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## Intercommunity Interactions in the Chimpanzee Population of the Gombe National Park

The purpose of this article is to describe the interactions between neighboring communities (unit-groups, Nishida 1968) of chimpanzees in the Gombe National Park. First, however, we should very briefly review the kinds of behaviors that occur during intergroup interactions in other higher primates as a background against which to view such behavior in chimpanzees. Space does not permit an exhaustive review, and only a few of the species exemplifying each type of encounter have been selected.

Monkeys and apes sleep, travel, and feed in areas usually referred to as home ranges (Burt 1943). Within the home range, certain *core areas*

(Kaufmann 1962) are used extensively, while other more peripheral areas may be visited only occasionally, usually in connection with seasonal availability of food. Many of the higher primates have home ranges that overlap, to a greater or lesser extent, with those of neighbors, and it is in these overlap zones that interactions between groups tend to occur most often.

Intergroup interactions in many primates are sometimes peaceful—at least lacking in overt hostility. Neighboring groups may mingle briefly or even travel and feed together for periods of time (e.g., mountain gorilla, Schaller 1963) or they may remain peacefully in proximity (e.g., rhesus monkeys, Southwick, Beg, and Siddiqi 1965; Nilgiri langur, Poirier 1968). Sometimes, when two groups are near one another, young members from each may approach and initiate friendly (often playful) interactions (e.g., mountain gorilla, Schaller 1963; Fossey, this volume; anubis baboons, Ransom 1972).

In many species, groups tend to avoid one another. Loud carrying calls may serve to indicate the whereabouts of neighboring groups within an area so that they are able to avoid meeting (e.g., howler monkeys, Carpenter 1965; orangutans, Galdikas, MacKinnon, Rodman, this volume). In other species, one or more males may reveal the whereabouts of their troop by sitting high in a tree near the boundary of the home range (e.g., the St. Kitts green monkey, Poirier 1972).

Often there is a good deal of tension when two groups encounter one another—males may show vigilance behavior, threatening and staring intently at the neighbors (e.g., Barbary macaque, Deag 1973), or they may lead or herd their females in the opposite direction (e.g., mountain gorillas, Fossey, this volume; anubis baboons, Ransom 1972). Fossey even records gorilla groups leaving their nests and traveling some distance at night after hearing calls from another group nearby. Primate groups with a high degree of overlap between their ranges, or which meet frequently, are often ranked: a subordinate group usually moves away at the approach of a more dominant one, sometimes precipitously (e.g., rhesus monkeys, Southwick, Beg, and Siddiqi 1965; Morrison and Menzel 1972; Lindburg 1971).

In most species, there will be at least some hostile encounters, particularly when two groups are competing for a food source. Subordinate groups may be actively chased away and sometimes attacked (e.g., rhesus monkeys, Southwick, Beg, and Siddiqi 1965; chacma baboons, Stoltz and Saayman 1970; Saayman 1971a).

Some species actively defend part or all of their home range from intrusion by neighbors—in other words, they defend a territory (Burt 1943). The most truly territorial are probably the gibbon (Ellefson 1968) and the little Callicebus monkey (Mason 1968). Hanuman, Ceylon Grey, and Nilgiri langurs (Yoshida 1968; Sugiyama 1967; Ripley

1967; Poirier 1968) are also territorial, as are vervet monkeys (Struhsaker 1967). The gibbons, langurs, and *Callicebus* all have loud carrying calls, which, in this instance, may serve to attract a neighboring group to a boundary area where members from both (usually adult males) may engage in aggressive displays that may lead to fighting.

Lone males (common in a number of primate species) may be chased off when they approach bisexual groups; sometimes they may be severely attacked (e.g., Japanese macaques, Kawai 1965; Nishida 1966; patas monkeys, Hall 1965; baboons, Ransom 1972; Packer, in prep.; Hanuman langurs, Jay 1965; Sugiyama 1967). Lone males may also transfer from one group to another (rhesus monkeys, Koford 1966; Lindburg 1969, 1971; Sade 1972; Boelkins and Wilson 1972; anubis and yellow baboons, Ransom 1972; Packer 1975; Altmann 1970; Rowell 1966; Japanese macaques, Nishida 1966). Sometimes a lone male or a group of males may attempt to drive out the leader and take over the females of a bisexual group (e.g., Hanuman langur, Sugiyama 1967; Mohnot 1971), or a lone male may herd or lead away one female (e.g., mountain gorilla, Fossey, this volume). These "raids" may lead to severe fighting.

Field studies of the same species in different areas show that the patterns of intergroup encounter may vary within a species; e.g., Hanuman langurs at Orchis were not aggressive when they encountered another group, whereas fierce territorial encounters were common in some other areas (Jay 1963; Sugiyama 1967). Moreover, encounters between the same two neighboring groups, within a species, may differ from one occasion to another; e.g., rhesus monkey groups, which usually showed extreme hostility to each other, sometimes fed peacefully together (Southwick, Beg, and Siddiqi 1965). It is becoming increasingly clear, as more and more results from long-term field studies become available, that "it is not the single social group which is the basic unit of social organization, but a system of social groups. The social groups interacting in a restricted area would correspond to the deme of the population geneticist" (Sade 1972). Yet the gathering of information that will enable us to understand properly a basic unit of this magnitude is one of the hardest problems that faces field research.

First, before we can comment meaningfully on why interactions between groups within species vary, we must know, among other things, something of the history of the relationship between neighboring groups. Figure 1 is a hypothetical diagram of the division of neighboring primate troops. If an investigator arrived during 1957 he would almost certainly observe differences in the interactions between the neighboring troops in his area. Troops A1 and A2 have been separate for six years: they will probably behave differently, during an encounter, than troops B1 and B2 which have only just split. The contacts

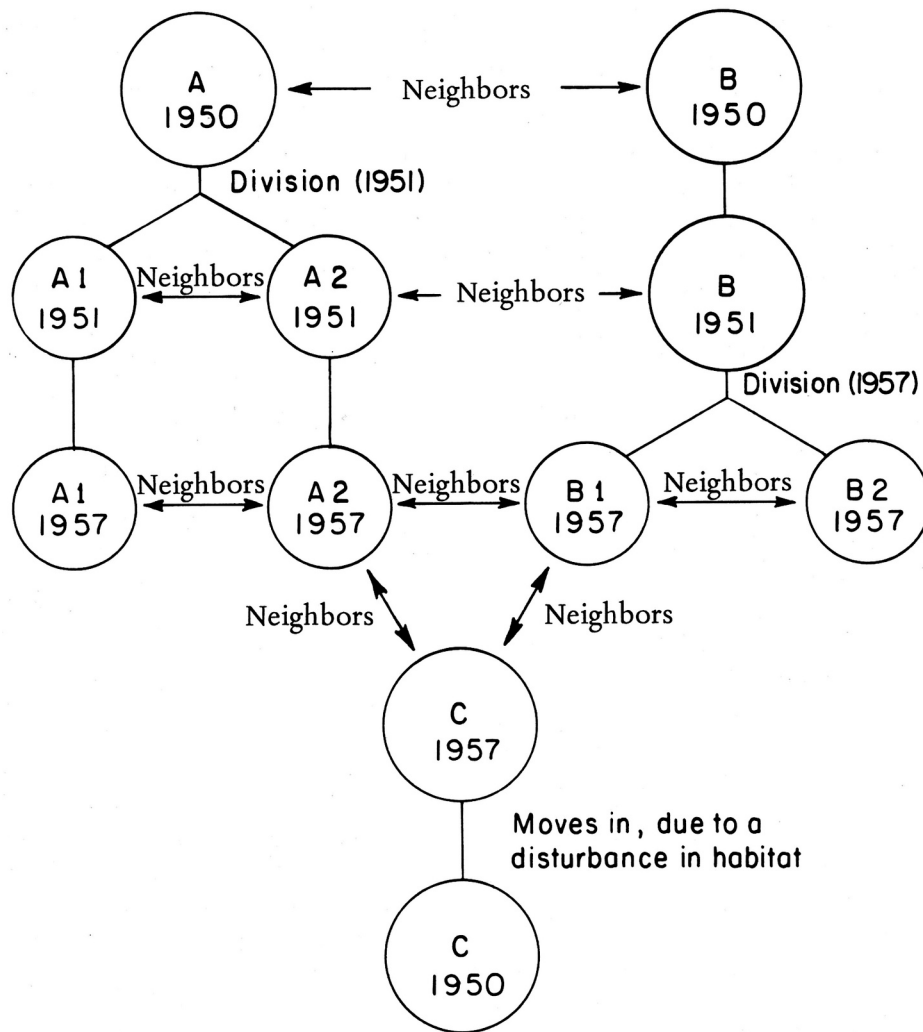


FIGURE 1  
Hypothetical diagram representing changes in neighboring primate groups over time

between troops A2 and B1 with troop C will undoubtedly be of a very different nature, since the former have been neighbors for many years and the individuals have some familiarity with each other, while C is an intruder and its members are complete strangers in unfamiliar surroundings. An understanding of this history would explain many differences observed during intertroop interactions that, without such knowledge, could not properly be interpreted.

Second, we must bear in mind that a whole complex of variables are liable to affect the nature of encounters between neighboring groups; here we list merely some of the more obvious ones:

1. Of major importance is the type of habitat and the availability of food since this will affect the density of the population, the spacing between neighboring troops, and the size of the home range.

2. The availability of food at a given time of year.

3. The relative composition of neighboring troops: the male-to-male ratio is particularly important (or the size and disposition of individual males of one-male groups); the presence or absence of females in oestrus may also be significant.

4. The location of an encounter between troops relative to the core area of the home range of each is likely to be important since animals tend to be bolder and more aggressive when on familiar ground and increasingly nervous and apprehensive as they move further into less well-known areas (e.g., Carpenter 1965).

5. The *type* of encounter, and we can label at least six: (a) Chance encounter—when two traveling or foraging groups happen to pass one another, (b) Food competition encounter—when two groups are attracted by a food source in an overlap zone. This will be further affected by the attractiveness of the crop in question and the availability of other staple foods at the time, (c) Water or sleeping site encounter—very similar to the above, when two groups gather at a water hole or sleeping rock in habitats where these commodities are scarce, (d) Boundary patrol encounter—when one or both groups appear to be deliberately seeking out an intergroup encounter with neighbors near the boundary of their home ranges, perhaps after one of the two has called, (e) Raid or invasion—when one or more males approach a bisexual group and attempt either to drive out the leader male of that group and take it over or to herd or lead away one or more females, (f) Transfer encounter—when one individual (occasionally more than one) tries to transfer into a neighboring group.

6. In all of the above situations we must take into account the personalities of the various animals concerned and their “mood” (or state of arousal) at the time of the encounter.

7. Finally it must be emphasized, since we are pointing out the difficulties facing the field investigator, that a major concern is the degree to which animals of two neighboring groups are habituated to human observers. If one of them is relatively shy, while the other is totally unconcerned by the presence of humans, there may be an overriding effect on the outcome and nature of an encounter.

Information regarding interactions between communities (or unit-groups) of chimpanzees has been obtained from the two long-term studies in western Tanzania; in the Gombe National Park and in the Mahali Mountains area. Throughout the range of the species, so far as can be determined by the literature, the social structure of the chimpanzee community is similar (Goodall 1975). All investigators seem agreed that a group of adult males forms the central focus of a community: these males typically have a home range that is larger than that of most individual females and overlaps a number of smaller female ranges (Goodall 1975; Bygott, this volume; 1974; Wrangham, this volume; 1975).

Nishida (this volume) describes interactions between two unit-groups (communities), which have been studied intermittently for 9 years in the Mahali Mountains area. One major difference between chimpanzees of this area and those at Gombe is the fact that the former

migrate annually, a distance of some 20 km, when the larger M group displaces the K group from the overlap portion of their home range.

Information regarding intercommunity interactions in the chimpanzee population at Gombe has been gradually collected over the years by many different field assistants and students. All data regarding such encounters—collected by Tanzanian field assistants, undergraduate science students from Stanford University and the University of Dar es Salaam, and by graduate students working for higher degrees—have been pooled in order that this chapter could be assembled. We should like to emphasize that this truly represents the spirit of collaboration which prevails at Gombe and to thank all concerned for the contributions they have made.

