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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 $2.00 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, notes, and announcements 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.

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CONTENTS

INTRODUCING UNFAMILIAR MONKEYS (*MACACA NEMESTRINA* AND *M. RADIATA*) TO ESTABLISHED SOCIAL GROUPS

Nancy G. Caine and Janet Short

University of Colorado Health Sciences Center

Introducing a new monkey to an established primate social group is potentially dangerous to the health and safety of all of the animals involved. The responses of the various animals are interesting not only from a theoretical perspective (such as in the study of xenophobia), but also, more practically, in aiding the initial establishment of social groups for later study, or developing more effective husbandry practices. We report here the results of two introduction techniques which we employed in our primate laboratory. We do not claim that these techniques are entirely novel; indeed, it seems likely that more than one primate laboratory has experimented with similar methods. Bernstein (1969), for example, has systematically evaluated numerous techniques relating to the formation of primate groups. Nonetheless, our experience may prove valuable to other investigators who find themselves faced with similar husbandry problems.

Our first case was that of an adult female pigtail monkey (*Macaca nemestrina*) (P8) and her two male offspring, P8.6 (2 years old) and P8.7 (6 months old). P8 was wildborn, and was brought to our lab in 1971. Most recently, P8 had been living in a large breeding group consisting of 10 adult females, one adult male, and approximately 12 immatures. This group had been stable for over a year (i.e., no animals were added or removed, except by birth or death).

In October, 1980, P8 was selected as a replacement for an unhealthy female in another social group (Pen F) which had been established in June, 1979. The Pen F group included one adult male, 8 adult females, and 5 immatures. (The infants in Pen F were being observed to obtain normative data on early development.) Experience had taught us that introductions of unfamiliar pigtails into established groups could easily result in social disorder and injury. Our goal, therefore, was to introduce P8 and her offspring to their new group in such a way as to minimize aggression, disruption and/or injury.

Our strategy was quite simple: we would introduce the new monkeys gradually, and with the protection of a cage placed within Pen F. On a Monday morning (10/20/80), we placed P8 and her offspring in a "gang cage" (.9 × .9 × .6m) and allowed them to acclimate there for an hour. We then placed the gang cage in Pen F (2.7 × 4.0m). This allowed the resident

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monkeys to explore the new animals without being able to chase or attack the latter. Similarly, P8 and her sons could evaluate their new physical and social surroundings from a protected vantage point. In order to prevent sustained levels of stress, the gang cage housing the new monkeys was removed from Pen F after two hours and was not replaced in Pen F until later that day. At 5:00 p.m., P8, P8.6 and P8.7 were again removed from Pen F and left alone in their gang cage overnight. On Tuesday, P8 and her offspring spent all day in their gang cage within Pen F, and, finally, at noon on Wednesday the new monkeys were released, unrestrained, into the new group. This method of introduction proved to be successful in preventing extreme forms of aggression. On Monday and Tuesday there was a good deal of interaction between the new and the resident monkeys (e.g., sniffing, touching, threatening, etc.) without the accompanying "violence" which so often occurs during group formations. By Wednesday at noon, all of the animals appeared to have adjusted to the situation. When the new monkeys were allowed to roam free in the pen the resulting social interaction, though certainly excited, did not result in any bloodshed; indeed, the aggression we saw was limited to some threats and displacements. By the end of the week, Pen F appeared to be quite calm and stable.

For approximately one month following her introduction, P8 seemed to be rather depressed and interacted minimally with her peers, although several of the females attempted daily to groom and/or sit with her. P8 also experienced some hair loss during this time, but in all other respects she appeared to be healthy. At the time of this writing (January, 1981), P8 appears to be of fairly low rank in the group (her social rank in her previous group is not known), and although still something of a loner, she seems well integrated into the social order. The behavior of her offspring is unremarkable; they interact normally with other group members.

The introduction of P8 into Pen F had one interesting and beneficial side effect on the behavior of the adult male (P69.2). P69.2 was a young male (6 years old) with limited social and reproductive experience. He was added to Pen F (as the sole adult male) several months prior to P8's introduction. Prior to the arrival of P8, P69.2 was obviously intimidated by the adult females in Pen F. He was often displaced and chased, and never completed a mount. From the moment of the initial introduction of P8's gang cage into Pen F, however, P69.2 adopted a dominant role, a role which he has since maintained. He is now sexually active, is rarely chased or displaced, and is frequently groomed. We can only speculate that the disruption and/or confusion associated with P8's introduction somehow provided circumstances in which P69.2 could assert himself effectively in the group.

Following our success with Pen F, we attempted a similar sort of

introduction with a bonnet (*Macaca radiata*) female (B63) and her four-month-old infant into a mixed species group consisting of three adult female pigtails, 5 adult female bonnets, and one adult male bonnet. On 11/6/80, B63, her infant, and three adult female pigtails were simultaneously placed into the group of 6 bonnets who had been together for 2-1/2 years. Only after several hours of physical attacks on B63 by two of the resident bonnet females was it decided that a version of the gang cage introduction method should be attempted. B63 adjusted well to her protected position within the gang cage, but, at some point during the first 24 hours, B63's infant was grabbed through the bars of the gang cage by a resident animal and the infant's arm was severely injured. This strategy of introduction may, therefore, be inappropriate when it involves very young animals.

The next method which we tested involved the introduction of a surplus 16-year-old male bonnet (B37) into a well-established bonnet breeding group (Pen A), consisting of 10 adult females, 20 immatures, and 1 adult male. One reason for adding this animal to the breeding group, was our concern with the fact that, because he had been living alone for as much as half of his captive adult life, his behavior and social "skills" were deteriorating. Another reason was that, because bonnets live in multi-male groups in the wild, it seemed desirable and appropriate to add a second adult male to our bonnet breeding group. Unlike the probable situation in the wild, however, these adult males had not grown up together, and, furthermore, B37 was also a stranger to the adult females in Pen A. Anticipating a difficult introduction, we opted to first pull an older, long-term resident female (B1) from Pen A and house her alone with B37 for a week or two. We hoped that these two animals would form an alliance, thus making B37's transition into the group an easier one. Within several days of having been placed with B37, B1 developed a comfortable relationship with him, complete with mutual grooming and sexual interaction. Two weeks later they were simultaneously released into Pen A.

