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Social Organization of Chimpanzees in the Budongo Forest, Uganda[1)]

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ABSTRACT A population of wild chimpanzees in the Budongo Forest, Uganda, was studied between September, 1966, and March, 1967, by means of habituation and identification of each individual. This article deals with the grouping patterns, social units, and social organization of the chimpanzees in their natural habitat. Although parties of chimpanzees form groups of many patterns according to each particular situation and have no permanent membership, many chimpanzees live within a certain restricted area and gather to form parties consisting, in the main, of chimpanzees acquainted with each other. More than 50 individuals combined by social bonds in a loose regional population which is separated from other populations without recourse to geographical or physical barriers, though it maintains friendly contact with neighboring chimpanzee residents and with strangers. No particular individual group leader can be found, but any adult, especially a male, may act as a nucleus of each party.

INTRODUCTION

Extensive work on the ecology and sociology of African great apes in their natural habitat began in 1958, though there had been classical works on the chimpanzee (*Pan troglodytes*) by NISSEN (1931) and on the gorilla (*P. gorilla*) by BINGHAM (1932).

The ecology of the mountain gorilla in its natural habitat was made clear by the study of SCHALLER (1963), which was carried out at the Birunga Volcanos, and by the work of others. On the other hand, a study of wild chimpanzees was begun by KORTLANDT (1962, 1967) in a high forest in the East Congo. He built an observatory in a high tree and observed chimpanzees invading papaya and banana plantations. Utilizing this excellent idea, he learned much about the wild life of chimpanzees. REYNOLDS and REYNOLDS (1963, 1965), who, in 1962, spent eight months in the Budongo Forest, Uganda, helped clarify chimpanzee ecology,

1) This study was carried out as a part of the Kyoto University Africa Primatological Expedition; the field work was financed mainly by a Grant for Scientific Research, Ministry of Education, and in part by the Wenner-Gren Foundation for Anthropological Research and by the economic world of Japan.

but could not identify each individual because they were obliged to observe timid animals stealthily so as not to frighten them. Therefore, in spite of detailed ecological records, information on chimpanzee society and social organization was insufficient. The research party of Kyoto University, which was continued the study of the savanna-living chimpanzees in Western Tanzania since 1961, was also obstructed by the same difficulty (AZUMA & TOYOSHIMA, 1962; IZAWA & ITANI, 1966 etc.). Only GOODALL (1962, 1963, 1965), who has been studying at the Gombe Stream Chimpanzee Reserve, Western Tanzania, since 1960, succeeded in obtaining continuous observations of calm chimpanzees from short distances, as the chimpanzees themselves visited her camp without much fear.

As a result of these studies the following facts on chimpanzee society were made clear. Chimpanzees have no closed group with permanent membership, but live in a group, frequently splitting apart, meeting others and joining them, congregating or dispersing. Sometimes a group contains four or five animals, but at other times may number more than 30. Frequently, however, chimpanzees move alone. Groups of males, females, mothers and their young, or a mixture of ages and sexes are to be seen. Recently, ITANI (1966) observed, in Western Tanzania, a large group which was crossing an open ridge divide into three parts; the divisions consisted of parties of males only, mostly females without infants, and mothers and their young. He hypothesized from this observation that the large mixed group is the basic social unit of chimpanzee society and that it divides into smaller groups according to the situation.

Still we had only fragmentary information on chimpanzee social organization. To obtain detailed information, continuous observation and the tracing of the same population by means of individual identification was of the utmost importance. Observation had to be done not only at artificial feeding places but also throughout the chimpanzees' entire range. This was the purpose of this study.

STUDY AREA AND BASIC ECOLOGY OF CHIMPANZEES

1. Study Area, Period, and Method

Area and Period: Chimpanzees of the Budongo Forest of northwest Uganda were preliminarily studied by J. ITANI in August, 1960 (ITANI, 1961), and then REYNOLDS and REYNOLDS studied them extensively in 1962. The Budongo Central Forest Reserve is divided into two parts by the road connecting Masindi and Butiaba which is located on the shore of Lake Albert; the northeastern part is called the Budongo, the other the Siba (Fig. 1). Trees attain a height of nearly 50 m and the canopy divides into three or four layers. In the rainy season little sun reaches the forest floor, but in the dry season many trees shed their leaves. Although the forest contains several different types of forest, the whole forest is classified as a medium altitude moist semideciduous forest (LANGDALE-BROWN

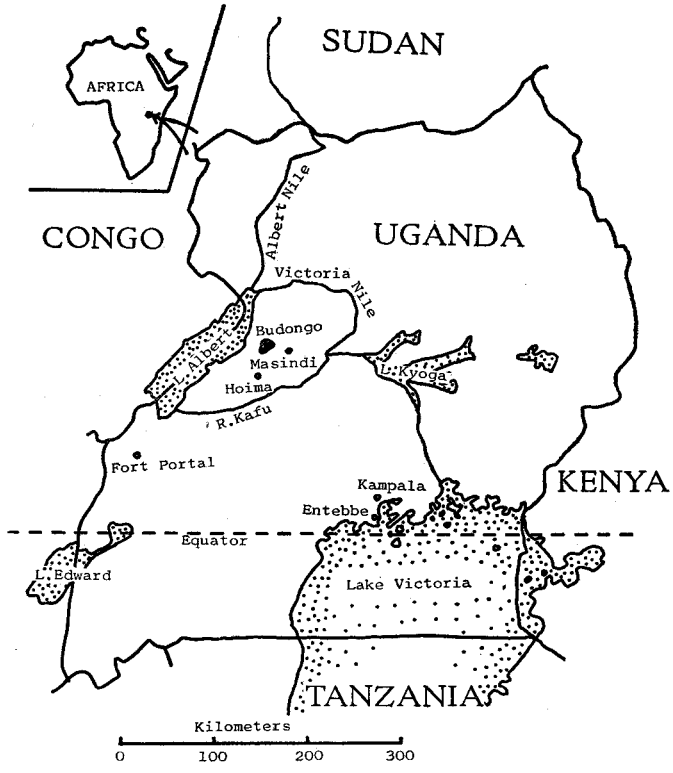

Fig. 1. Map of Uganda.

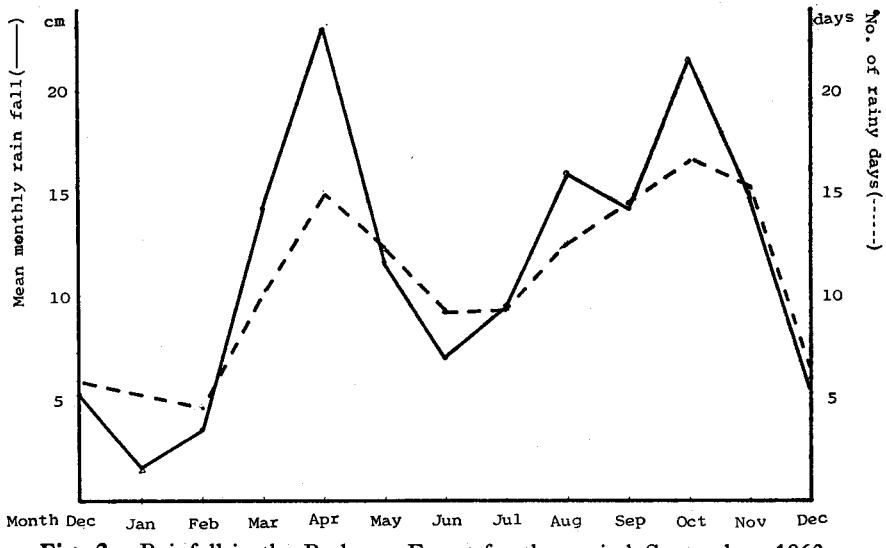

Fig. 2. Rainfall in the Budongo Forest for the period September, 1963—February, 1967 (recorded by the Forest Department, Uganda).

et al., 1964) (Photo 1).

The rainfall in the middle of the forest is 1424.6 mm a year (mean between September, 1963 and February, 1967) and March to May and August to November are the rainy seasons (Fig. 2). Maximum temperature in the daytime at Busingiro Hill, on the forest edge, is 26-30°C, and the minimum is 12-15.5°C, with little change throughout the year. A detailed description of the Budongo Forest is to be found in EGGELING (1947).

The study period was the six months' period between September 24, 1966 and March 19, 1967. The field station at the top of Busingiro Hill, attached to the Zoology Department, Makerere University College, was utilized as base for the field work (Photo 2).

Method: For recognizing individual chimpanzees and observing their social behavior and relations, it was essential that they become accustomed to the observer. As the chief material of this study a chimpanzee population living near the road and village was sought. The author, therefore, tried to approach the population living near Kihura Village and the Biiso and Siba blocks, which are located on both sides of the main road. He followed the chimpanzee population until the chimpanzees were habituated to his presence.