## **INTERCOMMUNITY INTERACTIONS AT GOMBE**

Despite the fact that we have now documented a variety of interactions between chimpanzees of different communities, our understanding of the real relationship between communities is in its infancy. The picture has been confused by a number of factors: (a) in the early years of the study it was not possible to identify accurately all individuals seen in different areas of the park; (b) the setting up of the artificial feeding area served to attract many individuals to a permanent food source over a number of years (see Bygott, this volume; Wrangham 1974; Goodall 1975); (c) nonhabituated individuals of neighboring communities flee the presence of observers, thus minimizing the opportunity for seeing normal encounters between neighbors; (d) more observation is done in the core area, near the research center, than in peripheral areas where intercommunity interactions normally occur. Nevertheless, some extremely interesting observations have been made and it seems worthwhile to discuss these in this volume.

### **Communities and Ranging Patterns**

Figure 2 (a, b, c) is a map of most of Gombe National Park showing the core areas of the two habituated communities, Kasakela and Kahama, during 1974. It was prepared for us by Steve Smith from the maps that are filled in to show the travel routes of chimpanzee groups by all personnel at Gombe: they are the particular responsibility of the Tanzanian field assistants. The map also indicates the location of the other, unhabituated communities, Mitumba, Rift, and Kalande. Unfortunately we do not yet know either the numbers of chimpanzees or the ranges of these communities. There is almost certainly another small community in the extreme south.

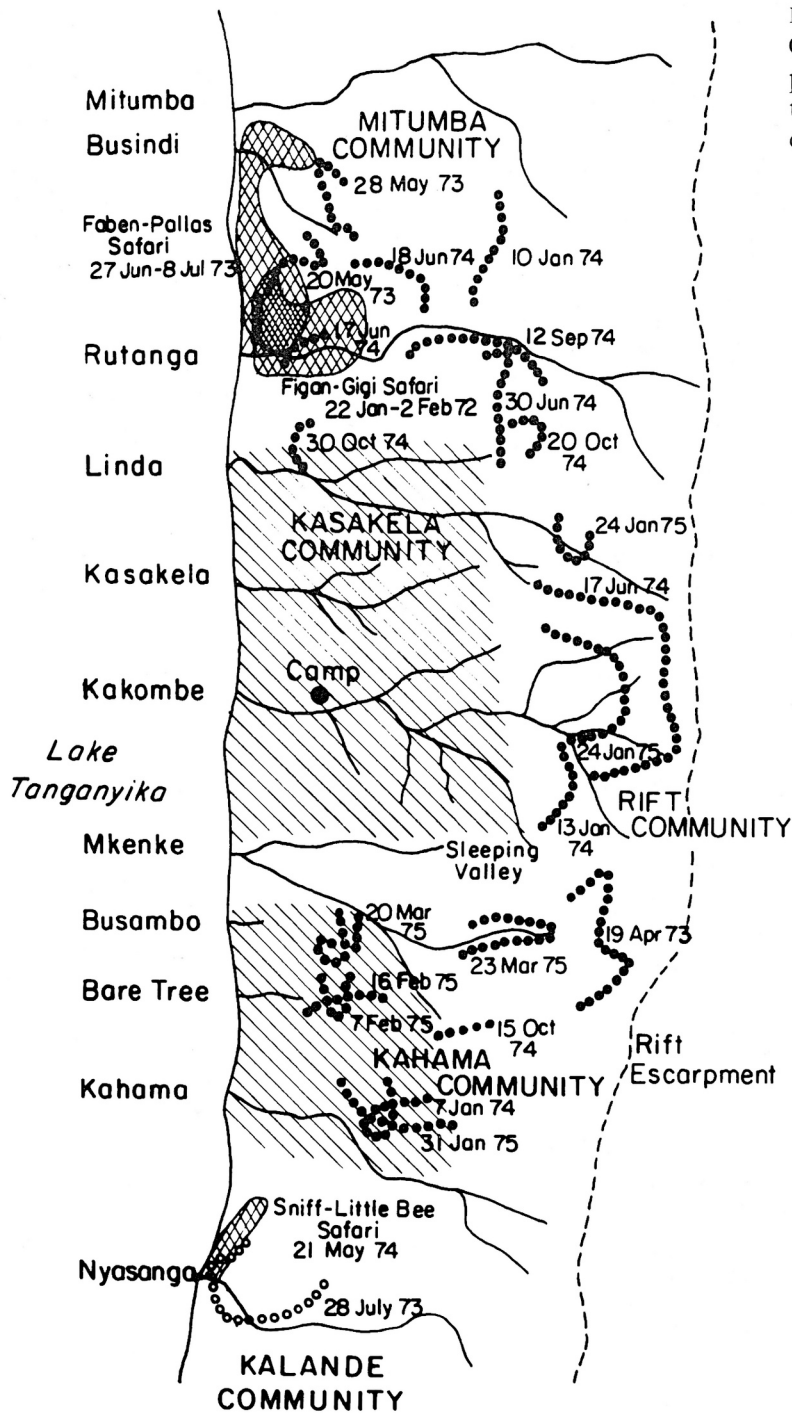


FIGURE 2(a)  
Core areas and  
peripheral patrols of  
the two main study  
communities

- Selected peripheral patrols by Kasakela chimpanzees
- Selected peripheral patrols by Kahama chimpanzees
- ////// Approximate core areas
- ▣▣▣ Safaris in peripheral areas

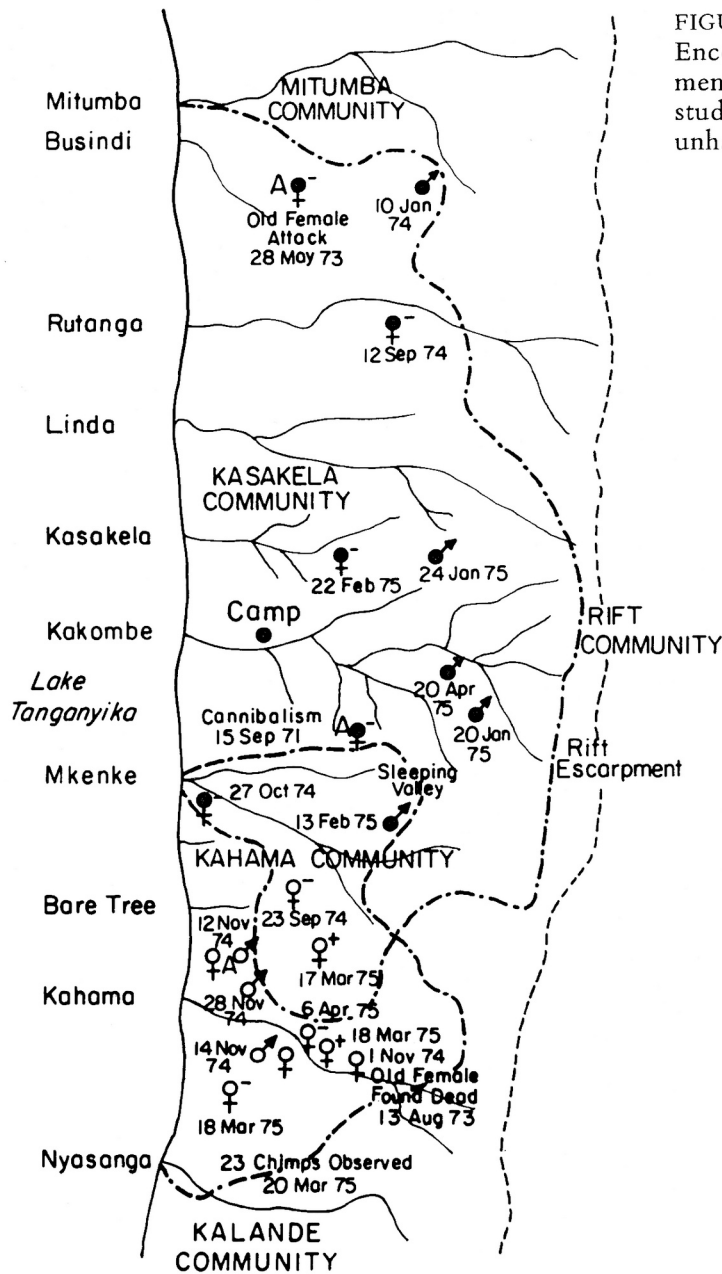


FIGURE 2(b)  
Encounters between  
members of the two main  
study communities and  
unhabituated individuals

- Approximate 1973-1975 boundaries of Kasakela home ranges
- Approximate 1973-1975 boundaries of Kahama home ranges
- ♀<sup>-</sup> Visual encounters with anoestrous females by Kasakela chimpanzees
- ♀<sup>-</sup> Visual encounters with anoestrous females by Kahama chimpanzees
- ♀<sup>+</sup> Visual encounters with females in oestrus by Kahama chimpanzees
- ♂ Visual encounters with males by Kasakela chimpanzees
- ♂ Visual encounters with males by Kahama chimpanzees
- A Attacks

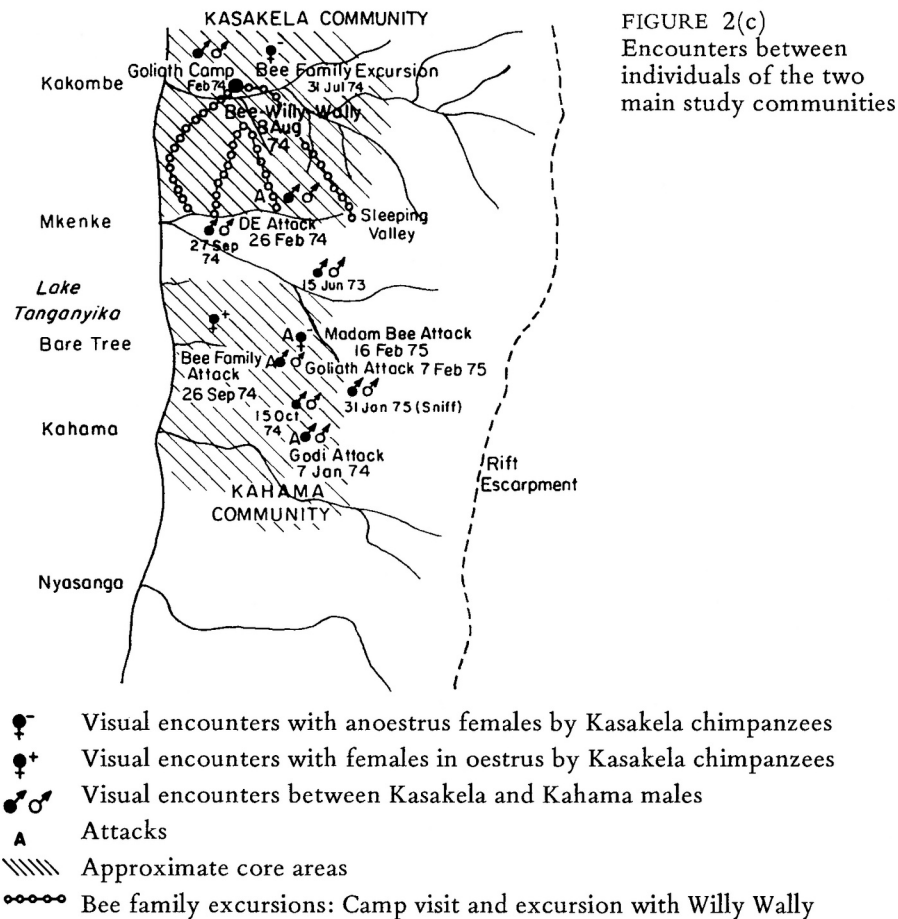


FIGURE 2(c)  
Encounters between  
individuals of the two  
main study communities

The home range of a community may change from year to year. In the early years of the study (1961 to at least 1964), habituated males of the Kasakela community sometimes traveled further north than they are known to do today. At that time, individuals of the Kasakela and Kahama communities associated freely and were considered one community (Bygott, this volume; Wrangham 1974; Goodall 1975). Males who are now members of the Kahama community, which split off to the south, were, in those early years, encountered in and to the north of Mitumba Valley (see Figure 2). The southern boundary of the habituated males at that time was not determined, but they uncertainly ranged as far as Kahama.

