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The Emotions: Focus on Inter-Male
Aggression and Dominance Systems
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INEQUALITY VERSUS EQUALITY FOR COEXISTENCE IN PRIMATE SOCIETIES

by

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1. INTRODUCTION

In an analysis of vocal sounds of Japanese monkeys I pointed out that there are social interactions based on an inequality principle and those based on an equality principle (Itani, 1963). They can be recognized in two types of face-to-face vocal sounds in the category of "sounds generally emitted in peaceful states of emotion." One of them is emitted when a subordinate individual attempts to "win a superior's favor, to please him or to beg his pardon." The other vocalization resembles it in the sound itself, but is emitted in a totally different situation. This vocalization is mutually exchanged, in which no inequality appears between the two individuals (Itani, 1963). What is important here is that both vocal sounds are emitted in non-aggressive interactions although one is based on the inequality principle while the other on the equality principle, and that in either case a peaceful coexistence of the two individuals is assured.

Besides sexual interactions and mother-offspring interactions, the social coexistence of individuals is based on either of the two principles. The inequality principle urges an individual to behave in accordance with its dominant/subordinate relationships with others, while the equality principle works as if there were no dominant/subordinate inequality between individuals. Prevalence of either principle not only depends on the situational structure of the given event, but also on the phylogeny of the given species.

The inequality principle and the equality principle can be metaphorically compared to a pair of Japanese words, "honne" (personal leaning) and "tatemae" (norm expected by convention). The latter, which is a social norm, is expected to be performed for some reason or purpose. Here I would like to ascribe the peaceful coexistence of individuals to the reason or purpose for the equality principle. By reviewing the dominance systems based on the inequality principle

among cercopithecids, I will probe into possible bases of social interactions based on the equality principle, and then trace the breakdown of the inequality principle and rise of the equality principle in the societies of the genus Pan, i.e., chimpanzees and pygmy chimpanzees.

Thus, this paper focuses on behaviors, whether active or passive, in which individuals are affirmative and tolerant to others and in which some social organization is assumed. Cases of negative interactions typically represented by aggression are taken for exposures of breakdowns of the assumed social organization. Since there are many societies of primates with structures in which individuals do not coexist, I will first briefly review the variations of social structures in primates.

2. SOCIAL STRUCTURES OF PRIMATES

Primate societies include those consisting of only solitaires and those comprising stable groups. I called the former "elemental societies" (Itani, 1972, 1977a). This type of society has few social interactions; solitary males and females come together only during the short mating season, and the following breeding period is also short. Therefore, the present article does not deal with this type of society, found only among nocturnal prosimians. Note, however, that all other higher primate societies also originate in this type of elemental society. The orangutan, as the sole exception among the simians, has a society without stable groups. Although this cannot be considered the same as the prosimian elemental society, it is not within the scope of the present paper.

In considering the societies made of stable groups, I would like to propose the concept of "basic social unit (BSU)" (Itani, 1972, 1977a). Although the group

size, composition, and their maintenance mechanism vary from species to species, the basic social unit has the following common features: It is a bisexual unit with a half-closed structure which allows inflow and outflow of certain individuals. It has a mechanism of maintaining a stable structure, and is antagonistic to other conspecific units (Itani, 1981). A specia (species society, Imanishi, 1950) can be schematized as consisting of BSUs which exist by keeping some social distance from one another, and of solitaires which do not belong to any BSU (Itani, 1977a).

Table 1 summarizes the types of primate social structures. Although this table is not complete, it summarizes the results of field studies made to date fairly well. There are three types of BSU compositions: one-male/one-female, one-male/multi-female, and multi-male/multi-female. The type of BSU composition is generally species-specific. The mechanism of maintaining the group structure further divides the latter two types into two each to give a total of five types. This is determined by the elements (male and/or female) which transfer between BSUs, and is closely related to the mechanism of incest avoidance.

1. MP_1 (nonmatrilineal-nonpatrilineal-1). This type of society has only one-male/one-female pair type groups. The young of both sexes mate out; thus incest is avoided and the pair type group structure is maintained. All nocturnal prosimians which have stable groups belong to this category. Also indris, callithricids, about one half of cebids, and gibbons have this type of society. Both sexes are tolerant of the presence of the same sex in the BSU, which is succeeded through neither the maternal line nor the paternal line.

2. M_1 (matrilineal-1). This is a one-male/multi-female type, and incest is avoided by the males' desertion of groups. Male offspring leave their natal groups before they become sexually mature, and the only male in the BSU is replaced by another within five years (Sugiyama, 1965; Hrdy 1974). This structure is found only among cercopithecids.

3. M_2 (matrilineal-2). This is the same as M_1 in that the group matrilineally perpetuates, but differs in that this has a multi-male/multi-female structure. Males leave before they sexually mature. Adult males usually stay in a group for less than five years and then transfer to another. Males which stay in their natal groups even after sexual maturity notably avoid incest with their mothers or sisters (Takahata, 1982a, b). This structure is found in Lemur and about one half of cebids and cercopithecids. Presbytes entellus has both M_1 and M_2 types (Yoshida, 1968), indicating their continuity; however, it is unknown what determines whether the dominant male tolerates another males' presence in the BSU.

4. MP_2 (nonmatrilineal-non patrilineal-2). This resembles M_1 in composition, which is one-male/multi-female, but differs in that females move between groups while males do not transfer. The gorilla is the only primate species which has this type of structure (Harcourt et al., 1976). However, the gorilla's society also includes one-male/one-female and multi-male/multi-female groups (Schaller, 1963). These three types of groups represent different stages of the gorilla's BSU; the one-male/one-female structure is the early stage, which becomes one-male/one-female by immigration of additional females. It is said that there is only one patriarchal male in a multi-male/multi-female group and the other males are his sons (Harcourt et al., 1976; Fossey, 1979; Veit, 1982). Since most males leave their natal groups, here I classified the gorilla's BSU as a nonmatrilineal-nonpatrilineal type. However, it is still possible for a gorilla BSU to be succeeded patrilineally; this issue awaits future studies (Harcourt et al., 1976; Veit, 1982; Yamagiwa, 1983).