As expected, the two males spent the entire day threatening and chasing one another, although physical contact between them was minimal and neither suffered more than scratches. During this time, B1 occasionally intervened between the aggressing males and often sat with and/or followed B37 around the cage. Likewise, B37 maintained much visual contact with B1 throughout the day. By the second day, B37 had obviously become subordinate to the resident male, although the interactions between the two had significantly decreased in number. The adult females and immatures in the group were quite friendly with B37, occasionally attempting to groom or play with him. B1 was particularly attentive to B37's presence throughout the introductory period.

Despite the fact that he was obviously intimidated by the alpha male, the acceptance of B37 by the other group members allowed us to be

guardedly optimistic about his eventual integration into the group. However, B37's stress apparently precipitated a nervous habit of pulling at his own skin and fur, and by the sixth day we were forced to remove him from the group for treatment of his irritated skin. It is our intention to sequentially house B37 with various adult females from Pen A before re-introducing him, hoping, thereby, to further reduce his stress and give him more "psychological leverage" with the resident male.

Obviously, we have no way of knowing how any of these introductions would have proceeded in the absence of our manipulations. However, insofar as we did prevent serious injury (except in the case of the bonnet infant), we are encouraged by our success, and hope that the reporting of our experience will prove useful to one or more of our colleagues in primate research.

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LETTERS: CLARIFICATION OF NOTE ON AIR SHIPMENT OF ANIMALS

We are writing to you in regard to an article in the *Laboratory Primate Newsletter*, Volume *20*, Number 1 (January, 1981).

The article, on page 8, was based on a note in the *AAZPA Newsletter*, 1980, and was titled "Deregulation May Affect Air Shipment of Animals." This article gives the impression that, since deregulation of the airlines, there are no applicable regulations governing the transportation of animals. This is not true.

All licensed dealers and exhibitors, and registered research facilities, carriers and intermediate handlers, must comply with USDA regulations and standards concerning the transportation of animals. We cannot force the airlines to accept animals for shipment. However, we can require compliance with standards if they do accept animals for shipment.

We feel this should be clarified so that the industry is not under the erroneous impression that regulations no longer exist for transporting animals.--*R. L. Crawford, Chief Staff Veterinarian, Animal and Plant Health Inspection Service, United States Department of Agriculture, Federal Bldg., Hyattsville, MD 20782.*

MEAT-EATING AND POSSIBLE STALKING IN A COLONY GROUP OF *MACACA ARCTOIDES*

Ramon J. Rhine, John S. Hopper, Nancy C. Harvey, and Steven C. Bunyak

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Caine et al. (1979) have stressed the need to place on record instances of primate predation occurring in colony groups. Hughes and Lang (1980) and Kessler et al. (1980) have responded with reports of bird predation by captive rhesus, stumptail, and squirrel monkeys.

Capture and eating of birds and mice occurred in our colony of stumptail macaques, one member of which may have engaged in stalking. In less circumscribed settings, such as an unfenced island, stalking may be difficult to distinguish from gathering, as in the case of searching for snails and worms (Estrada et al., 1978). Harding and Strum (1977) have described the acquisition of meat-eating habits by juvenile and other baboons, a finding to which the present report is relevant.

Since 1969, 12-16 adult and immature stumptail monkeys have occupied two connected outdoor pens, each having dimensions of 3.66 × 6.1 × 2.13m high (see Hendy-Neely & Rhine, 1977). The pens are constructed from wire mesh through which birds and small rodents sometimes enter, apparently attracted by bits of monkey chow on the floor. Part of the roof is covered by panels to provide shade. The back and one side of the pens rest against a cement wall which is several cm higher than the wire enclosure. Shade panels cover the roof corner where the back and side cement walls meet. Beyond the side wall is a large bush in which birds often roost. Birds enter and leave the pen, as they did in Hughes and Lang's (1980) enclosure, by a two-stage maneuver, first landing on the wire and then entering or leaving.

From 1971 to the present (March, 1981), the scattered remains of birds were found on several occasions. Adult males and females were seen many times to lunge at birds, and on rarer occasions to eat them. Mice were occasionally seen entering a pen. On one of these occasions, the mouse was chased into a pipe by the monkeys. Some monkeys attended patiently and silently to the pipe entrance for 10 min. Then the mouse emerged and was captured by the dominant female and immediately taken from her and eaten by her son, Paul, the alpha male. Momentary silence and motionless focusing upon a particular location often occurred prior to a capture attempt, sometimes drawing an observer's attention to a developing situation.

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By the age of 4 yr., Paul had shown considerable interest in birds and had gradually evolved a successful capture technique. To begin with, he would sit quietly watching, and if a bird came close enough would lunge with one hand. In three observations of one-half hour each, from 6 to 11 sparrows entered the cage per half hour and between 4 and 5 lunges per half hour were recorded. After several days without success, Paul improved his technique. He climbed up the side of the cage and waited until a sparrow landed on the top. Then he moved slowly onto the wire roof, gradually approaching the sparrow. When close, he swung forward, holding with both feet and reaching with freed hands. This sequence, which took about 10 sec, was once observed four times in 15 min, but no kills were seen.

A further refinement resulted in success. When birds were near, Paul began to station himself under the roof's metal shade panels in the corner near the bush. Then climbing upside down on the roof, he moved slowly from under the panels toward the edge, coming within a few feet of a bird, seemingly undetected, before the final lunge. After eight attempts were seen, this method proved successful. Paul's actions appeared to constitute deliberate stalking. However, his interest in birds and the technique used may have been due to a particular set of circumstances that rarely recur and were dependent upon the specific cage configuration and the location of the large bush. After the bush was trimmed so that the branches did not hang over the enclosure, the refined technique was rarely seen again and never with success.

