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Maternal Behaviour in Great Apes: Some Problems in Captivity

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Key Words: Great apes • Maternal behaviour • Captivity

This study explores the relationship between maternal behaviour and breeding success or failure in great apes. The data were gathered from a questionnaire survey returned by 48 zoos and from available studbook data, which gives a total sample size of 687 individuals (bonobos, chimpanzees, gorillas and orang-utans) born between 1990 and 2000 in 86 institutions. The physiological and external factors influencing maternal behaviour are discussed. Particular attention is given to the importance of learning and experience for the development of good maternal skills. We analysed each mother's rearing background and social group circumstances. The effects of maternal training were also analysed. The results show that for a female to demonstrate good maternal skills, the most effective experience is to have been reared by her own mother and to have observed maternal behaviour in her social group. This will give her the opportunity to observe and learn how to care adequately for her own infants.

INPRIMAT: A Research Project to Boost the Molecular Biology of Primates in Europe with Applications in Biomedicine and Conservation

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Key Words: Conservation • Biomedicine • Molecular biology

INPRIMAT is a research project financed by the European Commission (Ref. QLRI-CT-2002-01325) with the participation of 7 institutions from 7 European countries devoted to primatology, molecular biology and mammalian evolution. The objective of the project is to develop the research infrastructure needed to boost the leadership and cohesion of European institutions in biomedical and conservation biology research based on the molecular biology of primates. The field is rapidly developing, but the interpretation of large numbers of new sequences is hindered due to the lack of molecular data from non-human primates, with whom we share phenotypic characters and diseases. The objectives of the project are: (1) offering the scientific community an extensive collection of tissues, nucleic acids and cell lines from a wide representation of primates, (2) establishing and organising databases of institutions, samples, sequences and genetic markers of primates, and (3) developing and optimising advanced molecular tools for use in primates, such as microsatellite multiplexing kits, BAC libraries, FISH markers, and genotyping technologies, such as DHPLC and microarrays. As the coordinating institution of this project, the Universitat Pompeu Fabra contributes by: (1) developing an interactive website (<http://www.inprimat.upf.es/>) used not only for communication among the consortium members, but also as an interface for applications implemented by the project, such as the management of collections and databases, (2) organizing mitochondrial sequences produced in our laboratory and from GenBank to understand speciation and subspeciation processes and developing tools for the identification of species and subspecies, and (3) studying the genetic variability of the Y chromosome in primates.

Effect of Human Activities on Spatial Distribution of Gorillas (*Gorilla gorilla gorilla*) and Chimpanzees (*Pan troglodytes*) in a Logging Concession in South East Cameroon: Preliminary Results

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Key Words: *Pan troglodytes* • *Gorilla gorilla gorilla* • Spatial distribution • Human impact

In Central Africa, gorillas and chimpanzees undergo temporary disturbances of their habitat due to human activities related to selective logging. It has been suggested that these human activities tend to trigger movements among great ape social groups forcing them to emigrate temporarily from their former home ranges to safer areas. Although very close phylogenetically, the socio-

ecology of gorillas and chimpanzees differs greatly. Spatio-temporal strategies of avoidance of disturbances and socio-ecological mechanisms of demographic regulation when these species are forced to emigrate are, therefore, expected to be different as well. This study aims to achieve a better understanding of the impact on fauna of human activities related to logging and to obtain insights into sociological and/or ecological implications and modalities of dispersion of social groups of great apes. A vast zone (~175 km²) within an active logging concession in south eastern Cameroon has been surveyed and the density of great apes has been estimated along sixteen 11-km-long transects passing through differently disturbed areas and areas logged at different time in the past. Data on group size and composition have been collected, as well as information on nesting sites of the apes. Preliminary results show that great apes tend to respond quickly to human disturbances of the habitat by avoiding active logging areas. Recolonisation of formerly disturbed areas seems possible for both species and can occur less than a year after the end of logging activities. The results presented here come from the first great ape survey in this area. Others will take place, as the logging areas move, to document changes in densities before and after logging-related disturbances.

Sexual Differences in Daily Activity Patterns of Mantled Howler Monkeys (*Alouatta palliata mexicana*) in Patchy Habitat in Los Tuxtlas, Veracruz, Mexico

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Key Words: *Alouatta palliata mexicana* • Daily activity patterns • Sexual differences

Field studies on the daily activity pattern (DAP) in primates hardly ever consider sexual differences. The objective of this work was to describe and to compare DAP in males and females from two mantled howler monkey, *Alouatta palliata mexicana*, troops that were using areas with different levels of habitat disturbance. The monkeys were observed for 316 hours from June 2002 to May 2003. The subjects were 2 males and 4 females in group 1 and 5 males and 5 females in group 2. We considered five behavioural categories: resting, feeding, locomotion, travelling and social. Social behaviour was divided into affiliative, aggressive, sexual and caring behaviour. In both groups, there was a significant difference between males and females in DAP (χ^2 , 29.3 and 13.9; $p < 0.01$). Males from the most disturbed area (group 1), travelled significantly more than females (proportions comparison (PC); $z = 1.78$; $p < 0.05$). In group 2, females had longer feeding and resting periods (t student 2.7 and 2.9; $p < 0.05$), but males fed more frequently (PC; $z = 3.09$; $p < 0.001$). In both groups, females had more social interaction (PC; $z = 5.56$ and 2.43 ; $p < 0.01$) and less affiliative behaviour (PC; $z = 2.1$ and 3.61 ; $p < 0.05$). Locomotion and travelling patterns were significantly more frequent and feeding was less frequent in group 1 males than in group 2 males (PC; $z = 1.64$, 1.76 and 3.24 ; $p < 0.05$). We suggest that habitat disturbance fundamentally affects the behaviour of males, forcing them to travel more and, in this way, limiting the time available for feeding.

Conflict Management and Resolution in Preschool Children: A Working Social Ethogram

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Key Words: Social conflicts • Conflict management • Conflict resolution • Social ethogram • Preschool children

Understanding the nature of social relationships among preschool children and the way they manage and resolve spontaneously occurring conflicts have traditionally been major concerns of

developmental psychologists and (child) ethologists. More recently, some investigators have started to apply sampling and recording methods originally developed in studies of conflict management and resolution in non-human primates to the analysis of conflicts among children. What is lacking in this new approach, however, is an ethogram which is specifically tuned to the kind of dyadic and polyadic interactions that occur both in human and non-human primates when individuals are involved in a social conflict. This paper presents a working ethogram of the types of social interactions that typically occur during social conflicts both in non-human primates and among children. The social ethogram is based on a categorisation of three major sources of information (Colmenares & Rivero, 1986; Colmenares 1996): the types of behaviour patterns displayed (e.g., agonism, affiliation, play), the direction of the behaviours used by the participating individuals (e.g., direct and side-directed behaviours), and the role they adopt during the interaction (e.g., aggressor, victim, intervener, social resource, third-party). Although the direct application of the methods developed by primate ethologists may contribute to understanding of the strategies that children use to solve their conflicts, we believe that many of the benefits arising from this new methodology will not be fully realised unless we use an adequate categorisation of the interactions that take place when children are engaged in conflicts.