5. P (patrilineal). This is the second kind of multi-male/multi-female structure, which is found in the common chimpanzee and the pygmy chimpanzee (Itani, 1980). In this type of BSU, in contrast to M_2 , incest is avoided by the young females' mating out (Nishida & Kawanaka, 1972).¹ Although father-daughter

incest remains possible before the daughter leaves her natal BSU because of the multi-male/multi-female structure, adolescent sterility (Tutin, 1980; Goodall, 1983) seems to prevent births resulting from such mating. Also observations to date seem to indicate that mother-son sexual interactions are psychologically inhibited (Goodall, 1968, 1983; Pusey, 1980).

The five types listed above can be grouped into two: M_1 and M_2 which are matrilineal and MP_1 , MP_2 and P which are nonmatrilineal. The latter group is probably of the same structure originating from MP_1 (Itani, 1972, 1977a). However, clarification of the phylogeny between the five types of structures requires further studies. For example, as to M_1 and M_2 , one may conclude that M_1 is more complex than M_2 while another may evaluate the coexistence of several males in the M_2 type of BSU. It is also possible to conclude that M_2 is the more general structure because M_1 cannot be found among prosimians and ceboids.

Among the cercopithecids, which were believed to have only matrilineal types of structures, two exceptions have been reported. They are Presbytes potenziani (Colobinae) and Cercopithecus neglectus (Cercopithecinae) both of which have MP_1 type of BSUs (Watanabe, 1981; Gautier-Hion & Gautier, 1978). This may be related to the fact that in the genus Lemur, only L. variegatus has the MP_1 type of BSU. Furthermore, this is probably related to the fact that all prosimians which have groups are of the MP_1 type; this is inferred to be the oldest type of primate BSU. This is probably related to the fact that primitive taxa in cebids generally have MP_1 type of BSUs, while presumably more advanced taxa have M_2 type of BSUs. These must be studied with reference to the origin of matrilineal structure in primate societies.²

The present paper deals with the societies which have one-male/multi-female or multi-male/multi-female compositions, especially those with M_2 and P types of BSUs.

3. COEXISTENCE BASED ON THE INEQUALITY PRINCIPLE

One of the most important findings in the early studies of wild Japanese monkeys was confirmation of the presence of a definite mating season (Itani & Tokuda, 1958). Since the group structure comprising both sexes persists during the long asexual period of the year, the formation of a group cannot be explained by sex as Zuckerman (1932) did. In short, the BSU of Japanese monkeys consists of the matrilineally related females tied to a particular home range and the immigrant males which live in the BSU for a while. Therefore, the males and females, which have different life cycles, share the home range and membership of the same troop. The recognition of the troop members can be seen clearly in the reactions to solitary males by the troop (Itani, 1954), behaviors of emigrant males entering another troop and attitudes of the troop members to them (Nishida, 1966), different attitudes shown to individuals of the same or different troop in intertroop encounters (Kano, 1964; Kawanaka, 1973), etc.

The mutual recognition of members of the same troop is based on both the recognition of the dominance system, which is basic to the inequality principle, and the recognition of kinship, which can be regarded as basic to the equality principle. In this section, I will discuss the former.

In many primate species, the existence of dominant/subordinate relationships between individuals is known; in particular, there are many reports on the dominance system seen among the cercopithecids with M_2 type of BSUs (DeVore & Hall, 1965; Kaufmann, 1967; Kawai, 1958a, b, 1965a; Southwick et al., 1965). This section will present mainly the important findings from the studies of Japanese monkeys.

When we succeeded in provisioning the Koshima troop and began the identification of individuals, we found a linear rank order among the five males in accordance with their ages. There was another male aged between the third and fourth; being semi-solitary, he was outside the dominance system of the troop (Itani & tokuda, 1958). In the next year, I began observing the Takasakiyama troop which consisted of about 200 monkeys. They also had a linear rank order (Itani, 1954). The dominance relationship can easily be recognized by the facial expressions and attitudes when two individuals meet. However, I judged the dominance by a simple test of throwing some food between the subject individuals. The dominant always took the food, no matter how many times the test was repeated. When the food was thrown closer to the subordinate, the uneasiness of the subordinate increased, but the dominant took it. The non-aggressive relationship between the two is maintained by the inhibition of the subordinate (Kummer, 1971). Table 2 shows the linear rank order among 44 males of this troop in 1955, as well as that seven years later in 1962. In the meantime, although several individuals left the troop and two died and the troop divided into two troops A and B (Sugiyama, 1960), the order changed little among the high-ranking individuals who remained in the A troop except for a few cases of reversals. The rank order among males is very stable.

Following these findings, the studies of the Minoo B troop consisting of about 300 monkeys (Kawamura, 1958) and the Arashiyama troop, of 125 monkeys (Koyama, 1967, 1977), revealed that the rank order among females is also stable. Adult females are subordinate to mature males (Kawai, 1969; Furuichi, 1983a, b). Although little study has been made of the qualitative difference between male and female rank, the rank gap between adjacent ranking individuals seems smaller among females (Itani, 1954). Dependence on a third individual (Kawai, 1958a, b, 1965a) which affects the social interactions between the subject individuals in far more

prominent among females than among males.

The assumption of such a male-female difference in dominant-subordinate relationships leads naturally to the conclusion that there are two dominance systems according to sex in a troop. In 1973, the Takasakiyama A troop consisted of about 1000 monkeys and the B troop consisted of about 300. Mori (1977) compared the female ranks of the two troops and concluded as follows: In the B troop, dominance between individuals adjacent in rank was unclear, while in the A troop, dominance was unclear between individuals quite far apart in rank. This indicates that unstable interindividual relationships increase as the troop size becomes large; especially when the troop size exceeds 100, in which unstable relationships drastically increase. This is an interesting result showing the limit of mutual recognition of dominant/subordinate relationships among females.

