

moving forward, wipes its feet in the urine as it flows over the branch, that has been reported by Andrew (1964) for Galago crassicaudatus has also been observed for G. senegalensis.

3.1.2 Chest-Rubbing

Although Yasuda et al. (1961) have not found any marked concentrations of cutaneous glands suitable for scent production in Galago senegalensis, a display which appears to be similar to that recorded by Moynihan (1966) for Callicebus moloch has been observed in the bushbabies studied. Callicebus moloch performs Chest-Rubbing movements which spread an odoriferous secretion from a large gland in the centre of the chest. In addition Cebus apella has been observed to perform Chest-Rubbing movements although it is not known to have a conspicuous gland on the chest or adjacent area (Moynihan 1967.) Visual inspection of an adult male bushbaby reveals a prominent, comparatively bare, patch of skin in the centre of the chest. (See Plate XI fig. a) It is this area that is applied to the substratum during a Chest-Rubbing display.

In Chest-Rubbing along a flat surface such as a wooden ledge the animal lowers the chest to the ledge and pushes forward, first with one leg and then with the other, thus sliding its chest over the ledge-surface. The head is held straight forward, the nose skimming the surface of the ledge. (Plate III fig. a) Periodically the animal may stop and bite the edge of the ledge.

When Chest-Rubbing on a branch or a round surface such as the human caretaker's arm, the animal clasps its arms tightly round the branch hugging it closely to its chest. This is followed by pushing forward with the hind legs while the head is turned from side to side as the chest, side of the chin and inner surfaces of the arms are rubbed along the branch. The pushing forward causes the lower lip to be dragged back exposing the teeth and causing a trail of saliva to be deposited. As the animal releases its grip on the branch it gives it several sharp nips before repeating the rubbing movements.

This behaviour pattern is generally performed by the adult male but is occasionally seen in adult females and maturing juvenile males. The display is most conspicuous when animals are placed in a new environment when the males may Chest-Rub over a large surface area of the new cage in lengthy bouts which may last over an hour at a stretch. Vertical surfaces may also be marked, the male crouching bipedally against the vertical surface and pushing upwards until standing at full stretch against the surface.

Chest-Rubbing may also be performed by the male after smelling and licking the ano-genital area of the female. If the female does not jump away immediately the male may Chest-Rub vigorously along the back and flanks of the female while adopting a mount-like position. The Chest-Rubbing may be accompanied in this case by urine-marking. The female terminates the encounter by jumping away.

A variation of Chest-Rubbing may be seen when the animal, while rubbing along a horizontal surface comes up against a vertical surface. The top of the head is rubbed on the spot which may also be marked by Chest-Rubbing. (See Plate III fig. b)

Another form of rubbing, mouth (or chin) rubbing (See Plate III fig. c) in which the sides of the mouth may be rubbed on various surfaces (particularly on thin branches, edges of ledges or the hand of the caretaker) is also seen in the bushbaby. It is not clear whether this is a method of depositing odoriferous substances or whether the animal is merely scratching the corners of its mouth. However the lips are well supplied with sebaceous glands (Yasuda et al. 1961) and another primate, the lemuroid, Avahi laniger is known to possess a pair of glands situated at the angle of the lower mandible (Petter 1962.) Lemur (Andrew 1964) also rubs the top of the head and sides of cheeks on the spot being marked. Cercopithecus aethiops has also been observed to rub the angle of the lower jaw on rocks and branches and it is thought that they possess glands in that area. (Gartlan and Brain 1968.)

3.2 SOCIAL SNIFFING

3.2.1 Naso-Nasal Sniffing (See Plate IV fig. b)

Naso-nasal sniffing is a common "greeting" pattern especially between two previously unacquainted animals. In general one animal will approach the

other slowly with head stretched forward, ears slightly back, body held low. The individual being smelled may remain quiet at first with head slightly raised and then may respond by sniffing in return or jumping away. Naso-nasal sniffing may be followed by naso-nasal contact and brief allogrooming of the head and especially the chin area. Sniffing may be simultaneous, or the two animals may alternate. Naso-nasal sniffing may also be followed by high intensity agonistic behaviour especially if one animal flees from the initial approach of the other.

