LABORATORY PRIMATE NEWSLETTER

Volume 17, Number 1

January, 1978

ALLAN M. SCHRIER, EDITOR

MORRIS L. POVAR, CONSULTING EDITOR

Published Quarterly by the Primate Behavior Laboratory
Psychology Department, Brown University
Providence, Rhode Island

POLICY STATEMENT

The purpose of the *Newsletter* is to provide a central source of information about nonhuman primates and related matters, which will be of use both to the community of scientists who use these animals in their research and to those persons whose work supports such research. Accordingly, the *Newsletter* (1) provides information on care, breeding, and procurement of nonhuman primates for laboratory research, (2) disseminates general information and news about the world of primate research (such as announcements of meetings, research projects, sources of information, nomenclature changes), (3) helps meet the special research needs of individual investigators by publishing requests for research material or for information related to specific research problems, and (4) serves the cause of conservation of nonhuman primates by publishing information on that topic. As a rule, the only research articles or summaries that will be accepted for the *Newsletter* are those that have some practical implications or that provide general information likely to be of interest to investigators in a variety of areas of primate research. However, special consideration will be given to articles containing data on primates not conveniently publishable elsewhere. General descriptions of current research projects on primates will also be welcome.

The *Newsletter* appears quarterly and is intended primarily for persons doing research with nonhuman primates. Back issues may be purchased for $1.00 each. (Please make checks payable to Brown University.)

The publication lag is typically no longer than the 3 months between issues and can be as short as a few weeks. The deadline for inclusion of a note or article in any given issue of the *Newsletter* has in practice been somewhat flexible, but is technically the fifteenth of December, March, June, or September, depending on which issue is scheduled to appear next. Reprints will not be supplied under any circumstances.

PREPARATION OF ARTICLES FOR THE *NEWSLETTER*.--Articles and notes should be submitted in duplicate and all copy should be double spaced. Articles in the References section should be referred to in the text by author(s) and date of publication, as for example: Smith (1960) or (Smith & Jones, 1962). Names of journals should be spelled out completely in the References section. Technical names of monkeys should be indicated at least once in each note and article. In general, to avoid inconsistencies within the *Newsletter* (see Editor's Notes, July, 1966 issue), the scientific names used will be those of Napier and Napier [*A Handbook of Living Primates*. New York: Academic Press, 1967]. For an introduction to and review of primate nomenclature see the chapter by Maryeva Terry in A. M. Schrier (Ed.), *Behavioral Primatology: Advances in Research and Theory* (Vol. 1). Hillsdale, NJ: Lawrence Erlbaum Associates, 1977.

All correspondence concerning the *Newsletter* should be addressed to:
Allan M. Schrier, Psychology Department, Brown University,
Providence, Rhode Island 02912. (Phone: 401-863-2511)

ACKNOWLEDGMENTS

The *Newsletter* is supported by U. S. Public Health Service
Grant RR-00419 from the Animal Resources Branch,
Division of Research Resources, N.I.H.

The cover photograph of *Loris tardigradus* is from the Napier and Napier volume cited above. Reproduced with permission.

Managing Editor: Helen Janis Shuman

CONTENTS

GENETIC PRE-ANALYSIS: A NEW MODEL FOR BREEDING ENDANGERED PRIMATES IN CAPTIVITY

Martin S. Marion

Staten Island Zoological Society

Bruce P. Greenfield

New York University

This paper presents a new model for the initiation of a breeding colony of Macaca silenus, *the lion-tailed macaque. The model is applicable to the establishment of breeding colonies for any endangered species. The model entails a genetic survey of the extant population for protein polymorphisms and other genetic variants prior to the selection of animals for the breeding colony. The resulting data will enable the selection of a small, manageable group for breeding whose genetic diversity will more closely resemble the diversity of the total population. In this manner, much of the founder effect common to breeding isolates may be minimized. We believe that this is the first attempt to undertake a genetic survey of an endangered primate population prior to the selection of breeding animals.*

Status of *Macaca silenus* in the wild

Macaca silenus (Linnaeus, 1758), the wanderoo, or lion-tailed macaque, is an Indian primate whose range once extended from as far north as Goa, approximately 15°N, southward to near Cape Cormorin. Due to extensive habitat destruction the species has apparently become extinct in the north, and its range has been reduced to six separate hill ranges between approximately 14°16'N and 8°32'N (Figure 1).

Sugiyama (1968) speculated that the total population was less than 1,000. Green and Minkowski, in the *Red Data Book* (1976), have

---

Authors' addresses: Martin S. Marion, Department of Education, Staten Island Zoological Society, 614 Broadway, Staten Island, NY 10310. Bruce P. Greenfield, Laboratory of Physical Anthropology, Dept. of Anthropology, New York University, 25 Waverly Place, NY, NY 10003.

The authors are indebted to the following persons for their careful guidance and assistance in the formulation of this project: John Buettner-Janusch and Clifford J. Jolly, New York University; Donald G. Lindburg and Frank R. Ervin, University of California at Los Angeles; Al F. Coggins and William H. Summerville, Staten Island Zoological Society.

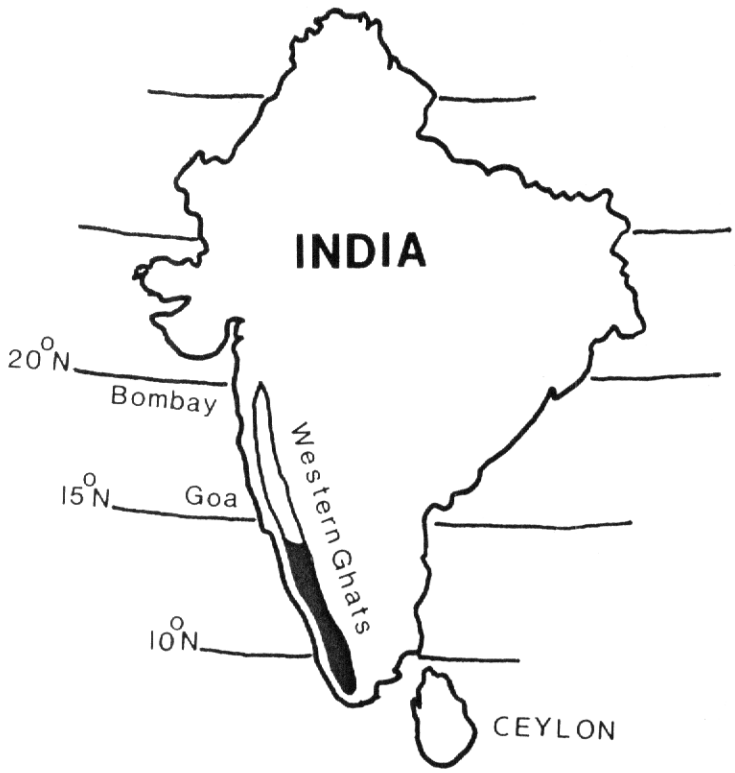

Figure 1. Range Map of *Macaca silenus*.

estimated the total population to be close to 500 in 1975. Subsequent work by these researchers (1977) has provided additional information about the status of these animals in the wild.

According to Roonwal and Mohnot "All workers in the field agree that the species is in danger of extinction" (1977, p. 218). Replacement of the indigenous rain forest for purposes of agriculture and industry has decimated the population. *M. silenus* apparently cannot adapt to this altered environment, and its chance of survival is low. Hill (1976) has also voiced the opinion that survival of this species in the wild is doubtful, and that a captive breeding effort may be the only hope for its survival.

Status of *Macaca silenus* in captivity

Hill (1976) has reported that the number of *M. silenus* in captivity in North America has risen from 52 adults and 29 juveniles in 1970 to 69 adults and 47 juveniles in 1975. Importation was not the cause of this increase, as only one individual was imported during these six years.

These data show that the lion-tailed macaque can survive and reproduce in a captive situation. However, despite numerical increase, it is reasonable to assume that much of the genetic diversity of the population is being reduced as a consequence of inbreeding and probably the founder effect. At least we can say that the genetic character of the captive population is probably unlike that of the wild population.

As of 1976, the captive North American population of *M. silenus* was distributed among sixteen separate zoos across the United States and Canada. For all intents and purposes, this means that there were 16 breeding isolates. This situation will, in all probability, lead to larger coefficients of inbreeding within individual groups. The genetic character of these groups is not known, and much of the genetic variation of the total population probably is being reduced as a result of the random placement of these groups.

Founder effect

The loss of genetic variation in a small population, as a result of the actions of stochastic processes, is known as the founder effect, and can be detrimental to the success of a breeding colony. In the selection of individual animals for any breeding colony when the genetic variation of the total population is unknown, it is likely that many important allelic forms of inherited characters would be omitted from the gene pool of the founding colony, and hence from the future populations propagated by this group. Any random choice of founding animals runs the risk of eliminating variants. There would be no way of assuring that the founding animals truly represented the state of genetic variability of the extant population. It should be understood that in an endangered species the population, and therefore its gene pool, is already decimated. It is therefore not in the best interests of the species to choose randomly or isolate individuals into breeding groups without as precise an understanding of the genetic character of the species as possible. At least we should know as much as we can of the genetics of the whole captive population from which the breeding colony will be chosen.

The principles of population genetics have as yet to be incorporated into the establishment of breeding colonies of endangered species. This paper describes a model that we have termed "genetic pre-analysis" that we feel can overcome to a great extent both the consequences of biological inbreeding and the founder effect. We are currently applying this model as a basis for the organization of a genetically sound breeding colony of *M. silneus*.

Genetic Pre-Analysis

One of the major concerns of those who wish to establish a breeding colony of rare primates (or any other animals), should be to maximize the genetic diversity of the relict population. This should be

the first step in the selection of mating pairs for the founding population. Thus we can minimize the reduction of biological variation in such a colony.

