

STUDY REPORTS

3. Title: Studies of gibbons at Ko Klet Kaeo

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Introduction of gibbons to Ko Klet Kaeo had a number of purposes. The first of these was to evaluate whether adult gibbons could survive in such a habitat, and if so, what special problems might be encountered in their maintenance there. A second intent of the study was to determine whether the behavior of gibbons at Ko Klet Kaeo is normal enough to permit an expectation that they might breed there and provide an opportunity for experimental ecological research. A third aspect of the study was a survey of patterns and shifts of home ranges and social grouping seen in the gibbons.

During the six months following April 18, 1967, a total of 19 adolescent or adult gibbons (Hylobates lar) were released at various locations on the island. In all but one case, members of heterosexual pairs which had been caged together in the laboratory were released together. In addition, three individuals who had been removed from the island (see below) were introduced again.

Observations were made during 44 visits to the island comprising approximately 1100 man-hours. Two general methods of data collection were used. The first was a notation of locations on the island in which individual gibbons were encountered. To do this, the main trails were covered until an individual or a group was seen. An attempt was made to find each animal at least once during a 3-day visit, and this goal was usually achieved. If an animal was difficult to find on the main trails, subsidiary trails in the area in which he had last been seen were searched.

When an animal was encountered, his location with respect to some landmark (usually one of the numbered feeder stations) was noted. Also, if other gibbons were present, they were identified and the coincidence of the encounters was noted.

The other method of data collection was field notes of significant events. Space limits a detailed report of these notes but they will be summarized in the following sections.

Survival and Distribution: Of the 19 animals introduced, three, all females, died. Each of these deaths followed a period of wandering, and in two of the three cases they occurred within two weeks of the animal's release. A fourth female disappeared the day after she was released and is presumed dead. Five males were removed from the island, either because they were ill (4) or because they interfered with the formation of social groups (1). Of these five, three were subsequently returned to the island, so that at this writing, there are 13 gibbons in the study.

Figure 1 illustrates the distribution of animals in 857 encounters during the report period. This aspect of the figure was plotted by dividing the total area of the island into a matrix of squares, 50 meters on a side, and placing a single dot for each encounter into the matrix at the appropriate location. The figure shows that only 39 percent of the 50 m. areas were used to a significant degree (i.e., 5 or more encounters). Encounters were concentrated within 50 m. of the ridge which runs most of the length of the island. There are also concentrations at the two beaches on the south side where the boat which serves the island ordinarily is anchored. These concentrations of encounters are undoubtedly due partly to an observational bias resulting from the fact that the ridge trail and beach areas were places most often visited by the observers. However, it is also the case that although the other areas of the island

were frequently searched, the animals were rarely seen there. Thus, it appears that the animals tended to be in the places most frequently used by people. This, in turn, was due to the fact that the presence of people attracted the animals.

In addition, however, the animals did seem to avoid areas where the terrain was steep. It probably is difficult for a gibbon to brachiate or climb through trees located on a slope. That food did not particularly affect distribution is indicated by the fact that although there were feeder stations located in the middle of the southern half of the island, there were few encounters there. By the same token, the north side, which had many tree hole water reservoirs, was not used frequently.

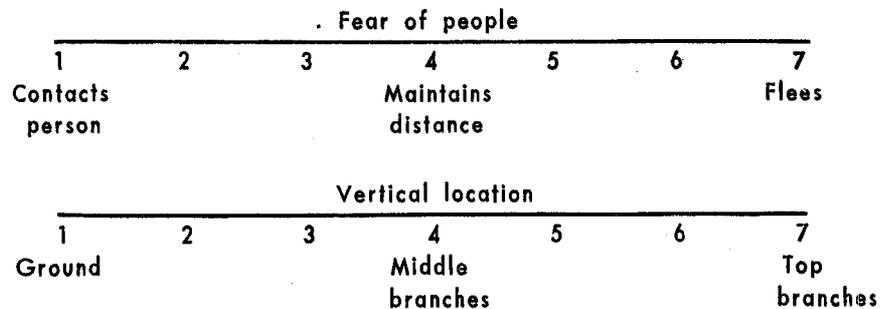
Thus, the two main factors determining the use of areas on the island seem to be the presence of people and the steepness of the terrain. Other factors, which will be discussed further on, were important in the division of the areas among the animals.

The feral-tame dimension There were marked individual differences in behavior of the gibbons which were relevant to their maintenance and to their formation of groups and home ranges. One of the dimensions along which these differences varied was the degree to which the animals were feral or tame. The feral-tame dimension was defined mainly in terms of two attributes of behavior. The first of these was the extent to which animals approached or fled from a person. Three of the gibbons always fled rapidly until they were out of sight when they saw the observer. Other animals approached the observer when he stood still or stayed in their place when he moved toward them. Animals who were most tame sought or permitted body contact with the observer.