3.2.2 Ano-Genital Sniffing (See Plate IV fig. a)

Ano-genital sniffing has been observed to occur between all animals in a cage. Infants begin reciprocal ano-genital sniffing when approximately a month old and this is gradually extended to include first the mother and then any other animals in their cage. Ano-genital sniffing is, however, seen mainly in adult males which frequently approach the females from the rear to sniff at their ano-genital regions. If the female jumps away a brief chase may follow with the male attempting to approach close enough to genital smell. A female may ano-genital sniff at a male which has sniffed at her ano-genital regions. Simultaneous ano-genital sniffing by a male and female has been observed but is rare.

3.3 DISCUSSION

Andrew (1964) has stated that animals which

scent mark do so in threat, greeting, courtship and in response to unfamiliar objects. In the case of the bushbaby it also appears to have the function of territorial marking. All the scent marking observed in this study falls into these categories if the marking at food sites is included in the territorial category.

Sauer and Sauer (1963) mention that grasping is facilitated by the wetting of the inner surface of hands and feet. It is possible that the living area of the laboratory animals is too small to show the 'trail' marking observed by these authors, as although the animals do have 'favourite' places where urine-marking occurs frequently, distinct 'trail' marking has not been observed. Bearder (1969) states that olfaction appears to play little importance in establishing 'trails' in the wild.

The incidence of urine-marking in mammals is generally higher in the male (Wickler 1967) and it is possible that in the bushbaby this may be correlated with a sexual function. The male urine-marks when contacting the female, particularly when anogenital sniffing. Doyle et al. (1967) report that 65% of male urine-marking during any one 50 min. observation period occurs when the male approaches or comes into contact with the female. When the female comes into oestrus the male shows a marked heightened interest in the female and the increased persistence in examining her genitals results in a

30% increase in his urine-marking. The fur of the female may become noticeably damp from urine deposited while the male grooms and Chest-Rubs along her back. This marking of the female in courtship appears to be fairly widespread in the prosimians and Andrew (1964) reports it in Tupaia glis (citing Sprankel 1961) and in several Lemuroids, noticeably in Lemur spp.

As previously mentioned, females who become dominant over the normally dominant males in their cage show a heightened urine-marking (and Chest-Rubbing) level, while the level in the male decreases. This suggests that the level of urine-marking is also at least partly influenced by dominance relationships. The more dominant the animal, the higher the urine-marking level becomes. This has however not been investigated in any detail in this study. As Jolly (1966a) has pointed out, it is very difficult to assign a simple motivation or a single social function to scent marking.

Some observations of Galago senegalensis tend to support the suggestion by Marler (1965) and Jay (1965a) that there may be individual recognition of animals by olfaction. In cases where two females in a cage have infants of approximately the same age recognition appears to be olfactory. On hearing an infant distress click both females will jump across to it but, after smelling it, only its own mother will retrieve it back to the nest.

If a stranger is placed in a cage containing a well established group of bushbabies the incidence of ano-genital sniffing increases sharply. Amongst the Lemuroidea, Propithecus verreauxi, Lemur catta and Lemur macaco are all known to smell the ano-genital region of troop members. (Jolly 1966a)

Recognition of sex may well be mainly olfactory since there is no readily apparent sexual dimorphism, although the females do tend to be slightly smaller than males. The female in oestrus does not exhibit the conspicuous sexual swelling seen in many of the primates, particularly amongst the Catarrhines (Wickler 1967.) She does, however, have a white vaginal discharge (Sauer and Sauer 1963 and Lowther 1940) and it appears likely that olfactory signals are important in courtship and mating.