The sampling and analysis of certain genetic markers will allow us to determine allelic variation in these systems. The deleterious aspect of the founder effect may be reduced when such data are used as a basis for the selection of the founding colony. Studies have shown a significant reduction of variation (loss of polymorphisms) in populations which were randomly initiated (Buettner-Janusch & Sockol, 1977). Analysis of the genetic character of potential founding animals for our proposed breeding colony will enable us to select a founding colony whose genetic character most closely reflects the character of the gene pool of the total population. We will attempt to include the bearers of as many as possible of the observed variations found in any of the genetic systems studied. In other words, we intend to start with a population whose members exhibit maximum heterozygosity, which has been shown to decay in geographically structured populations (Nagylaki, 1974), and to be of advantage (superior in mean fitness to either homozygote) in naturally selected populations (Parsons & Bodmer, 1961; Carson, 1958).

The markers, or traits, that will be studied include: (1) Genetically controlled blood proteins and enzymes. (2) Digital, palmar, and plantar dermatoglyphics. (3) Karyotype and other cytogenetic parameters. (4) Human ABO-like substances in the saliva. These will be discussed in the following sections.

In addition to minimizing the consequences of the founder effect, we hope to preserve those genetic variants we may find for future, more detailed analysis. This will contribute substantially to the general body of knowledge about such variants, and may provide us with information applicable to the study of those human developmental anomalies whose etiologies are in whole or in part genetic.

The evidence is good that the captive *M. silenus* from which our breeding group will be derived have originated from genetic isolates. Therefore, maximizing the genetic diversity that we can monitor should maximize total genetic diversity. This represents, to the best of our knowledge, the first attempt to undertake a genetic survey of an endangered species prior to the establishment of a captive breeding colony.

Electrophoretic analysis

Previous studies have indicated that there is considerable variation of protein systems within primate populations (Buettner-Janusch *et al.*, 1974a, 1974b; and personal communication). The analysis of many of these protein systems for the presence of polymorphisms will generate data that will be important in the selection of the founding colony. The proteins that will be analyzed electrophoretically for such polymorphisms are: Ceruloplasmin (Cp), haptoglobin (Hp), hemo-

globin (Hb), carbonic anhydrase 1 (CA1), carbonic anhydrase 11 (CA11), glucose-6-phosphate dehydrogenase (G6PD), purine nucleoside phosphorylase (PNP), superoxide dismutase (SOD), NADH-diaphorase, phosphoglucomutase 1 (PGM 1), transferrin (Tf), pseudocholinesterase (PCE), phosphoglucomutase 11 (PGM 11), adenosine deaminase (ADA), alkaline phosphatase (Al.P.), red cell acid phosphatase (RCAP), 6-phosphoglucose dehydrogenase (6PGD), lactate dehydrogenase (LDH), and phosphohexose isomerase (PH1).

The analysis of these systems will be undertaken by the Laboratory of Physical Anthropology at New York University, under the direction of Professor John Buettner-Janusch, in conjunction with Professor Clifford J. Jolly.

Dermatoglyphic analysis

One of the authors, B. P. Greenfield, using the baboon population of Awash National Park, Ethiopia, has demonstrated that the palmar dermatoglyphics can be used to construct a system of personal identification to complement the numerical markings assigned to the animals. In other words, each individual animal can be identified exclusively on the basis of dermatoglyphic criteria (Greenfield, 1977). Preliminary analyses suggest that the various subpopulations (troops) of the total Awash population are characterized by clusters of dermatoglyphic traits, unique to each troop.

Initial dermatoglyphic analysis suggests to us that the same system of personal identification can be developed for *M. silenus*. Detailed dermatoglyphic analysis will be undertaken to determine whether such clustering, as has been demonstrated for the Awash baboon population, is also to be found in the various wanderoo populations. Digital and plantar dermatoglyphics will be analyzed in addition to palmar.

Karyotype and other cytogenetic studies

Karyotype analysis and chromosome banding studies of *M. silenus* will be conducted for a number of reasons. We wish to survey the chromosomes for the possible presence of chromosome polymorphisms, rearrangements, inversions, and deletions. These studies will also include an attempt to determine whether karyotype analysis may be of use in the investigation of any kinds of developmental anomalies in any of the offspring of the founding animals. This work will be undertaken in part in the previously mentioned Laboratory of Physical Anthropology at New York University by the authors and John Buettner-Janush, and also at the Pediatric Developmental Anomaly Clinic of the Brooklyn Jewish Hospital and Medical Center, under the supervision of Drs. Martin J. Shorr and Stanley S. Greenfield.

Characterization of saliva content

Samples of saliva from various *M. silenus* will be analyzed for the presence of human ABO-like substances. Socha *et al.* (1977) have demonstrated the presence of these kinds of substances in the Awash baboon population. There is evidence that these kinds of substances exhibit polymorphisms in primate species and as such represent an important genetic marker which may be useful in the selection of the founding colony (Jolly, personal communication). We wish to ascertain whether the same system may be present in *M. silenus*. If this be the case, the presence of human ABO-like substances may serve as a genetic marker whose polymorphism is selectively maintained. This work will be conducted by Professor Clifford J. Jolly and Dr. Trudy R. Turner, the latter of the University of Wisconsin at Milwaukee.

Behavioral and reproductive studies

Particularly important to the successful establishment of a primate breeding colony are the many behavioral and reproductive studies which lead to an understanding of the complex sociobiologic, ecologic, and reproductive structures that are inherent in primate societies. Dr. Donald G. Lindburg, of the University of California at Los Angeles will attempt to provide information related to these questions.

Behavioral categories to be studied include: Tumescence and detumescence of the female "sexual skin", rated as to size and color; length of individual menstrual cycles; length of menses; time of ovulation in relation to menstruation; sex roles in consortship formation; diurnal cyclicity in mating activity; details of copulatory behavior (mounts to ejaculation, frequency of ejaculation, length of refractory periods, post copulatory activity); assessment of rank, proximity, grooming bouts, and irritability in relation to cycle states; occurrence of post-conception estrus; occurrence of "placental sign"; external indicators of stress (*e.g.*, male "branch shaking", yawning, aggression).

Location of the *M. silenus* breeding project

A protected parcel of land of about 55 acres, located on the grounds of the Brentwood Veterans' Hospital, Los Angeles, California, has been made available by the Veterans Administration for the breeding colony. The grounds are fenced, thus restricting public access. The site is of sufficient size to accommodate as large a number of *M. silenus* as would be necessary to represent the genetic variability which will be determined by genetic pre-analysis. The site will be constructed to provide for a buffer zone between the colony and the surrounding community. It is located in a "breezeway", making for clean air and year-round moderate temperatures. This colony will be under the direct supervision of Donald G. Lindburg.

A substation colony will be housed and maintained at the Staten Island Zoo, Staten Island, New York. This substation will house one group of the animals which will be rotated periodically with animals from the major site. The animals housed at this substation will be utilized for the regular sampling of blood for necessary genetic studies, as well as for various physiological studies. This substation will be under the project supervision of Martin Marion. In addition, the substation group will be exhibited to the public in conjunction with a major educational effort, directed to the public, dealing with endangered species, conservation efforts, and the need for public support of these kinds of projects.

References

Bourlière, F. The need for a new conservation policy for wild primates. *Annals of the New York Academy of Sciences,* 1962, *102*, 185-189.

Buettner-Janusch, J. *Origins of man.* New York: Wiley, 1967.

Buettner-Janusch, J. *Physical anthropology: A perspective.* New York: Wiley, 1973.

Buettner-Janusch, J., Dame, L., Mason, G. A., & Sade, D. S. Primate red cell enzymes: Glucose-6-phosphate dehydrogenase and 6-phosphogluconate dehydrogenase. *American Journal of Physical Anthropology,* 1974, *41*, 7-14. (a)

Buettner-Janusch, J., Mason, G. A., Dame, L., Buettner-Janusch, V., & Sade, D. S. Genetic studies of serum transferins of free-ranging rhesus monkeys of Cayo Santiago, *Macaca mulatta* (Zimmerman 1780). *American Journal of Physical Anthropology,* 1974, *41*, 217-231. (b)

Buettner-Janusch, J., & Sockol, M. Genetic studies of free-ranging macaques of Cayo Santiago: 1. Description of the population and some nonpolymorphic red cell enzymes. *American Journal of Physical Anthropology,* 1977, *47*, 371-374.

Carson, H. L. Increase in fitness in experimental populations resulting from heterosis. *Proceedings of the National Academy of Sciences,* 1958, *44*, 1136-1141.

Chu, E. H. Y., & Bender, M. A. Chromosome cytology and evolution in primates. *Science,* 1961, *133*, 1399-1405.

Dobzhansky, T., & Pavlovsky, O. Indeterminate outcome of certain experiments on Drosophila populations. *Evolution,* 1957, *7*, 198-210.

Green, S., & Minkowski, K. The lion-tailed monkey and its South Indian

rain forest habitat. In Prince Rainier III & G. Bourne (Eds.), *Primate Conservation.* New York: Academic Press, 1977.

Greenfield, B. P. A dermatoglyphic key to the identification of individuals in the Awash population. *American Journal of Physical Anthropology,* 1977, *47*, 134. (Abstract)

Hill, C. Fourth American Association of Zoological Parks and Aquariums survey of the lion-tailed macaque, *Macaca silenus,* in captivity, in North America, 1976. Available from American Association of Zoological Parks and Aquariums, 1976. Oglebay Park, Wheeling, WV 26003.

Lerner, I. M. *Genetic homeostasis.* New York: Wiley, 1954.

Marion, M. S. Genetic pre-analysis: A new model for breeding endangered species. *Staten Island Science Teachers' Journal,* 1977, *2*, 1.

Martin, R. D. (Ed.) *Breeding endangered species in captivity.* New York: Academic Press, 1975.

Nagylaki, T. The decay of genetic variability in geographically structured populations. *Proceedings of the National Academy of Sciences,* 1974, *71*, 2932-2936.

Parsons, P. A., & Bodmer, W. F. The evolution of overdominance: Natural selection and heterozygote advantage. *Nature,* 1961, *190*, 7-12.

Red data book. Vol. 1: *Mammalia:* Macaca silenus. Morges, Switzerland: International Union for Conservation of Nature and Natural Resources, 1976.

Roonwal, M. L., & Mohnot, S. M. *Primates of South Asia.* Cambridge, Mass.: Harvard University Press, 1977.

Rumpler, Y. The significance of chromosomal studies in the systematics of the Malagasy lenurs. In I. J. Tattersal & R. W. Sussman (Eds.), *Lemur biology.* New York: Plenum Press, 1975.