Although relatively tame animals were unafraid of people, the lack of fear was expressed either as a tendency to attack or to maintain body contact. That is, tame animals might either attack a person (see below) or follow and try to sit on him. Which of these patterns occurred depended on the location of the encounter, the animal, the person involved, whether other gibbons were present and other aspects of the circumstances of the encounter.

The second attribute defining the feral-tame dimension was the distance from the ground at which the animals rested and travelled. The three animals who always fled when they saw people generally stayed in the higher branches of trees and were never seen on the ground. Other animals used trees for resting and travelling but were often seen sitting or walking on the ground. Many used the trails for speedy bipedal locomotion.

Each of 14 animals was judged for its general position with respect to these two attributes. A seven-point scale was used for each attribute, and two judges placed each animal on the scale:



Inter-rater-rank-order correlations for fear and vertical location were .90 and .83, and the correlation of the two attributes was .80. These three correlations were statistically significant and their size indicates that the feral-tame dimension has a satisfactory degree of validity. The relationship between this dimension and the tendency to be part of a gibbon group is described further on.

A second characteristic in which individual gibbons varied was their tendency to attack people and other animals. In the gibbon, aggression is manifested as a series of responses which are apparently

graded in intensity. Attacks ordinarily occur near the center of an animal's home range and usually when two or more individuals (either people or animals) are present. An animal who does not ordinarily attack people may do so if other animals are intruding on its home range. In addition, there is a clear tendency for gibbons to attack people who are strange to them.

Attacks may or may not be slow to develop. A gibbon may attack another as soon as he is seen, or the two animals may sit in trees near each other for long periods on repeated occasions before any aggression is manifest. Most aggressive encounters culminate in one animal chasing another out of its vicinity. However, if the animal being chased grabs at the attacker, a more intense fight may develop. Simultaneous attacks by two gibbons on a third or on a person are rare but have occurred.

Threat of an attack is ordinarily manifested by vigorous locomotion in the trees near the individual being threatened. These vigorous movements make large branches shake, and the animal often stops with his legs and arms spread out between trees so that a large surface of his body is exposed to the individual being threatened. At the same time, the animal often snaps his jaws together rapidly and repeatedly, and the overall effect is to maximize the intensity of the stimuli coming from the animal.

The next most intense phase of an attack includes some kind of manual contact. During a bout of activity, the gibbon suddenly approaches and lightly touches or grabs at the individual attacked. Biting, the ultimate possible method of attack may then follow. Many bites are merely nips which do not break the skin. However, a slashing bite with the inside edge of the canine teeth may also occur. Instances have been noted in the literature of slashing bites by animals in captivity producing severe lacerations. However, in the forest such severe attacks have not been seen and on the island no bites have produced anything more severe than small superficial gashes, despite the fact that there have been numerous attacks on both people and gibbons.

Although attacks have thus far not proved dangerous to the personnel on the island, measures have been taken to prevent them. As much as is feasible, strangers have been kept off the island since the gibbons tend particularly to attack strange animals or people who come into their home ranges. When an animal does threaten an attack, the person can prevent the animal from approaching by looking directly at him, since a gibbon ordinarily attacks only when the person is not facing him. Thus, one can prevent an injury by backing down a trail until he is out of the gibbon's range. However, this is awkward to do and is not necessary. Soon after the first gibbons had been placed on the island, an attempt was made to pacify a group which was attacking people by hand-feeding them bananas and candy. This attempt was effective only temporarily and was abandoned in favor of the use of sling-shots to drive the gibbons off. Animals who attack or follow people are routinely shot with pebbles, and this has had the effect, not only of preventing attacks, but it also decreases the tendency of some animals to wander over the island. It may also have made some animals less tame and promoted the formation of gibbon pairs.

Gibbon groups Table 1 illustrates a number of features of the social behavior of animals on the island. The table lists the number of times each gibbon was encountered during the period December 1, 1967-March 15, 1968. It also includes the proportion of these encounters in which the animal was found alone and with each of the other animals.

With the exception of animals #9 and #13 who were not on the island for the full period, the number of encounters is an inverse measure of timidity. Those animals with relatively low counts were difficult to find.

The underlined figure in the table represents the proportion of encounters in which an animal was found alone. This figure is apparently a rough inverse measure of the extent to which the animal tends to join gibbon groups. Its correlation with the feral-tame dimension discussed above is—.53. This suggests that feral animals are more likely to join gibbon groups than are tame ones (who are more closely attached to people). The remainder of the table describes the extent to which each animal was found with the others on the island. The groups formed by the gibbons on the island can be determined from this table. Animals 1 and 2; 5, 6 and 14; 7, 8, 11 and 19; and 17 and 18, respectively made up four relatively stable groups. Number 6 who ordinarily was a very timid animal and difficult to locate,

joined the 5-14 group for a period of two weeks and during that time was quite bold and as easy to find as any other animal on the island. However, she soon left their area and thereafter once more became difficult to find.