In addition to the dominance systems among males and females, Kawamura (1958) showed the correlation between rank and lineage in a study of the Minoo B troop. He proposed the rule of "youngest ascendancy" which schematized the rank order within a lineage, and illustrated the mechanism of rank formation between kin-related groups (Kawamura, 1958). This predicts that if A is dominant over C and A has an offspring B, the rank order among them will be $\underline{A} \frac{1}{2} \underline{B} \frac{1}{2} \underline{C}$. Youngest ascendancy means that this relationship holds even if B and C are sisters, i.e. both are offspring of A but B is younger than C.

Koyama (1970, 1977) reported that Kawamura's rule holds also for the Arashiyama troop where the mother was dominant over the daughter in 60 mother-daughter pairs, and the younger was dominant over the older in 28 pairs of sister. In addition, he showed a linear rank order among 16 lineages, within which 50 females formed a linear rank order generally in accordance with Kawamura's rule. Kawamura's hypothesis does not apply to the males, which separate from their mothers and sisters as they grow and finally leave their natal troop. Even while

they are still in their natal troop, it is rare that a male is dominant over his older brother (Norikoshi & Koyama, 1975). In this way, the formation of rank order among females is based on recognition by C that B is an offspring to A and that B can depend on A, who tolerates this dependence. In a study of the nonprovisioned Yakushima M troop, however, Furuichi (1983a, b) found that in all four pairs of sisters the older sister was dominant over the younger and proposed that such a rank order exists because the monkeys do not need to depend on their mothers in a natural feeding situation. Nevertheless, he confirmed the existence of dominant/subordinate relationships between lineages.

Among infants born in the same year, a rank order parallel to that of their mothers is formed, irrespective of sex, by the time they reach one year of age (Koyama, 1977). In other words, until two years of age, males also follow the rank order formation process within the matrilineal dominance system; and they generally maintain this rank order, although they gradually separate from this dominance system at the age of three years.

Between troops, too, there are dominant/subordinate relationships. At Takasakiyama, three troops which formed after fissions shared the same provisioning site by feeding at different times according to the troop's dominance (Itani et al., 1963; Itani, 1975). The home ranges of the three troops overlapped with one another to include the provisioning site, and the most dominant A troop used the provisioning site until noon. The second dominant C troop used it in the afternoon, and the lowest B troop used it in the evening and early in the morning.

Kawanaka (1973) analyzed the intertroop dominant/subordinate gap between the three troops. The fourth and fifth ranking males of the A troop were even with the first and second ranking males of the C troop, and the first and second males of the B troop were even respectively with the 20th male of the A troop and the 10th male of the C troop. Differing from intro-troop social interactions

between individuals, intertroop encounters often involve antagonistic interactions, in which dominant/subordinate relationships are difficult to discern between individuals of different troops. Nevertheless, he showed that the even-ranked males who were dominant over most males of other troops maintained their overwhelming dominance and seldom had encounters with subordinate males of different troops (Kawanaka, 1973).

Such extratroop, even interindividual relationships, are also observed between troop males and solitary males (Itani, 1954). Until about 1955, many solitary males approached the Takasakiyama troop. Among them, Miminashi and Ushi respectively were even with the first and second-ranking troop males, Taku and Kuma were even with around the tenth ranking male, and Mimikire was even with around the 20th-ranking male. In 1962, a solitary male named Yama approached the A troop and repeatedly fought with its peripheral males. Some of them later came to follow Yama, and they formed a new troop, C, with lower ranking females of the A troop (Kano, 1964).

In the society of Japanese monkeys, the inter-BSU, inter-lineage, and inter-individual dominance systems are based on the inequality principle with which coexistence of individuals within the neighboring BSUs, lineages, and a BSU is maintained through the individuals' mutual recognition of the membership and identity of each. Although there may be some variation from species to species, these may be regarded as the main features of the M_2 type of society.

4. LIMIT OF COEXISTENCE BASED ON THE INEQUALITY PRINCIPLE

Kin relationships with the P type of BSU of chimpanzees differ greatly from those of the M_2 type BSU, e.g., of Japanese monkeys. From the observations

so far at the Mahale Mountains, it is known that since young females leave their natal troop, the mother-daughter bond lasts only 9-10 years (Nishida & Kawanaka, 1972; Kawanaka & Nishida, 1974; Nishida, 1979, 1983). Therefore, there is no kin-related group consisting of mothers and daughters.³ About mother-daughter relationships, Nishida (1979: 105) stated: "If we show the degree of association of a daughter with her mother by a familiarity index so as to categorize developmental stages of female chimpanzees, we can roughly define individuals between 0 and 4 years of age as in the stage of 100% dependence (infant), from 4 to 8 years of age as 85% dependent (juvenile), from 8 to 10 years of age as 50% dependent (adolescent) and from 10 to 12 years of age as 20% dependent (subadult)." Although Nishida (1983) pointed out that females which immigrated from the same BSU often associate within their new BSU, he stated that there is little possibility of kin selection even if sisters immigrated to the same BSU because their age differences are too great to have significant familiar relationships owing to the long birth interval. Thus, female-female relationships are rather "cool". This is well reflected in their grooming relationships. In the K group at Mahale, while there were recorded 218 sessions of male-male grooming and 180 sessions of male-female grooming, there were only 49 sessions of female-female grooming (Nishida, 1979). Similar figures were also reported from Gombe (Goodall, 1965). In the chimpanzee society, the matrilineal lineage does not work as the frame for the dominance system.