Socha, W. W., Weiner, A. S., Moor-Jankowski, J., & Jolly, C. J. Blood groups of baboons. Population genetics of feral animals. *American Journal of Physical Anthropology,* 1977, *47*, 435-442.

Stern, C. *Principles of human genetics.* San Francisco: Freeman, 1973.

Sugiyama, Y. The ecology of the lion-tailed macaque. *Journal of the Bombay Natural History Society,* 1968, *65*, 283-292.

Sutton, H. E. *An introduction to genetics.* New York: Holt, Rinehart, and Winston, 1975.

REPRODUCTIVE CYCLES OF CAPTIVE PATAS MONKEYS

James Loy, Michael Head, Kent Loy

University of Rhode Island

Patas monkeys (*Erythrocebus patas*) have been the subjects of behavioral studies in the wild (Hall, 1965; Struhsaker & Gartlan, 1970; Gartlan & Gartlan, 1973; Gartlan, 1975), in outdoor enclosures (Loy, 1975; Loy & Loy, in press) and in the laboratory (Hall, Boelkins & Goswell, 1965; Hall, 1967; Hall & Mayer, 1967). In addition, patas monkeys have been used in studies of disease (Draper & Laurence, 1969) and reproduction (Doyle & Chandler, 1973). The females of this species are anatomically well suited to be used as model animals in research on problems of human reproduction (Doyle & Chandler, 1973).

While a considerable amount is known about some aspects of patas monkey behavior and anatomy, there is little published information on reproductive physiology and cycling. The purpose of this paper is to present data on the reproductive cycles of patas monkey females in the laboratory.

Methods

The primate colony at the University of Rhode Island was established in September, 1974 with an initial group of 8 animals. All monkeys are housed in a laboratory room with temperature maintained at 70-72°F. The animals were placed on a 12-12 light and dark cycle in 1974, but were changed to a 14-10 schedule in mid-1975. The monkeys are fed commercial monkey chow and provided with water *ad libitum*. Fruits are occasionally provided as dietary supplements.

The five adult females of the colony and all immature monkeys are housed together in a gang-cage with an interior volume of slightly over 900 cu. ft. The one adult male is housed separately, but he is in visual, auditory, and olfactory contact with the females and immatures.

Records of menstrual bleeding were begun in September, 1974. Each female is visually checked for vaginal bleeding during daily cleaning and feeding. Between January, 1976 and May, 1977, systematic mating of the adult females with the adult male resulted in six conceptions. Dates of conception are known exactly in two cases, and ± 1-2 days for the other four pregnancies.

Authors' address: Department of Sociology and Anthropology, University of Rhode Island, Kingston, RI 02881.

The authors are grateful for the financial support of the University of Rhode Island and the Department of Sociology and Anthropology. Geoffrey Keifer, Sandra Drum and Donald Duarte all assisted with the collection of data.

Results

Menstrual Cycle

A total of 82 inter-menstrual intervals were observed among the combined females. The lengths of these intervals ranged from 11 to 91 days, and while some intervals (*e.g.*, those of 50 days or more) probably did not reflect normal menstrual cycles, but rather resulted from amenorrhea or missed observations, all were included for calculations of central tendency. The mean inter-menstrual interval was 32.9 days, and both the modal and median lengths were 30 days. Table 1 contains information on menstrual cycle lengths for individual females.

Table 1. Menstrual Cycle Lengths of Individual Patas Females

Female	Mean Cycle Length (days)	SD	Modal Cycle Length	Range	No. of Cycles
R	31.6	5.5	32	16-50	21
N	37.1	18.3	30	12-91	17
AE	31.9	8.4	28	27-58	13
X	30.5	2.4	30	27-38	19
V	34.2	14.9	27,33	11-67	12
Combined:	32.9	11.0	30	11-91	82

The durations of 91 periods of menstrual bleeding were recorded for the combined females. Mean length of bleeding was 2.4 days (SD = 1.0) and both the modal and median lengths were 2 days. The range of blood flow durations was from 1-5 days.

Mating and Conceptions

Females were mated with the adult male during the second week of their menstrual cycle and on a day when they were soliciting (see Hall *et al.*, 1965 for a description of the solicitation display). The estrous female was introduced into the male's home cage for mating and typically copulation occurred shortly after the monkeys were put together.

Table 2 contains information on day of conception for the six observed pregnancies. All females conceived between cycle days 9-14 (*i.e.*, 9-14 days after the onset of the preceding menses). None of the females had to be mated during more than two menstrual cycles in order to conceive.

Five pregnancies resulted in the birth of healthy, active infants. The mean length of these 5 pregnancies was 168 days (SD = 5.4; Table 2). The one unsuccessful pregnancy occurred in 1976, when female V gave birth at 152-155 days of gestation. Female V did not lactate, and her

Table 2. Conceptions, Pregnancy Lengths, and Post-partum Resumption of Menstrual Cycling

Female	Cycle Days Bracketing Conception	Estimated Cycle Day of Conception	Length of Gestation	Interval Between Parturition and Next Menstruation
R	12-14	13	168 ± 1 days	113 days
N	12	12	173 days	110 days
AE	9-13	11	173 ± 2 days[a]	181 days
X	11	11	166 days[a]	192 days
V ('76)	9-12	10-11	153.5 ± 1.5 days	191 days
V ('77)	10-12	11	160 ± 1 days	--------

[a]First pregnancy

infant died within a day in spite of attempts to bottle feed it.

Five instances of the resumption of menstrual cycling after parturition have been observed. The mean length of the interval from birth to the next menstruation was 157.4 days (SD = 42.1; N = 5; Table 2). The shortest post-partum intervals were shown by the two oldest females, R and N, who were both multiparous and who ranked 1 and 2 in the female dominance hierarchy. Much longer post-partum intervals were shown by AE, X, and V, who were all mid-to-low ranking and having either their first or second infant.

Discussion

The data on reproductive cycling presented in this paper appear to be in general agreement with the few earlier reports on patas monkey reproduction. Hall (1965) followed Zuckerman (1932) in reporting an approximately 30-day menstrual cycle. This figure agrees closely with the present study's mean, modal, and median menstrual cycle lengths. Similarly, the pregnancy observed by Goswell and Gartlan (1965) was estimated to have lasted 170 days; an estimate which is matched by our mean gestation length of 168 days. In disagreement with these studies is Ardito's (1976) report of a gestation length of 213 days for patas monkeys.

References

Ardito, G. Check-list of the data on the gestation length of primates, *Journal of Human Evolution*, 1976, *5*, 213-222.

Doyle, L. L., & Chandler, G. *Erythrocebus patas* - an anatomically suitable primate model for reproductive studies. *Fertility and Sterility*, 1973, *24*, 648-651.

Draper, C. C., & Laurence, G. D. Susceptibility of *Erythrocebus patas* monkeys to rubella virus. *Journal of Medical Microbiology*, 1969, *2*, 249.

Gartlan, J. S. Adaptive aspects of social structure in *Erythrocebus patas*. In S. Kondo, M. Kawai, A. Ehara, & S. Kawamura (Eds.). *Proceedings from the Symposia of the Fifth Congress of the International Primatological Society*. Tokyo: Japan Science Press, 1975.

Gartlan, J. S., & Gartlan, S. C. Quelques observations sur les groupes exclusivement males chez *Erythrocebus patas*. *Annales de la Faculté des Sciences du Cameroun*, 1973, *12*, 121-144.

Goswell, M. J., & Gartlan, J. S. Pregnancy, birth and early infant behaviour in captive patas monkeys, *Erythrocebus patas*. *Folia primatologica*, 1965, *3*, 189-200.

Hall, K. R. L. Behaviour and ecology of the wild patas monkey, *Erythrocebus patas*, in Uganda. *Journal of Zoology (London)*, 1965, *148*, 15-87.

Hall, K. R. L. Social interactions of the adult male and adult females of a patas monkey group. In S. A. Altmann (Ed.), *Social Communication Among Primates*. Chicago: University of Chicago Press, 1967.

Hall, K. R. L., Boelkins, R. C., & Goswell, M. J. Behaviour of patas monkeys, *Erythrocebus patas*, in captivity, with notes on the natural habitat. *Folia primatologica*, 1965, *3*, 22-49.

Hall, K. R. L., & Mayer, B. Social interactions in a group of captive patas monkeys (*Erythrocebus patas*). *Folia primatologica*, 1967, *5*, 213-236.

Loy, J. The copulatory behaviour of adult male patas monkeys, *Erythrocebus patas*. *Journal of Reproduction & Fertility*, 1975, *45*, 193-195.

Loy, J., & Loy, K. Sexual harassment among captive patas monkeys (*Erythrocebus patas*). *Primates*, in press.

Struhsaker, T. T., & Gartlan, J. S. Observations on the behaviour and ecology of the patas monkey (*Erythrocebus patas*) in the Waza Reserve, Cameroon. *Journal of Zoology (London)*, 1970, *161*, 49-63.

Zuckerman, S. *The Social Life of Monkeys and Apes*. London: Kegan Paul, 1932.

* * *

ON THE EXAMINATION OF PHILIPPINE MONKEYS FOR TRYPANOSOMES

Primo V. Arambulo, III and Benjamin D. Cabrera

University of the Philippines System

Trypanosomes have been reported to occur indigeneously in man (Johnson, 1933; Dissanaike *et al.*, 1974) and nonhuman primates (Weinman & Wiratmadja, 1969; Weinman, 1970) in Southeast Asia. Natural transmission is known to take place among nonhuman primates in Taiwan (Cross *et al.*, 1970) and in West Malaysia (Weinman, 1970).

The search for trypanosomes in nonhuman primates in Southeast Asia has been motivated by the unanswered question of whether *T. cruzi* is present or not in this part of the world. So far, the nonhuman primate trypanosomes isolated have not been identified with *T. cruzi*, nor with the human trypanosome from Malaysia (Weinman, 1972).

Since Weinman reported the isolation of trypanosomes from macaques in Malaysia (Weinman, 1970) and from primates in Indonesia (Weinman, 1969), the purpose of the present study was to search for trypanosomes in Philippine nonhuman primates.