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Habitat Fragmentation Effects on the *Alouatta palliata* Populations in the Reserva de la Biosfera de Los Tuxtlas, Veracruz, Mexico

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Key Words: *Alouatta palliata* • Habitat fragmentation • Demography

Habitat loss and fragmentation are widely proposed as the major factors contributing to the decline of forest primate populations. Earlier evidence showed that variability in howler monkey (*Alouatta palliata*) density and other population characteristics are linked to habitat fragmentation. In the present study, our target was to investigate which ecological characteristics are related to population variability. The study was carried out in the Reserva de la Biosfera de Los Tuxtlas (Veracruz, Mexico), in the San Martín Volcano's zone. We studied 16 forest fragments, recording the following variables: size, density of the edge (perimeter/area), mean altitude, mean distance to other fragments, distance to the nearest fragment and distance to the nearest human population. We sampled the vegetation using 10 transects of 100 m × 2 m in each fragment. For all trees with a diameter at breast height greater than 15 cm, we recorded family, species and the number of trees per transect. We made a census of the howler population by counting the number of groups, group size and the number of individuals in each sex and age category (males, females, juveniles and infants). We obtained significant differences when comparing the demographic values from populations in fragmented habitat with those in continuous habitat. The demographic values from fragmented habitat correlated with the marginal habitat conditions. These findings suggest that long-term studies of single populations are critical for understanding the relation between ecological factors and demographic changes that influence population characteristics.

Association Patterns and Subgroup Formation among Mantled Howler Monkey Males (*Alouatta palliata mexicana*)

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Key Words: *Alouatta palliata mexicana* • Association patterns • Subgroup formation

The fission-fusion pattern of social organisation has been reported in some howler monkey populations, although it does not seem to be very typical of this species. In this paper, the influences of this social system over the association behaviour of males living in a community on an island in Catemaco Lake, Veracruz, Mexico are analysed, and an evaluation is made of the social mechanisms that underlie this structure. Observations were made on the 13 adult males that lived in the community, using scan sampling at 15 minutes intervals (instantaneous recording), during which the identity of all males present in the subgroup was registered. There were significant differences in the association levels between males, suggesting the existence of individual grouping preferences. Both inter-individual association and size and composition of subgroups showed seasonal differences, in that, during the dry season, there was a generalised dispersion of individuals, while in the wet season, there was a concentration of males in subgroups. Kinship relations might justify the differences between males' association tendencies, since kin related animals usually associated more. The importance of these results for the understanding of the adaptive capacity of this species (behavioural plasticity) is discussed; additionally, we refute the idea that howlers, constrained by a digestive physiology that imposes serious limitations on the amount of energy that can be invested in social activities, do not develop complex behavioural strategies.

Play Invitations and Play Partner Preferences in Baboons (*Papio hamadryas*): Sex, Age Difference, Kinship, and Harem Membership as Factors Influencing Play Partnerships

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Key Words: *Papio hamadryas* • Play invitations • Play partner preferences • Play partnerships • Predictor variables

It has been argued that individuals engage in play interactions if the benefits to be derived from play exceed the costs. Social play is a dyadic interaction, however, and the available potential playmates may differ in the quality and quantity of benefits that they expect to obtain through play. This variation in the individuals' needs and requirements (i.e., individual optima) should lead to conflicts of interest over play (e.g., about type, time, place) and to variation in the rates at which play invitations are accepted and refused. The mere observation of 'who plays with whom' (i.e., play partnerships) may mask the individuals' actual partner preferences, for example, it may reflect the effect of partner availability and/or social constraints on the expression of play partner preferences. This study presents a preliminary analysis of 417 invitations to play in a colony of hamadryas baboons (*Papio hamadryas*). We analyse the rate of success of play solicitations and its variation as a function of the composition of the play dyad in terms of such predictor variables as sex, age difference, kinship and harem membership. We found that 55% of play invitations failed ($p < 0.025$, two-tailed). The sex, age difference and relatedness of individuals influenced their options to become playmates more/less often than expected by chance. These findings suggest that factors associated with dyad compatibility may play a role in the likelihood that play invitations are successful or are refused. Further analyses are needed to determine the relation

between such compatibility-related factors, variation in play partnerships and the immediate and ultimate functions of social play.

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Social Interactions and Dominance Hierarchy in a Captive Group of Mantled Howler Monkeys (*Alouatta palliata mexicana*)

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Key Words: *Alouatta palliata mexicana* • Social interactions • Dominance hierarchy

Despite their influence on the pattern of individual behaviours, studies on social relationships in *Alouatta palliata* are scarce. This work analyses dominance hierarchy and patterns of association in a captive group of 6 howler monkeys (one adult male, one subadult male, two adult females and two juvenile females). Focal animal sampling, changing subject after 30 min, in daily 5 h sessions, resulted in 180 h of observations. Inter-individual distances were recorded at two minute intervals. Actor and recipient of affiliative and aggressive behaviours and the context of these behaviours were recorded. The analysis of agonistic dyads indicated that the group showed a highly linear hierarchy. Males were dominant over females and adults over non-adults animals. Between females, there was little linearity in the hierarchy, due to the existence of a circular triad formed by the two adult females and the oldest juvenile. The group showed a significant frequency of affiliative interactions, agonistic interactions being associated with distribution of food in the cage. As well as the association index, we recorded contact between two individuals, as this is the most selective index of proximity. The number of affiliative interactions correlated positively with dyadic association indexes. Models of intra-group feeding competition and different indicators of association were evaluated as well.

Projet Grands Singes: Community Based Conservation through Collaborative Research on the Socio-Ecology of Great Apes in a Non-Protected Area at the Periphery of the Dja Faunal Reserve

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Key Words: Great apes • Primate conservation • Socio-ecology

Little is known about the situation of great apes in Cameroon. Most information comes from the protected areas that cover 10% of the Cameroonian rainforest. Effective protected area management requires information on, and conservation activities in, the surrounding matrix. In 2002, The Centre for Research and Conservation (Royal Zoological Society of Antwerp) established an Integrated Conservation and Development Project (ICDP) (Projet Grands Singes) in the periphery of the Dja Faunal Reserve (Cameroon). Scientific research is the major tool used to achieve the conservation and development objectives. Research is mainly focussed on the socio-ecology of great apes. Topics include both fundamental and conservation-applicable research questions. Fundamental research aims at elucidating the interaction between habitat and social structure and

a better understanding of the mechanisms of the evolution of the social structures of great apes and our ancestors. The conservation-applicable research questions focus on the influence of habitat disturbance on the social structure of the African great apes. For this, we focus on areas that were/are/will be subject to human activities. The prime conservation action is better protection of great ape populations in non-protected areas. We try to achieve this goal in close collaboration with the local communities. The integration of development objectives will enhance the achievement of the conservation objectives. A socio-economical study has been set up for basic monitoring of the effects of our activities on the local population. The results will give the necessary feedback for an evaluation of the achievement of our goals. This socio-economic study is combined with a project that aims to set up a sustainable management plan of the fauna in the geographical area between the villages and the great ape study site.