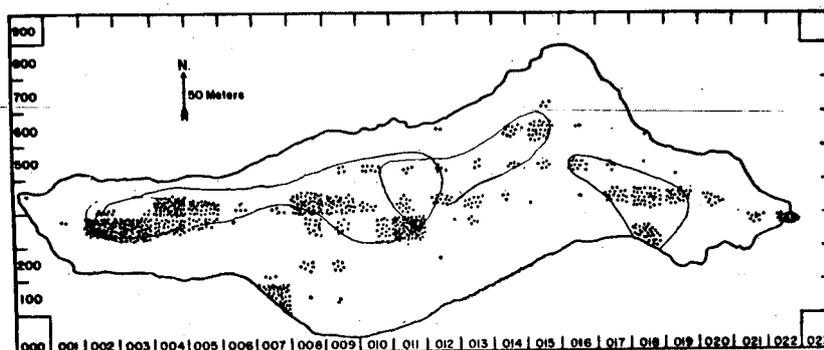
It may be seen that each of the groups contained animals with adjacent numbers. That is, 1-2; 5-6; 7-8; and 17-18 were parts of the different groups. These pairs of animals had been housed together in the laboratory prior to being placed on the island, and it is likely therefore that preliminary caging of pairs increases the likelihood that pairs will remain intact when placed on the island. This does not always occur, however, as is indicated by the 5-14 group.

Although a heterosexual pair is the typical gibbon grouping, it is possible for a group to contain more than two adult individuals. Number 7 and 11, two males, are equally attached to 8 and there is also apparently a strong bond between them. Number 19's position is equivocal since he is fairly frequently found alone and since he spends some time with 7-8-11 and some with 5-14.

It should also be pointed out that it seems, from the table, that there is a relationship between the members of the 5-14 and the 7-8-11-19 groups. This relationship is hostile. The two groups actually travel separately but 7-8-11-19 often intrude on the home range of 5-14, and at that time the animals are found together, usually in some hostile stance.

Home ranges It is known from studies of gibbons in natural forests that they live in defined areas from which they prevent other gibbons entrance. Territories have also been established at Ko Klet Kao, and Fig. 1 illustrates the ranges of the four groups. The largest of these is 8 acres which is roughly 20% of the size of the smallest gibbon group ranges in natural forests. The small size of these ranges is probably attributable mainly to the thickness of the forest at Ko Klet Kao.

Any animal can easily cover the breadth of his group's range in a matter of minutes. However, the animals tend to spend long periods in a small region and do not leave their range in groups.



1—Plot of encounters and ranges fo four groups of gibbons.

The ranges given in Fig. 1 represent those areas in which males and females were found together between December 1, 1967 and March 15, 1968. If one plots ranges for individuals, however, the size of the plot is often quite a bit larger since individual animals may wander more extensively alone than when they are with other animals. Thus, the plot in Fig. 1 probably reflects the "core" of the territory, while an individual plot which may be double the size of the core represents the area "in use".

Shifts of ranges occur either as extensions of an original area or as total changes of location. When animals are first placed on the island, their ranges are quite small. As they become accustomed to the situation, they begin to move about, and their range thereby increases. If an individual from an adjacent area joins a group or if one animal in a group extends his range, the whole group may then travel throughout the larger area encompassed by the original and new ranges. Gibbons of one group may go

toward the area of another group which is emitting morning calls. In so doing, they extend their range. In each of these three instances, the group has expanded into a previously unfamiliar area, and thereafter continues to use the larger territory. Therefore, it is likely that novelty of the area bordering the territory plays some role in limiting its size.

Groups do not usually make sudden total shifts of location. However, individual animals who are under attack by a group may one day appear in a completely different area from that in which they have been living. Individuals also extend or change their range by following people.

Sexual activity Copulation has been observed in three females and three males. It is most frequent at the time of initial pairing, and may play an important role in group formation. Except in one pair, copulation is infrequent and no pregnancies are apparent yet.

Table 1. Grouping patterns as revealed by percent encounters in which an animal was found by himself or with other animals (401 encounters)*

Subject #	# Encounters	Seen With																	
		1	2	5	6	7	8	9	11	13	14	15	17	18	19				
1	33	48	55			3	3		3										
2	33	<u>55</u>	<u>36</u>							6									15
5	39		21	15	5	15			13		67								15
6	13		<u>46</u>	<u>38</u>							46								50
7	44	2	5		<u>11</u>	77		75	5						2				56
8	41	2	15		<u>83</u>	<u>2</u>		83	2		5				2				
9	7							<u>100</u>											
11	43	2	12		77	79		9	5		5				2				53
13	8				25	13		<u>25</u>	25		50					13			9
14	33		79	18		6		6			<u>18</u>								
15	24				4	4				17					<u>79</u>	4			
17	15															<u>13</u>	<u>87</u>		
18	19		4	12	45	47			5		6				5	<u>68</u>	<u>21</u>		
19	49							47											<u>35</u>

* Odd-numbered animals are males, even numbered are females. Underlined figures represent percentage of encounters in which an animal was found by himself. Row sums usually total more than 100 since more than two animals were often seen in one encounter.