Two hundred adult Philippine monkeys (*Macaca fascicularis*), awaiting exportation, were examined. Blood samples were aseptically collected from the femoral vein of the monkeys and then transferred to citrated vials. Thick and thin blood smears were made, stained with Giemsa, and examined microscopically under low, high dry, and oil immersion magnification. One ml amount of the citrated blood sample was inoculated on nutrient agar slants containing 25% defibrinated rabbit blood containing streptomycin and penicillin 200 I.U./ml. The media used were previously tested for sterility. The media tubes containing the inoculum were incubated at 37°C and examined every 10 days for trypanosome growth. Tubes were discarded after the third reading, or 30 days after inoculation.

All 200 monkeys examined were negative for trypanosomes both by thick and thin blood smear, and by blood culture. This negative result was also recently obtained in our laboratory by Weinman and Cabrera who further examined adult monkeys from the same source.

References

Cross, J. H., Hsu, M. Y., & Hung, C. K. Trypanosome in the Taiwan monkey. *Southeast Asian Journal of Tropical Medicine and*

Authors' address: Institute of Public Health, University of the Philippines System, P.O. Box EA-460, Ermita, Manila.

Acknowledgment is due to Mr. Angel Viri and his staff at the A. T. Viri & Co., Inc. for allowing us to examine the monkeys used in this study.

Public Health, 1970, *1*, 150.

Dissanaike, A. S., Ong, H. T., & Kan, S. P. Trypanosome infections in Orang Aslis (Aborigines) in West Malaysia. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1974, *68*, 494.

Johnson, P. D. A case of infection by *Trypanosoma lewisi* in a child. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1933, *26*, 467.

Weinman, D., & Wiratmadja, N. S. The first isolates of trypanosomes in Indonesia and in history from primates other than man. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1969, *63*, 497-506.

Weinman, D. Trypanosomiasis in macaques and in man in Malaysia. *Southeast Asian Journal of Tropical Medicine and Public Health*, 1970, *1*, 11-18.

Weinman, D. *Trypanosoma cyclopis* N. Sp. a pigmented trypanosome from the Malaysian primates *Macaca nemestrina* and *M. ira*. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1972, *66*, 628-636.

* * *

CEBUS MONKEY MATERIALS AVAILABLE

A number of capuchin monkeys (*Cebus apella*) have been employed for investigations in experimental schistosomiasis supported by the National Cancer Institute. In terminating long-term studies it will be necessary to sacrifice a number of animals beginning early in 1978. Approximately 24 *Schistosoma haematobium* (Iran strain) infected capuchins, plus 12 to 15 uninfected controls will be necropsied. These animals have been in captivity for at least 5 years and host-parasite information is available for primates exposed to *S. haematobium*. Most of the schistosome infected capuchins have experienced self cure. In the interest of conservation and to make maximum use of materials, the principal investigator would be willing to provide recognized investigators with materials (tissue samples, parts of organs, blood smears, sera, etc., other than those used in an evaluation of host-parasite relationships) for collaborative studies. It would not be feasible for the donor to employ extraordinary or time consuming technics for the removal, preservation, and processing of study materials.--Contact: Dr. Robert E. Kuntz, Parasitology Department, Southwest Foundation for Research and Education, P.O. Box 28147, San Antonio, Texas 78284.

* * *

NIH ANNOUNCES ANIMAL POLICY REVISION

The Plenary Session speaker at the American Association for Laboratory Animal Science (AALAS) meeting in Anaheim, Dr. Thomas E. Malone, Deputy Director of the National Institutes of Health (NIH), outlined a proposed revision of the NIH policy concerning the care and use of laboratory animals. He noted that serious ongoing efforts on behalf of all animals have been a factor in the passage of animal welfare legislation, in the increasing importance of the voluntary American Association for Accreditation of Laboratory Animal Care (AAALAC) accreditation program, and in the formulation of NIH policy.

The revised policy will be more stringent than before and will require a stronger commitment from institutions that receive NIH grants, contracts, or other awards to comply with the "Guide for the Care and Use of Laboratory Animals" and NIH's "Principles for the Use of Animals". The following is a summary of specific points to be included in the policy:

(1) Institutions will be required to submit more complete assurance statements. The statement will commit an institution to comply with the "Guide for the Care and Use of Laboratory Animals" and the NIH "Principles for the Use of Animals". Accreditation by AAALAC is described as the best means of demonstrating compliance, although an institutional committee consisting of at least five qualified members can evaluate the institution's program annually for compliance. The names and positions of committee members and a summary of their qualifications will also have to be filed with NIH and kept current.

(2) The institution must maintain records of committee activities, of accrediting body determinations, and of investigator usage that will be available to NIH.

(3) A new assurance statement will have to be filed routinely every five years. When an institution is considered to be not in compliance, an annual progress report will be required. Failure to correct deficiencies in a reasonable period of time could be the basis for withholding or terminating awards.

(4) Grant applications and contract proposals will be expected to include information that makes possible an assessment of the rationale for animal use, the precautions taken to avoid discomfort and injury, and whether or not the numbers proposed and species to be used are appropriate.

(5) Measures will be taken to alert NIH staff and review groups to consider animal welfare issues in the review and award of applications and proposals. No grant, contract, or other award will be made unless there is compliance with the policy or its related principles.

For further information contact Dennis O. Johnsen, DVM; Chairman, AALAS, Public Policy Committee; Building 31, Room 5B55; National Institutes of Health; Bethesda, MD 21044.

* * *

REQUEST MADE FOR DETERMINATION OF GENERIC NAMES OF THE BABOON AND MANDRILL: COMMENTS INVITED

In the "Taxonomy" section of "New Books and Articles" in the July, 1977 issue of this *Newsletter*, we incorrectly cited the author of the "Request for Determination of the Generic Names of the Baboon and the Mandrill (Mammalia: Primates, Cercopithecidae, Z.N. (S.) 2093," published in the *Bulletin of Zoological Nomenclature*, as only E. Delson. The request was in fact jointly authored by Delson and P. H. Napier, the latter of the Department of Zoology, British Museum (Natural History), London.

The authors had independently approached the International Commission on Zoological Nomenclature with requests to rule on the name *Papio*, which is apparently invalid for the baboons. The authors' proposals were directly opposed to one another and they agreed at the request of the Acting Secretary of the Commission to collaborate and present the two alternatives in a combined request to the Commission, which is expected to vote on the matter sometime after this year. Delson's request is to uphold priority, which means to use *Papio* for the mandrill and drill and *Chaeropithecus* for the baboons. Napier's request is to preserve current usage, which means to use *Papio* for the baboons and *Mandrillus* for the mandrill and drill.

Interested persons should write to the Commission (Secretary, International Commission on Zoological Nomenclature, c/o British Museum (Natural History), Cromwell Road, London, SW7 5BD, England) giving their views. Until a decision is made, according to the international rules of zoological nomenclature (Article 80 of the Code) current usage must be maintained.

* * *

CADAVER MATERIALS OF *THEROPITHECUS GELADA* NEEDED

Embalmed heads of complete cadavers of *Theropithecus gelada* are needed for purposes of dissection and study of the masticatory apparatus. Loans, gifts,or sales will be welcomed.--Contact: Nina Jablonski or Daris Swindler, Department of Anthropology (DH-05), University of Washington, Seattle, WA 98195.

* * *

CLEARINGHOUSE ESTABLISHED FOR PRIMATE RE-USE*

The Primate Supply Information Clearinghouse, operating under the University of Washington Regional Primate Research Center in Seattle, has been created for the purpose of encouraging and assisting in the "re-cycling" of nonhuman primates used as laboratory animals for biomedical research studies. The project, which will be operational by mid-January, 1978, is supported by contract with the National Institutes of Health (NIH) Division of Research Resources.

With the shortage of primates for laboratory use and the increasing cost of animal procurement, NIH's Animal Resources Program recognized the need to encourage sequential and multiple use of the animals, and to effect direct and speedier communication between users through the newly created Clearinghouse.

Utilizing a computerized data system, the primate supply information will be transmitted to the biomedical research community by the issuance of a weekly *Alerting Bulletin* containing notices of availability of primates, or their tissues and body fluids, and notices of needs.

The overall purpose of the Clearinghouse is to make the best possible use of the available research primates in the country. Investigators and colony managers will be solicited and invited to list their animals available for transfer or to be shared. The Clearinghouse will also publish sources of supply for body fluids and tissues in addition to body organs of sacrificed animals.

It is also anticipated that investigators seeking animals or body fluids and tissues will file their needs with the Clearinghouse. In addition to the weekly *Alerting Bulletin,* the Clearinghouse will conduct a matching service by computer and will make referrals to possible users. The data base collected may include species used, species bred, probability of animals available for sharing, and availability of social groups for behavioral studies.

"We are promoting and encouraging sequential use of primates," says Manager Maryeva Terry. "Some laboratories may have fully conditioned primates presently not being used because a particular study has been concluded. These animals are maintained sometimes for long periods of time waiting for the next project to come along. They could be used immediately by other investigators, thereby making most efficient economical use of [the]...animals."

A user survey conducted in 1975 by Mrs. Terry indicated that there was a great willingness on the part of the primate user community to

---

*Based on "Science & Health Report #184" from the Division of Research Resources, National Institutes of Health.

cooperate in the contemplated service. There will be no charge for the service, which will be available to both government-supported researchers and scientists in private industry using primates in their work. Special efforts will be made to make scientists aware of potential laboratory animals available in their own locality. Particular emphasis will be placed on reaching colony managers and managers of research organizations.

The initial mailing of *Alerting Bulletin* will be made to all clients currently on the mailing list of the Primate Information Center, the primate information service maintained by the Washington Center for over a decade. In addition, mailings will be made to researchers and organizations with an interest in primate research and which are on various other mailing lists.

Scientists using or having need for primates for research purposes may be put on the list upon request. Write to Primate Supply Information Clearinghouse, Regional Primate Research Center, University of Washington, Seattle, WA 98105, or call 206-543-5178.