Use of Trees by Mantled Howler Monkeys (*Alouatta palliata mexicana*) in a Forest Patch in Los Tuxtlas, Veracruz, Mexico

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Key Words: *Alouatta palliata mexicana* • Use of trees • Daily activity pattern

Interest in the use of trees by primates is usually centred on feeding. Our objective was to analyse the use of trees by two troops of mantled howler monkeys (*Alouatta palliata mexicana*) living together in a patch of forest. The groups were observed for 316 h from June 2002 to May 2003. We considered four behavioural categories within the monkeys' daily activity pattern (DAP): feeding, resting, locomotion and social behaviour. Travel was excluded from the analysis because it overestimated tree use. Both groups used 11 tree families, approximately 33% of the total tree families in the patch. In the smaller group (Group 1), 7 individual trees were used in 54% of behaviours. In the other group (Group 2), 12 trees were used for the same proportion of behaviours. This indicates that the monkeys use intensively 9% and 14% of the trees in the areas they live in. Both groups frequently used the genus *Ficus*, though there were significant differences between the groups in the proportion of the different behaviours undertaken in them ($z = 4.61$, $p < 0.0001$). The most frequented trees were all used principally for resting. *Ficus yoponen-sis* and *Cordia alliodora* were the most important trees for feeding in Group 2 and *Cecropia obtu-sifolia* in Group 1. There was no relation between behaviour and specific trees.

Chimpanzees and Other State-Owned¹ Primates in Spain: Past, Present and Future

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Key Words: *Pan troglodytes* • Rehabilitation • Primate sanctuaries

Spanish coastlines, due to their proximity to the African continent, see much trafficking in protected animal species. The majority of these animals are destined for customers who are, sadly, influenced by what is 'fashionable' and are prepared to pay huge sums of money for them. This trafficking greatly endangers primates in their natural habitat. The exploitation of chimpanzees in Spain began in the 1970s when a young South American, on holiday in the Canary Islands, and

who had bought a chimpanzee from a zoo in England, charged tourists considerable amounts of money to have their photographs taken with the animal (Templer, 1985). Between 1989 and 1991, more than 60 chimpanzees were counted in bars, restaurants, beaches and at fiestas on the Spanish peninsula. Most of these were dressed up and used to pose for photographs with tourists. Mr. and Mrs. Templer pioneered the rescue of these chimpanzees. At first on their own and subsequently with the help of the IPPL (International Primate Protection League) they managed to rescue over 35 chimpanzees and other primates from the traffickers and 'owners' and move them to a sanctuary in southern England. Having previously collaborated with the Templers and worked with the IPPL, in 1996 a group of people initiated the creation of a non-profit making organisation and 2000 saw the beginning of the Mona Foundation. Realising the situation regarding State-owned¹ chimpanzees in Spain and seeing that there was no adequate solution to the problem, it was decided to set up a sanctuary in Spain, specialising in the recuperation and rehabilitation of these chimpanzees and other primates. The principle objective of the Mona Foundation's Primate Rehabilitation Centre is the ability to offer rescued primates a natural social group, adequate space and dignified conditions for the rest of their lives. The creation of this Centre sees, for the first time in Spain, a sanctuary specialising in State-owned¹ primates, which is run by professionals specialising in many different aspects of primate care. Apart from the rescue and maintenance of primates, the centre includes, among its main objectives, a policy of scientific investigation and sharing of information learned. The Mona Foundation also has an educational programme whereby the public is made aware of its work, its aims and its objects.

¹ State-owned: animals previously illegally held and confiscated by the authorities.

Comparative Study of Male Vocal Repertoire of Two Howler Monkey Species, *Alouatta palliata* and *Alouatta pigra*, in the States of Tabasco and Veracruz, Mexico

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Key Words: *Alouatta pigra* • Vocal repertoire

The vocalizations of males in seven populations of *Alouatta palliata* and *Alouatta pigra* living in different geographic areas of Mexico were studied. The study populations consisted of some groups of howler monkeys living in total isolation without contact with individuals belonging to other species and a number of groups of *A. palliata* and *A. pigra* inhabiting sympatric zones. Acoustic features of the characteristic loud calls of the genus were identified in order to find similarities and differences between the species at various locations. Only vocalizations uttered by a single male in alarm contexts, resulting from the presence of the observer, were recorded. Loud calls were categorised sonographically as roars, variant roars, barks and variant barks. Additionally, the following acoustic temporal parameters were considered: call length, units per phrase, unit duration and inter-syllable duration. All recordings were made with a Sony tape recorder TCM-50DV and unidirectional Hama RMV-01 microphone. Different groups of the same species, geographically isolated, could show different vocal patterns, which would confirm the existence of intra-specific dialects, or the two species could show similar vocal patterns, forming mixed groups, possibly even hybrids. Significant differences were found in the temporal parameters between populations that were geographically isolated.

Use of Habitat by *Ateles geoffroyi* Inhabiting Small Forest Fragments in the Southeast of Mexico

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Key Words: *Ateles geoffroyi* • Habitat use

We studied the pattern of habitat use by *Ateles geoffroyi* in a highly fragmented landscape in the south of Los Tuxtlas, Veracruz, Mexico. The study area is 3,980 ha, but only 8% of it is suitable habitat for the monkeys and this is distributed in 64 fragments, most of them (90%) smaller than 5 ha. In the study area, six groups of spider monkeys and a solitary individual exist in different forest fragments, totalling 60 to 70 individuals. Sub-groups consisted of 2-6 individuals, all including males, adult and juvenile females and infants. For the present study, we selected two groups: one of 21 individuals in a 24 ha forest and the other of 5 individuals in 4.6 ha. The study took place from October 2001 to April 2002, totalling 292 hours of observations. We recorded the composition of the arboreal stratum of the forest fragments in order to see if there was any relationship between the quality of the fragment and the movements of the monkeys. We found that the fragments had a degraded flora. Available foodstuffs in the fragments represent only 30% of the total species diversity and species were unevenly distributed between fragments. Sexes differed in their use of the fragments: sub-groups of females used a limited number of fragments, while males used the fragments indiscriminately and their range overlapped that of the females. The variables that best explained the presence of *A. geoffroyi* in the sectors of the fragments were the abundance and the basal area of some species of *Ficus* and other large tree species. The average penetration of fragments, which showed no difference between sexes, was less than 0.5 km/day. There was little interchange between fragments by individuals.

