacked the leopard. The men tried to carry the infant away, but it cried and the male hurried back¹⁶. They dropped the infant and the male returned to assist the female with his stick. A fight had taken place at the described spot when Rahm examined it, but there was no proof that a leopard had attacked the group. She states that the chimpanzee’s wounds were inflicted by claws and not by snares and cables.

The leopard’s activity prior to detection by the adolescent female in the 1974 Gombe encounter is unknown; however, it appears that the leopard attempted to prey upon the group. The following observed responses of the chimpanzees indicate that leopards are regarded as potentially dangerous: vigilance; orientation; movement into close proximity with others; wraaah (alarm) calls, primarily by the family of females; investigation; rock and tree climbing; displays from trees, including branch-shaking, stamping, and branch-throwing; and following the leopard out of sight.

These behavioral patterns may communicate that the leopard is detected and induce it to move elsewhere in search of food (see discussion of alarm signals^{17,18}). The movements of chimpanzees into close proximity with others in potentially dangerous situations may function as a defense tactic, which affords protection to members of the same community, such as related individuals, prospective mating partners and males with whom there are strong personal bonds (see discussion of male-male relationships¹⁹).

Although mothers protect their offspring in a variety of circumstances⁹, chimpanzees are also occasionally observed to respond in a protective manner to individuals other than their own offspring, such as “adopting” an orphaned sibling⁹. In 1975, field assistants reported that an adolescent female encountered an unidentified snake, which seemed to chase her. She climbed a tree and sat, watching the snake, until her infant brother toddled along, seemingly unaware of it. Suddenly, as the infant got close to the snake, the adolescent ran with hair erect down the tree, seized her brother, and ran with him to their mother²⁰. In Guinea a prime adult male ran down, picked up, and carried away an immature chimpanzee, who was unknowingly approaching Nissen²¹.

Field assistants at Gombe National Park reported that immature and adult male chimpanzees carried around an infanticide victim for hours after the fatal attack²². In 1974 a domestic dog charged toward the family described in the

leopard episode and bit MB on the head. As she slapped the dog with her arm, its tail was grabbed by LB and the dog hurled aside and chased into nearby forest. HB stood between them and watched (pers. obs.).

Prior to giving wraah calls, the adolescent female appeared alert to the alarm-chirps of the redbellied monkey troop above the leopard and climbed into a tree. This behavior suggests the possible role of interspecific communication in detection of potential dangers²³. The adolescent also seemed to be the most highly aroused member of the group in the leopard's presence, which is comparable to the responses of immature langurs (*Presbytis entellus*) in encounters with leopards, a predator of this species in Ceylon (Sri Lanka)¹⁷; the responses of juvenile orang-utans (*Pongo pygmaeus*) to the presence of humans²⁴; the stick-throwing response of an adolescent female, living with three other adolescent females and one adult male, to a lion's arrival on the island at Lion Country Safari, California (Patrick McGinnis, pers. comm.); the responses of juvenile Japanese monkeys (*Macaca fuscata*) to novel objects²⁵.

In Zaire and Guinea investigators have tested the "dehumanization hypothesis" of African ape evolution by exposing large parties of savanna and forest chimpanzees to a stuffed leopard. Some of the open country chimpanzees attacked the experimental object with sticks used as clubbing tools^{2,8,26}. Such behavior has not been observed in western Tanzanian chimpanzees during encounters with leopards in the wild and suggests that chimpanzees may distinguish between and respond differently to live and stuffed leopards.

ACKNOWLEDGEMENTS

I am grateful to Dr. Jane Goodall for the opportunity to study at Gombe National Park as a research assistant; the Tanzania National Park personnel, particularly the Director, Derek Bryceson, for their cooperation; the W.T. Grant Foundation, which financed the research; and the Stanford University Primate Research Group, particularly Dr. David Hamburg, for providing a stimulating environment in which to analyze data. I also thank C. Busse, R. Wrangham, W.J. Hamilton III, J. Silk, P. Lee, G. Heidrich, E.v.Z. Bergmann, S. Smith, C. Czeisler, J. Goodall, D. Hamburg, and others for their invaluable advice and critiques in the preparation of this manuscript. Finally, my thanks to E. Moore, E. Mpongo, and C. Chiwaga for their active assistance in searching for and following the southern chimpanzees.