* * *

LEMURS AND GALAGOS AVAILABLE

Lemur fulvus fulvus available from a well-established colony that includes up to 5 generations of known genealogy. Price: $1500 each. *Galago crassicaudatus crassicaudatus* available from a well-established colony that includes up to 8 generations of known genealogy. Price: $275 each.--Contact: Dr. Arthur S. Hall, Oregon Regional Primate Research Center, 505 N.W. 185th Av., Beaverton, OR 97005.

* * *

COMPARATIVE PATHOLOGY CONTINUING EDUCATION COURSE

The 5th annual Comparative Pathology Course will be presented May 8-10, 1978, at the Armed Forces Institute of Pathology, Washington, DC. Military and federal service employees in the medical, veterinary, and other health science fields are requested to consult respective agency regulations for appropriate application procedures. Civilian physicians, veterinarians, and allied scientists are invited to apply and will be considered on a space available basis. This course is specially designed to bring attention to disease processes in animals for which a similar entity occurs in man. Differences and similarities of pathologic lesions, as well as the biological behavior of specific entities,will be compared in animals and man. Application forms to attend this course may be obtained by contacting: The Director, Armed Forces Institute of Pathology, (AFIP-EDE), Washington, DC 20306. Completed application forms should be returned by April 15, 1978. Non-federal civilians and foreign nationals are required to submit a $75.00 fee, payable to the Treasurer of the United States.

SQUIRREL AND RHESUS MONKEYS AVAILABLE

The National Institutes of Health (NIH) has established several supply sources of nonhuman primates. These sources were established in the face of current and pending shortages in nonhuman primates to assure a supply of animals for NIH, and Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) supported projects. During the period from December 1, 1977, to March 1, 1978, the following animals will be available from these sources:

9 male and 15 female squirrel monkeys (*Saimiri sciureus*) of Guyanan stock, 3-4 months old, weighing 300-400 gm.

2 male and 55 female squirrel monkeys (*Saimiri sciureus*), adult excess breeders of Guyanan origin.

3 male and 1 female rhesus monkeys (*Macaca mulatta*), 24-27 months old, weighing 3-4 kg.

100 male and 7 female rhesus monkeys (*Macaca mulatta*), 12-24 months old, weighing 1-3 kg.

80 male and 65 female rhesus monkeys (*Macaca mulatta*), 0-12 months old, weighing up to 1 kg.

Except for the adult squirrel monkeys, these animals are domestically bred and reared in a controlled colony environment. The dates of birth and the parentage are available upon request. Unless specifically requested otherwise, the rhesus monkeys, but not the squirrel monkeys, will be vaccinated against measles. Requests for special handling and procedures will be considered.

Investigators in nonprofit institutions who wish to obtain animals from the above groups for use in biomedical and behavioral projects are invited to submit requests for them. The requests in letter form should indicate the source of support for the using project and, if supported by NIH, or ADAMHA, the title and number of the grant or contract. The request should also include a specification of the animals required, including number, age, sex or other special characteristics, and state what, if any, requirement there will be to obtain animals from captive-bred sources in future years. Such requirements for future supply from captive-bred sources will be honored whenever feasible. The entire request should not exceed one typewritten page. It should be addressed to Dr. Charles McPherson, Chief, Animal Resources Branch, Division of Research Resources, Room 5B59, Building 31, National Institutes of Health, Bethesda, MD 20014. Priority will be given to requests for use on NIH and ADAMHA supported projects received prior to January 1, 1978, and after that, all requests honored on a first-come/first-served basis.

The recipients of the animals will be required to pay a fee which will incorporate shipping costs for each animal. The fee will be $315 each for the rhesus monkeys and $240 each for the squirrel monkeys. These fees will be paid directly to the contractor supplying the animals and will be credited to the NIH-supported breeding program to provide partial support for the breeding colonies.

* * *

SYMPOSIUM ON COMPARATIVE PATHOLOGY OF ZOO ANIMALS

A three-day Symposium on Comparative Pathology of Zoo Animals will be held on October 2-4, 1978 at the National Zoological Park, Washington, DC. It will be sponsored by the Registry of Comparative Pathology, Armed Forces Institute of Pathology; National Zoological Park, Smithsonian Institution; Zoological Society of San Diego; and Registry of Tumors in Lower Animals, Smithsonian Institution. The Symposium will be conducted with the support of the Friends of the National Zoo (FONZ).

The Symposium will highlight the pathology and mechanism of diseases in zoo animals and in other species held in captivity (*e.g.*, wildlife parks, preserves, aquaria, and other facilities). It will include comprehensive reviews, brief reports, and poster sessions.

Topics to be discussed include genetic and developmental diseases, neonatal pathology, immunologic diseases, nutritional and metabolic disorders (including poisonings), infectious diseases, parasitism, neoplasms, capture pathology (including management and trauma), gerontological conditions, and clinical pathology.

Individuals interested in participating are invited to submit a title and a 200 word abstract by May 1, 1978 to Dr. Richard J. Montali, National Zoological Park, Washington, DC 20008. (Phone: 202-381-7293). Abstracts may be submitted as a presentation or for the poster session. Some abstracts submitted for presentation may be assigned to the poster session at the discretion of the program committee. Further information about the Symposium may be obtained from Dr. Montali, organizing secretary.

* * *

AMERICAN SOCIETY OF PRIMATOLOGISTS 1978 MEETING

The Second Annual meeting of the American Society of Primatologists will be held at Emory University in Atlanta, GA, September 6-10, 1978. Dr. Sue Savage Rumbaugh has been appointed to chair the local arrangements committee. A call for papers will be issued in the very near future.

* * *

INDIA BANS EXPORT OF ALL MONKEYS

In November, 1977, the government of India announced a complete ban on the further export of all monkeys from India. It is uncertain whether shipment of monkeys already authorized under the current year's quota (ending March 31, 1978) will be permitted.

* * *

MONKEYPOX INFECTIONS BEING WATCHED CAREFULLY

With smallpox on the verge of being eradicated, monkeypox virus, which causes a smallpox-like illness in humans, is being watched closely to determine whether there is a possibility of the smallpox virus subsisting in an unidentified animal reservoir. All available evidence indicates that no such reservoir exists.

Monkeypox, first identified in a captive cynomolgus monkey colony in 1958 in Denmark can be transmitted to man, though this happens infrequently. The virus is easily distinguishable from variola virus in the laboratory, but the patient with monkeypox presents a clinical picture similar to that of smallpox.

Since 1970, when the first case of monkeypox in humans was observed, a total of 28 cases have been diagnosed in West and Central Africa.

As a result of a special monkeypox survey conducted by the national health authorities in collaboration with the World Health Organization in the period September, 1976-March, 1977, 5 cases of monkeypox in humans were detected in Zaire. Teams went into 13 surrounding villages looking for possible cases. Approximately 120,000 persons were examined for pockmarks and vaccination scars, and many reports of rash illness were investigated.

Similar surveys were carried out by national and WHO teams in Liberia, Nigeria, Sierra Leone, and Ivory Coast in 1975. No new cases were found. Source: World Health 36:291, August/September, 1977. [From *CDC Veterinary Public Health Notes*, September, 1977, p. 2.]

* * *

RECENT BOOKS AND ARTICLES
(Addresses are those of first authors)

Living New World Monkeys (Platyrrhini). With an Introduction to Primates. Philip Hershkovitz. Chicago: University of Chicago Press, 1977. 1,100 pp. [Price: $80.00]

The first of two volumes whose purpose is to provide a thorough and comprehensive treatise on New World monkeys. The book is arranged in three parts. The first includes a brief history and a definition, characterization, and comparison of Primates as a taxonomic unit. Distinctive characters of the major subdivisions of the order are also discussed and compared, with principal emphasis on New World monkeys. There is also a discussion of platyrrhine centers of origin, evolution, and dispersal. The second part of the book deals with New World monkeys from comparative anatomical and evolutionary points of view. Whereas representatives of various orders of mammals are compared with primates in Part I, the morphological and comparative studies of Part II are based on virtually all known genera of living primates. Display characters, pelage, the evolution of color patterns, primate locomotion, cranial and dental morphology, and the central nervous system are considered in this second part. The third part of the volume is the most extensive and is devoted to the taxonomy and biology of the family Callitrichidae, comprising marmosets and tamarins, and the family Callimiconidae, represented by the callimico only. A synonymy preceding the descriptions of each family, genus, species, and subspecies summarizes the published taxonomic and biological history of the named animal or group. The names or name combinations in each synonymy are listed chronologically. Misidentifications or invalid uses of names of the taxon in question are listed. The precise spelling of each name in the literature is shown in the synonymy, together with author, date of publication, bibliographic reference, and annotation of the publication's content. The volume concludes with a bibliography of more than 2,500 published works and a gazetteer of essential geographic data. There are 520 figures and 7 color plates. Contents: Part I. History and evolutionary biology. Part II. Evolutionary and comparative morphology of New World monkeys, infraorder Platyrrhini. Part III. Systematics, evolution, and biology of the families callitrichidae and callimiconidae. Gazetteer; Tables of measurements; Appendix;

In many cases, the original source of references in this section has been the Current Primate References prepared by The Primate Information Center, Regional Primate Research Center SJ-50, University of Washington, Seattle, WA 98195. Because of this excellent source of references, the present section is devoted primarily to presentation of abstracts of articles of practical or of general interest. In most cases, abstracts are those of the authors. Any author wishing to have a published paper abstracted in this section may do so by sending the Editor a copy of the reprint with a summary or abstract and indicating his desire on the reprint.

Literature cited; Author index; Animal name index; Subject index.