Although Goodall (1965) and Reynolds & Reynolds (1965) wrote that males are dominant over females without exception, Nishida (1970, 1979) stated that some old females are dominant over low-ranking males owing to their personalities, individual histories, and kin relationships. The rank of a female fluctuates. The female's rank goes up by becoming estrous and mating with high-ranking males. When a dominant female babysits an infant of a subordinate female, their

dominant/subordinate relationship is reversed. A mother with a newborn becomes timid and lower-ranking. Nishida (1979) reported, however, an example of a past-prime female who was dominant over any other female for seven years, and stated that old females are generally dominant over young females and there is a linear rank order among the adult females within a BSU.

Among males, the rank order is easier to recognize than among females. Since it is not so rigid as that found in a M₂ type of BSU, judgement of dominance by means of throwing food is impossible. Although the one expressing submissive behavior in an antagonistic interaction is judged to be the subordinate, the grimaces of the dominant caused by the explosive display of the subordinate often leads to misjudgement. The example of a male who acquired a higher rank by throwing and hitting a kerosine can (Goodall, 1971) represents one aspect of the chimpanzee male's rank. Nevertheless, there can be assumed a stable linear rank order among them. In the K group at Mahale, the rank order among four males was stable from 1966 to 1969, and after the alpha male disappeared in 1969,⁴ the order among the remaining three males was stable until 1975. However, the young adult male who was the fifth ranking in 1966 often reversed its rank with the higher-ranking males. At Gombe, Bygott (1979) grouped the males into the alpha male, three high-ranking males, six middle-ranking males, and five low-ranking males, and he stated that as they develop from youth to prime age, they become more dominant, and then become lower-ranking as they grow older. Many researchers admit that their fierce displays are related to the rise of their ranks. Nishida (1979) said that this display behavior is prominent among high-ranking males and young adult males.

Although there is no report on the dominance rank in the pygmy chimpanzee, Kuroda (1980) inferred from the high tension among males that there is a definite rank order among them. By confirming the rank order of the first to eighth males of the 15 males in the E group composed of 59 pygmy chimpanzees at

Wamba, he also pointed out the rank gap between pygmy chimpanzees is far less than that found in Japanese monkeys (Kuroda, 1982). Among females, it was possible to distinguish between high, middle, and low-ranking individuals; but further individual rank could not be determined because of their peculiar social interactions which are described later. Nevertheless, as in common chimpanzees, old females are dominant over young ones and males seem to be dominant over females (Kuroda, 1980).

The pygmy chimpanzee society is the same as that of the common chimpanzee in that young females move from one BSU to another (Kano, 1982; Kuroda, 1982; Kitamura, 1983), but it differs in the intra-BSU structure. Kuroda (1982) stated that the mother-son bond persists until the son reaches the age of 11-16 years. There is no sexual interaction between mothers and sons.⁵ The mother-son bond within a BSU is so stable that the son is often observed to depend on her on occasions of inter-male interactions. In this society, the rank of the mother could greatly influence that of her son; this seems to be the crux of the subgroup formation mentioned by Kuroda (1982). Another difference between the two species of Pan is seen in the interindividual relationships in the BSU. The relative affinity index based on grooming data is highest between males and females in pygmy chimpanzees, and setting this to be 100, the index is 81 between females and 42 between males (Kuroda, 1980). On the other hand, in common chimpanzees, the index is highest between males, and setting this to be 100, the index is 17 between males and females and only 5 between females (Nishida, 1977). This contrasting difference corresponds to the strong male bond in the common chimpanzee society and the "routinely daily frequent sexual interactions" (Kuroda, 1982) in the pygmy chimpanzee society. At any rate, both societies have features which cannot be understood simply by the interindividual dominant/subordinate relationships based on the inequality principle.

Between neighboring chimpanzee BSUs, there are clear dominant/subordinate relationships (Nishida & Kawanaka, 1972; Kawanaka & Nishida, 1974). The K and M groups at Mahale overlap their home ranges, and M is dominant over K, which avoids being close to M. On occasions, there have been observed antagonistic intergroup encounters which I will discuss later. The case reported from Gombe that males of the Kasakela community attacked and killed males of the Kahama community (Goodall et al., 1979) could be an example in which the intergroup balance was lost. Kano (1982) reported that neighboring pygmy chimpanzee groups greatly overlap their home ranges up to 40-60%. The overlapping area often abounds in food sources, and each group uses this area by temporarily segregating from the others. Although groups encounter only infrequently as expected, there appears to be intergroup dominance (Kano, 1982).

It is evident from the foregoing that coexistence based on the inequality principle in the genus Pan differs greatly from that seen of the M_2 type of society. The very rigid structure as in the Japanese monkey society is not found. They cannot rely on the structure for group integration. Rather it may be better described by saying that they need a multiplex social organization for coexistence.

5. BUDDING COEXISTENCE BASED ON THE EQUALITY PRINCIPLE

I have stated that the equality principle originates in kinship. It originates in that animals recognize their kin among those they live with, and that they exchange interactions different from those with non-kin. While the relationships between non-kin are ruled by dominance, the relationships between kin are biased to fill up or obscure interindividual dominance gaps through sharing the same identity of kinship. The relationships between kin of being depended on and

dependent, such as seen between the mother and offspring, are thought to be the original forms of the bonds based on the equality principle. They are relationships in which the two individuals are ideally identical rather than equal. Even after becoming two individuals by parturition, the mother and offspring are psychologically and socially unseparated for a certain period of time. The importance of this period for the offspring's development is evident from the cases of orphaned chimpanzees under the age of 4.5 years, who are mostly reported to become inactive, playless, and eventually die (Goodall, 1983), and the cases of orphaned Japanese monkeys (Hasegawa & Hiraiwa, 1980).