This attempt was successful. The chimpanzees, especially the males, quickly became accustomed to the author, and he was able to observe calm animals from short distances. He tried to identify as many individuals as possible, to follow the same population every day, and to record its movement, behavior, social relations, grouping patterns, and so on. The total number of days on which the author met chimpanzees moving alone or in groups was 115, comprising 254 occasions, the total observation time from short distances amounting to 360 hours. Baiting was tried on a few occasions only.

2. Food and Feeding Habit

Food List: The main species of chimpanzee's foods and their seasons during the study period were recorded (Fig. 3). The chimpanzees ate the young leaves of *Celtis* spp., but the fruit and/or nuts of most other species. Though the blue monkey (*Cercopithecus mitis*) and the red-tailed monkey (*C. ascanius*) that live in the same habitat ate green fruit as well as ripe, chimpanzees rarely chose unripened fruit, but ate only that fruit which was fully ripe. The food repertoire of these monkeys and chimpanzees differs but little, but the total volume of food which the latter consume is, in all probability, much smaller than that of the former.

Evidence of meat-eating chimpanzees, which GOODALL (1963), KAWABE (1966), and NISHIDA (1968) found in the savanna of Western Tanzania, was not obtained. REYNOLDS could not observe it in the Budongo either.[2] Active eating of in-

2) Mr. A. Suzuki, who succeeded to the author's study in the Budongo Forest, observed that chimpanzees ate a blue monkey and a black-and-white colobus (personal communication).

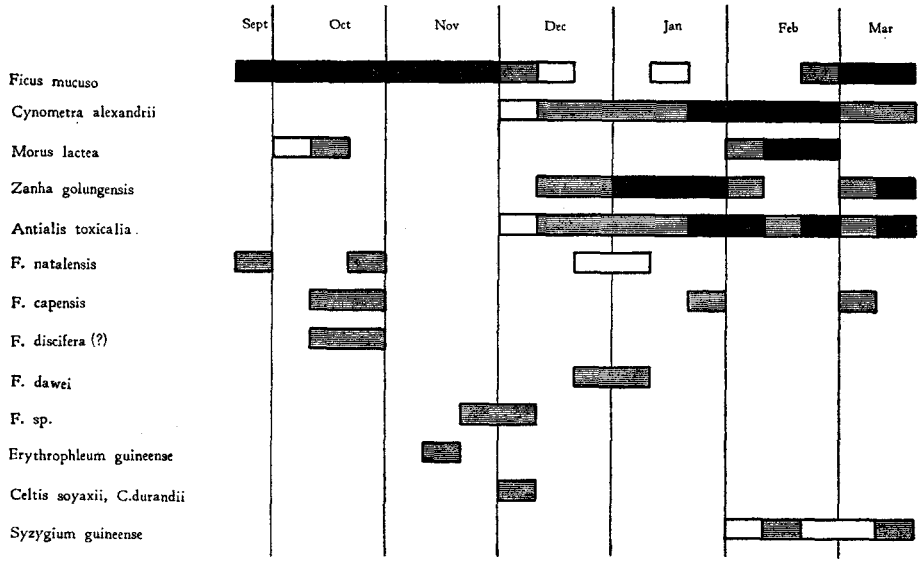

Fig. 3. Important food species for Budongo chimpanzees at the study area, September, 1966—March, 1967.
Most important (dark), rather important (half-tone), and less important (white) foods are shown for each month.
All except *Celtis* are fruit, and *Celtis* are young leaves.

sects was not observed.

Seasonal Change of Food: Figs were the most important food for the chimpanzees of the Budongo Forest, but the seeds of *Cynometra alexandrii*, omitted from the REYNOLDS and REYNOLDS' (1965) main food list, were one of the important foods during the dry season of December to March, at which time there were few figs in the forest (Photos 3 & 4). The volume of fruit of one species may vary greatly year by year, although the differences in the data of the author's and Reynolds' study may partly result from the different times of year at which the studies were carried out (REYNOLDS studied between March and October and the author between September and March).

SUZUKI (1968) found that, during the dry season, the dry seeds of *Brachystegia* spp. are an important food for the chimpanzees living in the savanna woodland of Western Tanzania and that they have as high a nutritional value as the soy-bean. KANO (in prep.) found that the distribution of the chimpanzees in Tanzania almost coincides with that of *Brachystegia bussei*. These facts mean that the survival of chimpanzees in the savanna is highly dependent upon and related to the distribution of their food supply. In the Budongo Forest the seeds of *Cynometra*, which may be equivalent to *Brachystegia* in the savanna, may have an important role in enabling the chimpanzees to survive lean years when the food supply is very small.

Feeding Behavior: Some kinds of complicated feeding behavior which are never seen in other kinds of monkeys and apes were observed in chimpanzees. The following example was recorded when chimpanzees were eating figs of *F. mucuso*, one of their favorite foods (Photo 5). One chimpanzee carefully took a large ripe, yellow fig from a branch by hand, peeled the rind with his fore-teeth, and then threw the flesh into his mouth. After filling his mouth by repeating this process four or five times, he chewed and kneaded the figs into a dumpling. Then he placed the dumpling in his hand or foot and made other dumplings until all his hands and feet were filled. He chewed them alternately and sipped the juice thoroughly before throwing them away (Photo 6). He sucked out the body fluid of small insects which had got into the ripe figs.

Characteristics of the feeding behavior of chimpanzees are that it is complicated in some instances, as shown in the above illustration, and that the animals choose only the best ripe fruit, which is neither bitter nor rough as compared with the food of monkeys.

3. Interspecies Relations

Predators: "The fact that subadults (adolescents) and even occasionally juveniles were observed alone on the forest floor may indicate that the chimpanzees had not learned any need for caution" (REYNOLDS & REYNOLDS, 1965). Although leopards may be a potential predator in the Budongo Forest, the following observations bear evidence that there are few predators in the Budongo Forest, not only for healthy chimpanzees, but also for those that are wounded or injured. The forest and the animals in it are protected by the Government, and the people neither kill chimpanzees nor have much interest in them.

Example 1. A. When *Mkono*[3] (FA♂)[4] was first found in November, he had no right hand, though the author could not determine whether its loss was due to injury or malformation. He could not move quickly as the others when running or climbing. However, he was one of the chimpanzees most habituated to the author and actively moved, frequently alone, during the author's study period. Active movement of *Mkono* was recognized by Mr. A. Suzuki, who succeeded to the present author's work, for more than one and a half years after the completion of the present work.

B. On January 24, *Laini* (FA♂) was found with the joint of his left knee dislocated and the exposed tibia tearing the skin. Even after the external wound healed, the tibia was not restored and he lost the function of walking in his left foot. He traveled very slowly but looked carefree even when he was moving alone, and his active movement was also recognized for more than one and a half years after the author completed his work.

Competitors: A description of relations between chimpanzees and monkeys

3) Individual chimpanzees were named by the author (see Table 5).

4) The age-sex classification and the code are to be found in Table 1.

living in the Budongo Forest is omitted because it is to be found in REYNOLDS and REYNOLDS (1965). In the Budongo Forest there are, other than monkeys, few competitors of chimpanzees.

Table 1. Classification of age class.

Class complex	Class	Code	Estimated age
Adult (A)	Full-grown adult	FA	more than 12 yrs.
	Young adult	YA	8—12 yrs.
	Sub-adult	SA	6—8 yrs.
Juvenile (J)	Senior juvenile	SJ	4—6 yrs.
	Junior juvenile	JJ	2—4 yrs.
	Infant	I	0.5—2 yrs.
	Baby	B	less than 0.5 yrs.

GROUP ORGANIZATION

1. Party

a) Size and Pattern of Parties

Any sort of aggregation of chimpanzees which was formed temporarily or constantly and was stable for more than several minutes will be termed a *party* in this article. Altogether, 371 parties and 143 solitary chimpanzees were observed during the study period (Table 2). Two patterns, one composed of parties of juvenile-subadults and the other composed of females without young, are added to REYNOLDS' four chimpanzee grouping patterns, which consisted of the adult party, the male party, the mother party, and the mixed party.[5] Infants and babies are also included in the total. A total of 1098 chimpanzees when traveling and of 1184 when feeding was observed, and those animals that were moving alone or in very small parties, consisting of 2 to 5 head, occupied 42.9% of all the traveling animals and 34.4% of all the feeding animals observed (Photo 7). This means that they tend to split into smaller parties when they travel and to gather into a large party at the feeding place, and this tendency coincides with the data of REYNOLDS and REYNOLDS (1965) and GOODALL (1965).

They also have a tendency to gather in mixed parties at food trees, and in feeding as well as in traveling situations animals by themselves or in small parties of less than 10 head occupied nearly 70% of the total number of animals observed during the study period. On the other hand, large parties of more than 21 head accounted for 14.9% of all animals feeding and 24.4% of those traveling.