Primate Conservation. His Serene Highness Prince Rainier III of Monaco & Geoffrey H. Bourne (Eds.). New York: Academic Press, 1977. 658 pp. [Price: $39.50]

The chapters in this volume describe the problems faced by various primate species in their natural habitats and discuss what is being done and what needs to be done to promote their survival. The royalties from the book are being donated to the cause of primate conservation. Contents: 1. The Galagines of South Africa, by G. A. Doyle & S. K. Bearder. Introduction; Distribution; Description; Habitat; Population densities; Activity patterns; Sleeping and nests; Locomotion; Feeding; Group structure; Home range; Birth periodicity; Mother-infant relationship and development; Relationships with other species; Discussion. 2. The Aye-Aye, by Jean-Jacques Petter. Systematics and description; Description--variability; Anatomy; Ecoethology; Rhythm of activity; The nest; Diet; Reproduction; Communication; Geographic distribution, habitat, protection; Conclusion. 3. Conservation of the Brazilian Lion Tamarins (*Leontopithecus rosalia*), by Adelmar F. Coimbra-Filho & Russell A. Mittermeier. Introduction; Taxonomy, distribution, and ecology; Past conservation measures on behalf of *Leontopithecus;* Conservation measures on behalf of *Leontopithecus* since the 1972 Washington Conference; Recommendations for the future. 4. Rediscovery and conservation of the Peruvian Yellow-Tailed Wooly Monkey (*Lagothrix flavicauda*), by Russell A. Mittermeier, Hernando de Macedo-Ruiz, B. Anthony Luscombe, & John Cassidy. Introduction; Description; History; The rediscovery of *Lagothrix flavicauda*; Habitat and range of *Lagothrix flavicauda*; Status of *Lagothrix flavicauda*; Conservation and recommendations for the future; Plans for a *Lagothrix flavicauda* breeding colony. 5. Primate conservation in Brazilian Amazonia, by Russell A. Mittermeier & Adelmar F. Coimbra-Filho. Introduction; Defining Amazonia; Habitat types in Amazonia; Threats to the survival of primates in Brazilian Amazonia; The primates of Brazilian Amazonia; The future of primate conservation in Brazilian Amazonia. 6. The Red Ouakari in a seminatural environment: Potentials for propagation and study, by Roy Fontaine & Frank V. Dumond. Introduction; The status of the Red Ouakari; History of the monkey jungle group; Description of the monkey jungle "Rainforest"; Ecological utilization of the environment; Specific characteristics of the Red Ouakari; Reproductive patterns; Some aspects of social behavior in *Cacajao c. rubicundus;* Suggestions for a captive propagation effort; Comparative perspectives. 7. The socioecological basis for the conservation of the Toque monkey (*Macaca sinica*) of Sri Lanka (Ceylon), by Wolfgang P. J. Dittus. Introduction; General information; The ecology and behavior of *Macaca sinica* at Polonnaruwa; The ecology of the subspecies of *Macaca sinica;* Estimation of available habitat and population size per subspecies; Conservation prospects and suggestions. 8. The status of the Barbary Macaque *Macaca sylvanus* in captivity and factors influencing its distribution in the wild, by John M. Deag.

Introduction; Distribution and habitat; Factors influencing distribution; Hunting, trapping, internal use, and export of monkeys; Monkeys and the regeneration of the Moroccan Cedar Forests; Barbary macaques in captivity; Conclusions and recommendations; Appendix 1: Zoos and wildlife parks that replied to the questionnaire on Barbary macaques in their collection 1964-1974. Appendix 2: Other zoos known (or reputed) to keep Barbary macaques, 1964-1974. 9. The lion-tailed monkey and its South Indian rain forest habitat, by Steven Green & Karen Minkowski. Introduction; Habitat; Status of *Macaca silenus* population and its habitat; The Ashambu Hills; Proposals for preserving *Macaca silenus;* Summary; Appendix 1: Preserving India's *Sholas;* Appendix 2: Cardamon cultivation in *Sholas.* 10. Population dynamics of rhesus monkeys in Northern India, by Charles H. Southwick & M. Farook Siddiqi. Introduction; Study area; Methods; Results and discussion; Comments on conservation; Summary. 11. The gelada baboon: Status and conservation, by R. I. M. Dunbar. Introduction; Distribution and natural history; Status; Conservation; Conclusions. 12. The baboon, by S. S. Kalter. Introduction; General considerations; Problems; Uses; Conclusion. 13. The Guereza and man: How man has affected the distribution and abundance of *Colobus guereza* and other black colobus monkeys, by J. F. Oates. Introduction; Where the Guereza lives; How the Guereza lives; Human interference with Guereza habitats in East Africa; Hunting and trapping of Guerezas in East Africa and Ethiopia; Legal protection of Guerezas in East Africa and Ethiopia; Guereza status in West and Central Africa and the Sudan; Other black colobus; Conclusions; Appendix: Vegetation types. 14. *Presbytis entellus,* the Hanuman langur, by John R. Oppenheimer. Taxonomy and distribution; Activity, habitat, and diet; Population density, structure, and dynamics; Relationship with other animals; Summary. 15. The Douc langur: A time for conservation, by Lois K. Lippold. Introduction; Distribution and status; Physical description; Description of study area; Mammals; Materials and methods; Comparative data; Reaction to observer; Population dynamics; Birth peaks; Interspecific competition; Feeding behavior; Locomotor behavior; Social behavior; Dominance behavior; Sexual behavior; Consort behavior; Play behavior; Conservation measures; Summary. 16. The lesser apes, by David J. Chivers. Introduction; Classification; Evolution; Socioecology; Population sizes; Discussion; Summary; Appendix: A day in the life of the Malayan Siamang and Lar Gibbon. 17. The conservation of eastern gorillas, by Alan G. Goodall & Colin P. Groves. Distribution and taxonomy; Ecology; Conservation; Summary.

Progress in Ape Research. Geoffrey H. Bourne (Ed.). New York: Academic Press, 1977. 300 pp. [Price: $16.00]

This book includes the papers presented at a conference held in 1976 at the Yerkes Regional Primate Research Center, Atlanta, Georgia, in honor of the 100th anniversary of the birth of Robert Y. Yerkes. Contents: Section 1. HISTORICAL BEGINNINGS OF RESEARCH ON GREAT APES. Introduction, by A. Riesen. Home life with chimpanzees (Part 1), by

D. N. Yerkes. Home life with chimpanzees (Part 2), by R. Y. Blanshard. Five years in New Haven and Orange Park: An appreciation, by M. P. Crawford. Reminiscences of the Yerkes Orange Park Laboratory in the mid-1930s, by G. M. Haslerud. Robert M. Yerkes and memories of early days in the laboratories, by J. H. Elder. Reminiscences of early days in New Haven and Orange Park, by S. D. S. Spragg. Memories of my friend Robert M. Yerkes and his "Prince Chim", by H. J. Coolidge. Dr. Robert Yerkes and sex research, by V. Nowlis. In search of the elusive semiotic, by K. H. Pribram. Section 2. COMMUNICATION AND LANGUAGE IN GREAT APES. The emergence and state of ape language research, by D. M. Rumbaugh. Primate vocalization: Affective or symbolic? by P. Marler. Spontaneous gestural communication among conspecifics in the pygmy chimpanzee (*Pan paniscus*), by E. S. Savage-Rumbaugh, B. J. Wilkerson, & R. Bakeman. Ameslan in Pan, by R. S. Fouts. Talking to Lana: The question of conservation, by T. Gill. Mathematical capabilities of Lana chimpanzee, by G. B. Dooley & T. Gill. Object- and color-naming skills of Lana chimpanzee, by S. M. Essock, T. V. Gill, & D. M. Rumbaugh. Section 3. CHIMPANZEES AS BIOMEDICAL MODELS. Introduction: Chimpanzees as biomedical models, by L. D. Byrd. Acute effects of stimulants and depressants on sequential learning in Great Apes, by W. A. Pieper. A survey of advances in chimpanzee reproduction, by C. E. Graham. Sexual behavior of the chimpanzee in relation to the gorilla and orang-utan, by R. D. Nadler. Visual characteristics of apes and persons, by F. A. Young & G. A. Leary. Immunology and melanoma, by H. F. Seigler. Section 4. COMPARATIVE PERSPECTIVES OF HUMAN ORIGINS. Field study of primate behavior, by S. L. Washburn. The release of primate aggression, by I. S. Bernstein and T. P. Gordon. A review of cross-modal perceptual research at the Yerkes Regional Primate Research Center, by R. K. Davenport and K. J. Pralinsky. Cognitive processing in Great Apes (Pongidae), by D. Robbins. Naturalistic positional behavior of apes and models of hominid evolution, 1929-1976, by R. H. Tuttle.

Reports and Proceedings

The Jersey Wildlife Preservation Trust Thirteenth Annual Report 1976. From the Headquarters of the Jersey Wildlife Preservation Trust, at the Zoological Park, Les Agures Manor, Trinity, Jersey, Channel Islands, 1977.

This report included the following articles, among others: Behavioural observations on groups of *Callitrichidae*, by M. F. Stevenson. Celebesian black ape, by N. B. D. Lindsey. Comparative physical development in six hand-reared lowland gorillas, by J. H. Usher Smith, G. J. King, G. Pook, & M. Redshaw. Development of play and social behaviour in two lowland gorilla infants, by M. Redshaw. Significance of the cross extension reflex in human and lowland gorilla neonates, by Dr. F. S. Carter. The affluent anthropoid, by G. J. King & J. P. W. Rivers. Investigation into "Wasting Marmoset Syndrome", by G. J. King.

Interest of the Non-Human Primate Model in Pharmacology and Toxicology. Proceedings of a symposium held in Lyon, France, May 13-14, 1976. *Sciences et Techniques de l'Animal de Laboratoire,* 1976, *1*, 189-338. [This special issue of the journal may be ordered from Dr. G. Mahouy, Laboratoire d'Expérimentation animale, Institut de Rechèrche sur les Maladies du Sang, Hôpital St. Louis, 75010 Paris, France. Name and address should be accompanied by a cheque for $12 made out to: "Tresorier de ATAL."]