On occasions when Paul or others captured prey, some other colony members showed interest. The monkeys typically ate kills while sitting on rails 1.12m off the ground. As bits of the carcass fell to the ground, immature and adult monkeys would investigate or eat them. The most complete observations were of Paul. When he captured a bird, he ate first the beak and skull, and then the entrails (see Steklis & King, 1978). Two infants immediately joined Paul and smelled his mouth and the bird. Later they and another animal were on the floor under Paul, smelling and tasting blood and other droppings. When Paul finished the entrails, he dropped the remainder of the carcass, which the infants occasionally touched or smelled, not loitering in the area but moving back and forth during play. Such interest could underlie the spread of a meat-eating tradition such as that described by Harding and Strum (1977).

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NEWS BRIEFS

Closing of LEMSIP Averted

Notices of the impending closing of the Laboratory For Experimental Medicine and Surgery in Primates (LEMSIP) had been sent out by New York University as a consequence of the loss of support of the chimpanzee breeding colony by the National Heart, Lung and Blood Institute, as well as the loss of core support from the National Institutes of Health. However, according to Dr. Moor-Jankowski, the Director, LEMSIP will continue to operate at the same level as before as a result of the efforts of members of the biomedical community and the receipt of long-term core support from American and foreign private sources.

Montagna's Retirement Temporarily Postponed

Dr. William Montagna will remain as Director of the Oregon Regional Primate Research Center, while the search for his replacement continues.

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FYSSEN FOUNDATION FELLOWSHIPS AND INTERNATIONAL PRIZE

The Fyssen Foundation's general aim is "to encourage all forms of scientific enquiry into cognitive mechanisms, including thought and reasoning, underlying animal and human behavior; into their biological and cultural bases; and into their phylogenetic and ontogenetic development".

Fellowships

The Fyssen Foundation will award a certain number of Fellowships. These fellowships are meant for the training and support of research scientists working in disciplines relevant to the aims of the Foundation such as ethology, paleontology, archaeology, anthropology, psychology, logic and the neurosciences.

The Foundation wishes to support, more particularly, research in such fields as:

Ethology and Psychology: Nature and development of the cognitive processes in man and animals.

Neurobiology: Studies of neurobiological bases of cognitive processes and of their embryonic and postnatal development, as well as the elementary mechanisms they involve.

Anthropology-Ethnology: Study of principles of construction:
a) of the representations of the natural and cultural environment,
b) of the technical systems developed in the various forms of social organization.

Human Paleontology: Origin and evolution of the human brain and human artifacts.

Priority will be given to French scientists wishing to work abroad and to foreign scientists wishing to work in French laboratories. Study grants will normally be granted for one year but may be extended up to three.

Applications should include: curriculum vitae, list of publications of the applicant, summary of past research work (2 pages maximum), project for future research or study (3 pages maximum) which includes a discussion on the relationship between the topic and the axes of the research proposed and the aims of the Foundation, written acceptance from the host laboratory, names of two senior scientists who have been asked to send testimonials to the Secretariat of the Foundation by the date indicated below, and a proposed budget for the utilization of the funds.

Applications should be sent in 15 copies to the Secretariat of the Foundation, 194, rue de Rivoli, 75001 Paris, imperatively before May 1st, 1981. [Although the deadline for these fellowships will probably be past by the time this issue of the Newsletter is in readers' hands, we include this notice for purposes of future reference, since the fellowships are offered on an annual basis.--Ed.]

International Prize

A substantial International Scientific Prize (awarded in 1980 to Professor Leroi-Gourhan) shall be given for a major contribution to the progress of knowledge in the fields of research supported by the Foundation.

The nominations should include: a curriculum vitae of the nominee, a list of his or her publications, a summary (4 pages maximum) of the research work upon which the nomination is based.

Nominations for the 1981 Prize of the Fyssen Foundation should be sent in 15 copies to the Secretariat of the Foundation, 194, rue de Rivoli, 75001 Paris, France, before September 1st, 1981.

* * *

PATHOLOGY OF LABORATORY ANIMALS COURSE

The "Pathology of Laboratory Animals" course will be conducted at the Armed Forces Institute of Pathology (AFIP) from August 10 to 14, 1981.

Military and federal service employees in the veterinary and other medical science fields are requested to consult their agency regulations for appropriate application procedures.

Civilian veterinarians and allied scientists are invited to apply and will be considered on a space available basis.

All applications must be received before August 1, 1981 and may be made by writing to: The Director, Armed Forces Institute of Pathology, Attn: AFIP-EDE, Washington, DC 20306.

Upon application, non-federal and foreign national registrants are required to submit a $125.00 fee, payable to the Treasurer of the United States.

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AGED APES AT THE YERKES REGIONAL PRIMATE RESEARCH CENTER

Terry L. Maple[1] and Susan G. Cone

Yerkes Regional Primate Research Center

In a recent contribution to *Laboratory Primate Newsletter*, Frank V. Velte (1980) described the oldest living captive male chimpanzee, *Jimmy*, currently in residence at the Seneca Park Zoo in Rochester, New York. Because the Yerkes Primate Center maintains a number of elderly chimpanzees, we were curious about the ages of other long-lived chimpanzees. To this end, we enlisted the cooperation of ISIS (International Species Inventory System) which generated the following list:

Name	Location	Date of Arrival/Birth	Estimated Arrival Age
BULA	Yerkes	Born 27 April 1930	
JIMMY	Rochester	Arrived 1 Jul 1931	est. age 1 year
GAMMA	Yerkes	Born 21 Sep 1932	
Unnamed	Racine	Arrived 4 Apr 1958	est. age 20
SJEFKE	Rotterdam	Arrived 10 Oct 1947	est. age 2
SUZY K	Noells Ark	Arrived 1956	est. age 10
FRANS	Yerkes	Born 1 Dec 1946	
Unnamed	Sacramento	Arrived 3 May 1951	est. age 3
KNOGO	Noells Ark	Born 28 Feb 1948	
Unnamed	Portland	Arrived 1 Feb 1958	est. age 6
Unnamed	Portland	Arrived 1 Sep 1955	est. age 3
GARBO	Yerkes	Born 10 Dec 1953	
WENKA	Yerkes	Born 21 May 1954	
BUTCH	Birmingham	Arrived 1 Jan 1957	est. age 2
ANNIE	Birmingham	Arrived 1 Jan 1957	est. age 2
PALEFACE	Holloman	Arrived 26 Sep 1958	est. age 3
CARMEN	Rotterdam	Arrived 15 Apr 1957	est. age 1
HALPHA	Yerkes	Born 17 Oct 1956	
MINNIE	Holloman	Arrived 13 Jul 1958	Est. age 1 1/2

From this information, it can be ascertained that the oldest living chimpanzee, with a documented birthdate, is *Bula*. This 50-year-old female was born into the Abreau primate colony in Havana, Cuba on 27 April, 1930. She remains vigorous and none the worse for her age.