These relationships are extended to between non-kin. They are seen in all nonaggressive interactions not based on the dominant/subordinate relationships. While the dominant/subordinate relationships realize the coexistence through inhibition of the subordinate, these relationships assure the coexistence by facilitating the interactions of both individuals concerned. While the former are mostly asymmetrical relationships, the latter are symmetrical. The greeting vocal sounds referred to in the Introduction are symmetrical since both individuals exchange greetings face to face. Most social play is performed as if the playmates were equal. Except for one-directional grooming based on dominant/subordinate relationships, the grooming is mutually exchanged while not exposing the dominant/subordinate inequality. In some monkeys, such as Macaca fuscata and M. sylvana, relationships similar to those between mothers and offspring are found between some adult males and particular juveniles (Itani, 1959; Deag & Crook, 1971). These are outside the social relationships governed by the dominance, and are based on the equality principle or indicating the trends toward egalitarianism.

I took more than 10 pages to discuss play behavior in The Monkeys of Takasakiyama (Itani, 1954), in which I described play as separated from the world of usual social interactions. This could be rephrased as a world in which unusual

rank distinctions do not apply. This separation from the world ruled by dominance means interactions based on the equality principle. It is unknown why social development requires a period which seems contrary to the behavioral development in accordance with the dominance system and why this period is limited to the early stages of the growth from one to three years of age. In species that have prolonged duration for development of young, such as ages, the period spent in play is longer and the social interactions are more complex.

Play is importance without the participants behaving as if they were equal. Social play requires not only this but also some kind of mood. Even if one solicits another to play, play does not occur if the latter does not share the mood to play. Hayaki (1983), in a discussion of play, pointed out that some self-inhibition works not to force the partner to play, that the dominant restrains its dominance toward the subordinate, and that when one stops moving, the other also stops its move and the play enters a pause. In rough and tumble play (Mori, 1974), which appears as an aggressive interaction at first sight, a fictitious world unfolds in which the subordinate chases and holds down the dominant.

Formerly, I thought play interactions eventually form the rank order among juveniles (Itani, 1954). Mori (1974: 316) criticized my interpretation and stated, "The most important relationship seen in play is that which provides the equal ground for the participants", which seems correct. After my early studies at Takasakiyama, it was shown that the rank order among infants is formed in 12 weeks after births as if their mothers' rank order were copied (Norikoshi, 1974). In other words, when play becomes most prominent in the developmental stage, the rank order is already firmly established, and play occurs as if such a rank order were nonexistent.

However, play partners are more easily formed if the rank gap is less, so as to put them on equal terms. The infants less than one year of age choose their

play partners from the cohort group or those one year older. Juveniles of 1.5-2 years also choose their partners from among their cohorts, those three or more years different in age are seldom chosen as play partners (Mori, 1974). Koyama (1977) reported that 45% of play occurred between the same-aged and 38% between those with one year of age difference, and that 42% occurred between males, 35% between females, and 23% between males and females. Between kin-related individuals, the incidence of play was 31.5% - much greater than expected - within the fourth degree of consanguinity (Koyama, 1977). These results suggest that smaller rank gap and closer kin relationships are more suited for the realization of interindividual equality, which is prerequisite for play. However, it should be noted that play sometimes occurs between an adult male and an infant (Itani, 1954). This kind of interaction is more frequent among chimpanzees (Nishida, 1981), although this may be better labelled as "babysitting".

Social grooming is also one of the social interactions based on the equality principle. The one-directional grooming by a mother of her infant is like an extension of self-grooming. Koyama (1977) showed that 50% of grooming occurs between individuals of first degree consanguinity and 15% between those of second degree consanguinity while only 32% occurs between non-kin, which indicates that grooming originates from maternal behavior. However, 27% of grooming between mothers and infants is directed from infants to their mothers, which indicates that grooming gradually becomes mutual as infants grow up. Eventually, this "service behavior" to clean the body surface of another is extended to facilitate non-kin relationships and becomes an important medium of social interactions based on the equality principle. Japanese monkeys cannot give others something valuable to them, but they can treat others with grooming.

Finally I would like to mention peculiar interactions exchanged between non-kin. In the Takasakiyama troop, I noticed a peculiar behavior that during the

birth season some high-ranking males take care of particular 1-year-old juveniles, and I called this behavior "paternal care" (Itani, 1959). These peculiar relationships are established between high-ranking males and some 1-year-old juveniles whom their mothers have to leave for parturition. Of the juveniles so cared for, 28 were males and 34 were females; there was little difference by sex. The caretaker's positive attitudes are prominent. The guardian becomes mild and shows high tolerance to his particular juvenile with maternal-behavior-like grooming, caring, covefeeding, etc. Some males attempt to enter the central part of the troop by holding a juvenile in its arms. Similar behavior was observed for the Barbary ape and called "agonistic buffering" (Deag & Crook, 1971).

Later, Kitamura (1977) noticed at Takasakiyama that particular females stay close to some high-ranking males, and that there are some "effects of proximity" between the individuals who have such relationships. Takahata (1982a, b) called this a "peculiar proximate relationship (PPR)," and studied this in detail in the troop at Arashiyama. According to him, more than half the females were in PPR with at least one adult male. High-ranking males are in PPR with females of several lineages. The first-ranking male was in PPR with 18 females of six different lineages, and the second-ranking male with 14 females of five lineages. Between individuals in PPR, intimate interactions as if between kin were observed; they mutually approach and groom each other. He showed that some male-female pairs that developed during the mating season became PPRs in the following nonmating season, and thereafter they seldom interacted sexually with each other (Takahata, 1982a, b).

PPR is notable as a relationship which assures the equality-principle-oriented interactions between non-kin in the society ruled by the dominance system. However, as with the other equality-oriented behaviors, this is far from the ideal social order which can be shared equally by all members of the society. The

equality principle in the society of Japanese monkeys does not apply to the whole¹⁹ of their group.

6. TOWARD AN EGALITARIAN SOCIETY

I have already pointed out that the dominance system is not almighty in the societies of the genus Pan. Its breakdown can be seen in every aspect of their social interactions. However, what the P type of society differs most from the M₂ type of society in the sharing of food is in response to begging. Although Japanese monkeys also beg for food by stretching their hands with palms up toward humans (Kawai, 1965b, 1969), this behavior is never directed to other monkeys, probably because they know well that they never do nor can share food, or because their dominance system prohibits begging and sharing. By contrast, in the societies of the genus Pan, i.e., common and pygmy chimpanzees, valued things are transferred by begging and sharing. This also may be regarded as originating in mother-offspring interactions, although it also occurs between non-kin and adults.