The main purpose of this symposium was to enable basic research scientists to discuss their views and theories related to the use of nonhuman primates in pharmacology and toxicology with members of the pharmaceutical industries. It was expected that this meeting would help sum up the possibilities of utilizing nonhuman primates in these disciplines and to establish models with long-term and more immediate applications. Contents: [3 papers are in English and 13 in French with English summaries.] Animal models in pharmacology and toxicology, by M. Bertrand; Nonhuman primates in toxicology--Choice of species--Spontaneous diseases, by G. Mazué, J. Berthe, G. Richer, & B. Dupuis; Drug toxicity in the central nervous system in nonhuman primates, by R. Heywood & P. L. Hepworth; Autoimmunization and autoimmune diseases in primates, by J. C. Monier & M. Lapras; The use of primates in teratological studies, by S. Bruggemann & J. Grauwiller; Contribution to the statistical study of the normal electrocardiogram in the macaque "*Macaca fascicularis*": Toxicological applications, by M. Clair, J. L. Rouaud, & D. Roffino; Nonhuman primates in pharmacology: The choice of animal models in pharmacology: The role of primates, by H. Weber; The role of nonhuman primates in pharmacokinetic studies, by R. R. Lister; Nonhuman primates in cardiovascular pharmacological studies, by B. Dupuis, M. Serre, P. Gautier, & G. Mazué; Nonhuman primates in pharmacological studies of the respiratory tract, by D. G. Clark; The use of primates for the evaluation of therapeutic efficacy of drugs in parasitology, by F. Benazet, C. Godard, & J. P. Leroy; Nonhuman primates in psychopharmacology; Use of primates in previsional psychopharmacology, by C. M. Milhaud & M. J. Klein; The baboon (*Papio papio*), human epilepsy model: A neurophysiological approach, by Ch. Menini; Primate model for the study of the effects of drugs on sleep, by J. Bert; Utilisation of a primate for pharmacological study of analgesic drugs and determination of pharmacodependence, by J. Mercier, P. Etzensperger, & S. Dessaigne.

Report on the Implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora in the United Kingdom: 1 January - 31 December, 1976. Department of Environment, United Kingdom of Great Britain and Northern Ireland, 1977. 76 pp.

The first several pages discuss matters related to the Convention and its implementation in Great Britain. There follow tables of statistics with explanatory notes. The tables summarize exports, re-exports, and imports of species of fauna and flora listed in the Convention Appendices as well as species not included.

Bibliographies

Bibliography on the Composition of Milk of Nonhuman Primates. Benella Caminiti. Seattle: Primate Information Center, 1977. 42 Citations. [Price: $2.00. Send orders to: Primate Information Center, Regional Primate Research Center (SJ-50), University of Washington, Seattle, WA 98195]

Atherosclerosis in Nonhuman Primates: A Bibliography with Primate Index. Benella Caminiti & Jean Balch Williams. Seattle: Primate Information Center, 1977. 415 Citations. [Price: $3.50. Order address same as in previous reference.]

Field research on Callitrichid and Cebid monkeys: An historical, geographical, and bibliographical listing. Baldwin, L. A., Patterson, T. L., & Teleki, G. (Dept. of Anthropology, 409 Social Science Bldg., Penn. State Univ., Univ. Park, PA 16802) *Primates,* 1977, *18,* 485-507.

Disease

Infectious primate type C virus shed by healthy gibbons. Kawakami, T. G., Sun, L., & McDowell, T. S. (Comp. Oncology Lab., Univ. of Calif., Davis, CA 95616) *Nature (London),* 1977, *268,* 448-450.

> Many captive gibbons are naturally exposed to infectious type-C virus based on the prevalence of animals with humoral antibodies reactive to the virus and isolation of virus from tissue of leukaemic and normal gibbons. A closely related infectious type-C virus has also been isolated from a wooly monkey with a spontaneous fibrosarcoma which implies that a common virus could infect unrelated nonhuman primates. Several reports recently have identified infectious primate type-C virus, viral components, and humoral antibody reactive to this virus in leukaemic and normal humans, suggesting that man also may be susceptible to infection by a related virus. In an attempt to identify a possible source for infectious primate type-C virus that might infect primates as well as other animals, we decided to investigate whether healthy captive gibbons were shedding virus, since this nonhuman primate is frequently displayed at zoos or kept as pets. This report presents evidence that gibbons can have long term viraemia with type-C virus without detectable immune response. These viraemic animals actively shed infectious virus in urine and faeces.

Lymphocyte subpopulations in spontaneous disease of rhesus macaques. Holmberg, C. A., Terrell, T. G., & Osburn, B. I. (California Primate Research Ctr. & Dept. of Vet. Path., Univ. of Calif., Davis, CA 95616) *American Journal of Veterinary Research,* 1977, *38,* 1855-1860.

> The immunologic status of rhesus monkeys (*Macaca mulatta*) with naturally occurring disease was evaluated by determining the percentages of B and T lymphocytes and mitogen responsiveness of lymphocytes in peripheral blood and lymph nodes. The B lymphocytes were identified by the presence of cell surface immunoglobulin and

receptors for complement. The T lymphocytes were identified by their ability to form spontaneous rosettes with sheep red blood cells. Rhesus macaques with idiopathic or primary amyloidosis had normal lymphocyte characteristics. Peripheral blood lymphocytes from rhesus macaques with atypical tuberculosis had decreased percentages of spontaneous rosette-forming cells and depressed responses to concanavalin A, and those with chronic diarrhea or chronic arthritis were also found to have abnormal peripheral blood lymphocyte characteristics. The percentage of B and T lymphocytes in normal lymph nodes was variable, making simultaneous histologic examination necessary for evaluation of diseased animals.

The olive baboon (*Papio anubis*) as an animal model for research in affective disorders of man. Benhar, E. (Dept. of Isotope Res., Weizmann Inst. of Sci., Rehovot, Israel) *Laboratory Animal Science*, 1977, *27*, [Part II of Two Parts], 887-894.

Efforts were made to develop an animal model for studies of the role of biogenic amines in a group of human "mood" diseases including mania and depression. Subadult, male olive baboons (*Papio anubis*), both normal and psychologically disturbed individuals, were anesthetized and administered heavy oxygen (18_0) enriched air for 60-130 minutes. Afterwards blood, urine, and cerebrospinal fluid were collected every hour, for 10 hours. The samples were subsequently fragmentographically analyzed for labelled metabolites of serotonin, dopamine, and norepinephrine. The results showed that significant incorporation of 18_0 was found in all metabolites studied, with a peak after about 4 hours. The effect of chlorpromazine injection of 18_0 incorporation was also measured. It was found that chlorpromazine caused a faster rise in labelling and indicated the stimulation of dopamine turnover in the brain. The usefulness of the animal model and the *in vivo* labelling technique for biogenic amine determination in the brain was demonstrated by the fact that the technique was subsequently used in human patients with neurologic disease.

Physiology

Nonhuman primates: Laboratory animals of choice for neurophysiologic studies of sleep. Balzamo, E., Santucci, V., Seri, B., Vuillon-Cacciuttolo, G., & Bert, J. (Laboratoire d'Écophysiologie des États de Vigilance chez les Primates, Service de Neurophysiologie Clinique, Centre-Hospitalo-Universitaire de la Timone, Boulevard Jean Moulin, 13385 Marseilles Cédex 4, France) *Laboratory Animal Science*, 1977, *27* [Part II of Two Parts], 879-886.

A systematic study was made of several nonhuman primates to learn more about their relative usefulness for studies of sleep. Species studied included the Guinea baboon (*Papio papio*), Kenya or yellow baboon (*P. cynocephalus*), olive baboon (*P. anubis*), sacred baboon (*P. hamadryas*), vervet monkey (*Cercopithecus aethiops*), rhesus

monkey (*Macaca mulatta*), bonnet monkey (*M. radiata*), crab-eating monkey (*M. fascicularis*), patas monkey (*Erythrocebus patas*), chimpanzee (*Pan troglodytes*), mongoose lemur (*Lemur mongoz*), black lemur (*Lemur macaco fulvus*), and bushbaby (*Galago senegalensis*). Comparisons were made of electroencephalographic activity, states of vigilance, and responses to sleep-waking drugs. The results showed that there were major similarities among the genera studied as well as individual intrageneric and intraspecies differences. It was concluded that the chimpanzee, olive baboon, and rhesus monkey were the best species for comparative studies, and that the rhesus monkey was the best single model because of its well defined sleep organization and ease of handling and housing.

Behavior

A preliminary survey of behavioural sterotypes in captive primates, Trollope. J. (Dept. of Growth & Develop., Inst. of Child Hlth., Univ. London, 30 Guilford St., London, WC1N 1EH, England) *Laboratory Animals*, 1977, *11*, 195-196.

This report gives the results of preliminary analysis of data on non-experimentally induced behavioral abnormalities in captive primates collected during 32 visits to 20 zoos. Behavioral abnormalities observed ranged from self-biting to stereotyped cage pacing. The overall incidence of abnormalities was low, only 5.7% of the 630 animals observed showed any abnormal behavior. However, abnormality is clearly associated with certain factors, some of which are described. For example, 40% of the animals caged alone had abnormalities, and only 5% of animals living 2 to a cage. No abnormalities were found with animals kept 4 or more to a cage. 10.2% of males observed had abnormalities compared to 2.7% of females. Variables showing no association with abnormalities included: access to inside or outside space and cage furniture (*e.g.*, presence or absence of perches or swings). Distribution of abnormalities by primate families is also given.

The common marmoset (*Callithrix jacchus jacchus*) as a model for ethological research. Stevenson, M. F. (Dept. of Zoology, Univ. Coll. of Wales, Aberystwyth, SY23 3DA, Wales) *Laboratory Animal Science*, 1977, *27* [Part II of Two Parts], 895-900.

The uses and advantages of the common marmoset (*Callithrix jacchus jacchus*) as an animal model for ethological research were examined. It was found that the group structure of this species in the laboratory provided a nearer approximation to the group structure occurring in the wild than is the case with Old World monkeys. The small size of the common marmoset also made it easier to handle and cheaper to maintain. The adult female gave birth at five-month intervals and usually reared twin offspring. This, and the short generation time, made it an ideal model for mother-infant behavioral studies. The common marmoset was also shown to be a useful model for studies of social play, especially for categorizing the changes in playful be-

havior with age, and the relationship of the patterns seen in play to other behaviors. It was also suggested that it may be an ideal model for experimental studies of play. Other suggested uses included studies of the relationship of food supply and feeding habits to territory size and group structure, and of the advantages to elder offspring of helping to rear their younger siblings. As a result of these observations, the common marmoset was considered to have great potential as a model for ethological research, both in its natural habitat and in the laboratory.

Breeding

The duration of gestation in the squirrel monkey (*Saimiri sciureus*). Kerber, W. T., Conaway, C. H., & Smith, D. M. (Caribbean Primate Res. Ctr., Univ. of Puerto Rico, PO Box 297, Sabana Seca, PR 00749) *Laboratory Animal Science*, 1977, *27* [Part I of Two Parts], 700-702.