Chest-Rubbing in bushbabies appears to be mainly a territorial marking display. The question as to whether an odoriferous substance is actually deposited, or not, has not been clarified in this study. However, the fact that three other Lorisoids, Nycticebus coucang (Montagna et al. 1961), Loris tardigradus (Montagna and Ellis 1960) and Perodicticus potto (Montagna and Ellis 1959) all possess apocrine glands suitable for use in depositing odoriferous substances in scent marking lends some support to the supposition that the central chest patch of the bushbaby is a similar gland. Galago crassicaudatus adult males also have a conspicuous bare

patch of skin on the chest but it is not known whether they also perform Chest-Rubbing movements. Cebus apella (Moynihan 1966) and Lemur macaco (Petter 1965) are both known to exhibit marking gestures although odoriferous glands are absent. In the case of Lemur macaco, however, which often rubs its forearms and hands on branches in a similar fashion to Lemur catta which possesses glands in these areas, this display only occurs during moments of sexual excitement or anger. (Petter op. cit.). The methods of scent deposition are so highly ritualized in most species which scent mark that it is possible that a visual signal is also involved. Lemur macaco might then have retained the deposition display as a purely visual signal. This is less likely to be the case with the nocturnal bushbaby, which Chest-Rubs even when alone.

Male bushbabies have been observed to rub their anal region along branches but this occurs very rarely and does not involve the lateral movements reported for the species which anal rub. It is thought that it is improbable that a scent marking signal is involved. No animal has been observed to show any interest in branches where this anal rubbing has occurred.

The general behaviour of the Lesser Bushbaby indicates that olfactory signals and cues are important. The initial approach to a new food source or novel object is that of head stretched forward, while the animal constantly sniffs. (See Plate II

fig. b) Many questions concerning the physical properties of the odoriferous substances, such as those concerning how rapidly their strength and quality deteriorate and at what distance they can be perceived by the animals, remain to be answered.

4.

TACTILE COMMUNICATION

Tactile communication in Galago senegalensis can be divided broadly into friendly and agonistic contact.

4.1

FRIENDLY CONTACT

Unlike the higher Primates, where the hand is generally used to initiate physical contact (Marler 1965), the naso-nasal or naso-anal contact of the lower mammals is still the most common form of greeting behaviour in the bushbaby. This may pass into brief allogrooming.

4.1.1

Allogrooming

As in the higher primates allogrooming is the most obvious of the tactile signals in communication. Allogrooming in the bushbaby occurs frequently, in a wide variety of circumstances and is not restricted to sexual situations. All possible combinations of groomer and groomee have been seen to occur, although allogrooming between adult males has only been recorded for two subordinate males who were denied access to females by the dominant male. Neither of these has been observed to groom the dominant male or to be groomed by him. (These animals, three males and two females were kept for some time in a cage, 90 sq.ft in size.) In contrast to infant monkeys in which allogrooming does not occur (Sparks 1967), allogrooming between infant twins has been observed on the second day after birth during the brief periods of absence of the mother from the nest box.

The method used by Galago senegalensis in allogrooming is common to most of the Lemuroidea and Lorisioidea where "licking alternates with short bouts of scraping with the procumbent lower incisors which are drawn upward over fur or skin by upward tilting of the head." (Andrew 1964) The hand is not used in grooming except to hold the other animal. (See Plate V fig. a) In contrast to many of the higher primates, grooming is usually reciprocal with the two animals alternating or occasionally grooming each other simultaneously. As in Galago crassicaudatus (Andrew 1964) a touch under the armpit during grooming will cause the arm to be raised and extended forward while remaining bent at the elbow. A touch on the side of the chin is responded to by tilting the head on one side exposing more of the neck region to the groomer.