The authors gratefully acknowledge the assistance of Nate Flesness of ISIS and the support of U.S. Public Health Service grant RR00165, Division of Research Resources, National Institutes of Health, to the Yerkes Regional Primate Center of Emory University

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Bula is currently caged with *Gamma*, the third oldest captive chimpanzee at 48. *Gamma* was the third animal born at Yerkes, known in 1932 as the Yale Laboratories of Primate Biology.

The Yerkes Primate Research Center currently houses 12 chimpanzees beyond the age of 24. In addition to the animals listed above, the colony now includes *Flora* (born 1941), *Banana* (b. 1946), *Cheri* (b. 1947), *Sparkle* (b. 1950), *Ada* (b. 1955), and *Anna* (b. 1955).

The utility of these animals is well demonstrated by the experimental history of *Bula*, a partial list of which follows:

Investigator	Type of Project
Nissen	Perception experiment (pull-in technique)
Jackson	Instrumentation
Wolfe	Symbolic reward
Forster	Reaction-time
Jackson-Nissen	"Relative vs. absolute" discrimination
Spragg	Stylus maze
Nissen-Crawford	Food sharing
Crawford	Cooperative behavior
McCulloch	Weight discrimination
Nissen-McCulloch	Strata vs. paired stimuli methods of discrimination
Cowles	Secondary incentives
Riesen-Nissen	Delayed response and discrimination learning
Crawford	Cooperation; imitation
Finch	Frustration
Yerkes	Non-spatial visual response; subordination and sexual status
Crawford	Dominance
Crook	Non-spatial serial learning
Lewis (Yerkes)	Hair samples
Nissen-Harrison	Spatial delayed response
Nowlis	Social interaction
Finch	Frustration
Nowlis	Dominance
Young	Response to non-sexual stimuli
Finch	Handedness
Hebb	Description of temperament
Hebb	Rating mechanical intelligence
Thompson	Simultaneous and successive discrimination
Jarvik	Position- and object-discrimination learning and reversed learning with partial reinforcement
Bernstein	Three-choice discrimination
Bernstein	Nesting
Bernstein	Simple reversal and conditional reversal

Clearly these elderly animals represent a valuable resource for the study of aging and its various effects. Among future projects planned for these animals is a study of their memory for complex visual stimuli.

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UPCOMING PRIMATE MEETINGS

Fourth Meeting of the American Society of Primatologists

June 2-5, 1981, in San Antonio, Texas. Checks for registration, made payable to the American Society of Primatologists, should be sent to the local arrangements chairman: Dr. Anthony M. Coelho, Department of Cardiopulmonary Disease, Southwest Foundation for Research and Education, PO Box 28147, San Antonio, TX 78284.

IXth Congress of the International Primatological Society

August 8-13, 1982, Atlanta, GA. Please address all correspondence to Dr. Frederick A. King, Director, Yerkes Regional Primate Research Ctr., Emory University, Atlanta, GA 30322.

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POSITION WANTED

Primate Behavior Research; B.A. in Anthropology with wide practical experience with laboratory animals and monkeys desires position involving work with primates; utilizing interest and skills in animal behavior, surgical assisting and animal nursing. Full resume on request.--Jayne Siegal, 255 Dutton Rd., Sudbury, MA 01776.

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RESOLUTION OF THE PRIMATE SOCIETY OF GREAT BRITAIN

Since Primate Society data show that a number of institutions in the United Kingdom are currently using for research purposes species of primate whose status in the wild is considered to be Threatened (as listed by the current edition of the IUCN Red Data Book and/or by Appendix I of C.I.T.E.S. and/or are protected in their countries of origin);

and since the IUCN/SSC Primate Specialist Group has expressed concern over the continued use of such threatened species in research:

the Primate Society of Great Britain resolves that institutions and individuals be requested to make every effort to ensure that:

(1) no further importations of such threatened species be made from the wild unless there are pressing conservation reasons endorsed by the government of the country of origin;

(2) no further new research programs using such threatened species be initiated, unless such programs are specifically and intimately concerned with the alleviation of a particular human suffering, providing

(a) that the species in question can be shown to be essential to the success of the research program because of its unique physiological and/or anatomical properties,
and (b) that the animals so required can be obtained wholly and entirely from self-sustaining captive-bred populations;

(3) any existing experiments using such threatened species either

(a) be phased out if the necessary animals cannot be obtained entirely from self-sustaining captive-bred populations,
or (b) be continued on such species as are not considered to be threatened.

Threatened Species of Primates

Primate species currently listed in the Red Data Book of the International Union for the Conservation of Nature (IUCN) and/or in Appendix I of the Convention on International Trade in Endangered Species (C.I.T.E.S.) are listed below. Note that taxa listed at the Family level include all species within that Family. An asterisk indicates species currently used for research in U.K. based on a survey in 1979.

Prosimians: *Lemuridae, Indriidae, Daubentoniidae, Tarsiidae.

New World Monkeys: **Callithrix argentata, C. aurita, C. flaviceps, C. humeralifer, Saguinas bicolor, S. imperator, S. leucopus, *S. oedipus, Leontopithecus rosalia, Callimico goeldii, Saimiri oerstedii, Callicebus personatus, Chiropotes albinasus, Cacajao calvus, C. melanocephalus, C. rubicundus, Alouatta fusca, A. nigra (caraya), A. palliata (villosa), Ateles geoffroyi, Lagothrix flavicauda, L. lagotricha, Brachyteles arachnoides.*

Old World Monkeys: *Cercocebus galeritus, Papio leucophaeus, Macaca pagensis, M. silenus, M. sylvanus, Colobus badius, C. satanas, C. verus, Presbytis entellus, P. geei, P. Johnii, P. pileatus, P. potenziani, Nasalis larvatus, Simias concolor, Rhinopithecus roxellanae, Pygathrix nemaeus.*

Apes: Hylobatidae, *Pongidae.