In 1971, at the time when the main study community was in the process of splitting (Bygott, this volume), the males of what is now the Kasakela community (the northern study community) were seldom observed to range further north than Linda Valley or further south than

Kahama: the Kahama males traveled most often in Mkenke and Kahama valleys and seldom went north of Kakombe. They occasionally penetrated Nyasanga and, on one occasion, Bygott (1974) followed a mixed group of Kahama males and the Kasakela males and females to Nyasanga. By the end of 1972, the division of the communities was virtually complete: the overlap zone at that time was Sleeping Valley (Figure 2).

During 1973 the Kasakela males began, once more, to extend their range further to the north, while the Kahama individuals frequently traveled as far south as Nyasanga. At the present time, as can be seen from the map, the Kasakela individuals frequently range as far north as Rutanga and they have extended their range to the south. The Kahama community now has a smaller range than during the previous year, and individuals seldom travel south of Kahama, possibly because unhabituated individuals of the large Kalande community (at least 23 individuals have been sighted in one party) are now often encountered in and to the north of Nyasanga Valley.

This oversimplified outline of changes in ranging patterns of males over a 14-year period shows that a chimpanzee can be familiar with a much larger area than he may be using at a given time. The factors that influenced phases of expansion and contraction of home ranges were, without doubt, extremely complex, depending in part on seasonal availability of food, on the extent to which the chimpanzees were provided with bananas, and on a variety of social factors (such as the relationship between the prime males, their personalities, or the availability of females in oestrus).

The ranging patterns of females are more complex and are discussed by Wrangham (this volume), Pusey (this volume), and Nishida (this volume). While young, regularly cycling females frequently accompany parties of males and may travel widely, older mothers with dependent young tend to have smaller ranges than adult males. On the other hand, the life range of a female may be quite large, since it is now an established fact that adolescent or young mature females may, temporarily or permanently, leave their natal communities to associate with neighbors (Nishida, this volume; Pusey, this volume). Each year at Gombe there are a number of sightings of unhabituated females within the community range. In some cases these females gradually become integrated into the social life of the community. Some females, as Wrangham (this volume; 1975) points out, have ranges in the overlap zone between two chimpanzee communities but, to date, the only females known to have peaceful interactions with members of two communities are those ranging between the Kasakela and Kahama communities, which have only divided in the last three years. It seems probable that females may have similar relations with two communities in other areas, but we do not yet have evidence for this.

### Visits to Peripheral Areas of the Range

Existing data suggest that visits to peripheral areas of the home range, which also overlap zones with neighboring communities, may be undertaken for a variety of reasons:

1. Certain preferred foods are not distributed equally through the Gombe habitat and may be more abundant, at certain times, in peripheral areas (Wrangham 1975). On such occasions, chimpanzees tend to travel to these food sources in large parties, often including females. Before moving in to feed, they may spend some time on a ridge, overlooking the valley: often the males will utter pant-hoots (distance calls, Goodall 1968) and may perform charging displays. Then they remain silent as though listening for a response. If all is quiet they continue their journey. At other times a party may travel to the same area with apparent unconcern.

2. Frequently a male chimpanzee travels with a female in oestrus to some peripheral area where it is less likely that the pair will encounter the males of his community (McGinnis 1973; Tutin 1975). One pair (Figan, Gigi) remained in the north of the community range for about a month, during which time they were continuously observed: Gigi was anoestrus for most of the time, but consortships may be formed with anoestrus females (Goodall 1968; McGinnis 1974). This and other peripheral safaris are shown in Figure 2(a). During such safaris the pair tends to be silent (McGinnis 1973).

3. Young females in oestrus may travel toward overlap zones with neighboring communities, often seeming to do so of their own accord (McGinnis 1974; Pusey, this volume).

4. Visits to peripheral areas may be to patrol or monitor their current boundaries. Two or more prime males are invariably present on such patrols. Chimpanzees on a patrol feed very little; they travel silently and give the impression that they are actively looking for neighbors, or indications as to the whereabouts of neighbors. Nishida (this volume) has observed similar excursions in the Mahali mountains' chimpanzees and has termed the behavior scouting.

### Boundary Patrols

During a 27-month period, from January 1973 to April 1975, adult Kasakela males (13 years old or more: see Table 1a) were observed on 25 occasions in peripheral areas to the north or east of their home range when they were either patrolling or were observed to respond to the sight and sound of chimpanzee parties presumably from neighboring communities to the north or east of their home range, or to unhabituated females in these areas. (In view of the long history of past association between Kasakela and Kahama individuals, excursions to the south of the Kasakela home range will be discussed in a separate section.) The *total* number of occasions when Kasakela chimpanzees were observed in these peripheral areas (i.e., when they are feeding there, or on safari, but were not patrolling and not observed to encounter neighbors) has not yet been extracted from the records.

CHIMPANZEES

TABLE 1a  
Kasakela individuals frequently referred to in text: they are ranked in order of the frequency with which they were observed participating in patrols.

| INDIVIDUAL       | COMMENTS  | PATROLS         |       |       | ATTACKS |     |
|------------------|---|-----------------|-------|-------|---------|-----|
|                  |   | NORTH<br>& EAST | SOUTH | TOTAL | ON♂     | ON♀ |
| Figan<br>(FG)    | Prime: alpha since May 1973: excitable: often leads retreat   | 8               | 9     | 17    | 2       | 2   |
| Faben<br>(FB)    | Elder brother to FG: totally paralyzed right arm: excellent bipedal locomotion  | 7               | 7     | 14    | 3       | 2   |
| Jomeo<br>(JJ)    | Heaviest male (110 lbs): low ranking: prime   | 7               | 7     | 14    | 3       | 1   |
| Sherry<br>(SH)   | Younger brother to JJ: not ranked fully socially mature until 1974: extremely active in patrols and attacks                                   | 8               | 5     | 13    | 2       | —   |
| Satan<br>(ST)    | Prime: few years older than Sherry: also very motivated to detect neighbors: active in destroying nests: spectacular waterfall displays       | 6               | 7     | 13    | 1       | 2   |
| Humphrey<br>(HM) | Alpha male January 1971–May 1973: just past prime: active on patrols in north and east but apprehensive to travelling south                   | 10              | 1     | 11    | 1       | 1   |
| Evered<br>(EV)   | Prime: just older than Figan but intimidated by FG and FB together: recently became rather peripheral but previously active on patrols        | 8               | 2     | 10    | 2       | 2   |
| Goblin<br>(GB)   | Early adolescent (born September 1964): often travelling with adult males: does not yet show adult patrol behavior                            | 6               | 4     | 10    | 1       | —   |
| Hugo<br>(HG)     | Very old: during 1974 he gradually dropped out of strenuous excursions: died January 1975   | 4               | 1     | 5     | 1       | —   |
| Mike<br>(MK)     | Very old: alpha 1964 to end 1970: dropped out like Hugo during 1974: disappeared since February 1975  | 2               | —     | 2     | —       | —   |
| Gigi<br>(GG)     | Sterile: has been cycling regularly since 1965: very often accompanies males: shows much “masculine” behavior (aggressive patterns, displays) | 6               | 2     | 8     | 1       | 1   |

TABLE 1b  
Kahama individuals frequently referred to in text

| INDIVIDUAL       | COMMENTS   |
|------------------|--|
| Charlie (CH)     | Prime: alpha male: has always been known for his fearless temperament                          |
| Godi (GI)        | Prime: challenging Charlie for alpha, October 1973: younger than Charlie: similar age as Figan |
| Dé (DE)          | Prime: sick in August 1973: became rather emaciated  |
| Sniff (SF)       | Prime young male: Leader in intercommunity interactions  |
| Willy Wally (WW) | Similar age as Dé: semicrippled in one leg, probably polio, since 1966                         |
| Goliath (Gol)    | Very old: fairly solitary: alpha prior to Mike   |
| Madame Bee (MB)  | Old female: mother of Honey Bee and Little Bee: paralyzed arm, probably polio, since 1966      |
| Little Bee (LB)  | Young, cycling female: right "clubbed" foot, probably birth defect                             |
| Honey Bee (HB)   | Adolescent female  |

An early adolescent male (Goblin, see Table 1a), usually without his mother, traveled with the males on 18 of these occasions, and females were present on 16 of them. Eight of the 13 Kasakela adult females were involved in such excursions but only one, the sterile female Gigi (see Table 1), consistently traveled with the males on such occasions. Thus she was present on 48% of the excursions while the female next most frequently involved (Patti, cycling, nulliparous) was present only on 16%. For the most part, females were in oestrus at such times: 69% of the occasions when they were involved they were half to fully swollen. Gigi, who cycles regularly, was only anoestrus during three excursions. As we have mentioned, females tend to have smaller ranges than do males, and those females involved in excursions to the north or east tended to be those who are normally found in areas to the north or east of the community range.

Chimpanzees taking part in patrols tended to travel in close, compact groups. Travel was silent with frequent pauses to look and listen. Often an individual stood bipedally, to see over tall grass or stare down into a valley or ravine ahead. From time to time the party stopped and sat silently, watching and listening: sometimes they climbed into a tree; at other times they sat, often within arms' reach, on some ridge overlooking a neighboring valley.

During patrols, males (rarely females) sometimes intently smelled the ground and the vegetation. They also smelled discarded food wadges and feces. We do not yet know whether chimpanzees recognize a distinctive odor for different individuals or sexes, or whether they are simply trying to determine the time which has elapsed since other

chimpanzees passed by. Of interest in this connection are observations of excessive defecation (diarrhoea) during a boundary patrol when strangers had been heard (Wrangham 1975; A. Pierce) and of excessive urination in a similar situation (A. Pierce). A relevant fact, though it did not occur during a patrol, was observed in a nervous adult male (Evered). He had been absent from the Kasakela core area for 10 weeks and was apprehensive of encountering the alpha male. As he traveled, on his own, he suddenly began to smell the ground very intently, going down on his elbows to do so. As he did, he urinated a number of times (E. Bergmann). Some primates are known to scent mark the boundaries of their range: this is common among the prosimians and some New World monkeys and has also been observed in vervet monkeys. These monkeys rub their cheeks and chins on branches or rocks along territorial boundaries: neighboring vervets may subsequently come to sniff such areas (Jackson and Gartlan 1965; Gartlan and Brain 1968). We are not suggesting that chimpanzees scent mark their boundaries, but it is possible that the proximity of a neighboring community may lead to a state of arousal, which might result in excessive defecation and urination. This can then serve as clues to patrolling neighbors.

When chimpanzees encountered fresh nests in peripheral areas, they often inspected and smelled the nests intently. Wrangham (1975) was the first person to observe this behavior at Gombe. Nest inspection has been seen now on eight occasions: five times one or more of the males present displayed "at" a nest until it was partially or totally destroyed.

Perhaps the most striking characteristic of patrolling chimpanzees is the silence which they may maintain for well over 3 hours. Occasionally, as they travel, a male may perform a charging display, but he will not call out as he does so. Females normally scream during copulation, but in peripheral areas matings are usually silent (McGinnis 1974; Tutin 1975b). Occasionally a party will move stealthily towards some creature rustling in the vegetation: on occasions such sounds were made by bushpigs or baboons, but the chimpanzees did not break their silence.

Sometimes the patrolling party sat in a tree, overlooking some valley, for as long as an hour without feeding, calling, or even rustling the vegetation. Only younger individuals sometimes broke silence during patrols (see section on individuality, Goblin).

By contrast, when patrolling chimpanzees returned once more to familiar areas, there was often an outburst of loud calling, drumming displays, and even some chasing and mild aggressive contact between individuals. Particularly spectacular were displays along stream beds or around waterfalls. Busse observed a display of this kind, which went on for a full 10 minutes (performed by Satan). It is possible that this kind of noisy and vigorous behavior, first observed by Bygott in 1972, serves as an outlet for the tension and social excitement, engendered by

journeying into unsafe areas, which the chimpanzees have suppressed for so long during silent travel.