Kortlandt (1962) first reported food sharing among wild chimpanzees. Later, many cases have been reported from the habituated common chimpanzees at Gombe and Mahale (Goodall, 1968; Nishida, 1970; McGrew, 1975; Silk, 1978). Among pygmy chimpanzees, even more frequent food sharing is reported (Kano, 1980; Kuroda, 1980). Here I will review the outline of this interaction. Kano (1980: 250) stated: "Food sharing was considered to have occurred when one individual obviously possessing a food item, by holding it in his hand, foot or mouth, transferred a part or whole to another individual without any overt antagonism. ...Food was distributed over all age-sex classes, except from infants." The donor-recipient relationships are summarized by Kano (1980), who analyzed 261 cases of

food sharing. Recipients are often subordinate. Although the gestures of begging are mostly expressions of submissiveness, such as grinning and grimacing, food possessors may, though rarely, even show positive food sharing by breaking off a portion of the food and letting the recipients take it. Nevertheless, Kano (1980: 250) noted, "Food was usually shared with reluctance to a craving recipient, although the donor exhibited no hostile rejection in most cases."

Kuroda (1980: 189) summarized the responses of donors as: "(1) letting the food fall from the mouth, (2) letting the beggar take as much as it wants, or (3) handing some portion to the beggar". However, possessors do not always share the food. They may ignore the begging, turn away from the beggars, firmly rehold the food, slap the beggars' outstretched hands, or run away from the spot; they express their refusal. Note, though, that these are neither hostile rejections nor aggressive interactions. Even dominant possessors sometimes express submissive grinning to subordinate beggars' persistent request (Kuroda, in press). Food items that can be the objects of begging are favorite foods of pygmy chimpanzees, and possessors would certainly hesitate to give them away; psychological ambivalence would cause the dominant possessors to show a submissive expression. The subordinate recipients move away from others and eat the distributed food. By contrast, dominant males seem to hesitate to do so, and remain there to be begged for females and immatures (Kuroda, in press).

Food sharing poses some important problems. First, their favorite food items move between individuals. This never occurs in Japanese monkeys. Direct consumption of food from hand to mouth is delayed through transfers between individuals, and the food is consumed also by some individuals who have not originally obtained it. Although it is an exaggeration to say that this is the origin of economic flow of goods, it is true that without this, the economic system in the human society would not work. Moreover, the objects flow from those who have to

those who do not have; this flow is opposite to that of exploitation found in an inequalitarian society. The objects which move become the media to assure the budding equality in their society. In an egalitarian society of hunter-gathers, they seem to visualize their principles of egalitarianism in the distribution of objects (Woodburn, 1981; Ichikawa, 1981). Similarly the pygmy chimpanzee society seems to have stepped toward this egalitarian society and away from one based on the inequality principle.

Secondly, begging individuals are psychologically free from the inhibitions that maintain the coexistence of subordinate and dominant individuals in the Japanese monkey society. Therefore, begging is a social interaction irrelevant to the inequality principle. Furthermore, food sharing indicates their recognition that one's favorite food is another's favorite food too, which is a mentality related to sympathy and objectification. Only on the basis of sympathy, food sharing becomes possible. As opposed to the inequality principle, this bud of mentality is oriented toward some social system based on the equality principle.

One of the features which facilitates such social interactions in the societies of Pan is their wide repertory of food. The food repertory of pygmy chimpanzees includes fruit, such as Annonidium mannii and Treculia africana, which are especially favored and large enough to be shared by several individuals (Kano, 1980), and that of common chimpanzees include meat of various mammals (Goodall, 1963; Teleki, 1973; Nishida et al., 1979; Nishida, 1981; Kawanaka, 1982). I agree with Nishida's (1981) proposition that large fruit for pygmy chimpanzees and meat for common chimpanzees facilitate food sharing among them.

Besides food sharing, there are many social interactions based on the equality principle in the societies of Pan. Employing varieties of facial expressions, vocal sounds, gestures, they have greeting, appeasement, and assurance behaviors, which not only make up for the breakdown of social interactions due to the non-

rigid support of their dominance system but also make their societies multiplex. While asymmetrical interactions are prominent in Japanese monkeys, mutual and symmetrical interactions are prominent in the societies of Pan. Of these symmetrical interactions I would especially like to mention the unique "genito-genital contacts" of pygmy chimpanzees.

Kano (1980) and Kuroda (1980) first described this behavior, and Kitamura (in press) attempted an analysis of this. Kano (1980: 253) explained this behavior as follows: "Female A approaches female B, stands or sits nearly, and stares into B's face. If B shows no response, A may demand attention by touching B's knee or foot with her foot. B may then respond by a slight gesture, such as turning to meet A's gaze. Then either of them may invite the other, by falling on her back, or hanging from a branch. They embrace face to face, and begin to rub each other's genitals together (probably clitoris) rhythmically and rapidly. Genitals rubbing lasts from just a few seconds to 20 seconds. On rare occasions, it may last over one minute....Estrous females with genital swellings were the majority of those involved, but anestrus females were not excluded....This suggests that this behavior does not occur exclusively in a sexual context, but has some other social significance."

This behavior usually occurs in a tense situation such as within five minutes of meeting each other in the provisioning site. Both Kano (1980) and Kuroda (1980) concluded that this behavior is related to relieving tension or anxiety and that this is appeasing or friendly behavior rather than homosexual behavior. The difference between common chimpanzees and pygmy chimpanzees in the female familiarity index (Nishida, 1977; Kuroda, 1980), mentioned earlier, is probably due to the absence in the former of this peculiar behavior.