Daily Estimation of the Time Budget of an Adult Male Mona Monkey, *Cercopithecus mona*: When to Observe and for How Long

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Key Words: Time budget • Single case experimental designs • Welfare

Single case experimental designs represent an alternative methodology, especially suitable for the evaluation of the efficiency of environmental enrichment techniques applied in zoos to animals kept in isolation. They can also be used to evaluate the condition of a single individual in a group. In spite of its methodological interest, the need to obtain repeated individual behavioural measurements over successive days raises a methodological problem that makes it hard to use on a regular basis. Our interest is to facilitate the use of this type of experimental design when planning environmental enrichment programmes in zoos. Here we present the results of a preliminary study aimed at answering the following questions: how much time should be devoted to daily observations of an animal in order to obtain a valid estimate of its time budget and how should it be distributed throughout the day? The study subject was an adult male *Cercopithecus mona* housed at Rainfer Primates Centre (Fuente del Saz, Madrid). We recorded the subject's behaviour for six consecutive hours. From this recording, we estimated its time budget by means of focal animal continuous sampling (used as control) and scan instantaneous sampling (with sampling periods of different duration and distributed across different times of the day). According to our results, the best estimate of the animal's time budget is obtained when we used a large number of short sampling periods distributed uniformly throughout the day (independently of the sampling interval chosen).

Evaluation of an Environmental Enrichment Technique for Chimpanzees (*Pan troglodytes*) by Means of a Single Case Experimental Design

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Key Words: Environmental enrichment • Single case experimental design • Welfare

The use of environmental enrichment techniques has experienced a remarkable expansion in the last few years. Among its functions is the promotion of animal welfare; it also facilitates the conservation, education and research functions assigned to modern zoological parks. In order to be effective, these techniques must be applied within an integrated programme of activities, which must be adapted to specific individual problems or situations. One of the main problems that arise from the evaluation of the effectiveness of the techniques derives from the small number of animals that usually make up the colonies in zoological parks. This fact makes it difficult to apply the most commonly used statistical tests for the evaluation of experimental data. The aim of this work is to present a new experimental design that will allow us to evaluate the effectiveness of an environmental enrichment technique based on the use of an A–B single case experimental design. The study subject was an adult male chimpanzee housed at Valencia Zoo (Spain). The animal was observed for 28 h distributed in 112 observational periods of 15 minutes each (seven times per day for 16 alternate days). One observer collected the data using an instantaneous time sampling technique. As our results show, the environmental enrichment technique introduced (which consisted of several hanging ropes and two nets placed inside the enclosure at different heights) significantly modified the animal's activity budget. More precisely, the subject increased the proportion of time dedicated to social interactions, locomotion and manipulation of environmental elements.

Generalizability of Observations on Affiliative Relationships between Individuals: Sources of Measurement Error

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Key Words: Generalizability theory • Behavioural measurements • Affiliation

When designing a study, adequate decisions about sampling and recording methods are crucial to ensure that valid generalizations from the sample of data to be collected can be made. Decisions about when to collect the data and which recording techniques to adopt are among the most important ones that behavioural scientists have to make before they start their observations. Generalizability theory (G theory) is a statistical theory for assessing the dependability (reliability) of behavioural measurements and can be used to help to make this kind of decision. Unlike classical theory, G theory can estimate separately in a single analysis the multiple sources of error in a measurement. In this study we use G theory to determine if measurements of affiliative behaviour (i.e., grooming) collected at different times of the day are exchangeable and if measurements obtained with one/zero time sampling provide the same estimates of grooming rate as measurements obtained with continuous recording methods. We used a mixed two-facet design (dyad × time of day × recording technique), where the dyad was the object of measurement ($n = 82$ dyads), the time of day was a random facet (with two levels) and the recording technique was a fixed facet (with two levels). The data come from a study of 27 h of grooming interactions in

three one-male units of hamadryas baboons (*Papio hamadryas*) housed in Madrid Zoo. Observations were collected using group sampling. The results indicated that whereas the measurements obtained at a given point in time of day can be generalizable to any other time of day, the two recording techniques do not provide comparable estimates of grooming rate. The interaction between dyad and recording technique was large (48% of the total variance), suggesting that there were dyad-typical profiles of grooming behaviour. G studies can help to isolate the various potential sources of error and design a measurement procedure that minimizes it.

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Preliminary Report on the Translocation of a Breeding Colony of Rhesus Macaques (*Macaca mulatta*)

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Key Words: *Macaca mulatta* • Translocation • Breeding colony

Little exists in the literature describing the effects of a large scale movement of a breeding colony of primates. The literature that does exist, points towards significant affects on the animals' survivorship and reproduction. This paper will outline an opportunistic project monitoring a colony translocation and will present some initial results. Several lines of investigation are used to examine the impact on the animals of their transportation and re-housing into a new, purpose-built facility. Data on both physiological and behavioural parameters were collected before and after the move and examined for quantitative and qualitative changes, as well as for correlation with stressful events and between physiological and behavioural data sets. It is hoped that this project will not only act as a welfare audit for the colony move, but also add to the relatively sparse body of data on the effects of transport on primates.

Mona Project: Rehabilitation, Resocialisation and Dehumanisation of State Owned¹ Primates

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Key Words: *Pan troglodytes* • Rehabilitation • Resocialisation

After the arrival of the first group of State-owned¹ chimpanzees (*Pan troglodytes*) at the Mona Foundation's Primate Rehabilitation Centre, observation showed that the animals initially exhibited marked 'human-like' behaviour, not having previously lived in natural social groups. After a while in semi-freedom, however, they developed a social structure and behavioural patterns more appropriate to their species. The study sample is made up of ten chimpanzees, eight males and two females, ranging in age from 2 to 47 years, which are split into two groups. It is envisaged that new individuals will be added to these groups. The global investigation project started in 2002 and will end in 2004. The general project is divided into two specific studies: PRIMAMONA (rehabilitation and resocialisation of State-owned¹ primates and their social behaviour) and AR-

QUEMONA (dehumanisation of State-owned¹ primates, study of their behaviour and their use of available habitat). The investigating group is made up of professionals from the fields of psychology, archaeology, anthropology, biology and veterinary sciences. New areas of investigation which will be introduced during 2003/2004 include the evaluation of animal welfare, habitat enrichment and the study of the process of adoption among primates. To summarise, the global investigation project covers a broad spectrum and aims to collect information on the rehabilitation, resocialisation and dehumanisation of chimpanzees, along with knowledge to improve their health and well being.