5) REYNOLDS and REYNOLDS (1965) called them *bands* (see Table 10).

Table 2. Size and composition of parties.

TRAVELING

Party size	Grouping pattern						No. of parties	No. of head	%
	Male	Adult (♂+♀)	SA, SJ & JJ	Mother-Young	Female	Mixed			
1 head	78		11		10		99	99	9.0
2	24	3	1	31			59	118	10.7
3	25	2		5		14	46	138	12.6
4	7	2		2		3	14	56	5.1
5	5			2		5	12	60	5.5
6	6	1				5	12	72	6.6
7	1	1		1		4	7	49	4.5
8	2					5	7	56	5.1
9	1					3	5	45	4.1
10	2					1	3	30	2.7
11									
12						1	1	12	1.1
13						1	1	13	1.2
14						2	2	28	2.6
15									
16—20	1					2	3	54	4.9
21—25						2	2	45	4.1
26—30						4	4	119	10.8
31—40						3	3	104	9.5
No. of parties	152	10	12	42	10	55	280		
No. of head	362	42	13	102	10	569		1098	
%	33.0	3.8	1.2	9.3	0.9	51.8			100.0

FEEDING

Party size	Grouping pattern						No. of parties	No. of head	%
	Male	Adult (♂+♀)	SA, SJ & JJ	Mother-Young	Female	Mixed			
1 head	30		7		7		44	44	3.7
2	14	1		16	4		35	70	5.9
3	21	7		6		12	46	138	11.7
4	7			6		7	20	80	6.8
5	6			1		8	15	75	6.3
6	5	2		1		12	20	120	10.1
7	1	1		1		8	11	77	6.5
8	1			1		8	10	80	6.8
9	1	1				4	6	54	4.6
10	2					4	6	60	5.1
11						1	1	11	0.9
12						3	3	36	3.0
13						2	2	26	2.2
14						2	2	28	2.4
15						1	1	15	1.3
16—20						5	5	94	7.9
21—25						5	5	116	9.8
26—30						2	2	60	5.1
No. of parties	88	12	7	32	11	84	234		
No. of head	253	51	7	100	15	758		1184	
%	21.4	4.3	0.6	8.4	1.3	64.0			100.0

Table 3. Age/sex composition of medium/large-sized parties (more than 10 individuals).

	TRAVELING							
Date	FA-YA ♂	SA-SJ ♂	FA-YA ♀ (estrous)	SA-SJ ♀	JJ-I	B	Total	Remarks
Dec. 4	10						10	RP-A
16	10						10	RP-A & D mixed
29	8	2	2(1)		1		13	RP-A
31	9	3	4(3)	2	2	1	21	RP-A
Jan. 20	9	1	12(4)	2	5	3	32	RP-C
21	2	1	2	1	3	1	10	RP-C
26	12	1	(1)		2		16	RP-A
Feb. 10	12	2	5(2)		3	2	24	RP-A
12	c.14	c.3	c.7(2)	c.2	c.3	1	c.30	RP-A
13							29*	RP-C
14	c.15	c.3	c.6(?)	c.2	c.2	c.2	c.30	RP-A
15	c.13	2	c.8(?)	c.2	c.3	2	c.30	RP-A
15							32*	RP-C
15	c.12	c.1	c.13	c.4	c.7	c.3	40	RP-C
16	18	1			1		20	RP-A
17	9	2	1		1	1	14	RP-A
18	c.10		1		3		c.14	RP-A
26	c.12	1	c.3(1)		1	1	c.18	RP-A
Mar. 5	10		1		1		12	RP-A

* These two were mixed parties, but the compositions were not determined.

FEEDING

Date	FA-YA ♂	SA-SJ ♂	FA-YA ♀ (estrous)	SA-SJ ♀	JJ-I	B	Total	Remarks
Oct. 27	2	1	3		3	1	10	RP-A
Nov. 3	5		3(1)		2	1	11	RP-A
7	8		8(3)		3	2	21	RP-C
10	4		3(1)	1	2		10	RP-D
Dec. 4	10						10	RP-D
16	9	1					10	RP-A
16	9	1	1		2		13	RP-A
29	8	1	2(1)		2		13	RP-A
31	9	2	4(3)	1	4	1	21	RP-A
Jan. 3	8	2	1(1)		1		12	RP-A
21	7	1	c.4(1)		3		c.15	RP-A
26	c.12	1	1(1)		2		c.16	RP-A
Feb. 10	12	2	5(2)		3	2	24	RP-A
11	4	1	3(2)		2		10	RP-A
12	c.15	c.3	c.7(2)	1	c.3	1	c.30	RP-A
14	c.15	c.2	c.6(?)	c.1	c.5	1	c.30	RP-A
15	c.16	c.2	c.4	c.1	c.2		c.25	RP-A
17	9	2	1		1	1	14	RP-A
18	c.12	1	c.4(1)		c.3		c.20	RP-A
18	c.10		1	1	1	1	c.14	RP-A
20	c.10	1	4(1)	1	3	1	c.20	RP-A
21	8	1	1		1	1	12	RP-A
26	c.12	1	c.2(1)	c.1	2		c.18	RP-A
Mar. 3	c.3		c.3		1	c.3	c.10	RP-A
12	c.16	1	c.4	c.1	1	2	c.25	RP-A
15	10		1		1		12	RP-A
18	c.10	1	c.4	1	3	1	c.20	RP-A

This may mean that one or a few food trees can accommodate a middle-sized party comfortably, but that the chimpanzees are able to move in a specially large mixed party, although a small party is better when mobility is desired. When chimpanzees moved in a large party, they usually divided into a few small parts and maintained a highly mobile function, as will be mentioned later. Chimpanzees, therefore, may determine the proper size of the party according to the situation.

Males may have a rather strong social bond toward each other. They frequently move in all-male parties, and great social interaction was observed between them, but was rarely seen between females (SUGIYAMA, in prep.).

b) Composition of Parties

Of 46 examples of medium- and large-sized parties (Table 3), 19 were observed while traveling and the remaining 27 were observed while feeding. Of the 46, 41 were mixed parties, the remaining 5 being male parties. The local chimpanzee population which was living in the main study area was named Regional Population A (RP-A), as will be mentioned later. The adult males numbered twice the number of females in most mixed parties belonging to RP-A. On the other hand, in all large mixed parties belonging to RP-C about the same number of males and females was observed. Such differences in the adult sex ratio might be based on the social composition of the population.

c) Relations between Different Parties

Conflux and Division of Parties: Several parties frequently coalesced into one or split into smaller parties. On many occasions some parties joined at a food tree, fed, rested, and moved away, dividing into parties of different combinations of individuals, as shown by the following example. When parties joined or divided, trouble or antagonistic behavior was rarely observed.

> **Example 2.** On November 4, at 07:20, five adult males, *Nyeusi*, *Senti*, *Laini*, *Kata*, and *Mkia*, together with *Mama* (A ♀) and her child *Mtoto* (I ♀), were feeding on *F. mucuso* No. 8.[6] At 08:59, *Pombe*, and then *Senti*, climbed down from the tree, beat the buttress of a huge tree, and moved northwestward to the Siba block, but *Senti* came back alone at 09:10. At 14:40, after a lengthy period of feeding and resting, *Kata*, and then *Nyeusi*, *Senti*, *Laini*, *Mama*, and *Mtoto*, climbed down from the tree and moved away to the east, crossing the road. *Mkia* alone remained for some time, and at 15:10, he left in the direction of the northwest.

What, then, is the reason for the frequent tendency to form a party containing animals of the same generation, same sex, or other similar characteristics? The following examples may help to shed some light. Example 3 shows that chimpanzees divide into two groups according to differences in food preference due to

6) The main food tree number. See Fig. 4.