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CLASSIC BOOK ON AMAZONIAN PRIMATES AVAILABLE

Available: Several copies of Eladio da Cruz Lima's classic book, *Mammals of Amazonia,* Vol. 1, *General Introduction and Primates,* English edition, 1945. This 274 page book, with 42 full-page color plates, was intended to be part of a series on Amazonian mammals published by the Museu Goeldi in Belem, Brazil. However, only one volume ever appeared, in Portuguese in 1944 and in English in 1945. The English edition was limited to 975 copies. Several copies of the English edition, all in good or very good condition, have recently become available through Brazil and can be obtained at $85. each. Contact: R. A. Mittermeier, Dept. of Anatomical Sciences, Health Sciences Center, State University of New York, Stony Brook, NY 11794.

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

Books

Catalogue of Primates in the British Museum (Natural History) and Elsewhere in the British Isles. Part II: *Family Cercopithecidae, Subfamily Cercopithecinae.* Prudence Hero Napier. London: British Museum (Natural History), 1981. Soft cover. 203 pp. [Price: £25]

This catalogue lists all the specimens of the subfamily Cercopithecinae of the Old World Monkeys (family: Cercopithecidae) in the collections of the British Museum (Natural History), and is complete up to the end of 1977. The collections consist mainly of study skins and skulls but skeletons, wet specimens and casts are included, as well as mounted specimens exhibited in the public galleries in London or in the Zoological Museum, Tring, Hertfordshire (formerly the Rothschild Museum), and specimens in the Comparative Anatomy Collection which is used for teaching. Fossil specimens in the collections of the Sub-department of Anthropology, Department of Palaeontology, are also included as well as a selection of important specimens available for study at other museums in the British Isles. All the available data on these specimens, derived from labels and from the museum registers, together with the coordinates of the great majority of localities, have been stored in a computer-based retrieval system. The published catalogue gives only a selection of the available data, which also includes information relating to the collection of the specimen, the nature and source of acquisition, any earlier identifications with identifiers, habitat, and field measurements.

Malayan Forest Primates: Ten Years' Study in Tropical Rain Forest. David J. Chivers (Ed.). New York: Plenum, 1980. 364 pp. [Price: $42.50]

As an aid to interpretation of behaviors described, new data on the structure and cycles of the forest are presented. The behavior of gibbons, leaf monkeys, and macaques is summarized, and niche differentiation, positional behavior, and long-term changes in behavior are discussed together with a brief consideration of competitors. The concluding contribution focuses on the socioecology of Malayan forest primates, relating the results to current concepts in primate ecology and to wildlife conservation in tropical forests. The

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In many cases, the original source of reference 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.

book also includes a special listing of plant species identified over the past ten years in the Krau Game Reserve, Malaysia, with details of the importance of each as food for primates and some other animals. Contents: 1. Introduction, by D. J. Chivers. 2. The forest, by J. J. Raemaekers, F. P. G. Aldrich-Blake, & J. B. Payne. 3. Siamang, lar and agile gibbons, by S. P. Gittins & J. J. Raemaekers. 4. Dusky and banded leaf monkeys, by S. H. Curtin. 5. Long-tailed macaques, by F. P. G. Aldrich-Blake. 6. Niche differentiation in a primate community, by J. R. & K. S. MacKinnon. 7. Locomotion and posture, by J. G. Fleagle. 8. Long-term changes in behaviour, by D. J. Chivers & J. J. Raemaekers. 9. Competitors, by J. B. Payne. 10. Socio-ecology of Malayan forest primates, by J. J. Raemaekers & D. J. Chivers.

Ecology and Behavior of Neotropical Primates (Vol. 1). Adelmar F. Coimbra-Filho & Russell A. Mittermeier (Eds.). Rio de Janeiro: Academia Brasileira de Ciencias, 1981. Soft cover. 496 pp. [Price: $25. Order from: Academia Brasileira de Ciencias, R. Anfilofio de Carvalho 29/3º, C. Postal 229 - Rio de Janeiro 20.000, Brasil.]

This two-volume series represents a preliminary attempt to synthesize what is known of the ecology and behavior of neotropical monkeys, to present this material in a way that will facilitate comparisons among the various genera, to point out gaps in our knowledge, and to indicate the directions that future research efforts might take. It is aimed particularly at the beginning student who is interested in neotropical monkeys, but who does not have access to much of the published material. Contents: SYSTEMATICS. 1. Systematics: The higher taxa, by A. L. Rosenberger. 2. Systematics: Species and subspecies, by R. A. Mittermeier & A. F. Coimbra-Filho. 3. The fossil history of nonhuman primates in the Americas, by K. D. Rose & J. G. Fleagle. ECOLOGY AND BEHAVIOR. 4. Goeldii's monkey, Genus *Callimico*, by P. G. Heltne, J. F. Wojcik, & A. G. Pook. 5. The night monkeys, Genus *Aotus*, by P. C. Wright. 6. The titi monkeys, Genus *Callicebus*, by W. G. Kinzey. 7. The squirrel monkeys, Genus *Saimiri*, by J. D. Baldwin & J. I. Baldwin. 8. The capuchin monkeys, Genus *Cebus*, by C. Freese & J. R. Oppenheimer. 9. The saki monkeys, Genus *Pithecia*, by D. B. Buchanan, R. A. Mittermeier, & M. G. M. van Roosmalen. 10. The Bearded sakis, Genus *Chiropotes*, by M. G. M. van Roosmalen, R. A. Mittermeier, & K. Milton. 11. The uakaris, Genus *Cacajao*, by R. Fontaine.