¹State-owned: animals previously illegally held and confiscated by the authorities.

Social Grooming, Affiliative Relationships and Formal Dominance in Chimpanzee Males

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Key Words: *Pan troglodytes* • Social grooming • Affiliative relationships • Dominance

This study examines the relationships between grooming, social status and affiliation in the chimpanzee colony in Edinburgh Zoo. This colony contains 12 individuals, 5 of which are adult males. The objective of the study is to show how each individual organises its social behaviour. Correlational methods are used to look for patterning in the frequency of different behaviours directed by individuals towards their various partners. The studies carried out on chimpanzees in the wild have not found a consistent relation between rank and grooming (Simpson, 1973; Bygott, 1979; Takahata, 1990). Nor did Hemelrijk et al. (1991) find an association between the dominance hierarchy and grooming frequency in studies carried out on the chimpanzee community in Arnhem Zoo. Results support the argument that rank as well as age is an important structural variable in chimpanzee society, although neither significantly affects the distribution of grooming, if by rank we mean only dominance rank. Reciprocity does exist if we consider affiliative relationships as intervening in development as well as in maintenance of interactions such alliances.

Phylogenetic and Phylogeographic Relationships between Rhesus (*Macaca mulatta*) and Japanese (*Macaca fuscata*) Macaques: Are They Really Different Species?

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Key Words: *Macaca fuscata* • *Macaca mulatta* • Phylogeny • Phylogeography

The rhesus macaque, *Macaca mulatta*, is distributed from Afghanistan to China and Vietnam whereas the Japanese macaque, *Macaca fuscata*, is restricted to the Japanese archipelago. Several studies based on fossils, morphology and genetic markers have demonstrated that these species are closely related. With the aim of studying the speciation and the population history of the Japanese macaque, we sequenced a fragment of 392 base pairs of mitochondrial DNA control region from 50 individuals from six populations located on different islands. These sequences were compared with 89 rhesus macaque sequences available from GenBank from seven populations from China and Vietnam. Mismatch distribution analysis, which consists of a graphic representation of the frequencies of nucleotide differences between pairs of sequences, was multimodal

in the Japanese macaque suggesting that no sudden population growth occurred in this species. Demographic expansions show unimodal mismatch distributions. This analysis, together with the high genetic differentiation found between Japanese macaque populations favoured by female philopatry, suggest that the colonisation of the Japanese archipelago by macaques was fast and occurred in the Middle Pleistocene. Among the 136 polymorphic sites found, only two were fixed between species. Moreover, genetic distances calculated for interspecific comparisons (average number of nucleotide differences (d_A : 24.8–51.6) were very similar or fell within the range of genetic distances found between Japanese macaque populations (d_A : 7–33.2), demonstrating the evolutionary proximity of these two species.

Self-Recognition in a Mirror by the Genus *Cercocebus*

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Key Words: *Cercocebus torquatus* • Self-recognition • *Cercocebus atys*

The purpose of the following study, undertaken at Barcelona Zoological Park, was to determine the existence of self recognition in a mirror in a group of eight monkeys in the genus *Cercocebus* (3 *Cercocebus atys lunulatus* and 5 *Cercocebus torquatus*). The behaviour displayed by the two species of monkeys in front of the mirror was contrasted following the methodology used by Gallup (1970), but making a series of controls and modifications in respect to the variables: subject, mirror and mark, with the intention of evaluating their relative relevance. Observations were made in five phases: (1) preliminary ad libitum observations, (2) base line, (3) covered mirror (control), (4) uncovered mirror, and (5) mark test. Focal experiments with continuous observations of 15 minutes per subject were carried out in the last four phases. The total time in front of the mirror was 52 hours. The results indicate the inability of these species to recognise themselves in a mirror. However, remarkable differences, both qualitative and quantitative, were found between the two species, with the number of behaviours manifested towards the mirror being much more significant in *Cercocebus atys lunulatus*. In this species, 955 occurrences of affiliative conduct were shown compared to the 81 occurrences in *Cercocebus torquatus* ($\chi^2 = 130.08$ gl = 1 $p < 0.001$). It has also been proven that the factors studied (location of the mirror and sociability, among others) do not facilitate self-recognition in these species.

Social Relationships among Adult Males and Immature Individuals in a Mixed Colony of Baboons (*Papio* spp.): Paternity Certainty, Sexual Selection or Female Choice?

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Key Words: Social relationships • Adult males • Immatures • Hamadryas baboons

Among primates, social relationships among adult males and immatures vary widely, from ignoring/tolerating through affiliation to active protection. Much of the variation reported in the relationships between these two classes of partners has been related to variation in mating systems and its effects on the extent of paternity certainty, the intensity of mate competition among males, and the potential for mate choice by females. This study tests predictions from three different hypotheses regarding the relationships that should be expected among the adult males and the immatures of a mixed colony of baboons (*Papio* spp.) consisting of two hamadryas males leading cohesive one-male units with harem-defence mating system and two cynocephalus males leading

small and unstable social units with promiscuous mating system. In their relationships with immatures, the hamadryas males were more protective than the cynocephalus males and were more so with the immatures attached to their one-male units (who tended to be their offspring). The hamadryas males were also more aggressive than the cynocephalus males were towards immatures from other social units (who tended to be other males' offspring). Finally, there was a general pattern of positive association between the relationship that the males had with the immatures and the relationship that they had with their mothers. The findings are discussed in relation to the three hypotheses and the effects of the interaction between males who exhibit different social systems, including mating and parenting strategies.

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Two Conservation Efforts: Bolivia and Guinea

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Key Words: Conservation strategies • Sanctuaries • Bolivia • Guinea

These studies are only preliminary and are intended as a project proposal rather than an analysis of results. The aim is to compare the conservation efforts in the Tuxtlas area of Mexico, the northernmost ecosystem for New World primates, with those of two very poor countries: Bolivia in South America and Guinea in West Africa. These two countries contain biodiversity hotspots, tropical Andean and Guinean forests, respectively. Two visits were made to Bolivia, to Manuripi-Heath Natural Amazon Reserve and Pando Department Region in 2001 and to Pilón Lajas Indigenous Territory and Noel Kempff Natural Reserve in 2002. In Guinea, a study has been conducted in the northern area of the country and, in 2002, three months were spent in the Chimpanzee Conservation Centre of Somoria, Mafou Park. Both studies shed light on which conservation strategies are best for poor countries like Guinea: protecting large areas or spending money on sanctuaries. Bolivia is a different matter, since it is a large country with a small population (1,100 million sq. km and 8.5 million inhabitants). Nevertheless, the two countries have similarities: Pando Region in Bolivia and Guinea both possess around 14 species of primates and in both countries, the rich nations are contributing to the protection of their unique ecosystems. However, whereas Guinean chimpanzees in the southern regions of the country are endangered, the very low human population in Bolivia means that there is less pressure on the ecosystems and the primates in that country. Is there a common conservation strategy that can be shared between Mexico, Bolivia and Guinea? We hope to find an answer to that question as a result of joint studies in the three countries.