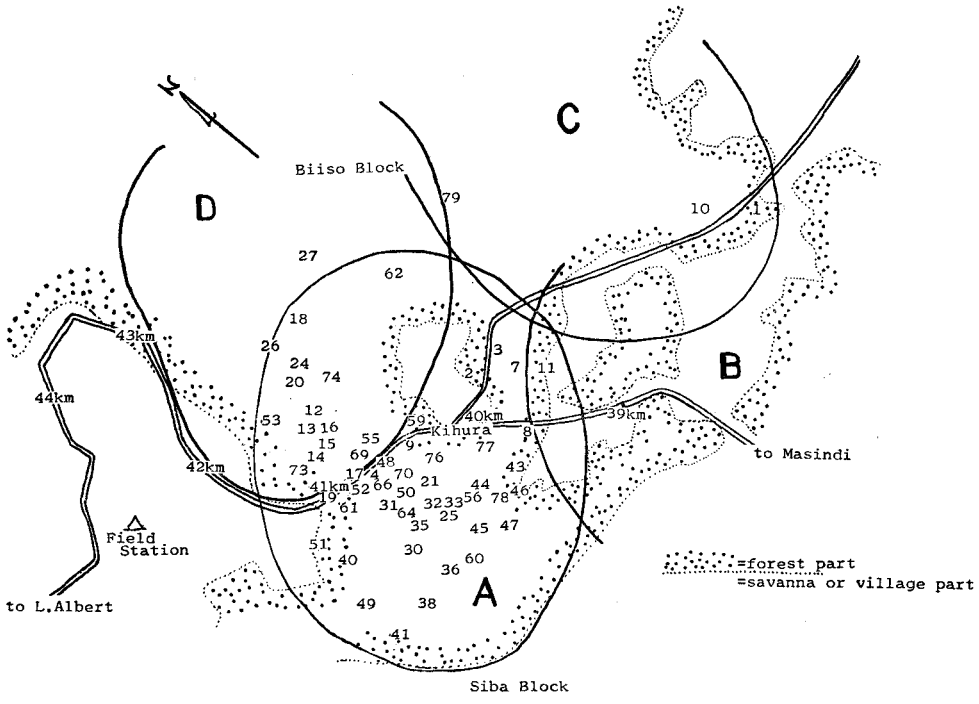

Fig. 4. Study area and ranges of regional populations.
The kilometric distance starts from Masindi. A, B, C, and D show the rough range of each regional population and small figures important food trees.

age, sex, or body size. There may also be a tendency for animals acquainted with each other to gather or to come to the same tree. Examples 4 and 5 suggest as the reason a difference of individual activity or fondness for raising a clamor. A mother carrying her baby is not able to move easily with active males. REYNOLDS and REYNOLDS (1965) also suggested that the reason lies in a difference of individual activity.

Example 3. *F. mucuso* No. 2 stands at the forest edge near Kihura Village. Between September 29 and October 8 chimpanzees came to this tree by twos and threes to take ripe figs of about 4 or 5 cm in diameter. *M. lactea* No. 3 stands near the road, about 200 m from the former. Between October 4 and 17 (Table 4) the chimpanzees came to this tree to eat fruit of about 1 cm in diameter. Nine out of the 11 chimpanzees which appeared at tree No. 2 were adult males and 10 out of the 11 at tree No. 3 were mothers with their young. Only one young adult male (*Nywele*) and one mother with her child (*Mama*+*Mtoto*) were animals which appeared at both trees.

Example 4. November 16. Three adult males (*Mguu*, *Mzungu*, and one other), two adult females (*Masikio* and *Juzi*), a senior juvenile (*Ngano*) and an

Table 4. Members who appeared in *Ficus mucuso* No. 2 and *Morus lactea* No. 3.

A. *Ficus mucuso* No. 2.

Name & Age/Sex Class		Sept. 29			30		Oct. 1			2					
		A	F	M	F	M	A	F	M	F	A	F	M	F	M
Nyeusi	FA♂														
Nyeusi	FA♂														
Mzee	FA♂													+	+
Senti	FA♂	+	+	+	+	+				+		+	+	+	+
Laini	FA♂	+	+	+	+	+				+		+	+		
Mkia	YA♂	+	+	+	+	+	+	+	+	+		+	+		
Kata	YA♂	+	+	+	+	+	+	+	+	+		+	+		
Kijana	YA♂													+	+
Nywele	YA♂														
?	A♂													+	+
Mama	FA♀									+	+	+	+	+	+
Mtoto	I♀									+	+	+	+	+	+

B. *Morus lactea* No. 3

Name & Age/Sex Class		Oct. 9		12			13			14				
		F	M	F	M	M	A	F	M	F	M	F	M	
Mgeni(+B)	FA♀	+	+											
Tano	SJ♂	+	+											
Mama	FA♀			+		+	+	+	+	+	+	+	+	
Mtoto	I♀			+		+	+	+	+	?	?	+	+	
Ndizi	FA♀			+		+								
Ine	SJ♂			+		+	+	+	+					
Kufura	FA♀									+	+			
Tatu	JJ♂						+	+	+					
Ndito	SA♀													
Nywele	YA♂			+	+							+	+	

* A=arrived together; F=fed together; M=moved away together.

infant, were feeding at *Erythrophleum guineense* No. 14 from early morning. At 08:50, hearing a heavy booming noise (SUGIYAMA, 1967) which might have been uttered by chimpanzees a few kilometers east, they stopped feeding, looked in that direction, and responded to the noise. After some minutes, all, except *Juzi* and her child, climbed down from the tree and run to the east, uttering a heavy booming noise. *Juzi* and her child continued to feed and rest quietly for another two hours.

Sexual parties containing estrous females and sexually excited males were also sometimes seen.

Table 4A (contd.)

3					4					5			6			7			8		
F	M	F	M	M	F	M	A	F	M	A	F	M	A	F	M	A	A	F	F	M	M
		+	+										+	+	+						
+	+												+	+	+						
+	+																				
		+		+						+	+	+	+	+	+		+	+	+		+
		+	+										+	+	+						
		+		+									+	+	+	+		+	+	+	
+	+						+	+	+							+		+	+		+
+	+												+	+	+		+	+	+		+
+	+												+	+	+		+	+	+		+
+	+				+	+							+	+	+						
					+	+	+	+	+				+	+	+		+	+	+		+
					+	+	+	+	+				+	+	+		+	+	+		+

Table 4B (contd.)

15							16		17								
F	M	M	A	A	F	M	F	M	F	M	A	F	F	M	A	F	M
							+	+							+	+	+
							+	+							+	+	+
+	+						+	+					+	+			
+	+						+	+					+	+			
			+		+	+			+	+	+	+					
			+		+	+			+	+	+	+					
+		+		+	+	+			+	+	+	+					
+		+		+	+	+			+	+	+	+					
											+	+					
							+	+									

Example 5. On January 6, at 08:30, three males (an unidentified large adult, *Laini* (FA♂), and a senior juvenile) in a *Zanha golungensis* tree, and two males unidentified middle-sized adult and *Kijana* (YA♂) in another tree of the same species in the Siba block, were uttering high pitched calls and looking around uneasily. The call of the juvenile gradually became a scream and was uttered more frequently than before. At last they were unable to hear any response from other chimpanzees, and at 09:25 the large male and the screaming juvenile climbed down from the tree and moved to the northwest, and *Laini* followed them after calmly filling his mouth with fruit. At 09:35, the middle-sized male and *Kijana* moved in the opposite direction.

From such observations of grouping activity the author got the impression that they do not have a high psychological dependency on the group, but some other observations, which follow, suggest that they feel uneasy if they lose sight of their fellows.

d) Seasonal Change of Party Size

Between September and November chimpanzees stayed in fruit bearing fig trees for many hours every day; however, the fruit of *F. mucuso* does not grow equally on every branch but is densely concentrated on several boughs. Therefore, a large number of chimpanzees is unable to feed on a tree at the same time. This might be one of the reasons that they rarely gather in a large party. *M. lactea*, *C. alexandrii*, *Z. golungensis*, and *A. toxicalia* trees which are more than 30 m in height and have large canopies, bear fruit in their canopies in January and February. They were the main source of food for chimpanzees during this season. In these trees many chimpanzees can easily feed by dispersing throughout the canopy, and though they rarely stayed in one tree for many hours, they frequently moved from tree to tree and formed medium- or large-sized parties of more than ten head. Many more chimpanzees were observed in a short period of time during this season (January and February) than in September and October (see Table 5).

Although REYNOLDS and REYNOLDS (1965) reported that "during chief fruit seasons the groups gathered on a tree or in a patch of neighbouring trees often numbered 15 or more individuals and in the periods between, unless a large tree in the area happened to bear fruit, parties (bands) of three or four, or single individuals were the rule," the rough tendency of the seasonal change of the party size may partly depend on the pattern of the availability and kind of food and on the pattern of the distribution of food trees in the habitat. The seasonal change of the grouping pattern of the chimpanzees in the savanna woodland, where food is much scarcer, may be remarkable. AZUMA and TOYOSHIMA (1962) pointed this out and suspected that the party size is a sociological adaptation to a change of condition in the food supply. On the other hand, IZAWA (in prep.) did not find seasonal change to influence party size in Western Tanzania. GOODALL (1965) recognized large groupings of chimpanzees before the rainy season, and NISHIDA (1967) also found chimpanzees forming large parties during seasonal migration in the savanna woodland of Western Tanzania.

2. Organization of a Regional Population

a) Membership of a Regional Population

Is there any permanent membership in the local population of chimpanzees and are there any social boundaries between such populations? The identified chimpanzees and their appearance in the center of the study area of about 5 sq. km are recorded (Table 5). For about 10 days or so the same food-bearing trees were well supplied with fruit and the chimpanzees continued to have the same or

Table 5. Recognized chimpanzees and observations on them.