Females were present on 12 of the 16 patrols to the north and east. Again, they were usually in oestrus when they accompanied males on such occasions: anoestrus females were present on only four patrols. Gigi, who took part in eight patrols, was in oestrus on all but two of them. When females went on patrols, they usually did not take an active part, but tended to trail along in the rear. They were less attentive, for the most part, to the possible whereabouts of unhabituated individuals than were the adult males. Only Gigi was observed to inspect the nest of a presumed stranger, and only she has actively joined the males as they smelled the ground.

### **Response to the Sight or Sound of Unhabituated Neighbors**

On 14 occasions the Kasakela individuals were observed as they responded to the sight or sound of neighbors or unhabituated individuals unknown to the human observers. At the first indication of the proximity of strangers, the chimpanzees often showed reassurance contact behavior (Goodall 1968), reaching out to touch one another and sometimes grinning (teeth exposed as lips are retracted, Goodall 1971) and usually with erect hair. Responses varied and presumably depended on a variety of factors, which, for the most part, observers were unable to record because of the shyness of the neighbors. However, there is evidence that a small party of males may flee from a larger one (Bygott 1974; Wrangham 1975). Two parties of more or less equal size may approach and display at one another until one or both groups retreat.

In response to hearing calls, presumably made by neighbors, the chimpanzees sometimes approached silently and cautiously, or they broke into a bedlam of noise and raced towards the sounds, particularly if they were made by single females or mother-infant pairs. Sometimes they appeared to hunt the perpetrator of the call, traveling slowly, peering around intently, and sniffing the ground and vegetation as they went. When they caught up with unhabituated individuals, the latter often were chased or attacked. On a number of occasions, the habituated party ran so fast that it was lost by human followers.

Table 2 gives some idea of the behavior shown by the Kasakela chimpanzees on those occasions when they were observed responding to unhabituated individuals. It lists (a) the response to the known or presumed presence of neighboring males (when they were either seen or a chorus of pant-hoots indicated they were there) and (b) the response to the sight of an unhabituated female or to single calls, most of which were known to have been made by females. Although we need many more observations, the data do suggest that parties of adult males are

CHIMPANZEES

TABLE 2a  
Responses of habituated chimpanzees to presumed neighbors—to the sight of unhabituated males or calls from parties when the pant-hoots indicated that males were present

| DATE           | COMPOSITION OF PARTY |   |    | RESPONSE OF HABITUATED PARTY             |                                |                                 |   | LOST  |
|----------------|----------------------|---|----|--|--------------------------------|---------------------------------|---|---|
|                | HABIT-<br>UATED<br>♂ | ♀ | A♂ | UNHABIT-<br>UATED                        | CALL                           | APPROACH                        | DISPLAY   |   |
| 25.5.<br>1973  | 9                    | 5 | 1  | Few pant-hoots heard                     | Screams, waa barks, pant-hoots | Race toward                     | Many male displays possibly directed at involving strangers | x   |
| 10.1.<br>1974  | 6                    | 2 | —  | 6 adult males seen                       | —                              | Slow, cautious                  | Run off when charged  |   |
| 24.1.<br>1975  | 5                    | 4 | 1  | Mixed group, bad visibility              | —                              | Slow, cautious                  | Display: both parties                                       | Presently retreat                             |
| 20.4.<br>1975  | 4                    | — | 1  | Hear drumming, pant-hoots. Later see 3♂♂ | Pant-hoots, waa barks          | Race toward                     | Display: both parties                                       | Strangers flee as last Kasakela chimps arrive |
| 21.5.<br>1973  | 7                    | 3 | 1  | Chorus pant-hoots heard                  | —                              | Fast                            |   | x   |
| 30.5.<br>1973  | 9                    | — | 1  | Chorus pant-hoots heard                  | —                              | Race: subsequent slow, cautious | Search, then give up and return                             |   |
| 18.9.<br>1973* | 5                    | 3 | —  | Chorus pant-hoots heard                  | ♀♀ pant-hoots                  | Females, Evered wander toward   | Other males return  |   |
| 8.1.<br>1974   | 4                    | 1 | —  | Chorus pant-hoots heard                  | —                              | Race toward                     |   | x   |

\* Observation by R. Wrangham (1975)

motivated to approach individuals of other communities, even if the subsequently retreat upon finding themselves outnumbered or faced with more formidable opponents. Unhabituated females in peripheral areas are often chased and attacked (as they may be also when they appear in core home range areas, Pusey, this volume).

*Responses to the Proximity of Unhabituated Males.* A few examples will serve to give a better idea of behavior that may occur when unhabituated males are encountered. On April 20, 1975, a group of four adult males (Figan, Humphrey, Satan, and Sherry), with the adolescent Goblin, were eating meat in Kakombe Valley (Figure 2b). Suddenly there was an outburst of pant-hoots and drumming from high in the valley: the chimpanzees became very excited, gave pant-hoots and waas, and raced off towards the calls. Sherry and Goblin were in the lead with the older males some distance behind. They continued to run until they caught up with a party of three adult males: there was much noise with both parties calling loudly as they displayed towards each other, branch waving and drumming. The strangers displayed at Sherry, coming to within about 10 meters before Humphrey and Figan charged up, both waving branches and throwing rocks. At this the strangers turned and fled. The Kasakela males continued to call and display but did not chase the three males. On this occasion it seems that the strangers may not have fled the observer (P. Leo): he was lying flat behind some bushes and he may not have been seen.

TABLE 2b

Responses of habituated chimpanzees to presumed neighbors—to the sight or sound of unhabituated females, or to a single call probably made by a female

| DATE           | COMPOSITION OF PARTY                     |   |                   | RESPONSE OF HABITUATED PARTY                               |                        |   |  |             |
|----------------|--|---|-------------------|--|------------------------|---|--|-------------|
|                | HABIT-<br>UATED<br>$\delta$ ♀ A $\delta$ |   | UNHABIT-<br>UATED | CALL   | APPROACH               | DISPLAY/<br>ATTACK                            | RE-<br>TREAT                                       |             |
| 28.5.<br>1973  | 9  | 3 | 1                 | Single pant-hoot heard                                     | Scream, waa, pant-hoot | Race toward: then long, silent hunt, smelling | Chase, 3 $\delta\delta$ attack old female severely | She escapes |
| 11.6.<br>1973  | 8  | 2 | 1                 | Single pant-hoot heard. Later <i>see</i> mother and infant | Pant-hoots             | Just look                                     | She escapes. Chase her                             | She escapes |
| 12.7.<br>1973  | 8  | 1 | 1                 | Single pant-hoot heard                                     | —                      | All run toward                                | Satan displays again and again                     |             |
| 21.12.<br>1973 | 8  | 3 | 1                 | Infant scream heard  | —                      | All run toward                                | Fifi (♀) kicks mother 30 meters from tree          |             |
| 16.7.<br>1974  | 2  | — | 1                 | See young female (Harmony)                                 | —                      | Run toward                                    | Figan, Faben attack, display                       | She escapes |
| 21.6.<br>1973  | 4  | 1 | —                 | One chimpanzee pant-hoots                                  | —                      | Slow, cautious, hunt                          | Give up and return                                 |             |

On a second occasion, six Kasakela males were feeding in the north of the home range with Goblin and a mother (anoestrus) and dependent young. Suddenly Goblin gave pant-hoots and stared to the north: a party of six unhabituated adult males were sitting in a tree some distance away. The Kasakela chimpanzees uttered no further sounds but stared towards the strangers, hair erect. After a short while they began to approach, traveling cautiously. The six males continued to sit, looking at them, and the Kasakela party halted, then moved on again. At this point the six males swung down from the tree and charged despite the presence of humans: the Kasakela chimpanzees turned and fled. Presently they stopped and looked back: there was no sign of the strangers but Humphrey, after uttering a soft pant-hoot, turned southward again and hastily led the party back towards more familiar ground (report by H. Mkono).

Three detailed observations involved the males of the Kahama community and their interactions with males presumed to belong to the Kalande community to the south. Once the young prime male, Sniff, who had been feeding with Charlie and Willy Wally, suddenly stared and began a display. In response there were some calls to the south and the observers (Mpongo and Bandora) noticed two unhabituated chimpanzees, a male and a female. The female ran off as Sniff, followed by the other two Kahama males, ran towards them. The male also tried to escape but was hindered by a semiparalyzed leg. He was caught and briefly attacked by Sniff and Charlie, while Willy Wally displayed nearby. As the stranger escaped, he was chased for a short while.

The second incident was observed by Matama. The same Kahama males were in association. As Charlie sat, feeding on the carcass of an infant bushpig, an unhabituated adult male suddenly appeared on the opposite side of a narrow ravine. Charlie left his meat and fled northward: the other Kahama males also raced off. The observers heard screaming and other calls near Kahama stream and hastily followed: they found Charlie, screaming loudly, but more sounds were coming from just ahead and they moved on. Soon they came across Sniff who was displaying along a track part way down a very steep-sided ravine, about 20 feet from the bottom. Other chimpanzees were below him, hidden in the thick bush. Both Sniff and the unseen party were calling loudly, uttering mainly waa barks. As Sniff displayed, he repeatedly picked up quite large rocks and threw them so that they landed near the strangers below him. Matama counted about 13 missiles thrown in this way. At the same time, it appeared that the others were also hurling things: every so often a rock or a stick flew upward from the undergrowth below but, falling way short of Sniff, rolled back into the ravine. Matama moved round to try to get a better view of the strangers and saw three males: there were almost certainly more. As the strangers

retreated, they repeatedly displayed and there was a good deal of drumming and pant-hooting.

The third event involved the same three Kahama males. As they traveled along the southernmost Kahama ridge, Charlie suddenly gave an alarm call (wraaah, Goodall 1968) as a party of seven to nine chimpanzees was seen to the south. The three males charged uphill, seemingly to get a better view of the strangers. Charlie and Willy Wally then fled northward. Sniff, however, remained behind and did not follow his companions until two males of the party charged to within 25 m of him (Observers Pierce and C. Chiwaga). The three observations occurred on November 12, 14, and 28, 1974. Their locations are shown on the map (Figure 2b).

*Response to Unhabituated Females.* During the past few years, a number of unhabituated females, both young nulliparous individuals and older mothers with infants, have been observed traveling within the range of the Kasakela and Kahama communities. The exact number of such females in any given year has not yet been determined, since it is seldom possible to identify accurately chimpanzees who are rarely seen, who are shy, and who are encountered by a succession of different observers. Some of these females have been positively identified as individuals who gradually associate more and more frequently with habituated chimpanzees until they become habituated themselves and are eventually included among the known members of the community concerned (see Pusey, this volume).

Sometimes these females are encountered, during a follow, in association with habituated individuals: such incidents have not been included in Table 2 which only documents responses to such females encountered on their own or with other unhabituated individuals. When Kasakela males heard calls uttered by these females, or by their infants, they often showed instant excitement, called loudly, displayed, or attacked.

During the 1973-1975 period, only one serious attack was witnessed. The victim was an old female (no offspring visible), and the event was witnessed by C. Tutin, C. Kakuru, and R. Bambaganya. Tutin's detailed report describes the entire sequence of events, and we are grateful for her permission to summarize it. During the morning of May 28, 1973 a large party of Kasakela chimpanzees (nine males, adolescent Goblin, and three females with young) was feeding to the south of Rutanga Valley (see Figure 2b). When a single chimpanzee call was heard on the far northern side of Rutanga Valley, there was instant pandemonium, pant-hoots, waa barks and screaming from the Kasakela party. Humphrey and Evered led off at full speed toward the sound and all the others followed, except the one anoestrus female. When the chimpanzees reached the stream, travel became silent and they moved on, in a fairly

compact group, until they reached a place, which, Tutin reckoned, was close to where the single call had been made. There the Kasakela chimpanzees sat, still silent, for 15 minutes. They moved on, then sat staring over another ravine for half an hour. Then, still maintaining silence, they traveled on until they reached the Busindi-Mitumba ridge. There Humphrey, who was still in the lead, began intently smelling the ground and tree trunks: the others followed his example. Soon after this, it looked as though the party had given up, since they spread out a little and began to feed. But then, 3 hours and 20 minutes after the original call had been made, Figan and Evered began to race to the east, retracing their steps, and the rest of the party ran after them. Four minutes later, there was a tremendous outburst of calling—screams, waa barks, and the wraaa of alarm. As the observers arrived they saw Humphrey, Evered, and Satan jointly attacking an old anoestrus female. She was screaming and crouched to the ground as they pounced on her. She finally managed to escape and ran off, pursued by the Kasakela party. The chimpanzees traveled rapidly and noisily and were lost by the observers. The quantity of blood at the site of the attack suggested that the female had been quite badly hurt.