Genito-genital contacts also occur between male pygmy chimpanzees. Male-male mounting, which is well known in Japanese monkeys, is also present in

pygmy chimpanzees. In addition, pygmy chimpanzees have a more symmetrical contact called "rump-rump contact" in which two males touch their anal regions while standing on all fours. (Kuroda, 1980). Kitamura (in press) classified various genito-genital contacts into four categories: "(1) male-mature female, (2) mature male-infant, (3) female-female, and (4) mature male-mature male," and concluded that the latter two categories, being "interactions occurring within a set," are not sexual interactions.

Pygmy chimpanzees have more frequent true copulations than common chimpanzees, and the sexual skin swelling of cycling pygmy chimpanzees lasts 14-20 days (Kano, in press), more than twice as long as the common chimpanzee's 6.5 days of swelling period (Goodall, 1968). Since the birth interval of pygmy chimpanzees is 5-6 years (Kuroda, 1982; Kano, in press), most of frequent copulations do not result in conception. Kuroda's (1982) description that "pygmy chimpanzees routinely daily have sexual behavior" may be better rephrased by "they perform even sexual behavior in the context of interactions based on the equality principle."

Few agonistic interactions resulting in injuries, which are frequent in common chimpanzees, have been observed in pygmy chimpanzees. With the exception of young females who emigrated, there has been only one missing individual from the BSU studies over 6 years (Kuroda, personal communication). The socionomic sex ratio is close to one (Kuroda, 1979, 1982; Kano, 1982) and there seems to be little sexual difference in the death rate. These factors seem to be related with their overdeveloped varieties of appeasement behaviors, and probably with the rise of the equality principle to rule social interactions.

Thus far I have reviewed the systems supporting the coexistence of individuals within a BSU and traced the transition from the system based on the inequality principle to the system based on the equality principle by comparing M_2

and P types of primate societies. If we assume the hunter-gatherers' egalitarian society (Lee, 1979; Tanaka, 1980; Woodburn, 1981; Ichikawa, 1982) as an ideal model based on the equality principle, we see that the P type of primate societies already have some of its important features. This trend probably cannot be reversed unless the multi/multi-female group composition is resolved. In the hominid evolution, this orientation toward equality between BSU members for coexistence probably permeated into every aspect of daily life, and various sharings have been intensified. The solution to the old anthropological problem of the origin of human family could be sought along these lines.

7. NEGATED COEXISTENCE

The topic of this symposium session is male aggression, which I have hardly discussed so far. Most aggressive interactions can be understood in the context of failure to conform to the social systems for coexistence of individuals - whether inequality-based or equality-based. However, interactions between groups which do not come under the rules of such systems cannot be understood in the same context. Aggressive interactions within a group are mainly trifles due to social mismanagement. On the other hand, intergroup interactions may result in serious episodes even involving some individuals' deaths (Itani, 1982). Since there are many varieties, it is not easy to draw out general characteristics of these intergroup interactions. Nevertheless, they indicate that the social mechanism for maintaining intergroup relationships is far less developed than that for intragroup relationships. Since I have summarized the types of intergroup aggressive interactions elsewhere (Itani, 1982), here I will only briefly point out the main features.

Many students have recognized the presence of firm, coherent ties between

male chimpanzees within a BSU (Itani & Suzuki, 1967; Nishida, 1979). Many episodes recorded from Gombe and Mahale seem to indicate that this is related to the fierce intergroup relationships (Goodall et al., 1979; Nishida, 1979; Itani, 1977b; Itani et al., 1983). Such a male bond has not been noticed in pygmy chimpanzees. The male bond of chimpanzees even has characteristics of those of a combat troop; this strongly suggests fierce antagonism between males of different BSUs. Males born in a BSU become involved in the male bond as they grow up. Goodall (1973) ascribed sibling relationships as an important factor in the formation of male coalition. Nishida (1979: 93) emphasized the ambivalent psychology between subordinate and dominant individuals and discussed the mechanism of maintaining and reinforcing the male bond: "complex sequences of threat-submission-reassurance interaction may strengthen the male bond."

At Gombe, the Kasakela community exterminated the Kahama community. At Mahale there has been a dominant/subordinate relationship between the M and K groups, and they seem to have been in balance; however, now the M group appears to have almost exterminated the K group. How can we interpret these two cases in which the neighboring BSUs could not coexist? Each BSU exists provided that females emigrate from neighboring BSUs; then, what does the extermination of the females' natal BSUs imply? If there is no psychological or social constraint on extermination of other BSUs, the only way left for each BSU to survive is to have a strong male bond within it. The systems maintaining coexistence of individuals within a BSU are not supported by aggressiveness; but it is the male bond that counterpoises the aggression directed to the males of enemy BSUs. This means that inter-BSU balancing by means of uncompromising antagonism is the only way of assuring neighboring BSUs to coexist. Therefore, those which cease to resist will be eventually wiped out.

At Gombe, since the Kahama community was exterminated, the Kalande

community further south has begun to interact with the Kasakela community (Itani et al., 1983). At Mahale, the M group has begun to intrude into the former core area of the K group, and there the M group once happened to encounter the B group of about 100 chimpanzees in the north (Nishida, 1981; Itani et al., 1983). We have to wait for further studies to see what now happens between these strong BSUs. One of the most important and not yet solved problems in the evolutionary pathway of primate societies is how the antagonism and conflict between males of different BSUs could have been resolved.