CATEGORY	DATE		SEP.	OCT.	OCT.	OCT.	OCT.	NOV.	NOV.	NOV.	NOV.	DEC.	DEC.	DEC.	JAN.	JAN.	JAN.	JAN.	FEB.	FEB.	FEB.	MAR.	MAR.
			29	4	18	27	31	6	10	23	28	1	13	29	4	14	18	21	10	26	28	6	7
			|	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
	FOOD		OCT.	17	27	3	NOV.	9	21	28	DEC.	7	20	31	7		19	26	21		5	7	19
	TREE NO.		8				6				11												
	RANGE*		OCT.	OCT	OCT.	NOV.	NOV.	NOV.	NOV.	NOV.	DEC	21	15	29	36	40	28	43	49	62	64	8	67
			2	3	4	7	8	9	12	18	19	|	|	|	|	·		!	|		|		|
		AGE							|	·		25	26	35	39	41		48	61		71		78
		-SEX							17	20													
	NAME	CLASS	A	A	A	A	A	A	AD	AD	AD	AD	AD	A	A	A	AD	A	A	AD	A	A	AD
I	*NYEUSI*	FA ♀	+			+	+	+			+	+		+	+			+	+	+	+	+	+
	MZEE	FA ♀	+		+	+					+	+		+				+	+	+	+		+
	MKONO	FA ♀					+						+	+	+			+	+	+			+
	LAINI	FA ♀	+				+				+	+		+	+			+	+				+
	SENTI	FA ♀	+				+		+		+	+		+				+	+		+		+
	MKIA	YA ♀	+		+		+				+	+		+	+	+			+		+		+
	KATA	YA ♀	+			+	+	+			+	+		+	+	+			+		+		+
	NYWELE	YA ♀	+	+							+		•						+				
	KIJANA	YA ♀	+		+							+		+	+	+		+	+		+	+	+
	NYEUPE	SA ♀				+								+					+	+	+	+	+
	MAMA(+B,C)	FA ♀	+	+		+	+				+			+		+			+		+	+	
	NDIZI+B	FA ♀		+										+	+			+	+		+		+
	MGENI+B	FA ♀		+		+	+												+		+	+	+
	POMBE	YA ♀					+	+	+										+		+		
	NDITO	SA ♀		+										+									+
II	*KUBWA*	FA ♀												+					+		+		+
	MREFU	FA ♀																	+				
	MJINGA	FA ♀																	+	+	+		+
	CHELEWA	FA ♀																+	+		+	+	+
	KUFURA	FA ♀		+		+																	
	SIMAMA(+I?)	FA ♀												+	+				+		+		
	CHAFU+B	FA ♀																+	+	+	+		
	NGABI+B	YA ♀														+		+	+		+	+	+
	ALASIRI	FA ♀										+											
	KURA	FA ♀																	+		+		
	NDEVU	FA ♀																+					
III	*MGUU*	FA ♀							+	+	+		+	+					+				
	LABDA	FA ♀											+	+					+	+	+		+
	SIMO	FA ♀									+	+		+				+	+		+		+
	NJIA	YA ♀							+	+	+	+	+	+	+	+		+	+		+		+
	KIDOGO	SA ♀						+		+	+	+	+	+					+		+		+
	JUA	YA ♀			+								+	+									
IV	*MZITO*	FA ♀							+	+	+		+										
	WILI	FA ♀							+														
	ASUBUHE	FA ♀							+														
	KESHO	FA ♀							+	+													
	JANA	FA ♀							+	+													
	RORO	FA ♀											+				+						
	KAYU	YA ♀															+						
	MZUNGU	YA ♀							+	+													
	NUSU	YA ♀							+	+							+						
	UZI+B	FA ♀							+		+		+				+						
	JUZI+(♀)	FA ♀							+	+			+										
	USIKU+(♀)	FA ♀							+	+													
	MASIKIO+(♀)	FA ♀							+				+										
	KUNJA+(♀)	FA ♀								+													

Only subadult animals and older are listed and only when the existence of each animal confirmed is marked +.

* : A shows the area exclusively occupied by RP-A. AD shows the overlapping area of RP-A and RP-D. D shows the area exclusively occupied by RP-D.

**: Animals of category I appeared throughout or nearly throughout the study period in range A or its overlapping area. Animals of category II appeared for a short period in range A or its overlapping area. Animals of category III appeard in range A, range D, and their overlapping areas with animals of category IV appeared only in range D or its overlapping area.

similar pattern of nomadic movement.

For at least half a year many chimpanzees moved in a restricted area and formed parties mainly of fellows acquainted with each other. Although they did not form a strictly-organized troop, they were connected by loose social bonds; this kind of social unit, distinct from the party, is named *regional population* (or

sometimes simply *population*). The regional population which had a range of movement of about 5 sq. km on both sides of the main road with Kihura Village in the center was named Regional Population A (RP-A). Chimpanzees, especially adult males, who were in the main study area throughout the study period, were frequently observed to gather in the same party, but little difference of intimacy in behavior between these individuals and others was confirmed.

b) Composition of a Regional Population

Although 41 head were identified in RP-A, the total may reach about 56 if the unprecisely recorded animals are added (Table 6). Some males were in the main study area throughout the study period, but some appeared there only during the latter half of the study period. Some other animals who had such distinguishable characteristics as scars on the face or cut off ear lobes were observed only once or twice in the study area, moving with members of RP-A without showing any antagonism toward them. Some individuals were observed to be with members of RP-D in an overlapping part of the ranges of RP-D and A in November and December and were later seen in the proper range of RP-A with members of RP-A. Some chimpanzees were observed in a mixed party comprising parts of RP-A and D, but they never advanced into the proper range of RP-A. They were judged proper members of RP-D.

The estimated population contains all the chimpanzees who stayed within the range of RP-A for a rather lengthy period, and the regional population might be habitually more than 50 head. Though there might be some chimpanzees whose recording is unprecise, there must be more adult males than adult females, and this result is also supported by every observation of parties (Tables 3 & 4).

REYNOLDS and REYNOLDS (1965) found it convenient to divide their study area into regions of about 15-20 sq. km, within which chimpanzee parties had a higher frequency of interactions among one another than with parties beyond. Their Eastern Valleys-Siba region coincides with the total range of RP-A, D, and

Table 6. Size and composition of Regional Population A.

Age class	Male			Female			Sum total
	No. of confirmed animals	Estimated miscount	Total	No. of confirmed animals	Estimated miscount	Total	
FA	11	1	12	7	3	10	22
YA	5	1	6	2	2	4	10
SA	2	1	3	1	1	2	5
SJ	3	1	4	1	1	2	6
JJ	1	1.5	2.5	2	0.5	2.5	5
I	1	0.5	1.5	2	0.5	2.5	4
B	1	0.5	1.5	2	0.5	2.5	4
Total	24	6.5	30.5	17	8.5	25.5	56

their vicinity. Even though a large proportion of the author's observations revealed that social interaction and intermingling between parts of RP-A and RP-D were frequent, some observations showed that they were separate social units (Example 6).

c) Range and Population Density

Though the recognized range of movement of RP-A was about 5 sq. km if 2.5 sq. km can be added as the periphery of the range which the author was unable to confirm, the chimpanzee population density of the main study area was 50 head/7.5 sq. km, that is, 6.7 head/sq. km. REYNOLDS and REYNOLDS (1965) estimated the population density of the Eastern Valleys-Siba region as a little less than 4 head/sq. km, but there might be more chimpanzees in this region. The main study area in this forest was, according to rough observation, mostly populated by chimpanzees, and the total population of the Budongo Forest may not exceed REYNOLDS' estimate of between 1000 and 2000. In the Budongo Forest chimpanzees are more densely congregated than in the savanna woodland of Western Tanzania, where GOODALL (1965), at the Gombe Stream Reserve, estimated the population as 1 head/sq. km. This means that more food and a better environment for chimpanzees must be concentrated in the forest than in the savanna woodland.

d) Other Regional Populations and Relations between Regional Populations

Other Regional Populations: In neighboring areas of the main study area some chimpanzee populations which were separated from RP-A were found but could not be observed sufficiently because of their shyness and caution towards the author. The members of a party of chimpanzees that was found on November 10 at *F. mucuso* No. 11 were all strangers to the author; they gave alarms and threatened him. This tree was only 400 or 500 m from *F. mucuso* No. 2 and No. 8 and *M. lactea* No. 3, which the chimpanzees of RP-A frequently visited. Some of the chimpanzees that appeared in *F. discifera* (?) No. 7 showed the same attitude towards the author. A population of chimpanzees that was separated from RP-A and which had an overlapping range to the southeast of RP-A was named Regional Population B (RP-B) (Fig. 4 & Photo 2).

Another shy population of chimpanzees, which was named Regional Population C (RP-C) and which had a range which bordered that of RP-A on the east, was observed at *F. natalensis* No. 1, *F.* sp. No. 10, and so on. The chimpanzees of RP-C sometimes formed particularly large parties, and more leading and warning behavior could be seen in this population than in others. Such observations suggest that RP-C was more organized than other regional populations of the study area. In this population (RP-C) more adult females than adult males were counted.