Other serious attacks were seen in 1971, prior to the community division, by Bygott (1972; 1974). In the first instance, five males (Mike, Humphrey, Satan, Jomeo, and Figan) suddenly raced forward, there was an outburst of screaming and barking, and when Bygott caught up he found some males attacking, while others displayed around, an unhabituated female. Finally she escaped; Humphrey next appeared holding an infant chimpanzee, between 2 and 3 years old, which he and Mike killed by eating. They tore at an arm and leg despite the fact that the infant still screamed and kicked. A few days later, Humphrey, Jomeo, Figan, and Faben were again observed as they chased and severely attacked an unhabituated female thought, by Bygott, to be the same individual.

One final observation may be relevant. In 1973 a small group of Kahama males apparently made a detour in order to approach and inspect the dead body of a very old female. There were bad puncture wounds on her back, which could have been inflicted by chimpanzee canines. The only other animals in the area that could have inflicted such wounds are leopards or baboons. The body was not eaten, nor were there any lacerations such as would be expected if the attack had been made by a leopard. Baboons have never been known to inflict serious injury on a chimpanzee, even in severe competition during banana feeding or during a hunting episode when chimpanzees were attacking infant baboons. It seems likely, therefore, that she was also a victim of chimpanzee aggression. (The observations were made by Y. Selemani and reported by Wrangham 1975).

Females of the Kasakela community often took part in chases that preceded male attacks on unhabituated females. Once, after a large

party had raced noisily in the direction of a single call, the unhabituated female who was found was attacked by only one member of the Kasakela party: adult female Fifi kicked the stranger some 30 meters to the ground after pursuing her through the branches. When young unhabituated females begin to move into the core area of the Kasakela community, associating more and more frequently with habituated chimpanzees, the Kasakela females very often direct aggression toward them, threatening, and sometimes attacking (Goodall 1971; Pusey, this volume).

### **History of the Relationship Between Kasakela and Kahama Communities**

We have already mentioned that, until 1972, the Kasakela and Kahama communities were considered one big community. Bygott outlines the gradual decrease in frequency of meetings and associations between males of the two groups (this volume; in more detail, 1974). At the time of the split in 1971, the Kasakela (northern) group comprised eight fully adult males: five prime males (Humphrey, Evered, Figan, Jomeo, and Satan), one prime crippled male (Fabén), and two old males (Mike and Hugo). The Kahama (southern) group comprised only five fully adult males: three prime males (Charlie, Godi, and Dé), one slightly older male (Hugh), one prime crippled male (Willy Wally), and one old male (Goliath). Also there was one adolescent male (Sniff). However, although the Kahama group was smaller, the two top-ranking males, Hugh and Charlie (suspected siblings), were able to intimidate the alpha male of the Kasakela group, Humphrey.

The Kahama group, or part of it, had always ranged farther to the south and had always been less frequent visitors to the banana feeding area: after the change in the feeding system in 1968 (Wrangham 1974) when bananas were no longer provided daily, the camp attendance of the southern, Kahama, chimpanzees dropped even more and by 1971 they ranged, for the most part, to the south of Kakombe Valley and camp.

One female who had previously visited camp regularly (Mandy) and another who had appeared fairly often (Madam Bee) also began to stay away for longer and longer periods during 1971. Bygott (1974) writes the following: (In September, 1971)

A significant event in the southern subcommunity was that Mandy (a middle-aged female) came into oestrus for the first time in six years. She seemed to be very attractive to all the males and when receptive she was commonly accompanied by all or most of the southern males.

Thus on the few occasions when the southern males visited Kakombe Valley, they all came together in a cohesive party, with Mandy, and all returned south together. Similarly, when the northern males went south and met southern males, they often found them in a large party. When a large party of southern males encountered northern males (in any part of their range) they tended to display-charge in parallel and cause the northern males to scatter, although after the

initial excitement both sides usually settled down to groom or feed peacefully together. It was perhaps for reasons of security that northern males, when they traveled south, usually went in parties of at least five. Thus there developed a pattern of “expeditions” in which a party of males from one sub-community left their normal range and traveled perhaps 1 km. or more until they met males of the other sub-community. At least 13 such expeditions were recorded between August 25th and November 7th.<sup>1</sup>

These expeditions are reminiscent of boundary patrols and many of the incidents Bygott describes resemble intercommunity avoidance interactions as he points out in this volume.

Kasakela and Kahama males continued to meet occasionally during 1972, with some peaceful interactions, but they showed increasing avoidance of one another and the Kahama chimpanzees had stopped visiting Kakombe Valley, as a group, by September of that year. Only the male, Goliath, and Madam Bee and her two daughters have appeared in camp since that time. After 1972 the only nonaggressive interactions seen between Kasakela and Kahama males involved the three old males (Mike and Hugo with southern males, and Goliath with northern males), but these became increasingly rare (Wrangham 1975; Gombe Stream Research Centre records).

During 1973 the only significant overlap zone between the ranges of the Kasakela and Kahama males was Sleeping Valley, to the north of Mkenke stream (Figure 2a): the two groups were now considered as separate communities (Wrangham 1975). In January 1973, a party of Kasakela males was observed as it traveled to a ridge overlooking this overlap area and sat, silently, until they heard calls from the Kahama males in the distance (Nyasanga/Kahama ridge). Only then did they move down to feed in Sleeping Valley (Wrangham 1975). In May, 4 prime Kasakela males were followed on a patrol to the south: they overlooked Kahama Valley for some time, saw and heard nothing, and returned to their core area. In June, seven Kasakela males heard pant-hoots to the south when they were traveling into Mkenke Valley. They broke into a bedlam of calls and displays and then ran silently down towards the stream. Meanwhile the Kahama males were still calling continuously on the south bank. For the last few hundred meters, only four Kasakela males continued to run forward: they reached the stream and sat silently while the other party continued to call and display, not visible in the undergrowth. Soon the Kasakela males retreated, maintaining silence for some time before breaking out into pant-hoots and drumming displays (D. Riss).

In January and February 1974, parties of Kasakela males chased, caught, and severely attacked two males (Godi, Dé) of the Kahama community. (These attacks will be described in detail in the next section.) In April, Riss was working full time in the Kahama area but, at

the same time, the Kahama males were mostly traveling alone. By July, when Pierce began her long-term study in the south, the core group of Kahama males was very small: Hugh had disappeared at the end of 1972, and Godi and Dé were not seen after January and April respectively. Thus only Charlie, Sniff (now adult), cripple Willy Wally, and old Goliath remained. These males associated with the two females and their young already mentioned and an unknown number of unhabituated females.

During 1974, the Kasakela males began to push their range to the south. Occasionally small parties were observed traveling and feeding as far south as Busambo without signs of nervousness (although there were also occasions when they were cautious in the same areas). Between August and December, Kasakela males were followed on five long excursions to the south. Once eight males silently and stealthily hunted Sniff, whom they had seen in a tree only some 50 meters distant before he climbed down and moved away (Pusey 1977). The Kahama males, however, were still able to intimidate the Kasakela males: when Faben, Figan, and Jomeo encountered the four Kahama males by Kahama stream, both parties called and displayed, without contact. The Kahama individuals called longest and loudest, and the other party retreated.

The early part of 1975 was marked by Kasakela excursions and patrols deep into Kahama territory (Figure 2a). During February, the third attack on a Kahama male (Goliath) occurred.

### **The Three Attacks on Kahama Males**

These attacks were all characterized by extreme violence and a brutality shocking to observers. Because of the rarity and intrinsic interest of such incidents, we shall describe each in detail (Figure 2c).

*Godi Attack.* (Report by H. Matama) On the morning of January 7, 1974, a large mixed group of Kasakela individuals traveled slowly southward, with periods of feeding. At 1415 a party of six adult males (Hugo, Humphrey, Faben, Figan, Jomeo, and Sherry), an adolescent male (Goblin), and the sterile female (Gigi, in oestrus) detached itself from the others and began to travel more purposefully southward. During this journey calls were heard to the south. The party began to travel quickly and silently in that direction. Finally they came upon Godi who was feeding in a tree and clearly caught unaware. He leapt down and fled, screaming. Humphrey, Jomeo, and Figan were close on his heels, running three abreast with the rest of the party following. Humphrey grabbed Godi's leg and pulled him to the ground, then jumped on Godi as he tried to escape. The other chimpanzees began hitting Godi as he sat, pinned to the ground by Humphrey who was

leaning forward and holding on to the victim's legs with both hands. During the ensuing attack, Humphrey remained in this position: Godi had no chance to escape or to defend himself.

Figan, Jomeo, Sherry, and Evered beat on Godi's shoulder blades and back with their hands and fists: Hugo bit him several times (though his teeth, which were worn to the gums, could not inflict serious wounds). Gigi, meanwhile, raced round and round, screaming loudly. Matama cannot recall seeing Goblin who must have kept out of the way.

Finally Humphrey got off, the others stopped hitting Godi, and the attack, which lasted 10 minutes, came to an end. Hugo, screaming loudly, stood upright and hurled a large rock at Godi. The rock, weighing well over 5 kg, fell short. The attacking party then left, moving rapidly to the south, uttering pant-hoots and displaying. Throughout the attack they had all been screaming quite loudly. Later, calls were heard to the south and the party hurried on towards them: but they did not persist for long and eventually returned to their core area.

Godi remained motionless on the ground when Humphrey got off his head but, as the attackers moved off, he got up and looked after them, screaming. It was clear that he was badly wounded: he had a great gash, from his lower lip down the left side of his chin, and this was bleeding profusely. Blood was also coming from his nose, his upper lip was swollen, and there were bleeding cuts in the right corner of his mouth. There were puncture marks on his right leg and between his ribs on the right side. He had a few small wounds on his left forearm. Since that moment Godi has not been seen, despite the fact that field assistants and students have been working with the Kahama community since April 1974.

*Dé Attack.* The second attack, observed by E. Mpongo and A. Bandora, took place on February 26, about one and a half months after the Godi attack. This time, the Kasakela party was smaller, consisting of Evered, Sherry, Jomeo, and Gigi (anoestrus). In the early morning the group fed, slowly moving southwards. At 0845 they began to travel more purposefully to the south. As they arrived in Sleeping Valley, they started to walk slowly, often pausing to stare around and listen intently. Once they tensed with hair erect and stared into a tree: two baboons appeared and the chimpanzees gave a few soft grunts and appeared to relax. They then continued their cautious travel, as if they were hunting prey. Suddenly at 0915 the four raced forward, and a moment later there was an uproar of screaming and barking. The observers thought there had been a predation, but as they approached, the three Kasakela males were found attacking Dé. Calling and displaying nearby were Sniff and Charlie: Little Bee (Kahama female, daughter of Madam Bee) was fully swollen and present with Dé.

After two minutes, Evered and Jomeo left Dé and charged southward, apparently in pursuit of Sniff and Charlie, but the observers stayed to watch the struggle that continued between Sherry and Dé. Sherry stamped on and bit Dé, who was unable to escape as the younger male hit him. Perhaps he had already been badly hurt by the fierce gang attack, or perhaps he was still weak from an illness he had the previous year which left him very thin. At any rate, he soon stopped struggling and sat hunched over, uttering squeaks, as Sherry continued the assault. Another two minutes passed, and then Dé appeared to bite Sherry who ran off. Dé managed to climb a tree, but Sherry followed and renewed the attack. Dé began to scream loudly again.

Soon afterwards Jomeo and Evered charged back: Jomeo immediately climbed up to join his brother in the attack. Dé managed to jump away to another tree, now very quiet, but the brothers leapt after him and continued hitting and biting their victim. Dé, again screaming, managed to jump away but the branch he landed on cracked so that he was left hanging close to the ground. Jomeo instantly leapt down, seized Dé's leg and dragged him to the ground. Evered now joined the attack: Dé lay flat on the ground and no longer tried to escape as the three prime males assaulted him, all screaming. Little Bee continued to watch and Gigi began a display, stamping and slapping the ground, and then joining in the attack. The fight became even more vicious, as all four Kasakela chimpanzees hit and stamped again and again on the still prostrate Dé who was uttering a few squeaks. The observers saw the aggressors tear skin from Dé's legs with their teeth, and at some point he was dragged along the ground.