Identification of Primates Described in the Eighteenth Century

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Key Words: History of science • Buffon • Daubenton • Tyson

The science historian cannot travel into the past and put himself in the place of the authors he studies, he knows much less; but, on the other hand, he can study them in light of modern science and, in that sense, know more. The species, subspecies and varieties of primates described

between 1699 (E. Tyson) and 1812 (F. Cuvier) appear mainly in Buffon and Daubenton's *Histoire Naturelle*, vols. 14, 15 and *Suppléments* VII, a true 18th C. encyclopaedia of primatology. The methodology consisted of a systematic comparative study of the writings, especially those where primate anatomy or behaviour was described by the authors, but also comparing measurements (by Daubenton) and drawings, when these were provided, with modern ones. We have used the contemporary studies of Napier & Napier to compare modern and ancient primatology. We have also discussed some particular problems with colleagues. Although Buffon describes around 40 species, these belong to almost every family and to a great number of genera. Buffon did not want to use Linnaean systematics and his nomenclature is idiosyncratic. Buffon was a transformationist, considering that species might vary over time. It is interesting to see that he saw some species, mainly species of *Macaca*, to be intermediate, not in the sense of hybrids, but as links between natural groups. Some specimens were easy to identify, others very difficult and uncertain (e.g. some New World monkeys). Many were interesting, for instance, Tyson's and Buffon's 'orangutans' were actually two infant chimpanzees. The skeleton of the first and the embalmed body of the second – the oldest embalmed mammal available today – have been preserved. However, all the rest of the animals that arrived dead or alive at 18th C. European zoos and natural history cabinets exist only in written description. Thus, in a time when all primates seem endangered, this study makes its own contribution to conservation.

The Effects of Group Size on Weight Loss in Cotton Top Tamarins (*Saguinus oedipus*) after the Birth of Infants

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Key Words: *Saguinus oedipus* • Body weight loss • Parental behaviour

After the birth of infants in captive groups of cotton-top tamarins, individuals that participate in carrying the offspring loose body weight, with the exception of reproductive females, which gain weight. It has been noticed that the bigger the size of the group, the less body weight is lost by the adult males. The objective of this study was to see whether the number of individuals in a group affects the body weight of reproductive members and subadults. Body weight loss in 5 groups of cotton-top tamarins was examined for 9 weeks after the birth of infants. The groups contained between 4 and 13 individuals. A Spearman correlation index was used, with a significance level of $p < 0.05$, in order to study the relationship between the number of group members and the body weight loss in the different categories of individuals. Reproductive females gained least body weight in those groups with the highest number of individuals, even losing weight in large groups. Fathers, on the other hand, lost most weight in the smallest sized groups, although this result was only marginally significant. Group size also affected the weight of male and female subadults, which suffered body weight loss in the smallest groups despite the fact that they were still growing. Therefore, whereas fathers and subadults of both sexes benefited from the presence of a higher number of group members, mothers, in contrast, suffered body weight loss in the largest groups.

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Relationships between Captivity and Stereotypic Behaviour in Rhesus Monkeys

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Key Words: *Macaca mulatta* • Stereotypic behaviour • Captivity

The aim of this project was to test predictions about the relationship between captivity and stereotypic behaviour in rhesus monkeys (*Macaca mulatta*). We studied how stereotypic behaviour varied according to the type of deprivation. Behavioural assessment was of 48 individuals divided into three groups of 16 monkeys. The first group had only visual and audio contact with other monkeys. They were caged in single-house facilities for a year or more in the Animal Resources Centre (ARC). The second group also had only visual and audio contact with other macaques. They were caged in single-house facilities at the Caribbean Primate Research Centre (CPRC), but for less time than the ARC group. The third group was also in captivity, but had physical contact with others at CPRC. The data were collected in Puerto Rico through focal animal and ad libitum sampling. Of the 48 animals surveyed, 33% exhibited at least one abnormal behaviour. Space limitations and the interaction type influenced stereotypic behaviour.

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Cooperative Problem-Solving Behaviour in Chimpanzees (*Pan troglodytes*)

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Key Words: *Pan troglodytes* • Cooperation • Chimpanzees • Tolerance • Motivation • Competition

Chimpanzees are known to cooperate when forming coalitions and in the context of hunting. However, the few studies that have investigated the cooperative problem-solving abilities of chimpanzees have shown that their cooperative behaviour in an experimental set-up was far from spontaneous. Even in those experiments in which the task itself was an intuitive one, like pulling a rope attached to a baited box, human assistance was necessary to coordinate the subjects' actions on the box or several sessions were necessary before the animals learned to coordinate their behaviour with that of their partner. A possible explanation for these findings is that those tasks did not offer enough motivational incentives for cooperation to appear. In this study, our main goal was to find a paradigm in which chimpanzees cooperate spontaneously, reliably and without training. Therefore, we tried to increase their social and non-social motivation to cooperate in an intuitive pulling-task. We increased the social motivation by using tolerant dyads as partners and making them compete against other chimpanzee dyads, thus adding a competitive incentive to the task. We increased the non-social motivation by using highly sharable food, so that both partners may profit from their efforts. Preliminary data show that 3 out of the 4 pairs tested successfully and spontaneously pulled together to retrieve the baited tray. We discuss these results in terms of the constraints that tolerance level and payoff structure may have on chimpanzee cooperative behaviour.

Self-Recognition of the Image in a Mirror by *Miopithecus talapoin*

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Key Words: *Miopithecus talapoin* • Self-recognition • Mirror

Studies of non-human primate self-recognition in mirrors provide evidence of variation both within and between species. The absence of this cognitive capacity in some species could be due to the use of inappropriate methodology. In this study, carried out at Barcelona Zoological Park, we examined some of the factors indicated by Gallup (1987) to be potential facilitators of self-recognition and other factors specified by Mitchell (1993) in his inductive and deductive theory about the process of self recognition. We tested a group of ten *Miopithecus talapoin*. This species has some characteristics that may be interesting for the study of self-recognition, such as the manifestation of some cultural behaviour and a high encephalization. This investigation had different stages: (1) elaboration of an ethogram and habituation of the subjects to the observer, (2) base line observations, (3) presentation of the covered mirror, (4) presentation of the uncovered mirror, (5) mark test. The monkeys showed an initial interest in the mirror that waned by the end of each session and throughout the following days of exposure. The majority of the behaviour directed towards the mirror was social, generally agonistic and the subjects showed no kind of self-directed behaviour guided by the mirror image. The chance to undertake some physical exploration and, therefore, establish comparisons between the real subject and the specular image, did not help the monkeys to understand the nature of the mirror. The subjects tested did not show any evidence of self-recognition of their image in the mirror.