On the north of the range of RP-A there was another chimpanzee population, RP-D, whose range overlapped that of RP-A and whose members frequently contacted and mixed with members of RP-A.

RP-A had more adult males than adult females, but RP-C had more adult females than adult males (Tables 3, 4, & 7). The observations of ITANI and SUZUKI

Table 7. Size and composition of Regional Populations C and D.

	C*			D**		
Age class	Male	?	Female	Male	?	Female
FA	8		10	8+		7+
YA			1	3+		0+
SA	1		3	1+		1+
SJ		1		1+		1+
JJ		1		1+		0+
I+B		7		4+		1+
Total	9	9	14	18+		10+
Sum total		32			C. 40~50	

* Count depends on an observation of a traveling party on January 20, 1967. Though it was not possible to determine the composition, 40 animals were observed on a different occasion.

** Count depends on rough observation with identification of characteristic individuals.

(1967) and of NISHIDA (1967) revealed that the male-female sex ratio of adult of each population of savanna woodland was about 1/2 (♂/♀), so the adult sex ratio may be quite different from one regional population to another. Though the exact reason for the variety of sex ratio in a population of chimpanzees is not certain, there may be a difference in land value from one place to another for the chimpanzees and there may also be some differences in the social organization of the regional populations.

Relations between Regional Populations: The ranges of RP-A and RP-C were almost separated and, accordingly, their social interactions must be slight, as no chimpanzee recorded in RP-A could be found among parties of RP-C.

The range of RP-B overlapped a part of that of RP-A, which the chimpanzees of RP-A frequently utilized, and social contact between the chimpanzees of RP-B and A was sometimes observed as follows: On December 30, at 14:00, at a point a little south of *F. mucuso* No. 11, two medium- or large-sized parties came to touch, run and jump about, uttering a heavy booming noise and beating the buttresses of both parties, but moved separately to the southeast and northwest. The former party must have been a part of RP-B, as it was shy and no individual which the author knew was found, but the latter party which advanced into the Siba block, was a part of RP-A, as many chimpanzees which the author knew were found.

The contact and exchange of members of RP-A and D were frequently observed in the overlapping area of the ranges of both populations (Table 5), but no antagonistic behavior between them was observed, and so the observations suggested to the author that they all might belong to the same regional population. For

example, on *F. mucuso* No. 15, members of both populations appeared and intermingled (Table 8), and some of the chimpanzees, *Mguu* (FA♂), *Labda* (FA♂), and *Njia* (YA♂), that had been recorded as members of RP-D advanced to the Siba block, the proper range of RP-A, and from that time moved habitaully with members of RP-A.

On the other hand, *Mzito* (FA♂), *Robo* (FA♂), *Uzi* (FA♀), and many others never moved beyond their original range. Even in the overlapping area of both populations, other observations stressed that they were separate social units (Example 6). Although they exchanged members and mixed with each other in a friendly manner, there might be a vague social border between social units RP-A and RP-D.

Example 6. February 14. Many RP-A members were feeding at *M. lactea* No. 52 and the neighboring trees, where they had slept the previous night. About 15 adult males, 6 adult females, 5 subadults and juveniles, and 4 infants and babies, altogether about 30, comprised the party. As soon as they began to run about and make a booming noise at about 07:30, the same sound was heard from the east of the Biiso block and it gradually approached. At about 08:30, 14 adult males and one subadult of RP-A climbed down from the tree and began to move to the east, crossing the road, but the females and their children did not join this movement; instead, they retreated into the interior of the Siba block. The males met a party that came from the opposite direction at the fruit-bearing *Syzygium guineense* No. 53. Chimpanzees of both parties run about here and there, barked vigorously, beat the buttresses excitedly, and ate fruit in an exaggerated manner. Each individual moved independently, and direct social interaction between individuals was little observed. Though few were identified due to their quick movements, chimpanzees of the party from the east were more shy than the others and were presumed to be a part of RP-D. At 09:55, the party from RP-D moved quickly to the north and the males of RP-A moved to the southwest, but with less excitement.

e) Party Organization when Traveling

The order in which individuals of a party moved when traveling and the other in which they moved away from a stationary situation such as feeding or resting gave information about the party's organization. The order of movement of such parties consisting of more than 5 animals was recorded (Table 9). All except one of the large parties of more than 10 head had a few smaller parts. Many adult males, as well as adult females, rather than one particular individual, were seen to move first in the procession, but subadults and juveniles were rarely seen to move first. Many instances of travel were actually begun by the starting of a particular individual (underlined animal in Table 9) who served as a nucleus; such acts of leadership were carried out mainly by the large, full-grown, adult males *Nyeusi*, *Mzee*, *Kubwa*, and *Labda*. As membership of a party changes frequently, no particular individual can serve as permanent leader, but any adult male, especial-

Table 8. Members who appeared in *Ficus mucuso* No. 15.

RP	Name & Age/Sex Class		Dec. 16				Dec. 17					Dec. 18					Dec. 20	
			F	A	F	M	F	A	F	M	M	A	A	A	F	M	F	M
D	*Mzito*	FA♂	?		+	+												
D—A	*Mguu*	FA♂	?		+	+												
D—A	*Labda*	FA♂	+		+	+		+	+		+		+		+	+		
A	*Mkono*	FA♂	+		+	+	+		+	+			+		+	+	+	+
A?	*Robo*	FA♂	+		+	+												
A	*Laini*	FA♂										+			+	+		
D—A	*Njia*	YA♂	?		+	+												
A	*Mkia*	YA♂	?		+	+												
A	*Kata*	YA♂						+	+		+							
A	*Kijana*	YA♂	?		+	+						+			+	+		
A	*Nywele*	YA♂					+		+	+								
D—A	*Kidogo*	SA♂	?		+	+							+		+	+		
D?	?	A♂	+		+	+												
D	*Juzi*(+I♂)	FA♀		+	+	+												
D	*Uzi*(+B)	FA♀					+		+	+								
A—D	*Jua*	YA♀												+	+	+		
D?	?	JJ♀	+		+	+												

A=arrived together; F=fed together; M=moved away together.

ly a senior adult, may assume leader-like behavior. As exceptions, in the instances of December 18 and 29, males moved following the estrous females, and these females had the deciding vote for determining the time and the direction of movement.

The traveling party which was seen crossing the forest track on January 20 was a part of RP-C. Finding the author, the large full-grown adult male who was moving at the head of the party stopped before crossing the track, watched him, and proceeded after all members of the first part except two adult males crossed the track safely. The large male might have been leading the party and was probably recognized as leader by the females and their young, who were gathered into the first part; the second part consisted mainly of males, and the third was a large mixed part, in which all of the four estrous females were included. All parts that were separated from each other for five minutes continued to travel, communicating by vocalization. The whole organization of the regional population, combined by a loose social bond, may be said to have been maintained in this large party.

The traveling order of two examples observed by ITANI (1966) in the savanna woodland of Western Tanzania (Table 9) also suggests the tendency to divide into a few parts, consisting of males, mothers, and mixed parts.

f) Leadership

A shy chimpanzee usually runs away without making a sound of alarm soon after it finds a man. If there are other chimpanzees in the same tree who do not see the man, they continue to feed or rest quietly, although they also rush away immediately after they notice him. Many observations noted that a chimpanzee does not communicate the existence of an approaching enemy to its party-mates. Such observations, which are quite different from the observations of groups of many kinds of monkeys and apes, suggest that no cooperation among individuals of a party exists among chimpanzees.

On the other hand, leader-like behavior as shown in the above section was sometimes observed, especially by chimpanzee parties which were not accustomed to the author, which showed a vigilant attitude towards him, and of which some of the senior males uttered alarms and warning calls to inform their followers of the danger. Latter observations impressed the author that what leadership as exists in each party is to be found when the party travels; it becomes noticeably apparent in an emergency, though it is not clearly shown in feeding or resting situations.

The behavior pattern which details leadership will be described in a separate paper (SUGIYAMA, in prep.).

Table 9. Observations of procession order.