4.1.2 Play-Wrestling

Contactual play behaviour is frequently closely associated with allogrooming especially amongst young animals. Play wrestling often precedes an allogrooming bout or is followed by one. As is common in primates, the behavioural elements of fighting are seen during play. The participants kick, push and pull at one another, each apparently attempting to grasp the other round both ankles with their feet and obtain a handhold on the opponent's ears or hands. (See Plate V fig. b) Sexual elements seen in the play of monkeys (Loizos 1967), are absent in the play

of bushbabies and most of the contact is ventro-ventral. These wrestling bouts may occur while the participants are hanging upside down from a branch suspended by their feet, in which case only the hands are used in boxing and wrestling. If suspended by the hands, only the feet are used in kicking. Manley (pers. comm. to Loizos 1967) has stated that play between fully adult animals is a feature of lorosoid primates. However, in the animals observed in this study, play between adults was rare unless juveniles were present in the cage. Play wrestling has been observed amongst infants from the sixth day.

4.1.3 Mounting

Tactile signals are involved in mounting. Besides true male-female copulation, two types of mounting involving the adult females have been observed in Galago senegalensis moholi. The first type involves female-infant mounting and the second female-female mounting.

Female-infant mounting has been observed in all females when their infants have reached 20 days of age. The mother approaches her infant from the rear in a manner similar to that employed when she retrieves them back to the nest box. However, instead of picking them up by a dorso-lateral fold of skin releasing the carrying posture in the infant, she pulls the infant under her with her hands and assumes a mounting position despite the sometimes considerable difference in size. Movements similar

to the male pelvic thrusting are given. The infant may struggle at first while the mother is pulling it under her, then remains quiet before struggling again and being released. Females differ greatly in the extent to which this behaviour is shown. Female Pv showed it frequently from the infant's 30th to 76th day while with all the other females it is far less common, e.g. with female Vi it was seen from 20th to 30th day.

Female-female mounting has been observed at times when male-female mounting or attempted mounting normally takes place, i.e. when the female is in oestrus or in the week preceding parturition; e.g. female Pa has been observed to repeatedly mount a younger but adult female W when the latter was in oestrus. This female, Pa, frequently disturbed the male Q during his mating with W. The mounting position assumed by Pa was similar to that of the male and bouts of vigorous pelvic thrusting were observed. A week later when Pa came into oestrus W was observed to mount her although less persistently and pelvic thrusting was not seen. Female Vi has been observed to chase and mount females C and Pr when they were in oestrus even though both these females were normally dominant over her and she generally avoided approaching them.

4.1.4 Infant Transport

An important mother-infant tactile signal is concerned with infant transport. In common with the

Cheirogaleinae and some Lemurinae such as Hapalemur griseus, Lemur variegatus and Lepilemur mustelinus (Petter 1965) the bushbaby carries the infant in the mouth. (Doyle et al. 1969) A lateral grip on an abdominal skin fold instantly releases the carrying posture in the young infant. The infant draws up its limbs closely to its ventral surface. For the first few days the female grasps the infant posteriorly near the hind limbs so that the head dangles low (See Plate VI fig. a) but the grip rapidly shifts anteriorly as the infant gains weight. The tail of the infant is at first curled in a loose spiral but when the mother's grip is shifted anteriorly the tail is thrown across the back or head of the female. It does not appear to possess prehensile properties. (See Plate VI figs b, c)

4.1.5 Nursing

If an infant crawls or attempts to burrow under the chin of a lactating female she assumes the humped nursing posture. On the few occasions when the mother has nursed her infants while lying stretched out on her side the infants have been seen to rhythmically knead the female while suckling in a manner similar to puppies or kittens.

4.1.6 Sleeping Huddles

Another behaviour which may have tactile communicatory value concerns sleeping huddles. The animals sleep in close contact with each other even when

there is ample space and if one is disturbed it immediately attempts to bury itself under its companions. This starts a chain reaction with each animal attempting to burrow under the others. If the human caretaker (acting presumably in this case as a predator) attempts to lift one animal out of the nest box it clings so tightly to its companions that a further one or two animals may be lifted at the same time.

4.2 AGONISTIC CONTACT

Biting, kicking and pulling out handfuls of fur occurs during fights where both contestants may drop in a writhing ball from branch to floor. Open wounds from biting occur generally on the feet, hands and face while loss of fur occurs mainly on the head, neck and shoulders. The fur plucking may be so violent that the skin may be torn in places.