Home Range of Howler Monkeys (*Alouatta palliata*) in a Forest Patch in Los Tuxtlas, Veracruz, Mexico

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Key Words: *Alouatta palliata* • Home range

Studies of primate home range size in patchy forests without special protection are scarce. Our objective in this study was to determine and to compare the home range size of different groups of howler monkeys (*Alouatta palliata mexicana*) living in a forest fragment in Los Tuxtlas, Mexico. We recorded 118 geographic locations (UTM coordinates) of four howler monkey groups in an area of 83.5 ha from March 2002 to June 2003. Our interest was to establish a relationship between patchiness level and home range size. The study area contained secondary forest, not disturbed forest, plantations and grassland. We observed two permanent troops containing 10 and 15 monkeys, respectively, and two other groups, of 8 and 12 monkeys, that were present seasonally. Home range sizes were calculated by the minimum polygon convex method, obtaining respective areas of 9.43 ha and 19.1 ha for permanent groups (monthly mean $\pm$ SD: 0.63 ± 0.90 ha and 2.47 ± 3.1 ha). The seasonal groups had home range sizes of 9.6 ha and 9.27 ha, respectively (monthly mean $\pm$ SD: 1.12 ± 1.99 ha and 2.15 ± 2.62 ha). Analysis of the monthly mean home ranges using the Mann-Whitney U test showed statistically significant differences in permanent groups ($p < 0.02$). Despite the observed overlap in home range of the troops, qualitative analysis of occupation pattern in the fragment indicates that the group living in the more disturbed area had the greatest home range.

Spatial Use and Cognitive Maps in a Group of Guinean Baboons (*Papio papio*) in Semi-Free Conditions

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Key Words: *Papio papio* • Spatial use • Cognitive maps

We have studied spatial use and the possible existence of cognitive maps in a group of Guinean baboons (*Papio papio*) under semi-free conditions, focussing on critical factors influencing differentiation of use of space and its implied relationship with cognitive processes. The optimal exploitation of a certain habitat involves integrating the following data into the decision-making process: (1) spatial information, (2) temporal information, (3) ecological information, and (4) social information. These summate to confer great complexity on the rules of baboon spatio-temporal decision making. The study was carried out in the safari park in Mallorca, Spain, in a 15-hectare area of undisturbed countryside with free access to surrounding areas. The study group consisted of 34 baboons: three mature males, thirteen mature females and the rest were immature. After exhaustive categorization of the living space, a complete ethogram was developed to permit recording of activity/time budgets for each area. In a preliminary study, focal and behavioural surveys were combined with ad libitum sampling. Then experiments were carried out to verify hypotheses derived from this initial phase. Results indicate that the baboons spent a greater period than expected within a very restricted area of the available space, although visiting or crossing other areas on a few occasions. They appeared to employ time-minimising strategies. These results may only be understood in terms of the only critical factor which might have affected use of this habitat: predator pressure, evinced in the study site in the form of measurable aversion stimuli. A detailed spatio-temporal cognitive map of the environment and of its associated resources appears to underlie patterns of spatial use.

Behavioural Indicators of Anxiety in *Papio hamadryas hamadryas*

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Key Words: *Papio hamadryas hamadryas* • Hamadryas baboons • Anxiety • Behavioural indicators • Displacement activities

Displacement activities are behavioural patterns that occur under circumstances in which they are apparently irrelevant to ongoing activities and seem to reflect motivational ambivalence or frustration in conflict situations. The behavioural patterns displayed in these contexts are typically related to body care activities and, at least in primates, have been widely used as indicators of anxiety. Identifying a species' behavioural repertoire of displacement activities and assessing their relationship to anxiety become important issues which need to be addressed, especially if one's goal is to determine the factors that may influence an individual's levels of stress during and after social conflicts. Although post-conflict stress-related behaviours have been described in several primate studies of conflict management and resolution, especially in species of *Macaca* and *Pan*, no detailed study of such behaviours has yet been conducted on *Papio* species. In this study we set out to identify the repertoire of displacement activities observed in a colony of hamadryas baboons (*P. h. hamadryas*) and assess their value as indices of anxiety in this species. Observations were conducted in three different contexts: before the baboons were fed, after a social

conflict, and during relaxed contexts. The data come from 7 adult males and 11 adult females collected during 85 h of individual follows. The analyses show that in hamadryas baboons self-grooming, self-touching, scratching, body shaking, yawning and sweeping are significantly more frequent during stressful conditions than in relaxed contexts and that sex-related differences in the use of these behaviours can be identified. We also find evidence that these displacement activities can be interpreted as reliable indicators of anxiety in this species.

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Heterochromatin Polymorphisms in *Cebus nigrivittatus* from Venezuela

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Key Words: *Cebus nigrivittatus* • Heterochromatin analysis • Cytogenetic characterisation

Heterochromatin polymorphism analysis is important for cytogenetic characterisation of species and populations. Polymorphisms in C+ constitutive heterochromatin bands in six *Cebus nigrivittatus* specimens (3 male and 3 female) from Venezuela are described. Metaphases have been obtained from peripheral blood cultures and sequentially stained (uniform, G-bands and C-bands). All chromosomes presented a C+ centromeric band, five presented a C+ telomeric band (4 in the p arm and one in the q arm) and ten chromosome pairs presented a C+ interstitial band in the long arm. All centromeric bands were G+ while telomeric and interstitial C+ bands were G negative except in two chromosome pairs. Chromosomal polymorphisms observed in 4 pairs are described. We also discuss the location of C-bands and polymorphisms in relation to those described in the species *C. apella* and *C. capucinus*.