Date	Time & Order	Remark
Oct. 2	1156/YA ♂ (*Mkia*), FA ♂ (*Laini*), YA ♂ (*Kata*), FA ♂ (*Senti*), FA ♀ +I ♀ (*Mama*+*Mtoto*)/=6	moved after 4 hour's feeding
Oct. 17	1130/FA ♀ +JJ ♀ (*Kufura*+*Tatu*), FA ♀ (*Ndizi*), SA ♀ (*Ndito*), SJ ♀ (*Ine*)/=5	
Nov. 3	1225FA ♀ e(*Pombe*), FA ♂ (*Laini*), FA ♂ (*Nyeusi*), FA ♀ +B(*Mgeni*), YA ♂ (*Kata*), SJ ♂ (*Tano*)/=7 •	
Nov. 4	1440/YA ♂ (*Kata*), FA ♂ (*Nyeusi*), FA ♂ (*Senti*), FA ♂ (*Laini*), FA ♀ +I ♀ (*Mama*+*Mtoto*)/=6	moved after many hour's feeding. see P.236
Nov. 5	935/FA ♀ +I ♀ (*Mama*+*Mtoto*), 946YA ♂ (*Kata*), 1000FA ♀ e(*Pombe*), 1011YA ♂ (*Mkia*), FA ♂ (*Senti*), FA ♂ (*Nyeusi*)/=7	moved very slowly
Dec. 3	1020/FA ♂ (*Mzee*), 1023SA ♂ (*Kidogo*), SJ ♂ (*Alasiri-Jr.*), FA ♀ (*Alasiri*), 1030YA ♂ (*Njia*)/=5	
Dec. 16	935/JJ(?), 955FA ♂ (*Labda*), FA ♂ (*Mguu?*), FA ♂ (*Robo*), YA ♂ (*Kijana*), FA ♂ (*Mzito?*), SA ♂ (*Kidogo?*)/ 1030/FA ♂ (*Mkono*), YA ♂ (*Mkia?*), YA ♂ (?), YA ♂ (*Njia?*), J ♀ (?), FA ♀ (*Jusi?*)/=13	
Dec. 18	1040/YA ♂ (*Kijana*), 1043FA ♂ (*Mkono*), FA ♂ (*Labda*), 1047FA ♂ (*Laini*), SA ♂ (*Kidogo*), 1133YA ♀ e(*Jua*)/=6	see P.247
Dec. 29	1150/FA ♂ (*Laini?*), SJ ♂ (*Mzuri*), FA ♂ (*Mzee?*), YA ♂ (*Mkia*), FA ♀ +I ♀ (*Mama*+*Mtoto*)/1207/A ♂ (?)J/ 1315/YA ♀ e(*Jua*), FA ♂ (*Labda?*), YA ♂ (*Njia*), FA ♂ (*Mkono*), J(?), YA ♂ (*Kijana?*)/=13	see P.247
Dec. 30	820/FA ♂ (*Nyeusi*), FA ♂ (*Labda*), FA ♀ e(*Jua*), YA ♂ (*Kata*), YA ♂ (*Mkia*), YA ♂ (*Njia*), SA ♂ (*Nyeupe*)/=7	
Jan. 20	1645/FA ♂, FA ♀ +I, FA ♀ +I, SA ♀, JJ, SJ, YA ♂, A ♂, A ♂,/1653. 1658/FA ♀ +I, A ♂, A ♂, A ♂,/ 1700. 1705/FA ♀ +I, FA ♀ +I, FA ♀ +I, FA ♀ +I, FA ♀ e, YA ♀, FA ♂, A ♀ e, A ♀ e, A ♀ e, SA ♀, FA ♂ /=32	see P.247
Feb. 16	1026/FA ♀ e+B(*Mgeni?*), JJ(*Tatu?*), FA ♂ (?), FA ♂ (*Nyeusi*)/=5	
Feb. 18	715/FA ♂ (?), SA ♂ (*Nyeupe?*), FA ♀ e(?), JJ(?), JJ(?), JJ(?), 725YA ♂ (*Mkia*), 728FA ♂ (*Kubwa*), FA ♂ (*Senti*), YA ♂ (*Kata*), FA ♂ (*Nyeusi*), FA ♂ (*Mjinga*), 739FA ♂ (*Labda*), 744FA ♂ (*Chelewa*)/810/FA ♂ (*Laini*), YA ♂ (*Njia*)/=16	
Feb. 18	1014/FA ♂ (?), FA ♀ (*Chafu*), FA ♀ +B(?), FA ♀ +B (*Mama*), I ♀ (*Mtoto*)/1045/FA ♂ (?)/=8	
Feb. 20	1545/FA ♂ (*Mkono*), 155/FA ♂ (*Nyeusi*), 1557FA ♀ +B (*Mama*), I ♀ (*Mtoto*)/1625/FA ♂ (*Laini*), FA ♂ (*Labda*), YA ♂ (*Njia*)/=8	
Feb. 21	1557/FA ♂ (*Simo*), FA ♂ (*Chelewa*), FA ♂ (*Labda*), YA ♂ (*Kijana*), FA ♀ +B(*Mama*), I ♀ (*Mtoto*), FA ♂ (*Mkono*), YA ♂ (*Mkia*), SA ♂ (*Nyeupe*), YA ♂ (*Kata*), FA ♂ (*Senti*)/=12	moved after heavy booming and barking simultaneously and speedy
Feb. 28	940FA ♂ (*Nyeusi*), FA ♂ (*Senti*), FA ♂ (*Chelewa*), YA ♂ (*Mkia*), FA ♀ +I(*Simama*)/=6	
Sep. 3, 65	1121/A ♀ +I, A ♀ +I, A ♀ e, A ♀ +I, A ♀ +I, J, J, A ♀ +I, A ♀ +I, A ♀ +I, A ♀ +J, A ♀ +I//A ♂, A ♂, A ♂, A ♂, A ♂, A ♂, A ♂ //A ♀ e, A ♀, A ♀, A ♀ e+J, A ♀ e, A ♀, A ♀, A ♀ e+J, A ♀, A ♀ e, SA/A ♀ +I/=43	observed by ITANI & SUZUKI at W. Tanzania
Dec. 5, 61	/1A ♂ +4A ♀ +5J+1I/ /4A ♂ / /9A ♀ +4J+3I/=31	observed by ITANI & AZUMA at W. Tanzania

Underlined animals accelerated or led the movement of the party.

DISCUSSION AND CONCLUSION

Social Organization and Social Unit: It is said that chimpanzees do not have permanent, stable groups, but instead have temporary groups (parties) which frequently divide, coalesce, and change their membership. The author's record of behavioral movement by means of individual identification and continuous following of the same population revealed that a restricted number of chimpanzees moved within a certain area for a long period, though there were some newcomers and wanderers. In the author's main study area more than 50 chimpanzees that knew each other were living in an area of about 7.5 sq. km, forming and dividing parties, the formation and division of which depended partly on change of location and situation. Although there was no strict social border, the author recognized those individuals as a loosely organized social unit, the *regional population.*

The main study area was one of the areas of the Budongo Forest most densely populated by chimpanzees, and many regional populations were living in overlapping ranges. Chimpanzees of the neighboring populations came near, touched, mixed, and even changed members without observable antagonism. There may be friendly or at least non-antagonistic relationships between chimpanzees of neighboring regional populations.

Although many individuals prefer to live in a certain restricted area and know each other, some move beyond the range to join a party of strangers. Observations of the strangers who appeared occasionally or for only a few days in the main study area tell of this phenomenon. Even to those strangers little antagonistic behavior from the residents was seen. The regional population is a loosely organized social unit which combines individuals by regional social bonds, is open to the stranger, has a friendly or non-antagonistic neighborhood relationship with the other populations, and has an easily changeable membership.

The friendly neighborhood relationships among parties or local populations and the free acceptance of strangers of chimpanzees are quite unique among non-human primates. However, groups of gorilla may not be strictly closed, for some strangers are accepted without antagonism from the senior male of the group (SCHALLER, 1963), and some observations of baboons (*Papio cynocephalus*) have revealed that neighboring troops can drink at the same water hole during the dry season and that member change also sometimes occurs (DEVORE & HALL, 1965; ROWELL, 1966).

There was much difference in the adult sex ratio between regional populations, and some observations suggest that social organization also differed from one population to another. According to the observations of NISHIDA (1967) and IZAWA (in prep.) in Western Tanzania, there are more adult females than adult males in a local population, and the adult sex ratio of those populations is not similar to that of RP-A of the Budongo Forest but to that of RP-C. Though the present data

cannot explain the reason for these differences, the above mentioned phenomena may be related to the exchange of individuals among the regional populations due to change of favorite foods, sexual desire, or other conditions, or to their own request. The author observed such wanderers and sometimes counted them in his record of RP-A.

ITANI (1966), from his observation of a large party of chimpanzees, postulated the existence of a social unit of a higher level than the party and hypothesized the *familoid*, the family-like nucleic social unit similar to a human family, and he named the large party, as the basic chimpanzee social unit which can be compared to the band of primitive human society, the *preband*. The preband may be equivalent to the regional population of the Budongo Forest, but the author could not find any permanent family-like social unit, and ITANI himself now doubts the existence of the familoid in chimpanzee society but still persists in regarding the band-like society as the basic social unit in chimpanzees (ITANI & SUZUKI, 1967).