Functional Morphology of the Hip and Thigh of Lorisiformes. (Contributions to Primatology. Vol. 17) J. E. McArdle. Basel: Karger, 1981. Soft cover. 132 pp. [Price: SFr. 32. Approx. $19.25]

Lorisines and galagines are generally recognized as distinct groups of prosimians, whose individual species share a basically similar morphology and locomotor behavior. Each species, however, is characterized by distinct physical, behavioral and ecological

differences. This volume reports a study designed to determine the extent to which differences in morphology of the hip and thigh of the lorisiformes, as observed in relative body proportions, myology and osteology, are associated with species specific variations in body size, locomotor behavior and ecological preferences. Ten relative body proportions, the musculature of the hip and thigh, and 46 dimensions of the post-cranial skeletons were examined. The author concludes that lorisines comprise two distinct morphotypes (1) large-bodied species with relatively short limbs and extensive, well-developed muscle insertions and (2) small-bodied species with relatively thin, elongated limbs, reduced areas of muscle insertion, elongated tendons and rearranged muscle fibers architecture.

Proceedings

The Great Apes of Africa. R. V. Short & Barbara J. Weir (Eds.). *Journal of Reproduction & Fertility* (Supplement 28), 1980. 198 pp. [Price: £19. Order from Journals of Reproduction & Fertility, PO Box 32, Commerce Way, Colchester, CO2 8HP, England]

This book represents the proceedings of a conference held in the new laboratories of the Centre International de la Récherche Medicale de Franceville, Gabon, W. Africa in December, 1979 to review in depth the present state of knowledge about the three great apes of Africa, the gorilla, the chimpanzee and the pygmy chimpanzee. Contents: The great apes of Africa, by R. V. Short; Sex differences in the behavioral ecology of chimpanzees in Gombe National Park, Tanzania, by R. W. Wrangham & B. B. Smuts; Social structures of African great apes, by J. Itani; Reproductive behavior of wild chimpanzees in the Gombe National Park, Tanzania, by C. E. G. Tutin; Reproduction in wild gorillas and some comparisons with chimpanzees, by A. H. Harcourt, D. Fossey, K. J. Stewart, & D. P. Watts; The husbandry of gorillas in captivity, by J. Aspinall; Reproductive physiology and behavior of gorillas, by R. D. Nadler; Chromosomes and spermatozoa of the African great apes, by H. N. Seúanez; Chromosomal evolution of the great apes and man, by B. Dutrillaux; Hormonal and immunological aspects of sex steroid-binding plasma protein of primates, by J.-M. Renoir, C. Mercier-Bodard, & E. E. Baulieu; Monitoring the female reproductive cycle of various primates by determinations of oestrogen and LH in small volumes of urine, by B. L. Lasley, J. K. Hodges, & N. M. Czekala; The endocrine basis of sexual development in the chimpanzee, by J. S. D. Winter, C. Faiman, W. C. Hobson, & F. I. Reyes; Gorilla diseases and causes of death, by K. Benirschke & F. D. Adams; Infectious diseases of the great apes of Africa, by S. S. Kalter; The tissue antigens of chimpanzees; genetics of the ChLA complex studies in captivity-bred chimpanzee families, by H. Balner.

The Proceedings of the Workshop on "Needs for New Animal Models of

Human Disease", Bethesda, MD, Apr. 28 & 29, 1980. *American Journal of Pathology*, December, 1980. [Price: $4.00. Copies of this supplement can be obtained from: Universities Associated for Research & Education in Pathology, Inc., 9650 Rockville Pike, Bethesda, MD 20014.]

The program included the following talks: Value of animal models, by T. C. Jones; Criteria for development of animal models, by R. Leader; An appraisal of genetically defined and random bred animals, by T. Gill; Studies of teratomas in mice: Possibilities for future production of animal models, by J. M. Lehman; Cytogenetic approaches for mouse models of human genetic diseases, by U. Francke; Animal models of human diseases of the GI system, by I. M. Arias & N. F. Cheville; Animal models of human diseases of the respiratory system, by L. Reid & D. O. Slauson; Animal models of human diseases of the endocrine system, by G. Cahill & C. Capen; Animal models of human diseases of the eye, by D. M. Albert & G. Aguirre; Animal models of human diseases of the nervous system, by F. S. Vogel & W. J. Hadlow; and Animal models of human diseases of the reproductive system, by K. Benirschke & L. Corbeil.

Bibliographies

Colony breeding of New World monkeys: A bibliography (2nd Edition). Benella Caminiti. Seattle: Primate Information Center, 1980. 216 Citations with Primate Index. [Price: $6.00. Send orders to: Primate Information Center, Regional Primate Research Center (SJ-50), University of Washington, Seattle, WA 98195]

Effects of noise and intense sounds on nonhuman primates: A bibliography. Benella Caminiti. Seattle: Primate Information Center, 1980. 62 Citations with Primate Index. [Price: $5.00. Ordering information same as in previous reference.]

Observations of feral and free-ranging rhesus monkeys (Macaca mulatta): *A bibliography.* Jean Balch Williams. Seattle: Primate Information Center, 1980. 147 Citations. [Price: $6.00. Ordering information, same as in previous reference.]

Behavioral observations of feral and free-ranging baboons (Papio): *A bibliography.* Jean Balch Williams. Seattle: Primate Information Center, 1981. 244 Citations with Species Index. [Price: $6.00. Ordering information, same as in previous reference.]

Disease

Human monkey-pox, 1970-1979. Breman, J. G., Kalisa-Ruti, Steniowski, M. V., Zanotto, E., Gromyko, A. I., & Arita, I. (Smallpox Eradication, World Health Organization, 1211 Geneva 27 Switzerland) *Bulletin of the World Health Organization*, 1980, *58*, 165-182.

Increasing attention has been given to human monkeypox since the

achievement of global smallpox eradication. Monkeypox, which was first described in Central Africa in 1970, resembles smallpox clinically but differs from it epidemiologically. Forty-seven cases of human monkeypox have occurred since 1970 in 5 Central and West African countries; 38 of these cases have been reported from Zaire. The evolution of the illness and the sequelae of monkeypox and smallpox are the same; monkeypox has a case-fatality rate of about 17%. Children below 10 years of age comprise 83% of the cases. All cases have occurred in tropical rainforest areas and clustering of cases has been observed in certain zones within countries and within families. Person-to-person may have occurred in 4 cases; the secondary attack rate among susceptible, very close family members was 7.5% (3 cases/40 contacts) and among all susceptible contacts was 3.3% (4 cases/124 contacts)--much lower than the 25-40% secondary attack rate that occurs within smallpox. Although the low transmission rate and the low frequency of disease indicate that monkeypox is not a public health problem, more data are needed. While many animals near human monkeypox cases have been demonstrated to have orthopoxvirus antibodies, the natural reservoir(s) and the vector(s) of monkeypox virus are unknown. Studies are in progress to identify the natural cycle of monkeypox virus and to define better the clinical and epidemiological features of this disease.