REFERENCES

1. Chance M, Jolly C 1970. *Social Groups of Monkeys, Apes, and Men*. Dutton, New York.
2. Kortlandt A, Kooij M 1963. Protohominid behaviour in primates. *Symp Zool Soc London* 10: 61–88.
3. van Lawick-Goodall J 1970. Tool-using in primates and other vertebrates. In: *Advances in the Study of Behavior* 3, Lehrman DS, Hinde RA, Shaw E (eds), Academic Press, New York, pp. 195–249.
4. Itani J 1970. *Chasing Wild Chimpanzees*. Chikuma-Shobo, Tokyo (in Japanese).
5. Izawa K, Itani J 1966. Chimpanzees of Kasakati Basin, Tanzania. *Kyoto Univ Afr Stud* 1: 73–156.
6. Nishida T 1968. The social group of wild chimpanzees in the Mahali mountains. *Primates* 9: 167–201
7. Kano T 1972. The distribution and adaptation of the chimpanzee on the eastern shore of Lake Tanganyika. *Kyoto Univ Afr Stud* 7: 37–129.
8. Kortlandt A 1972. *New Perspectives on Ape and Human Evolution*. Stichting voor Psychobiologie, Amsterdam.
9. van Lawick-Goodall J 1968. The behaviour of free-living chimpanzees in the Gombe Stream Reserve. *Anim Behav Monogr* 1: 161–311.
10. van Lawick-Goodall J 1975. The behavior of the chimpanzee. In: *Hominisation und Verhalten*, Kurth F, Eibl-Eibesfeldt I (eds), Gustav Fischer, Stuttgart, pp. 72–135.
11. Wrangham R 1975. *Behavioural Ecology of Chimpanzees in Gombe National Park, Tanzania*. PhD thesis, University of Cambridge, Cambridge.
12. Marler P 1973. A comparison of vocalizations of red-tailed monkeys and blue monkeys, *Cercopithecus ascanius* and *C. mitis*, in Uganda. *Z Tierpsychol* 33: 223–247.
13. Thomas DK 1961. The Gombe Stream Game Reserve. *Tanganyika Notes Records*, 56: 35–39.
14. van Lawick-Goodall J 1967. *My Friends the Wild Chimpanzees*. National Geographic Society, Washington, D.C.
15. Rahm U 1967. Observations during chimpanzee captures in the Congo. In: *Progress in Primatology*, Gustav Fischer, Stuttgart, pp. 195–207.
16. Rahm U 1976. Personal communication by letter dated May 2, 1976.
17. Eisenberg JF, Lockhardt J 1972. An ecological reconnaissance of Wilpattu National Park, Ceylon. *Smithsonian Contrib Zool* 101: 1–118.
18. Smythe N 1970. On the existence of "pursuit invitation" signals in mammals. *Am Nat* 104: 491–494.
19. Bygott D 1974. *Agonistic Behaviour and Dominance of Wild Chimpanzees*. PhD thesis. University of Cambridge, Cambridge.
20. Goodall J (ed) 1975. *Gombe Journal: Part 3. Gombe Stream Research Centre Reports*. Unpublished manuscript.
21. Nissen HW 1931. A field study of the chimpanzee: Observations of chimpanzee behavior and environment in western French Guinea. *Comp Psychol Monogr* 8: 1–122.
22. Goodall J, Bandora A, Bergmann E, Busse C, Matama H, Mpongo E, Pierce A, Riss D 1979. Inter-community interactions in the chimpanzee population of the Gombe National Park. In: *The Great Apes*, Hamburg DA, McCown ER (eds), Benjamin/Cummings, Menlo Park, pp. 13–53.
23. Marler P 1965. Communication in monkeys and apes. In: *Primate Behavior: Field Studies of Monkeys and Apes*, DeVore I (ed), Holt, Rinehart, and Winston, New York, pp. 544–584.
24. MacKinnon, J 1974. The behavior and ecology of wild orang-utans (*Pongo pygmaeus*). *Anim Behav* 22: 3–74.
25. Menzel EW 1966. Responsiveness to objects in free-ranging Japanese monkeys. *Behaviour* 26: 130–150.
26. Albrecht H, Dunnett SC 1971. *Chimpanzees in Western Africa*. Piper, Muenchen.