Social Rehabilitation of Spider Monkeys (*Ateles geoffroyi vellerosus*) in Captivity

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Key Words: *Ateles geoffroyi vellerosus* • Social rehabilitation • Captivity

The following study is part of a behavioural rehabilitation project involving 5 captive spider monkeys (*Ateles geoffroyi vellerosus*) before their possible reintroduction in Los Tuxtlas region (Veracruz, Mexico). Social rehabilitation consists of facilitating the manifestation of species-typical social relationships in captive animals, which could be limited by confinement. The aim of this study was to socially integrate 3 adult male and 2 adult female spider monkeys and evaluate their social behaviour. The animals were submitted to a social integration process that consisted of progressively increasing the number of animals present to interact with. A cage (2.8 m × 2.9 m × 1.9 m) was prepared at PAFFASIT facilities (Universidad Veracruzana, Veracruz, Mexico), where the animals were grouped in dyadic and triadic combinations for 1 h. Later on, in another cage (6.60 m × 2.9 m × 3.8 m), all the animals were placed together for 5 h a day. In all three

combinations, behaviour was recorded through focal animal sampling with continuous recording for 60 min per animal, with a total of 180 h of observation. Our findings show the social integration of all individuals. The rate and pattern of social interactions found was similar to that shown by free-ranging spider monkeys: males were more affiliative with males than with females; females were more solitary than males and they tended to be attacked by males. These findings suggest that the integration of the individuals in a social group was successful and that they developed species-typical social relationships.

'*Pan erectus*' Project: Preliminary Results on Occasional Bipedality in Captive Chimpanzees (*Pan t. troglodytes*) and Their Importance for the Study of the Origin of Bipedalism in Forest Areas

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Key Words: *Pan troglodytes* • Bipedalism

When we discuss the origin and the evolution of bipedalism, it is still very easy to explain it using a Lamarckian and mythological point of view: that bipedality was combined with the appearance of savannas and the consequent need to walk on two legs to see above the high grasses, it also reduced the energy employed during displacements, a smaller body surface was exposed to solar radiation and the hands were liberated for tool-use and tool-making activities and for carrying these tools. These examples are advantages of bipedalism, but they can never be used as the explanation of its origin. Through the paleoanthropological record, we know that some of the first unquestionably bipedal hominids (*Australopithecus africanus*, *Australopithecus afarensis*) did not inhabit savannas but used forests, as the paleoecological reconstructions demonstrate (through paleontological and palinological studies). The anatomical and biomechanical characteristics of these australopithecines show that they were adapted to climb trees. While the discussions on bipedalism continue to raise questions as to how, where and when the first bipedal primate appeared, we can be sure that the bipedal position conferred big advantages on the hominids who inhabited forest. To prove this hypothesis, we have studied the occasional bipedalism observed in chimpanzees (the living primate closest to the first mio-pliocene hominids from a phylogenetic, morphological and ethoecological point of view). Indeed, our '*Pan erectus*' Project in Barcelona Zoological Park, studying a group of chimpanzees (*Pan troglodytes troglodytes*) has revealed interesting results about the links between the occasional bipedal walk in chimpanzees and the use and carrying of tools and food.

Paleoecological Reconstruction of *Homo erectus* and *Paranthropus boisei* through the Study of Living and Fossil Specimens of the Genus *Papio*, Tanzania, East Africa

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Key Words: *Homo erectus* • *Paranthropus boisei* • *Papio* • Paleoecology

Members of HOMINID have participated in the archaeological and paleontological project at Peninj (Lake Natron, Tanzania) since 1996 with the objective of studying the behaviour of the first species of *Homo* to use open areas. In 1999, we decided to develop a interdisciplinary re-

search project, the purpose of which was to reconstruct the diet of the fossil hominids in savanna habitats (*Paranthropus* and *Homo*) using data from both the past and the present. Having recovered remains of fossil baboons in the location of Peninj, we proceeded to study the baboon groups which inhabit the same region today. This study includes the observation of the feeding behaviour of these primates in order to identify and classify the vegetation and animal resources eaten; the recovery of recent baboon bones (skulls and jaws) and the study of dental microwear as products of oral manipulation of foods. Studies of fossil pollen and phytoliths indicated that the flora of Peninj 2 to 1.5 million years ago was very similar to the present flora. Thus, it is appropriate to compare dental microwear of living and fossil baboons, and fossil hominids, of the Peninj area, for purposes of verification of our palaeobotanical data, and in order to infer dietary choice in early *Homo* and *Paranthropus*.

Fundación Neotrópico: A Wildlife Rescue Centre

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Key Words: Environmental education • Primate rescue • Neotropical primates

Fundación Neotrópico is an international, not-for-profit organisation working, since 1991, in environmental education, research and rescue of wildlife. Registered as a foundation in the year 2000, it was declared of public interest by Ministerial Order on September 11th 2000; it has also been included in the Education, Culture and Sports Ministry Registry of Foundations, with the number TNF 1-3-2. Non-domestic species of animals (mainly Neotropical) are rescued and rehabilitated internationally by our organisation. The individuals are confiscated (from illegal traders) or are abandoned in the natural environment and rescued by the authorities: Customs Office, Centre for the Inspection of Foreign Trade (CICE), SEPRONA of the Guardia Civil. Fundación Neotrópico's facilities lodge more than 70 individuals: rescued from illegal trade, from research or rejected by zoological institutions. These animals are principally primates, but there are also deer, armadillos, snakes, crocodilians, turtles and others. This poster displays information about some of the primates recuperating in our Rescue Centre. The seizures were from airports, brothels, circuses, etc. Many of the primates have suffered ill treatment and arrive with behavioural problems as a result of their traumatic experiences and are then cured in Fundación Neotrópico. New facilities are being built by Fundación Neotrópica in Tenerife to continue the rescue and rehabilitation of Neotropical fauna in general and sea turtles.

Intervention and Postconflict Affiliation in the Hamadryas Baboon (*Papio hamadryas hamadryas*)

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Key Words: *Papio hamadryas hamadryas* • Interventions in conflicts • Post-conflict behaviours • Affiliative interactions • Reconciliation

The hypothesis of the valuable relationship postulates that variation in conciliatory tendency across dyads of individuals should be related to the importance of the benefits that both partners derive from their relationship. In some harem-forming species, it has been found that affiliative relationships are stronger between the unit leader and his females than between the females them-

selves (e.g., gorilla, hamadryas baboon). This across-sex bondedness also involves the frequent intervention of unit leaders in their females' fights. Previous findings from our hamadryas study showed that affiliation (grooming), cooperation (help in fights) and reconciliation (postconflict affiliation between former opponents) were all highest between dyads of unit leaders and their females. Here we explore two further predictions from the valuable relationship hypothesis, namely, that victim females will affiliate with their unit leaders more often if the latter have intervened on their behalf than if they have not, and that this effect is exacerbated even further when the antagonist females belong to the same unit. The latter would be a consequence of females competing for access to such a valued partner. The data come from a study of the multi-level colony of hamadryas baboons in Madrid Zoo and involve 300 10 min post-conflict samples and their corresponding matched control periods in which the focal animal was the victim. Both predictions were borne out by the data, although only the first one reached statistical significance. These results suggest that the strong bond between the unit leader and his females facilitates the latter's efforts to calm down after a conflict and is further reinforced by the female if the unit male has protected her.

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