A restricted mating period was used to determine the duration of gestation in the squirrel monkey (*Saimiri sciureus*) of Colombian-Brazilian origin. Ten pregnancies were observed. The length of the gestation period was found to range from 141 to 154 days with a mean of 146.9 (± 3.28 SD), a median of 146.5, and a modal length of 146.

The reproductive cycle of the Capuchin (*Cebus apella*). Wright, E. M., Jr., & Bush, D. E. (Dept. of Vet. Pub. Hlth., Coll. of Vet. Med., Texas A & M, Univ. Coll. Station, TX 77843) *Laboratory Animal Science*, 1977, *27* [Part I of Two Parts], 651-654.

Six mature female capuchins (*Cebus apella*) were used to study occurrence of bleeding, the length and phases of the menstrual cycle, and the gestation period. During a 3-month period the menstrual cycle was determined to be 21 days, including an average of 4 days in which bleeding was detectable. It was found that only proestrus and estrus could be reliably identified during the menstrual cycle by the use of vaginal smears. Each female was housed with a male for a sufficient time to allow insemination. Four became pregnant. Three had term pregnancies and one aborted. The other two remained barren. The average gestation period for the three normal pregnancies was 153 days.

Variation in age at puberty in monkeys. Rowell, T. E. (Zoology Dept., Univ. of CA., Berkeley, CA 94720) *Folia primatologica*, 1977, *27*, 284-296.

5 female and 3 male patas (*Cercopithecus patas*) monkeys and 6 female and 3 male talapoin (*C. talapoin*) monkeys matured in a captive breeding colony. Age at puberty is given, and some variation discussed. The talapoin, a very small monkey, becomes adult at 4 1/2 years for females, 1 or 2 years later for males. The patas, a rather large monkey, becomes adult at 2 1/2 years, for females, and 1 or 2 years later for males. Both these ages for puberty differ from data for the rhesus monkey which has been accepted as generalizable to all Old World monkeys. Possible causes of differences between species in average age at puberty are discussed, including nutrition,

environmental inconstancy, and relative size of infant and mother. It is suggested that age at first conception, a biologically more relevant index than menarche, should be considered as a potentially important adaptive variable when describing primate species.

A comparison of the reproductive cycle of three species of *Lemur*. Bogart, M. H., Kumamoto, A. T., & Lasley, B. L. (San Diego Zoological Garden, PO Box 551, San Diego, CA 92112) *Folia primatologica*, 1977, *28*, 134-143.

The duration of the luteal phase and the 'proestrus' phase in three species of lemurs (*Lemur macaco*, *L. catta*, and *L. variegatus*) was determined by serum progesterone measurement. Total immuno-reactive estrogens were measured and remained below 0.20 ng/ml except for an apparent peak of short duration during estrus. Circulating testosterone levels in males confirm previously described seasonal gonadal function. The reproductive cycle of the female lemur is discussed and compared to the cycles of estrous and menstrual animals.

Factors influencing sexual performance in male rhesus monkeys. Phoenix, C. H. (Oregon Reg. Pri. Res. Ctr., 505 Northwest 185th Av., Beaverton, OR 97005) *Journal of Comparative Physiology*, 1977, *91*, 697-710.

A 5-year retrospective study of the sexual behavior of eight adult male rhesus monkeys, the youngest of which was estimated to be at least 10 years old, showed that sexual vigor declined over the years but testosterone levels in peripheral vein plasma did not. Two prospective experiments were then carried out on these males during the sixth year. (a) The four poorest performers were injected daily for 28 days with testosterone propionate (1 mg/kg of body weight). There was no significant increase in level of performance, and behavior was not correlated with plasma levels of testosterone either before or 24 hr after the last hormone injection. (b) All eight males were exposed to novel nonspecific sensory stimulation during tests of sexual behavior. Eight different adult male rhesus strangers--present in the room but not in the test cage--were used as stimuli, one for each experimental test. Sexual behavior during experimental and control tests did not differ.

Effects of geographic transfer on the timing of seasonal breeding of rhesus monkeys. Varley, M. A., & Vessey, S. H. (Synanon Found. Inc., Box 786, Marshall, CA 94940) *Folia primatologica*, 1977, *28*, 52-59.

This is a study of the effects of geographic transfer on the timing of seasonal breeding of free-living rhesus monkeys on Cayo Santiago and La Parguera islands in Puerto Rico. The results demonstrated a progressive shift in the breeding season of the transferred group. The full shift required a period of 2 years. Change from one environment to another produced shifts in onset of estrous. The explanation for this phenomenon proposes an interaction between the specific reproductive state of the female, which may or may not be sensitive to a particular environmental change, and the environmental variation which is correlated with onset of breeding.

Life history of yellow baboons: Physical development, reproductive parameters, and infant mortality. Altmann, J., Altmann, S. A., Hausfater, G., & McCuskey, S. A. (Allee Lab. of Animal Beh., Univ. of Chicago, 5712 S. Ingleside, Chicago, IL 60637) *Primates*, 1977, *18*, 315-330.

Longitudinal data from a population of yellow baboons, *Papio cynocephalus*, in the Amboseli National Park, Kenya, provide life history parameter estimates. Females reached menarche at approximately four-and-a-half years of age and then cycled for approximately a year before first conception. Postpartum anestrum averaged 12 months but ranged from six to 16 months. In cases of still births or infant death during postpartum amenorrhea, females commenced cycling after approximately one month. In mature females the time spent cycling before conception was five months on the average with a range from one to over 18 months. Only half of all full-term pregnancies resulted in infants who survived the first year of life; only a third, in infants who survived until the birth of their mother's next infant. In comparison with data from laboratory colonies, our data indicate that female baboons in Amboseli are older at birth of first infant. They have, on the average, a somewhat shorter interbirth interval than was estimated from earlier cross-sectional field data, and therefore spend a larger portion of their adult life pregnant, but have a much longer interval--at least three years on the average--between the birth of an infant and the birth of that infant's next older surviving sibling. A number of morphological changes in immature baboons are described.

Ecology and Field Studies

Some observations on the ecology of *Colobus badius temmincki*, Abuko Nature Reserve, The Gambia, West Africa. Gunderson, V. (Infant Primate Lab. WJ-10, Univ. of Wash., Seattle, WA 98195) *Primates*, 1977, *18*, 305-314.

Three groups of red colobus (*Colobus badius temmincki*) were observed at the Abuko Nature Reserve in the Gambia, West Africa between December, 1973 and August, 1974. The population of the three groups ranged from 24-40 animals with home ranges measuring 4.3-12.8 hectares. The red colobus fed on a wide variety of flora and their diet included fruit, flowers, shoots, and bark, as well as new and mature leaves. There was a change in diurnal activity patterns over the two seasons (dry and rainy), with more definitive activity peaks occurring during the dry season.

Taxonomy

Errata and Addenda: We wish to correct the following errors in the reference in the July, 1977, issue of this *Newsletter* to the article by E. Delson, The family-group name of the leaf-eating monkeys (Mammalia, Primates): A proposal to give Colobidae Blyth, 1875, precedence over Semnopithecidae Owen, 1843, and Presbytina Gray, 1825, Z. N. (S.) 2094, published in the *Bulletin of Zoological Nomenclature*. The name,

Presbytina, and the date following the name, Gray, were incorrect in the title. In the first and second lines of the abstract, the family and subfamily names should have been spelled, Cercopithecidae and Cercopithecinae, respectively. In addition, it should be noted that Dr. Delson's full address is Department of Anthropology, Lehman College, City University of New York, Bronx, NY 10468. Lastly, as in connection with Delson and Napier's proposals for the scientific names of baboons and mandrills and drills (see the note on page 16 of this issue of the *Newsletter*), parties who have comments about the present proposal should send them to the International Commission on Zoological Nomenclature.

Instruments and Techniques

An empirical evaluation of instantaneous and one-zero sampling of chimpanzee behavior. Leger, D. W. (Dept. of Psychol., Univ. of Calif., Davis, CA 95616) *Primates*, 1977, *18*, 387-393.

The behavior category in progress at the end of every 15 seconds of observation of chimpanzee behavior was recorded (instantaneous sampling), as was the occurrence or nonoccurrence of all defined categories during every 15 second observation interval (one-zero sampling). The scores obtained using the above procedures were then correlated with the percent of net observation time, hourly rate, and mean bout duration of the behavior categories. One-zero sampling scores correlated very strongly with percent of net observation time and moderately with hourly rate and mean bout duration. Instantaneous sampling scores correlated very strongly with percent of net observation time and moderately with hourly rate and mean bout duration.

Conservation

The lemurs of the Comoro Islands. Tattersall, I. (Dept. of Anthropology, American Museum of Natural History, NY, NY 10024) *Oryx*, 1977, *13*, 445-448.

The Comoro lemurs, the only wild lemur populations outside Madagascar, are protected and seem secure. But after spending seven months in the islands the author believes that they could become threatened if forest destruction, particularly of the protected forest, continues at the present rate. He urges the need to enforce both forest protection and the hunting laws.

* * *

ADDRESS CHANGES

James M. Danilovitz
PO Box 331
Waymart, PA 18472

David G. Gantt
Department of Anthropology
Florida State University
Tallahassee, FL 32306

Stefen H. Graham
1000 Lake Side Dr.
Baltimore, MD 21210

H. Hofer
Dept. of Comp. Anatomy,
Univ. of Kassel
Heinrich Plett Strasse 40
Kassel, Germany

A. L. Knezevich
Bio/Dynamics
Mettlers Rd.
East Millstone, NJ

Peter S. Loizeaux
Chief, Animal Assessment Division
USAMRIID, Fort Detrick
Frederick, MD 21701

Thad W. Martin
110 Robinhood Rd.
Kings Forest
Covington, LA 70433

Jeffrey A. McNeely
PO Box 133
Bogor, Indonesia

E. Schwartz
Dept. of Toxicology
Schering Corporation, PO Box 32
Lafayette, NJ 07848

James F. Vondruska
The Quaker Oats Co.
617 West Main St.
Barrington, IL 60010

W. R. Voss
LS II, Room 10
Southern Illinois University
Carbondale, IL 62901