GOODALL (1965) named the sum of the chimpanzees in an area the *community* and suggested that only a geographic barrier would constitute a limiting factor to its size. However, in the Budongo Forest the chimpanzee population has a loosely separated social unit without physical or geographic barriers. REYNOLDS and REYNOLDS (1965) also suggest that the chimpanzee habitat in the Budongo Forest can be divided into regions without any geographic or physical barrier, though they could not confirm the social boundary. The author recognized, from continuous observation of a population of which each individual was identified, that the edge of the region is the social boundary of the loosely organized social unit, the regional population, though the barrier is not strict. REYNOLDS and REYNOLDS (1965) also recognized that some parties, of which individuals were identified, were relatively stable units.

Terms for Social Units: Due to the complications of chimpanzee social organization, the term applied to each grouping pattern or social unit is different with each worker (Table 10). Technical terms for behavioral, ecological, and sociolo-

Table 10. Social unit and its term.

Namer	Temporarily formed congregation	Congregation or individuals which live in the same area
KORTLANDT (1962, 1967)	group or band	
GOODALL (1965)	group (temporary group)	Community
REYNOLDS (1965)	band	(region)*
ITANI & SUZUKI (1967)	small-sized group	large-sized group
ITANI (1966)		(preband)
NISHIDA (1967)	sub-group	group
SUGIYAMA	party	regional population

* This term is not used for chimpanzee society, but for the range or area of the animals' movements.

gical studies of chimpanzees should not contradict in definition or concept in anthropology, neither should they in animal ecology, judging from the present importance and special character of this kind of study as *Grenzgebiet*. For this reason some terms are not suitable for each grouping pattern of chimpanzees.

The author offers *party* for the first category, i.e., any chimpanzee group which is formed temporarily, even if only for several minutes, and *regional population* for the second category, the population of chimpanzees, the members of which move in almost the same range, know each other, and easily form parties together. These are rather neutral terms, and some other terms which have a more restricted meaning may be applied to particular types of society; they may also be applied when the social organization of chimpanzees will have been completely determined.

Comparison with Other Habitats: NISHIDA (1967) found, in the savanna woodland of Western Tanzania, some chimpanzee populations of about 30 or 40 animals separated from each other without a geographic barrier, which may be equivalent to the regional population of the Budongo Forest, but NISHIDA's chimpanzee population is more closed, organized, and antagonistic towards others, and it seasonally migrates as a group. As food for chimpanzees may be sparse and scattered over a large area in the savanna woodland, the population density of chimpanzees is low, 1 head/sq. km, and they must move long distances, compared with those chimpanzees of the high forest, where food is rich and concentrated in a small area. The population density of chimpanzees in the high forest is great, and the range of movement is comparatively small. Therefore, the chimpanzees in the high forest can contact each other and they know of the situation and the existence of their fellows by vocal communication. The differences in organization between two societies of chimpanzees in separate places must be related to their adaptation to different environments.

As population density is high in the Budongo Forest, frequent social interaction occurs among individuals and populations. As chimpanzees have non-antagonistic contact with each other, the border between parties and populations may become blurred by friendly mixture, member exchange, and the receiving of strangers, in contrast to the majority of monkeys and apes, who are antagonistic towards neighboring groups.

A high ability of recognition and memory must be essential if chimpanzees are to have friendly associations with other chimpanzees in a temporarily formed party, though they do not form a permanent, stable group. This kind of ability must be a necessary condition for maintaining the complicated chimpanzee social organization. The social behavior which characterizes chimpanzee social organization will be discussed in a separate paper (SUGIYAMA, in prep.). The relative lack of enemies, which is, perhaps, related to the large body and the power of chimpanzees, may be one of the necessary factors which enables not only single adults but also mothers, juveniles, and even wounded animals, to move independently.

KORTLANDT (1967) suggests that chimpanzees fight with leopards brandishing a tool stick.

Comparison with Other Species: Most monkeys and apes that have a strictly closed troop have a territory or closed home range, and each troop has a tendency to have a clear-cut range (CARPENTER, 1965, on the howling monkey, *Alouatta palliata*; SUGIYAMA, 1960, on the Japanese monkey, *Macaca fuscata*; SUGIYAMA, 1968, on the lion-tailed monkey, *M. silenus*; SUGIYAMA et al., 1965, on the hanuman langur, *Presbytis entellus*; CARPENTER, 1940, on the gibbon, *Hylobates lar*; and many others). The closedness of the group, the uniformity of movement of members of a group, and the pattern of social interaction among neighboring and strange individuals and populations of these monkeys and apes are said to be far different from those of chimpanzees.

Monkeys of some species, such as the hamadryas baboon (*Papio hamadryas*) (KUMMER & KURT, 1963) and the gelada baboon (*Papio gelada*) (CROOK, 1966), seem to have a small, stable group at one time and to gather into a large aggregation according to the situation at other times; the spider monkey (*Ateles geoffroi*) may have a similar social organization (CARPENTER, 1935), though there has been no intensive study of the species. Groups of gorilla seem to have no territory; they approach each other with little antagonism, and some strangers can join the group with no antagonism from the senior male (SCHALLER, 1963). Hamadryas baboons and gorillas may be said to have a rather open social organization, and they attain intergroup communication easier than other kind of monkeys and apes.

Even compared with such species, chimpanzee society has a distinguishing characteristic in that an aggregation of individuals is open to other individuals and that each can move independently of others, though they still spend much of their life in group-life. This kind of open group organization makes it possible to bind the small social units into a large, loosely organized society and to have a wide range of intersocial unit communication. On this point, REYNOLDS' hypothesis, which emphasizes the important role of open group organization in hominid evolution, must be appreciated (REYNOLDS, 1966). Although CHANCE (1967) asks whether the local population accepts strangers or not, the author observed some instances of strangers joining parties of RP-A.

Some human hunting and gathering tribes, such as the Hadzapi of East Africa (TOMITA, 1966, 1968) and the Bushman of South Africa (TANAKA, 1968), habitually have a small, stable group, the *family*, for daily life, but make camp with members of the same population, the *band*. Though members of a band rarely gather in one camp at the same time, they frequently visit each other and get information from other members of the band. These primitive tribes' pattern of social organization appears similar to that of chimpanzees, whose regional population may be equivalent to the band of early human society, although chimpanzees have neither the family nor its prototype in their society.

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Photo 1. Budongo Central Forest Reserve. The left side of the road is the Biiso Block and the right is the Siba. This part was frequently crossed by chimpanzees of Regional Population A.

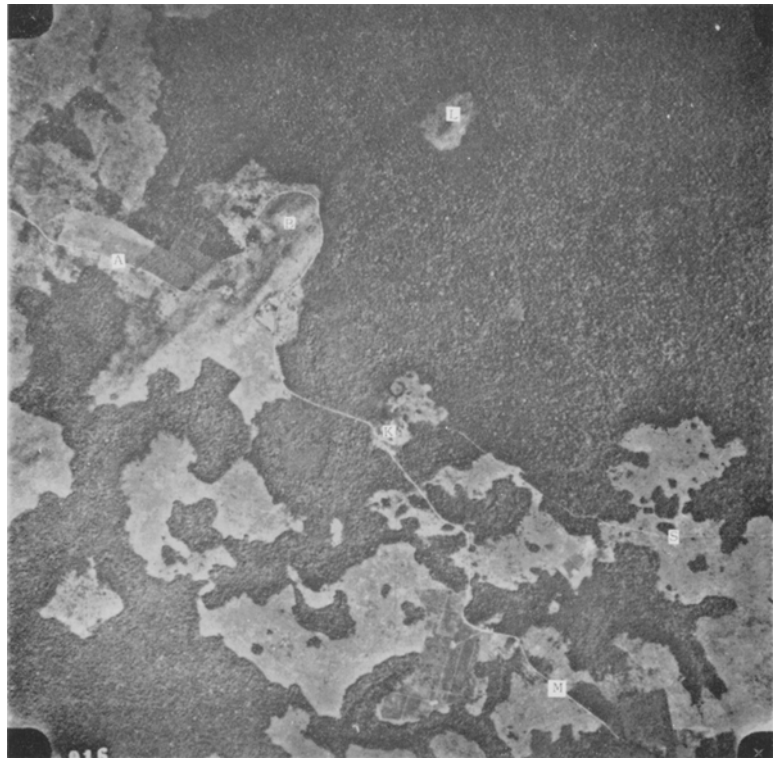

Photo 2. Aerial photograph of the study area and its vicinity (see Fig. 4). B=Busingiro Hill; K=Kihura Village; L=Little Kasenene Hill; A=road for Butiaba, Lake Albert; M=road for Masindi; S=road for Sonso Saw-mill.

Photo 3. An adult male chimpanzee eating figs of *F. capensis*.

Photo 4. Pods of *C. alexandrii* discarded by chimpanzees after taking out their seeds.

Photo 5. Adult male chimpanzees eating figs of *F. mucuso*.

Photo 6. Figs of *F. mucuso* and the remnants of food discarded by chimpanzees.

Photo 7. A party of four males in a food tree.