Most cases of infanticide which have been recently reported from many primate species are inter-BSU episodes. The infanticides seen in Hanuman langurs (Sugiyama, 1965) is performed by the new male after the male replacement; this also should be distinguished from ordinary intra-BSU interactions. Although there has been much individual-centered selectionist argument on this phenomenon, I will not join in that argument here. Most cases of infanticide have occurred in societies with BSUs of one-male/multi-female compositions. It cannot be denied that the infanticide can be possibly interpreted in the context of elimination of offspring resulting from father-daughter incest inevitable due to the one-male/multi-female structure by a non-father male. Another notable feature is that the infanticide occurs as a symbolic event characterizing the birth of a new BSU (Fossey, 1979) or rejuvenation of a BSU (Sugiyama, 1965) in the initial phase or final phase of the aging cycle of the BSU. These features are shared by the two types of societies with the same one-male/multi-female BSU composition, M_1 and MP_2 , although the two types of societies have different diachronic structures.

On the other hand, the infanticide in common chimpanzees which have BSUs of multi-male/ multi-female composition does not seem to have these features. Chimpanzees differ from langurs or gorillas in that the killing sometimes results in cannibalism and that their infanticide is not exclusively an inter-BSU episode

(Goodall, 1977; Kawanaka, 1981). Kawanaka (1981: 83) attempted to analyze infanticide in detail with 12 cases including his own observations, and stated: "It seems that more male infants were killed by conspecifics than females, and this trend was more apparent in the cases where the captors were males." Two of the 12 victims could not be sexed, seven of the other ten were males and three were females. Four of the six victims reported from Gombe were killed by a particular female named Passion (Goodall, 1977). Another victim was not consumed, which differed from the other cases. Excluding these five cases, the remaining five sexed victims were males. Of course we have to wait for future studies. Nevertheless, at present it is undeniable that male infants may be selectively killed. Although implications of this are not clear, its effect on the BSU composition is not negligible.

I have briefly reviewed the three types of intraspecific killings in primate societies especially from a sociological viewpoint. All these indicate negation of coexistence. It also should be noted that in effect primates themselves modify their own societies, and that this is more prominent in higher primate taxa and more highly developed species (Itani, 1982). Continuing sociological studies of wild primates, we have been observing their societies which are "artificially modified" by themselves. Implications of the negated coexistence and its seemingly paradoxical links with humanistic characteristics are important topics in future studies of human evolution.

FOOTNOTES

1. Sugiyama & Koman (1979) and Sugiyama (1981) reported cases in which male chimpanzees might have migrated between groups in the Budongo Forest of Uganda and Bossou of Guinea; these could be the sole exception reports if any.
2. Starin (1981) reported that females are dominant over males in multi-male/multi-female groups of Colobus badius and that all females and most males migrate between groups. Also for Papio hamadryas, which has a multi-layered social structure, complex moves of individuals have been reported (Sigg et al., 1982). However, the process and meaning of their deviation from the M_2 type of structure have not been clarified.
3. In contrast with this, at Gombe three generations of a maternal lineage comprising Flo and her daughter are known to live in the same community (=BSU). Recently from Mahale also, J. Hasegawa and M. Hasegawa reported two lineages consisting of three generations from the grandmother to the grandchild within the large M group containing 106 chimpanzees. Thus, large BSUs could contain such lineages. This issue needs further research (Itani et al., 1983).
4. Nishida (1979) ascribed the disappearance to his death by old age.
5. Out of about 2000 observed cases of copulation, there were only a few cases of mother-son copulation (Kano, personal communication).

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Table 1

Social structure of non-human primates

Group composition	Incest avoidance mechanism		Social structure	
	Mother-son	Father-daughter		
One-male/one-female	Mate out (m)	Mate out (f)	Nonmatrilineal- Nonpatrilineal	(Mp) ₁)
One-male/multi-female	Mate out (m)	Mate out (m)	Matrilineal	(M ₁)
	Mate out (m)	Mate out (f)	Nonmatrilineal- Nonpatrilineal	(MP ₂)
Multi-male/ multi-female	Mate out (m) and PA	Mate out(m)	Matrilineal	(M ₂)
	PA	Mate out (f)	Patrilineal	(P)

(m): By male (f): By female PA: Psychological avoidance

Table 2

Rank order of 44 males of the Takasakiyama troop in 1955,
and changes up until January 1972

Individual	Rank in 1955	Leave or death up to Dec. 1962	Rank* in Dec. 1962	Leave or still in troop, Jan 1972.
Jupiter	1	D-1961		
Tatan	2		A-1	L-1964, 5
Pan	3	L-1956, 4		
Monk	4	L-1956, 7		
Bacchus	5		A-2	L-1967, 5
Boor	6		A-3	L-1967, 8
Achilles	7		A-5	L-1964, 11
Dandy	8		A-6	L-1969, 12
Yubi	9		A-7	L-1964, 8
Uzen	10	L-1960, 9		
Kuro	11		A-4	L-1963, 2
Sharaku	12	D-1959, 4		
Utumaro	13	L-1960, 3		
Aome	14		A-10	L-1970, 12
Saruta	15		A-8	L-1970, 11
Cyrano	16		A-9	L-1967, 6
Soba	17	L-1956		
Gon	18	L-1962		
Gen	19	L-1955		
Sibu	20	L-1962		
Pac	21	L-1955		
Don	22	L-1956		
Shiro	23	L-1959	B-2	L-1969, 9
Hoshi	24	L-1959	B-1	L-1965, 8
Curi	25	L-1959	B-3	L-1966, 7
Akutare	26	L-1958, 7		
Tamo	27		A-22	L ?
Zin	28	L-1959	B	L ?
Pong	29	L-?1961		
Nula	30		A-31	A-7
Tion	31	L-1955		
Kin	32	L-1955		
Oro	33		A-11	L-1963, 2
Goemon	34		A-23	L-1963, 1
Ali	35	L-1956		
Gata	36		A-12	L-1963, 1
Jose	37		A	L-1968, 2
Los	38	L ?		
Peke	39		A-29	L-1970, 12
Toku	40		A-13	A-1
Ika	41		A-26	L-1968, 2
Tanc	42		A-34	L-1971
Idi	43	L ?		
Bob	44	L-1955		

*Main group split to A and B troops in 1959. The alphabet indicates the troop number and indicates the rank in each troop.