Once again Evered and Jomeo left Dé to charge after the retreating Charlie and Sniff, uttering barks and screams and waving branches. Sherry continued to attack Dé who began screaming loudly again. Gigi moved off a little way and Little Bee traveled to the south, perhaps trying to follow the Kahama males in their retreat. Evered and Jomeo followed her and only then, after the attack had lasted 20 minutes, did Sherry leave his victim to follow the others. Gigi, however, was left near Dé and was not seen again that day.

One and a half hours later, the Kasakela males returned to the site of the attack. As they approached they called and seemed to listen for a response. They followed the track along which they had dragged their victim and intently smelled the ground and vegetation, particularly where blood was seen. Evered stared into the trees where Dé had been attacked. The party spent about half an hour in that vicinity, but although the observers searched for Dé during that time, they could not find him.

Two months later Dé was found, traveling by himself in Kahama. He was incredibly emaciated with his spine, backbone, pelvic girdle, and



FIGURE 3  
Dé, a Kahama male, two months after the 26-2-74 attack. Photo by Jim Moore.

anus protruding (Figure 3). He was lame due to a bad unhealed gash on his inner left thigh that prevented normal locomotion: he had great difficulty in climbing and spent much of his time feeding on the ground. Nails were missing from his fingers, a toe was partially bitten off, and part of one ear was torn away. His once large scrotum had shrunk to a fifth of its former size. He was followed for five consecutive days during which he was always alone. He has not been seen since despite intensive searching (D. Riss).

*Goliath Attack.* The third attack, on old Goliath, took place on February 7, 1975, and was witnessed by Bergmann and Bandora. During the early afternoon a party of males (Humphrey, Faben, Figan, Satan, Jomeo, and adolescent Goblin) separated itself from a large mixed group of Kasakela chimpanzees and began to travel south. Faben was the leader. Progress was slow and cautious with pauses for intent listening. After 15 minutes of traveling with the group of males, Humphrey turned back. Faben continued to lead as the party crossed Bare Tree Valley. The chimpanzees then climbed into a tree and sat for 48 minutes staring towards Kahama. During this time the only sounds were made by Goblin who fed, rustling the vegetation.

Suddenly the males climbed silently to the ground, sat for a moment, and then Faben gave pant-hoots, displayed, and raced forward some 25 meters to where Goliath was sitting on the ground amidst a

tangle of low bushes. Possibly he was hiding. Faben began the attack, leaping at the old male and pushing him to the ground, his hand on Goliath's shoulders. Goliath was now screaming and the other chimpanzees were giving pant-hoots and displaying. Faben continued to hold Goliath to the ground until Satan arrived: both aggressors pulled at the victim who did not try to retaliate, but sat, hunched forward, while Faben and Satan hit him and kicked him all over his body. Jomeo, screaming, ran up and joined in the attack. At one point Goliath seemed to be lifted bodily from the ground and dropped. Goblin then ran up, hit Goliath's head, and ran off. During the attack, which lasted for about 20 minutes, Goblin repeatedly ran in, hit Goliath, and ran off again. As the three males continued to pound and hit their victim, Figan displayed towards them, calling, and hitting out at Goliath as he passed. Unlike the other adult males, Figan never clinched with Goliath, but displayed as he went past, at least eight times, hitting him on each occasion, and once biting him in the thigh.

Meanwhile the other males continued, without pause, to beat up their victim, using their fists and their feet. Goliath tried to protect his head with his arms but soon gave up and, as Dé had done, lay completely still. Faben took one of Goliath's arms and dragged him for about eight meters through the bush. Satan followed and dragged him back again; Faben returned and, jumping onto Goliath's back, stamped on him many times without pause. Goliath still lay, stretched out, his face in the dirt. Faben got off Goliath and began hitting him with his hand again, joined by Satan and Jomeo. Suddenly, with very rapid movements, Jomeo began to drum with his hands on Goliath's shoulder blades. Faben sat on Goliath's back, took one of his legs and, with his hand, seemed to twist the leg round and round.

Eighteen minutes from the start of the attack, Jomeo moved away from Goliath, followed by Satan and Faben. The Kasakela party was incredibly excited as they drummed and pant-hooted. Faben returned towards the victim, displaying, branch-waving, screaming, and charging right over Goliath who lay, motionless, as he had been left. He gave a slight squeak, the only indication that he was still alive. After this, the attacking party set off at a fast run back to the north. There was much vocalization, including loud screaming, and the males drummed on trees as they traveled to rejoin the group they had left earlier in the day.

At the time of this attack, Goliath was looking very old indeed: his shoulders, back, and head were balding, his ribs and spine protruding. After the attack, he was seen to have sustained a very severe wound on his back, low on the spine, one wound behind his left ear which was bleeding profusely, and another on his head. He was clearly in a state of shock after the attack. He tried to sit up when the Kasakela party had left, but fell back and was shivering all over. Several times he tried to sit up, but seemed unable to do so. He was holding one wrist with his hand.

We do not know whether Goliath survived this brutal assault. Intensive searches were made in all likely places, and once he was thought to have been seen, but the small party was with an unhabituated individual and ran off before positive identification could be made. In view of his extreme age and physical condition before the attack, as well as the severity of the fight itself, it seems unlikely that he could have survived.

### **Interactions Between the Kasakela Community and Kahama Females**

As already mentioned, two habituated adult females stopped visiting the banana feeding area at the time of the community split in 1972 and were included in the Kahama community. Mandy, who had previously traveled often with the “northern” Kasakela individuals, moved quite far to the south and was not seen associating with the Kasakela individuals for about two years. Madam Bee has always ranged to the south, like the Kahama males themselves. She was never a frequent visitor at the feeding area, and it seems that the community split affected her ranging patterns very little. Her range includes the zone between the core areas of the two communities, and she and her two daughters (Little Bee, now adult, and adolescent Honey Bee) continue to have some association with Kasakela individuals. The family has been observed feeding with Kasakela females on a number of occasions, though there were few interactions. The Bees have also traveled and fed with the two old Kasakela males, Mike and Hugo. In August 1974, Madam Bee led her daughters to camp for the first visit in two years. During the excursion they encountered Hugo and several females and their young but, again, there was little social interaction. A short while later, Madam Bee again tried to visit camp but was prevented by Kahama male Willy Wally (who was on safari with Little Bee). Each time Madam Bee tried to head down the valley towards camp, which was clearly visible, Willy Wally displayed at her. Finally she gave up and returned southward (Figure 2c).

Little Bee has never severed her relations with the Kasakela community; she has made periodic visits to its core areas during periods of oestrus since 1972 (Pusey, this volume). In February 1974, Little Bee was traveling with the Kahama males at the time of the attack on Dé: she was in oestrus at the time. When the other two Kahama males left the scene (they had been displaying and calling nearby), Little Bee followed: it was at this point that the Kasakela males stopped their assault and hurried in the direction she had taken. It seems that she traveled fast and it took the males some time to catch up with her: the Kahama males were nowhere to be seen. Little Bee tried to continue southward, but the males displayed at her and she stopped. After a short rest the party turned back to the north. As they traveled, Little Bee frequently

hesitated but each time one of the males displayed at her, shaking branches, and she typically screamed and presented. She remained with the males until they hunted and caught a monkey: as Evered ran off with it, followed by the others, Little Bee did not follow.

Little Bee was also in oestrus when Kasakela males attacked the entire family on September 26, 1974. She was attacked successively by Evered, Faben, and Gigi. At the same time, Honey Bee was attacked by Satan, and Madam Bee was severely beaten up by Jomeo and then Figan. Only the mother was injured, sustaining a bad gash in one leg, which bled profusely and caused her to limp. After this gang attack, Little Bee remained with her aggressors, this time traveling back with them to their core area and remaining there for 4 weeks. The other two females remained in the south.

The following month, after Little Bee had returned to her family, circumstantial evidence suggests that she was again encountered by Kasakela males in her home range. Pierce was following a group of Kahama males when male pant-hoots were heard in lower Mkenke Valley, to the north. They were followed by female pant-hoots from the area where Pierce had left the Bee family the day before. The Kahama males gave loud calls and displayed, racing over the Kahama stream and then remaining quiet and listening for some time. There were no further calls to the north. Later in the day, it was found that Little Bee was no longer traveling with her family: the following day she was again seen associating with Kasakela individuals in their home range. Again she was in oestrus.

In April 1975, Little Bee was still associating frequently with the Kasakela males, and it is possible that she has transferred permanently into their community. It is interesting that in February 1975 Little Bee (anoestrus) traveled with a party of Kasakela chimpanzees as they patrolled south. After a long period of silent travel, during which the other two anoestrus females dropped out of the patrol, the party paused, staring over a ravine ahead. Then Faben and Gigi raced forward and Faben was seen attacking Madam Bee whom he kicked five times. Madam Bee and Honey Bee fled, screaming. Faben and Gigi returned to Figan, but Little Bee had vanished and did not accompany the males as they returned north. However, she was back with the Kasakela community the following day: possibly she had rejoined her mother for a while.<sup>2</sup>

### **Peaceful Associations Between Males of Neighboring Communities?**

In 1971, before the community split, unhabituated males were twice seen in association with the “southern” males (i.e., those who subsequently formed the Kahama community): once three prime males were seen traveling with habituated individuals, and a second time one adult

male was feeding with them in a tree (Bygott 1974). Did the Kahama males once enjoy a peaceful relationship with males to the south, similar to that which existed until 1972 between the Kasakela and Kahama males? Were these unhabituated chimpanzees part of the same community, but ones who normally ranged even further to the south and who never traveled as far as the feeding station? If so, it suggests that communities at that time were much larger and less compact. Or were inter-community interactions, in the past, less aggressive in nature? Bygott (1974) has put forward a theory that increasing agriculture outside the boundaries of the park may have driven more chimpanzees into the area, thus increasing their density. This is plausible: certainly it is true that the Kalande community has recently moved further northward and that members of the Rift community are encountered more frequently than before. If the theory is true, it might account for an increased aggressiveness between males of different communities: the primate literature provides much evidence that crowding, particularly in the presence of strangers, leads to increased aggression (e.g., Hamburg 1971).

Certainly at the present time, there is no firm evidence that Kasakela or Kahama males interact peacefully with males of unhabituated neighboring communities. Wrangham (1975) describes an occasion when adult Kasakela male Evered followed three Kasakela females towards a party of chimpanzees that had called from the north. However, neither the sex nor the identity of the calling individuals was established with certainty, nor was it known whether any of the four Kasakela adults did in fact join the party that had called. Evered certainly tends to absent himself from the center of his community range for quite long periods (up to 10 weeks), and he usually seems to go off to the north on such occasions. But, while we have often speculated as to whether he might, perhaps, have associations with members of another community, his absences could be accounted for by safaris with peripheral, or even neighboring, females. More recently, a male chimpanzee who could not be identified by an experienced field assistant (H. Bitura) was seen to make his nest some 100 meters from Figan. When this male was approached, he threatened the observers but did not flee: early the next morning the two nests were empty. Although it is difficult to believe that a neighboring male could wander into the heart of the Kasakela core area and nest so close to its alpha male, we withhold final judgment until more neighboring males have become habituated.