4.2.1 Fighting

In general two types of fighting occur. In the first type one animal is the aggressor and the other exhibits a high tendency to flee resulting in a lot of chasing interspersed with short contactual fighting during which calls are uttered by the submissive animal. This type of fighting is seen between adult females and between adults and maturing juveniles. It may also be seen between females and males where a female becomes very aggressive and by fighting in this manner takes over the dominant role in her cage from the normally dominant male.

The second type of fighting occurs between two adult males, each dominant in his own cage. (On rare occasions it also occurs between equally dominant females.) If placed together no chasing occurs as they both spring at each other, and grapple and fall to the ground. Each attempts to gain a foothold on the ankles of the other. Locked together by these ankle holds, each one attempts to throw himself on top of his opponent while striking and biting at the other's face, and particularly at the eyes. This type of fighting is completely silent. It is not known how these fights are ended as in the laboratory the animals are separated as quickly as possible. The grips that each one has on the other are so strong that considerable effort has to be exerted to separate the combatants who appear to be completely unaware of the person attempting to separate them. (See Plate IX)

4.3 DISCUSSION

It is agreed amongst most workers in this field that grooming in primates does not merely serve to keep the skin and fur of the animals in good condition but is also a social bonding ritual that helps to reduce tension and aggressive tendencies and thus intraspecific damage. Galago senegalensis moholi, with the aid of its toilet claw, can reach almost every part of its body in autogrooming. Allogrooming is however frequently seen and observations such as the following, support the theory that it helps to reduce intraspecific damage and facilitates other reactions involving contact.

- (1) Generally a strange bushbaby introduced into the cage of an established group will be vigorously and aggressively chased and attacked and may receive serious, even fatal, wounds. However, the chances of successfully introducing a newcomer are greatly increased if the animal is placed in the new cage during the light period when the resident animals are asleep. If the stranger is successful in entering the nest box without disturbing the occupants, he will immediately groom them all briefly before settling down to sleep with them. Any animal that wakes up is groomed and quickly falls asleep again.
- (2) A juvenile male was successfully introduced to a mature female and her twin infants when the three were allogrooming. The newcomer approached hesitantly and groomed the tail and thighs of the female briefly before springing away. The female engrossed in grooming her infants took no notice and he approached once again, repeating the sequence several times each time grooming closer to the head of the female. Eventually he pushed his head between the female and the infant that she was grooming and she began to groom him. This led to a lengthy bout of reciprocal grooming that eventually included all four animals.

If the period of high tolerance of the close proximity of other fellows that is seen during the

light-inactive period in the laboratory, and which has been noted in the field by Sauer and Sauer (1963), was extended to include the dark-active period, it is possible that this might give rise to a method of evolving larger social groups from these essentially small family groups.

Regarding reduction of hostile tension by tactile stimuli, the night monkey, which does not allogroom or play-wrestle with any appreciable frequency, is regarded by Moynihan (1967) as being very aggressive, at least under captive conditions. Data on Galago senegalensis does not support the suggestion by Moynihan (op. cit.) that primates which sleep in close proximity, in holes, in trees or nests, do not allogroom frequently.

Altmann (1962) has observed four types of mounting in the Rhesus, namely:-

- (1) True copulation.
- (2) Greeting or indication of non-aggression.
- (3) Indication of relative dominance status.
- (4) Integral part of play interaction.

It is interesting to note that Dominance Mounting amongst females on lower-ranking group-members has been observed in Papio spp., Macaca spp., Presbytis entellus and Pan troglodytes (Wickler 1967) and is known for females in oestrus in a number of domestic animals. The female-female mounting seen in Galago senegalensis moholi, however, does not occur in clearly dominance situations, nor is it the

female in oestrus that is the active mounter. It is felt that both Vi and Pr, which are wild born animals, have been observed to mount other females it is fairly unlikely that this is purely a result of some factor found only in the laboratory. Female-infant mounting appears to arise from frustrated retrieving when the female is unsuccessful in picking up the infant when it struggles. Field observations may clarify the causes and function of these two types of mounting.