Method to detect asymptomatic carriers of simian hemorrhagic fever virus. Gravell, M. A., Palmer, A. E., Rodriguez, M., London, W. T., & Hamilton, R. S. (Infectious Dis. Br., National Inst. of Neurological & Communicative Disorders & Stroke, NIH, Bethesda, MD 20205) *Laboratory Animal Science*, 1980, *30*, 988-991.

Evidence was obtained that mononuclear phagocytic cells are the target cells for simian hemorrhagic fever virus replication. Using peritoneal macrophages from rhesus monkeys in an *in vitro* test, 18 of 20 asymptomatic chronically infected patas monkeys were detected from coded samples. The two chronically infected patas monkeys not detected by the test, nevertheless, contained virus. This was determined by inoculating macrophage cultures with plasma from macaques dying as a result of inoculation with plasma from these chronically infected animals. In addition to virus found in chronically infected animals, all isolates of simian hemorrhagic fever virus tested from previously described epizootics lytically infected rhesus monkey macrophages. These data suggested that the highly fatal nature of simian hemorrhagic fever in macaques was related to the extreme sensitivity of their mononuclear phagocytic cells to infection and lysis.

Psorergatic mange (*Acari:Psorergatidae*) of the stumptail macaque *(Macaca arctoides)*. Lee, K. J., Lang, C. M., Hughes, H. C., & Hartshorn, R. D. (Dept. of Comp. Med., Coll. of Med., The Milton S. Hershey Med. Ctr., Pennsylvania State Univ., Hershey, PA 17033) *Laboratory Animal Science*, 1981, *31*, 77-79.

Psorergates (Psorobia) sp were recovered from dermal cysts on the

face, chest, and abdomen of three stumptail macaques in a breeding colony of research animals. The lesions were multiple and appeared as white, crusted structures measuring 2 to 10 mm in diameter. These lesions were not associated with pruritis or other clinical symptoms. The mites were embedded in the epidermis and associated with mild hyperkeratosis. A few mononuclear leukocytes were present in the dermal and subcutaneous tissues.

Studies on the examination of imported laboratory monkey, *Macaca fascicularis* for *E. histolytica* and other intestinal parasites. Sano, M., Kino, H., de Guzman, T. S., Ishii, A. I., Kino, J., Tanaka, T., & Tsuruta, M. (Dept. of Parasitology, Hamamatsu Univ. Sch. of Med., Hamamatsu, Japan) *International Journal of Zoonoses*, 1980, *7*, 34-39.

Infection rate of imported cynomolgus monkeys with intestinal protozoa is higher than the infection rate with intestinal nematodes. Mostly encountered protozoa were *E. coli*, *E. nana*, *E. histolytica* and *I. butschlii*. Formalin-Ether concentration method yielded higher % positive for *E. histolytica* than the culture method using Tanabe-Chiba medium, but the results obtained from these 2 methods correlate perfectly well with each other. Efficacy of thiabendazole against intestinal nematodes such as *Strongyloides*, *Trichuris*, *Physaloptera*, *Oesophagostomum* and *Capillaria* was very satisfactory.

Simian virus nomenclature, 1980. Kalter, S. S., Ablashi, D., Espana, C., Heberling, R. L., Hull, R. N., Lennette, E. H., Malherbe, H. H., McConnell, S., & Yohn, D. S. (Dept. of Microbiol. & Infect. Dis., Southwest Fdn. for Res. & Educ., PO Box 28147, San Antonio, TX 78284) *Intervirology*, 1980, *13*, 317-330.

Approximately 75 simian viruses, counterparts of other animal viruses, are recognized. Nomenclature of these isolates, in general, consists of an SV (simian virus) or SA (simian agent) numerical series with no attempt to group them according to virus families. The biological characteristics of these viruses indicate they may be classified into recognized families and groups. A simple sequential numerical designation is recommended as a nomenclature within virus families and groups. Finalization of nomenclature would follow approval by the Study Groups of the International Committee on Taxonomy of Viruses.

Physiology and Behavior

Hemolytic complement in nonhuman primates. Rommel, F. A., Bendure, D. W., & Kalter, S. S. (Plum Island Animal Dis. Ctr., Greenport, NY 11944) *Laboratory Animal Science*, 1980, *30*, 1026-1029.

Hemolytic serum complement activity was quantitatively compared in baboons, squirrel monkeys, cebus monkeys, and cotton-top marmosets. Squirrel monkeys showed the highest activity, and marmosets had the lowest activity. The complement level in squirrel monkeys was ten-fold greater than marmosets and almost four times higher than that of man. Cebus monkeys had levels most similar to that of man while the

baboon exhibited activity almost as low as that of the marmoset.

Chimpanzee R-C-E-F blood group system: A counterpart of the human Rh-Hr blood groups. Socha, W. W., & Moor-Jankowski, J. (Lab. for Exp. Med. & Surg. in Primates (LEMSIP), New York Univ. Med. Ctr., 550 First Av., NY, NY 10016) *Folia Primatologica*, 1980, *33*, 172-188.

A chimpanzee blood group system is defined by a set of isoimmune antisera, anti-R^c, anti-C^c, anti-E^c, anti-F^c, anti-c^c and anti-c_I^c, that distinguish 19 blood types. Population analysis of 285 unrelated animals and the study of 21 chimpanzee families support the postulated model of inheritance by 9 allelic genes. There is a close relationship between the R-C-E-F blood group system and human Rh-Hr blood groups as indicated by overall structural resemblance of both systems and by serological similarity of their principal antigens, R^c and Rh_o. There are indications that R-like structures are also present on the red cells of other anthropoid apes, and possibly on those of the Old World monkeys.