### **The Individuals**

It is quite clear that some individuals play a more prominent role than others in initiating or taking part in boundary patrols and interactions with unhabituated chimpanzees. Table 1 shows the number of

times the different males of the Kasakela community were involved in excursions to peripheral areas of the home range when behavior relevant to intercommunity interaction occurred, and the number of times they were involved in boundary patrols. The actual figures, however, do not by any means provide the whole picture. Figan, who became the alpha male during 1973 (Riss, in prep.), has the highest score, yet when it came to actual confrontations with neighboring males the facts show that Figan tended to absent himself. On a number of occasions he hung back while other males in the party charged ahead towards strangers: sometimes he hastily led a retreat. Moreover, although he sometimes led boundary patrols, he frequently traveled toward the rear of the party. Figan was present during two of the attacks on Kahama males but played a relatively minor role in both. He was one of the leaders when the party chased and attacked the old female in the north, but he was not seen to take part in the attack (nor did he play a prominent role in 1971 when the female was attacked and her infant killed). (Figan's record of a great number of patrols might be, in part, due to the fact that he was observed more than any other chimpanzee during the study period.) Perhaps we might mention also that Figan's elder brother, Faben, was present with Figan on all but three of his patrols: Figan had relied heavily on the presence and support of Faben when he took over the alpha position from Humphrey (Riss, in prep.). Often it was one of the two brothers who, after a long period of silence near a boundary, would initiate a series of pant-hoots, the response or absence of response to which would indicate whether or not neighboring males were in the area.

Faben, unlike Figan, and despite his completely useless right arm (Figure 4), seemed motivated not only to take part in patrols, but also to lead travel and take part in the final charge that would rout strangers or lead to a retreat. Faben took part in the attack on Godi and appeared to be the most vicious and brutal assailant during the attack on Goliath which, it appeared, he initiated. After long periods of silent tension, Faben often initiated the outburst of calling, displaying, and drumming which a party engaged in on return to more familiar home ground.

Satan, Evered, and Jomeo were all actively engaged in boundary patrols and intercommunity interactions: all three took part in a number of "final charges" when part of the group remained behind. Jomeo took part in all three of the attacks on Kahama males and was violent and brutal in all of them. Without doubt he was responsible for many of the bad wounds, since he is the largest and heaviest of all Kasakela males (50 kg; average 43 kg). Evered and Satan very often acted as leaders in boundary patrols: they went, together, on one very long patrol in the far eastern part of their range and, a few days later returned to the same area on another long, tense patrol, this time accompanied by a

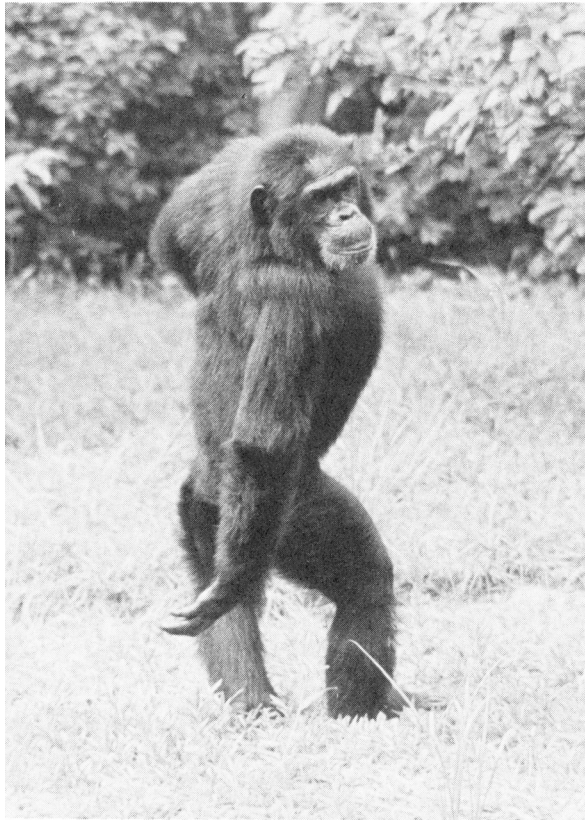


FIGURE 4  
Faben, a partially paralyzed Kasakela male, is an active participant in patrols and attacks. Photo by Larry Goldman.

few other males. The figures shown for Evered in Table 1 are misleading: towards the end of 1974 and during the early months of 1975, he spent long periods away from the Kasakela core area and was simply not around to accompany the other males on their peripheral excursions. During 1973 and most of 1974, he was a very active participant in boundary patrols, being present for nine out of the total of 14 and clearly leading on at least five occasions. He was particularly aggressive when he encountered chimpanzee nests presumed to have been made by chimpanzees of other communities: on four of the five occasions when his response was observed, he not only inspected nests but also displayed "at" them, often destroying them almost entirely (see also Wrangham 1975). (Humphrey and Satan each displayed once at nests, but other individuals merely inspected them carefully.) Evered was an active aggressor in two of the attacks on Kahama males. Satan was also one of the males most eager (subjective impression of observers) to find strangers. Frequently he led patrols and was almost always near the front. A characteristic of Satan was his performance of

impressive and spectacular stream-bed and waterfall displays on his return to safe areas (C. Busse).

The behavior of Humphrey is of particular interest. He was alpha male of the Kasakela community in 1971 and 1972, at the time when the Kahama community was gradually splitting off. Even then, Humphrey was intimidated by the presence of Charlie, who almost always traveled around with his presumed elder brother Hugh. Both of these individuals were known for their fearless temperaments: it was mainly the joint performance of Hugh and Charlie with their impressive displays, that made the Kahama males so intimidating when they charged forward in a group. Bygott (1974) describes nine occasions when the Kahama males met and intimidated parties of Kasakela males. On eight of these, Humphrey was involved: seven times-he either left his party before the confrontation or soon after the meeting had taken place. A glance at Table 1 shows that Humphrey still tends to avoid confrontation with the Kahama community. He was observed almost twice as often on excursions to the northern areas of the range than to the south, and he was only known to take part in one patrol to the south in two years. Moreover, as recently as March 1975, Humphrey was seen to leave a party with which he had been associating because the other members began traveling purposefully to the south on a patrol. By contrast, Humphrey was present on most of the patrols to the north and east and took part in several chases when it was presumed that strange males were present. Thus, despite the fact that some two years have passed since the community split became finalized, despite the fact that Hugh has been missing for a similar length of time and no longer backs Charlie in his displays, and despite the fact that the little Kahama community has been decimated, it seems that Humphrey still retains his old fears of Charlie and the south.

The youngest of the Kasakela males, Sherry (still a late adolescent during 1973), has become one of the most active of all participants in intercommunity interactions. Recently he has been in the forefront of many border patrols and, several times, has clearly led parties to peripheral areas. It was Sherry who led the charge towards the three unhabituated males on April 20, 1975 and held his ground, even when the strangers displayed within a few meters. There was another occasion in early 1975 while Sherry was patrolling with five other males to the south of Mkenke stream. When calls were heard further to the south, the Kasakela party displayed and called in response: Sherry raced off by himself toward the other party (probably Kahama chimpanzees). After a moment Faben followed him, but the other Kasakela males (led by Humphrey and Figan) hastily retreated northwards. It was another 10 minutes before Sherry and Faben finally rejoined their companions. Sherry took part in the attacks on both Godi and Dé. Twice, when he

continued to attack Dé by himself, his aggressive behavior was remarkable for both its intensity and its persistence.

Of interest is the fact that Sniff, the youngest mature male of the Kahama community (about 2 years older than Sherry) shows similar enthusiasm for encounters with neighbors. He was in the forefront of the attack on the male with the paralyzed leg and, on his own, he engaged in a spectacular rock-hurling encounter with a group of at least three adult males, and probably more. Again, when he remained behind by himself to face the charge of two adult males, although he ran to catch up with his companions, he subsequently left Charlie and Willy Wally and returned southward alone. On this expedition his behavior clearly showed that he was searching for the party of neighbors again, as though he had to have 'just another look.' Perhaps it is significant that Sniff seemed so calm when he spotted the Kasakela patrol (led by Sherry). It seemed almost certain that Sniff must have seen the patrol before climbing down from his tree, yet he made his getaway in a most unflustered manner (Pusey, personal communication).

Early adolescent Goblin has been observed traveling to peripheral areas of the Kasakela community range on 27 occasions. On 19 of these, females in oestrus were also present and Goblin's participation seemed very closely linked with this fact (Tutin 1975; Pusey, in prep.). However, he did accompany the adult males on four patrols when no females in oestrus were present (out of a total of ten patrols on which he was seen) and, on his last such excursion (February 7, 1975), he actually left a fully swollen female with whom he had been associating and accompanied a party of males on a long patrol to the south.

Goblin seems to have learned that he should suppress vocal sounds when the adult males are maintaining silence: if he pant-grunts in submission, he does so very softly, and twice he threw temper tantrums, when threatened by superiors, that were remarkable in that they were almost totally silent (Tutin, personal communication). On three occasions when he did scream, he was almost immediately embraced or touched by older males (once by old Hugo who had not caused the sound in the first place). This reassurance contact served to quiet him quickly (Pusey, in prep.; Tutin, personal communication). However, although Goblin will now accompany adult males on patrols even without the attraction of females in oestrus and has begun to show appropriate behaviors, such as smelling the vegetation, inspecting nests and suppressing vocal sounds when older males do these things, he has not yet acquired the intent, concentrated silence that typifies the behavior of the adult male on such excursions. Sometimes when his elders are sitting motionless, staring across some valley ahead, Goblin continues to feed, snapping twigs and rustling the vegetation. Once he engaged in

a wild play session with an infant and, although neither “laughed,” they made a good deal of noise in the branches (E. Bergmann). It will be interesting to see at what age Goblin acquires fully adult patrolling behavior. Goblin was present during two of the attacks on Kahama males. During the first, on Godi, he apparently kept out of the way and his behavior was not noted. The second, on Goliath, occurred a year later, and on that occasion Goblin did indeed take part, running in and hitting the old male before getting out of the way.

The two old Kasakela males, Mike and Hugo, both took part in some peripheral excursions and patrols in 1973 but, as they aged and became increasingly solitary, they dropped out of such community activities. In 1973 Mike actually led some patrols and on a few occasions took part in the final charge toward strangers, but seemed able to keep up for only a short distance (Wrangham 1975). Hugo’s last observed patrol was in early 1974 when he took part in the attack on Dé. Both Mike and Hugo sometimes traveled alone quite far to the south where they associated peacefully with Kahama females. Their counterpart in the Kahama community, Goliath, had been the alpha male of the community in the early years of the study, before Mike displaced him in 1964 and before the community split. Goliath had frequently ranged far to the north in those days and was not known to associate regularly with the southern males. It was not clear why he moved to the south when the Kahama males did so in 1972. As mentioned, Goliath continued to pay occasional visits to his old haunts after the other Kahama males had stopped doing so. In February 1974, Goliath encountered two Kasakela chimpanzees on the periphery of camp, including one prime male. The three individuals stared at each other for about 2 minutes, but did not interact further. And he was seen peacefully feeding in a group with Kasakela males (Evered, Faben, Figan and Satan) in Mkenke Valley only 5 months before his brutal, probably fatal, attack.

Only one more individual should be briefly mentioned, the adult sterile female Gigi. Her ranging pattern and her frequent involvement in patrols are not typical for the Gombe female chimpanzees. Gigi has been cycling regularly since 1965; when she is swollen, she is sexually popular with the males and usually associates with them. She shows many other behaviors atypical for females, such as her frequent charging displays and attacks on other individuals. It is our subjective impression that Gigi has become increasingly aggressive and increasingly masculine during the course of the years. However, although Gigi was observed on 13 patrols, joined in sniffing the vegetation and, once, inspected nests, she tended to trail along in the rear like other females, and seldom showed the alert, intense, searching behavior of the adult males.

## AN APPRAISAL OF INTERCOMMUNITY RELATIONSHIPS

Intercommunity relationships in the Gombe population are complex and fascinating. The Kasakela community has a large home range, the boundaries of which change from year to year. Parties of up to ten adult males, sometimes accompanied by females and young, may patrol peripheral areas near the current boundary, when they apparently search actively for signs of neighbors. When a fairly large party of strangers, including adult males, is encountered, both parties may approach and engage in visual and vocal displays reminiscent of the territorial boundary displays of gibbons, langurs, and *Callicebus* monkeys. Such an encounter may end when one of the parties charges and chases the other away, or when both give up and return towards their core areas. At other times a party, upon hearing or seeing neighbors, may flee, thus avoiding an encounter. Factors determining exactly what response is made need further investigation and cannot be fully understood until individuals of communities to the north and east have been habituated. When single chimpanzees or very small parties are encountered, or their calls are heard, they may be chased and sometimes attacked, particularly if they are females. The relationship between the Kasakela community and the Kahama community to the south should, for the present, be considered separately in view of the known past history of close association: during 1974 and early 1975 parties of Kasakela males made excursions deep into the heart of Kahama core areas, and three times Kahama males were savagely attacked.