It is difficult to evaluate the importance of tactile cues as the observer is handicapped in that they can only be assessed from a purely visual aspect. A considerable length of time during the active period is spent grooming and resting together. This may however be influenced by the fact that, as food is provided under laboratory conditions, time that would normally most probably be occupied in the wild by foraging becomes available for other activities. If tactile signals are an aid in reducing intraspecific damage one could possibly expect an increase in such activities under laboratory conditions where the living area is comparatively small and the animals thus forced to live continually in close proximity to each other.

5.

V I S U A L C O M M U N I C A T I O N

Lowther (1939, 1940), Hill (1953) and Bolwig (1959, 1964), all state that because the facial musculature in Prosimians is limited in the labial and nasal areas and has not attained the level of fine control found increasingly in the primates, the prosimians have a "blank expression."

The mouth, together with the eyes and various movements of the mobile external ears has, however, given rise to several facial expressions. These, combined with various body postures and movements, constitute the visual signals given by Galago senegalensis moholi.

5.1

F A C I A L E X P R E S S I O N S

The most obvious facial expressions involve the opening of the mouth.

5.1.1

D e f e n s i v e T h r e a t

Galago opens the mouth in defensive threat. The mouth becomes rounded. The lips are not tensed but, due to the tensing of the m-orbicularis oris (Andrew 1964), the teeth remain covered and only the tongue can be seen in the mouth. The eyes, which are wide open and the ears fully extended at first, become narrowed as the threatening stimulus approaches nearer, and the cymba begin to fold and flatten against the head. (See Plate VII fig. a)

5.1.2 Defensive Attack

As the intensity of the threat increases and particularly when the animal is cornered the defensive threat may develop into the defensive attack. The contraction of the m-naso-labialis and the m-auriculo-labialis pull the lips back so that the teeth are exposed (Bolwig 1964). (See Plate VII fig. b) The animal rears up and assumes a bipedal stance, with the arms held up on either side of head and with fists clenched. (Plate VIII fig. b shows this at a low intensity.) This is followed by a downwards pounce accompanied by biting.

Two other facial expressions centre around an opened mouth are both shown in high intensity offensive agonistic situations:-

5.1.3 Fighting Face

The "fighting face" is exhibited during silent fighting between two adult males. Here the mouth is open and both upper and lower teeth are exposed. The ears are folded and drawn backwards so tightly that the skin over the forehead and top of the skull is also drawn back and the head assumes a flattened appearance. The skin above the nose between the eyes is deeply wrinkled horizontally and the eyes are nearly closed. This face shows the most extreme form of the protective responses given when Galago catches living prey or advances the face towards a superior fellow. (See Plate IX fig. a)

5.1.4 Offensive Attack

Bolwig (1964) reports that a rounding of the eyes becomes visible in fury in lemurs. This is also seen in Galago senegalensis moholi when the tendency for offensive attack is very high. The ears are upright, eyes wide open and staring and the mouth is open with upper canines and full lower teeth visible. (See Plate X) (The upper teeth are not fully exposed as the middle of the upper lip is bound by the frenulum to the underlying premaxillary area. Lowther 1940).

The grin in which the corners of the mouth are drawn back and the teeth exposed is also shown by infants while intense Clicks and Crackles are given when contact with the mother is lost. (See Plate XI fig. b)

5.2 BODY POSTURES AND MOVEMENTS

5.2.1 Swaying

A visual signal involving the whole of the body is that of swaying. A swaying animal slowly moves its body, which is held low, close to the substratum, from side to side without moving either hands or feet. The eyes are kept wide open and appear to be staring at the threatening source. The mouth can vary from being slightly, to wide open with lips covering the teeth. The ears are upright but may begin to fold back at high intensities when swaying becomes very slow. This pattern is given in response

to the presence of the observer by highly nervous animals such as the female Vi. Swaying is generally silent when the threatening stimulus is at a distance but is accompanied by Defensive Grunts if the threatening stimulus advances. The swaying animal flees rapidly to the rest box if the threatening stimulus retreats.