It seems that, for a number of primate species, intergroup encounters may be attractive, at least for some individuals. Gibbons and langurs, for instance, travel swiftly to boundary areas in response to the calls of neighbors. A male gibbon may leave his female and young to watch or actually participate in a dispute between two other groups (Ellefson 1968). A langur troop, after hearing the whooping calls of neighbors, may go far out of its normal range to initiate intertroop displays. These conflicts are often started by young males who may actually leave their troop and travel some 500 meters to engage in whooping and branch-shaking encounters with neighbors (Ripley 1967). On Cayo Santiago, parties of male rhesus sometimes sought contact with another troop. A number of monkeys then became involved in the hostile encounter (Morrison and Menzel 1972).

It seems that intergroup encounters may be attractive to mountain gorillas also. Fossey, at the conference, described how some silverbacks seemed to seek out interactions with neighboring groups: one such prime male was Uncle Bert. Sometimes aggressive encounters occurred: one led to over a minute of screaming and skirmishing during which an infant was bitten and killed, probably by Uncle Bert (Fossey, this volume).

Certainly, as we have pointed out, intercommunity contact seems to be sought by some male chimpanzees. Young prime males, in particular, are strongly motivated to travel to peripheral areas where they appear to look intently for signs of neighbors. Silent, sometimes stealthy travel, visual, auditory, and olfactory scanning, and long periods of time during which parties may maintain almost total silence characterize patrols near the boundaries. Some excursions take the chimpanzees into the core area of neighboring communities. The response to the sight or sound of supposed strangers, particularly the sometimes frenzied race towards the location of calls, suggest that encounters with neighbors may be extremely attractive. Often, after a long silent patrol, the males concerned, on returning to home ground, may explode into loud calling, branch-waving and drumming displays, and occasionally dramatic waterfall or stream-bed displays: this gives some idea of the suppressed excitement and tension to which they have probably been subjected.

In some primate species, males may make aggressive attempts to take over one or all of the females of a neighboring group: for the most part these are lone males or all-male groups without females of their own. On occasions when the leader of a bisexual langur group tries to defend his right to his females against an all-male group, the fighting that results may be prolonged and severe. Mohnot (1971) describes raids and skirmishes that continued, on and off, for periods of 3-10 days. Fossey (this volume) has observed a number of occasions when lone silverbacks entered a group and subsequently left, accompanied by one female. Sometimes this appeared to take place peacefully: but there were also aggressive incidents. One lone silverback charged into a group with violent displays and chest-beating. During the confusion an infant was killed: the following week the silverback went off with the mother of the infant.

Some of the Gombe observations are of interest in relation to the appropriation of females from neighboring groups, such as the incidents described previously involving Kahama community's young female, Little Bee, and the Kasakela males. Twice, after severely attacking Kahama individuals, (once Dé, once all three members of the Bee family, including Little Bee herself) a party of Kasakela males traveled toward their core area, accompanied by Little Bee. Both times she was in oestrus. On a third occasion circumstantial evidence strongly suggests that a party of Kasakela males encountered the Bee family and returned to the north with Little Bee who was again in oestrus. The events after the attack on Dé, when the three Kasakela males pursued Little Bee to the south, displayed at her and, subsequently, branch-waved (in threat) every time she hesitated, clearly indicate that the female was forced to travel north against her inclination.

There is insufficient data to draw any firm conclusions as to the significance of the preceding information, but it certainly seems possible

that male excursions to areas that are overlap zones with neighboring community ranges may sometimes serve to recruit females into their own social group. And we should note that excursions may be made by a male traveling alone, such as Evered during his long periods of absence from the core area of his community range.

Young nulliparous females during the one-to-two-year period of adolescent sterility (Asdell 1946; Goodall 1968) cycle regularly and, therefore, travel relatively frequently to peripheral areas in the company of their community males (a) during consortship safaris and (b) during other excursions to feed or to patrol near the current boundaries. Young mothers also tend to cycle for a good many months prior to the birth of the next infant (Goodall 1975), so that they, too, tend to travel with their males on such journeys. At such times there is always the risk that they may encounter neighboring males. Females on safari may try to escape from their male consorts (McGinnis 1974): a female who succeeded in doing so, in an overlap zone, would give an excellent opportunity for an encounter by a neighboring male.

Perhaps we should also review some of the puzzling attacks on unhabituated females in this light. A male chimpanzee, during a consortship with a female (who may even be anoestrus at the time) will sometimes attack her if she tries to escape (Goodall 1968; McGinnis 1974). Such attacks serve a similar function to the neck-bite in the hamadryas baboon (Kummer 1968): the female becomes submissive and follows the male. Possibly brief attacks on females encountered in overlap zones between neighboring communities play a similar role and attract rather than repel the females concerned. Certainly some young unhabituated females not only remain in the Kasakela home range, but gradually move into the core area despite occasional attacks (Pusey, this volume). When such attacks are observed, the fact that the female normally flees can readily be accounted for by the presence of human observers. When Little Bee was attacked she did not flee, but followed the males north. (The gang attacks on the older females—and note that Madam Bee was much more severely attacked than either of her daughters during the family attack—almost certainly fell into a different category and, at present, are not understood). Only when other communities have been habituated, and the different individuals recognized, can we hope to learn more about the motivation behind attacks on these females and the function they fulfil in the complex chimpanzee social structure.

It is now well documented that Hanuman langurs, after driving a leader male from his females, may systematically kill all infants in the troop (Sugiyama 1967; Mohnot 1971; Hrdy 1974). In this way the new leader ensures that most subsequent infants will carry his genes (Popp and DeVore, this volume). Of interest are Fossey's observations relating to infanticide in the mountain gorillas: three infants were killed as a

result of aggressive intergroup interactions. Moreover, on one occasion the lone silverback responsible left with the mother of the dead infant a week later.

Two cases have now been recorded of infant-killing in chimpanzees.<sup>3</sup> One of these occurred at Gombe (Bygott 1972) and the other in the Budongo Forest, Uganda (Suzuki 1971). The Gombe incident occurred when a party of males attacked an unhabituated female: the circumstances were not clear in the other event, but Suzuki describes the kind of loud vocalizing and excited displaying and drumming that might well have resulted from an intercommunity encounter. Although it seems extraordinary that a female, after being so severely attacked, would actually remain in the home range of her aggressors, Bygott saw a female, whom he suspected might be the same one, 10 days later! Possibly she was still around a couple of weeks later when she might have come into oestrus (Goodall 1968). Thus, although the killings were rather different from the langur and the gorilla infant killings (since the chimpanzees, in both instances, partially ate the bodies of their victims), it seems possible that a similar mechanism for increasing the genetic contribution of the aggressors may have been operating.

Some of the most severe intergroup aggression reported in field studies of primates occurs in conditions of extreme overcrowding. Intertroop fighting in langurs tends to become more frequent and more severe as the density increases (Sugiyama 1967). Probably the most fierce intertroop fighting observed in monkeys was that described by Southwick, Beg, and Siddiqi (1965) among rhesus monkeys living in a temple in India where there was 90% overlap between the ranges of three troops. Severe fighting was almost a daily occurrence and all the males bore scars and often sustained broken bones.

We have mentioned the possibility that the chimpanzee density within the Gombe National Park has increased in recent years due to more extensive cultivation outside the boundaries and resultant habitat destruction. This could well account for increased intercommunity hostility, but it does not seem to us that there is enough overcrowding to account for the severity of the three attacks perpetrated by the Kasakela community against Kahama males. These incidents are among the most shocking observations in 14 years of research at Gombe, and all were characterized by unusual brutality and persistence. The attack on Godi lasted for at least 10 minutes and the other two for some 20 minutes each. Descriptions of the incidents contain many similarities: all three victims were held down or pressed to the ground; all were hit, stamped upon, bitten, and dragged; all three were severely injured. After the initial phases of attack, both Dé and Goliath lay passively on the ground, making no further attempts to defend themselves. Godi, with Humphrey sitting on his head, was securely pinned to the ground

and rendered harmless throughout the fight. The aggressors each time became intensely excited, screaming loudly and, when they were not actually fighting, displaying nearby.

One of the attacks, that on the old male Goliath, is particularly puzzling, both in view of his extreme old age and his history of long and peaceful associations with the Kasakela males. Goliath could in no way be considered a reproductive competitor. (It seems, also, that Dé was not in prime physical condition at the time of the attack.)

Is it possible that the violence of the attacks was, in fact, due to previous familiarity? Bygott (this volume) found that the most severe attacks between male chimpanzees occurred when they had been apart for some time. Wilson and Wilson (1968), working with captive chimpanzees, found that the most severe aggression occurred when they reintroduced into the colony a young male who had been removed for a period of several weeks. Certainly this may have a bearing on these attacks. The only actual attack recorded on a male from an unhabituated community was fairly brief (that by Sniff and Charlie on a supposed member of the Kalande community). Nishida (this volume) describes an attack by the top-ranking male of K-group on the fourth-ranking male of M-group: it was severe but of relatively short duration. Intuitively we feel that additional factors must be involved: after all, Goliath was seen associating peacefully with three of the males who attacked him only a few months previously. Clearly it is necessary to observe other attacks between Kasakela males and those of unhabituated communities before we can draw any conclusions.

One further point should be brought forward. At some time during all three attacks, observers felt that the aggressors were trying to kill their victims. Indeed, some of the attack patterns were not dissimilar to those sometimes shown by chimpanzees trying to kill an adult monkey or to dismember a carcass, such as the twisting round and round of Goliath's leg or the tearing of flesh from Dé's thighs. Moreover, after the 1972 attack on the female, the captured infant was indeed partially eaten, even when it was still alive and screaming.

The intense excitement shown by the aggressors during the attacks was apparent for some time afterward. The party that attacked Godi hurried off, apparently in pursuit of other Kahama individuals heard calling to the south: the party that attacked Goliath continued calling and displaying as they ran back north. The three males who attacked Dé, after following and retrieving Little Bee, returned to the site of the attack, searched around as though looking for their victim once more, and then began to hunt a troop of red colobus monkeys. They persisted in this even after one monkey had been caught only to escape when a male colobus ran to its aide. After 15 minutes, Evered was successful in the hunt. Again, when the Kasakela party had patrolled for 2 and a

half hours, “hunting” for Sniff and maintaining almost total silence throughout, most of the males spent some time hunting a baboon troop. Only when they had given up did they break their long silence and burst into loud calls with drumming and branch-waving displays (Pusey, personal communication).

We lack sufficient data to draw any conclusions from these observations, but we mention them for their intrinsic interest to those who are interested in the evolution of human violence and warfare and its relation to hunting for food. Often it has been suggested that we should consider the behavioral and motivational mechanisms of hunting in a completely separate category from aggressive intraspecific interactions (e.g., Moyer 1968): the above observations suggest that, in some instances, similar motivational factors may be involved.

Clearly the intercommunity interactions of the Gombe chimpanzee population are complex and fascinating. Over the next 5 to 10 years, our major research goal will be to try to habituate other communities, in an endeavor to get a truer picture of chimpanzee behavior. If chimpanzees are to serve as models for the better understanding of human behavior, then we must learn more about factors that lead these apes to seek out contact with neighboring groups, that make aggression attractive to some individuals, and that may result in aggressive incidents of exceptional violence.

## Notes

1. Quoted with Bygott’s permission.
2. In August 1975, after this paper was written, Madam Bee was the victim of a brutal gang attack by Kasakela males. Four days later she died of her wounds. (Goodall, do Fisoo, Mpongo, and Matama, in preparation)
3. Since this chapter was written, members of the Kasakela community have killed three more infants: two infants of unhabituated females were killed by males, one was the 3-week-old baby of a Kasakela female and was killed by an adult female. These incidents are being prepared for publication.

# Bibliography

Extracted from the Table of Contents (pp. xi-xiii) and Bibliography (pp. 501-38) of this volume.

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Gigi, a sterile Kasakela female. Photo by Larry Goldman.

(This photo appears on page 12, opposite the first page of the chapter.)