Moynihan (1964) suggests that swaying in Aotus trivirgatus has been derived from unritualised "peering", and this also appears to be the case in Galago. "Peering" movements may be given by an animal prior to making a jump especially in unfamiliar surroundings. In swaying there is a strong tendency to flee and it may have been ritualised from an intention movement for jumping.

5.2.2 Cringing Posture

A visual signal also involving the whole body is a submissive 'cringing' posture. When threatened by the approach of an aggressive superior or the observer's hand, the animal may assume a crouched posture, body very tense and held low against the substratum, head retracted between hunched shoulders, eyes narrowed, ears back and flattened against the head. (See Plate VIII fig c which shows a low intensity 'cringing' posture.)

5.2.3 Tail Positions

Sauer and Sauer (1963) state with regard to tail positions that, "subdominance is indicated by

lowering the tail, and the lower the tail is kept, the more hesitantly and weakly its bearer encounters the hostile situation." In the animals used in the study this was not observed very markedly. The tail is lifted prior to jumping and in hostile situations the subordinate, with its high tendency to flee, generally holds its tail high. (Hall-Craggs 1967 reports that the tip of the tail is the last part of the animal to leave the substrate when jumping occurs. However this holds true for the particular case of a standing-take off, vertical jump. In the situation where an inferior is being vigorously chased the tail position is more varied and tends to be held high between jumps especially when the animal is on the ground and progression is by means of "kangaroo-hops".) A good indication of subdominance under laboratory conditions is the tendency for the submissive animal to 'go to ground.' A dominant aggressor frequently 'dive bombs' the subordinate on the floor from the ledges and branches.

5.2.4 Tail Lashing

Tail lashing has been observed on three occasions, in one situation only. The action occurred during mating when another animal approached the pair. The mounted male lashed his tail violently from side to side. Andrew (1964) states that, "in mammalian displays, wagging or lashing movements of the tail tend to occur in a wide range of situations in which there is a strong tendency to move." This is sup-

ported in Galago, as on two occasions the male dismounted in order to chase the intruder.

5.2.5 Presenting

Presenting either by the female to the male in sexual situations, or by inferiors towards superiors is a visual signal prominent in many of the higher primates (Wickler 1967.) In Galago senegalensis moholi, however, although the female will on occasions stop in front of the male and lift her tail high allowing naso-ano-genital inspection (See Plate VIII fig d) she does not do this more frequently when she is in oestrus, and the male does not necessarily respond in a sexual manner. Probably an olfactory signal, rather than a visual one is involved. Apparent presenting by an inferior to a superior has been observed but does not occur frequently.

5.2.6 Nose Licking

Bushbabies frequently lick their noses with their tongues in situations involving uncertainty and low level alarm. Nose licking often accompanies Sneezes and is also seen when a lot of sniffing is involved, for example, in smelling a new object. Here the main function could be to moisten the rhinarium and facilitate smelling and a visual signal may not be involved at all.

5.3 DISCUSSION

A large repertoire of facial expressions as well as various body postures constitutes an exten-

sive visual communication system in the higher primates, particularly in the case of the ground dwelling species. This is not the case in the bushbaby. The physical handicap of a simple facial musculature together with a nocturnal and arboreal habit may account for the paucity of facial expressions which may be used as communicatory signals. For these reasons visual signals are probably not as important in communication as other signals, particularly auditory signals.

Andrew (1963a, 1963c, 1964) considers that many components of facial expressions in the primate group have originated from "protective responses." Closing of the eyes and flattening of the ears help in protecting these vulnerable parts of the head, while withdrawal of the corners of the mouth facilitates removal of noxious substances from the mouth. The facial expressions seen in the Lesser Bushbaby clearly show their origin from protective responses and indeed this may still be their main function. During intraspecific conflicts in the laboratory the contestants direct most of their attention towards their opponents' eyes and eye wounds are common. The facial expressions of the bushbaby do not occur when the animals are more than one or two feet apart, and do not occur frequently amongst members of an established group, under laboratory conditions.

In the laboratory visual signals do not appear to play an important role in communication and in

fact one of the animals, male B2 who has bilateral cataracts and possesses an estimated vision of less than 5%, shows little indication of his handicap. Long accurate jumps in unfamiliar surroundings indicate, however, that the bushbaby's eyesight is keen and under field conditions visual signals may be more important than is apparent under laboratory conditions. (Facial expressions occur mainly during agonistic encounters in the laboratory.) Sauer and Sauer (1963) report that the groups of up to 6-8 animals seen sleeping together in the field, break up during foraging activities at night. Animals may well meet strangers during this time when visual signals may be advantageous.

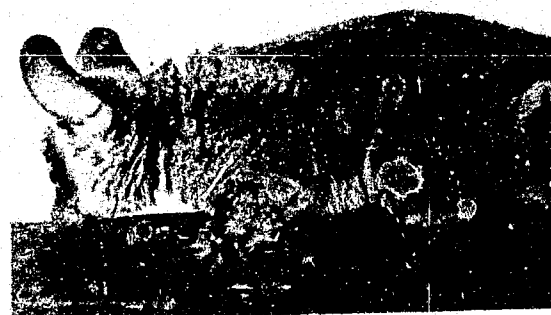
Swaying accompanied by the open mouth, teeth covered, facial expression (defensive threat) has been seen in the Laboratory only in response to threatening behaviour from humans. An open mouth with teeth covered is a primitive mammalian threat which persists throughout the higher primates (Andrew 1964, Jolly 1966a). If the bushbaby shows it in response to the presence of a potential mammalian predator while on a nest or in a hole in a tree, it is possible that it may function as an interspecific visual signal. This suggestion is purely speculative as the behaviour of bushbabies towards predators has not been studied. The female Vi, however, who frequently gives a swaying, open-mouth teeth-covered response to the approach of the human observer will,

if imitated by the observer, become markedly less tense, stop swaying and slowly close her mouth. If the observer stops swaying and closes her mouth without retreating, Vi will immediately resume the tense swaying posture and defensive threat facial expression. This has also been seen in other animals although less markedly. It appears therefore that the bushbaby itself is capable of responding to interspecific visual signals.

The Lesser Bushbaby does not show displacement reactions during hostile encounters and only yawns while resting. This has also been reported by Moynihan for the night monkey (1964.) Moynihan (1967) notes that Pilo-erection displays are seen in species of New World monkeys which are moderately to very small in size and which have little variety of facial expression. He suggests that these displays are functionally equivalent to some facial expressions of larger species. This is not the case in the Lesser Bushbaby where conspicuous Pilo-erection displays do not occur.



a. Urine Marking.



b. Smelling.

PLATE II. URINE MARKING.



a. Chest - rubbing.



b. Head - rubbing.



c. Chin - rubbing.

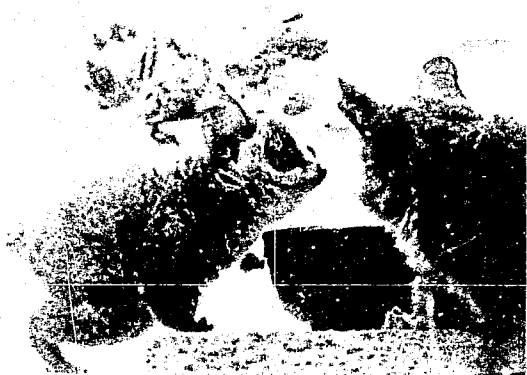


d. Chin - rubbing.

PLATE III. CHEST - RUBBING.



a. Ano-genital sniffing.



b. Naso-nasal sniffing.

PLATE IV. SNIFFING.

Author Andersson A B

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