Normal cellular and humoral immunologic parameters in the baboon (*Papio ursinus*) compared to human standards. Mendelow, B., Grobicki, D., de la Hunt, M., Marcus, F., & Metz, J. (Dept. of Hematology, Sch. of Pathol. of the Univ. of Witwatersrand and the South African Inst. for Med. Res., Johannesburg, S. Africa) *Laboratory Animal Science*, 1980, *30*, 1018-1021.

Normal adult Chacma baboons were investigated with reference to their basic immunological parameters, including serum immunoglobulin concentrations, proportions of T- and B-lymphocytes in the peripheral blood, and lymphocyte response to activators. As rabbit antihuman antisera to immunoglobulins were used for the serum immunoglobulin determinations, cross-reactivity between human and baboon immunoglobulins was evaluated, and it was found that human and baboon IgG and IgM were both completely cross-reactive, while IgA was partially cross-reactive. The serum immunoglobulin concentrations, proportions of T- and B-lymphocytes, and response to activators were found to be similar to those of man. These findings indicate that the Chacma baboon would be a useful and relevant model for the study of cellular and humoral immunology.

Facilities and Care

Weight gain in bonnet and pigtail macaques. Rosenblum, L. A., & Smiley, J. (Primate Beh. Lab., Downstate Med. Ctr., Box 120, Brooklyn, NY 11203) *Journal of Medical Primatology*, 1980, *9*, 247-253.

Developmental weight gain was traced in two species of macaque, *Macaca radiata* and *M. nemestrina*. Some similarities in growth patterns between the two species were observed. Spontaneous obesity in bonnet macaques was observed, and growth curves of these specimens were compared with those of normal animals.

Competition for a desired food in family groups of the common marmoset

(*Callithrix jacchus*) and the cotton-top tamarin (*Saguinus oedipus*). Tardif, S. D., & Richter, C. B. (C. B. Richter, Med. & Hlth. Sci. Div., Oak Ridge Assoc. Universities, PO Box 117, Oak Ridge, TN 37830) *Laboratory Animal Science*, 1981, *31*, 52-55.

Four captive groups of common marmosets and three groups of cotton-top tamarins were each presented with a desired food and their consumption was monitored. Inequalities in consumption between individuals were found for each group of each species. Generally, adult females consumed most of the desired food, followed by juveniles, and finally adult males. High consumption levels by all individuals during isolated feedings indicated that consumption inequalities within groups were most likely due to competition rather than inter-individual preference differences. Aggressive defense of the food cup was performed most frequently by adult females in both species. In *Callithrix jacchus* groups, this aggression was most often directed against adult males, but in *Saguinus oedipus* groups, it was most often directed against juveniles. Modification of the method of food presentation, such that food was more dispersed, lessened, but did not eliminate, inequalities in consumption.

Evaluation, using baboons, of a commercial cereal diet supplement, designed to prevent/combat malnutrition. Sly, M. R., du Bruyn, D. B., de Klerk, W. A., Robbins, D. J., Liebenberg, N. v. d. W., & van der Walt, W. H. (Biological Evaluation Div., Nat. Food Res. Inst., CSIR, Pretoria 0001, South Africa) *Nutrition Reports International*, 1980, *22*, 223-234.

A protein-, vitamin- and mineral-containing dietary supplement (PVM) has been developed primarily for the prevention and treatment of malnutrition resulting from the consumption of predominantly cereal diets. This supplement is manufactured commercially and is used by the South African Department of Health to combat malnutrition. Extensive studies at the time PVM was developed did not include a long-term experiment with primates. We describe such an experiment in which special attention was paid to the likely effects of prolonged consumption of anti-nutrients such as phytate, for example, a zinc deficiency leading to poor growth. PVM was found to perform well in that young baboons, fed for nearly 8 1/2 months solely on a mixture of maize and PVM, grew well and remained in excellent health, suffering none of the diseases common in maize-eating communities. A degree of zinc deficiency, manifesting as decreased serum and femur zinc contents, could probably be overcome by the addition of this element to PVM.

Breeding

Potential for cumulative inbreeding and its effects upon survival in captive groups of nonhuman primates. Smith, D. G. (Dept. of Anthropology, Univ. of Calif., Davis, CA 95616) *Primates*, 1980, *21*, 430-436.

The effect of population structure of six captive groups of rhesus macaques (*Macaca mulatta*) upon level of inbreeding and resulting

survival of offspring is estimated and found to be substantial. Breeding colony management policies designed to minimize inbreeding and its deleterious effects are discussed and compared for their efficiency. It is concluded that the most efficient policy involves the rotation of groups of adult males among several breeding groups every few years.

Characteristics of the menstrual cycle in nonhuman primates. III. Timed mating in *Macaca arctoides*. Bruggemann, S., & Dukelow, W. R. (W. R. Dukelow, Endocrine Res. Unit., Michigan St. Univ., E. Lansing, MI 48824) *Journal of Medical Primatology*, 1980, *9*, 213-221.

Analysis of five years of reproductive data from *Macaca arctoides* showed the mean menstrual cycle length was 29.9 ± 4.4 days. Using timed mating, a conception rate of 16.3% was observed. The highest conception rate occurred after matings on day 11 of the cycle. Eight pregnancies went to term and the mean gestation length was 172.4 days. The sex ratio was 137.8 males per 100 females in fetuses obtained on day 100 post-conception.

Semen parameters in *Macaca mulatta:* Ejaculates from random and selected monkeys. Harrison, R. M. (Delta Reg. Prim. Res. Ctr., Three Rivers Rd., Covington, LA 70433) *Journal of Medical Primatology*, 1980, *9*, 265-273.

Semen samples were collected by rectal probe electroejaculation techniques from groups of adult male rhesus monkeys. Mean values for 249 ejaculates from 100 monkeys were a sperm concentration of 419.43 × $10^6/cm^3$ with 53.9% of the sperm showing progressive movement. Sperm concentration showed a positive rank correlation coefficient with sperm motility. Significant motility and concentration differences were found among groups. Seasonal differences were noted but were not significant. The study provides data that will aid investigators who are screening animals for studies involving reproductive potential.

Age at first pregnancy and reproductive outcome among colony-born squirrel monkeys (*Saimiri sciureus*, Brazilian). Taub, D. M. (Yemassee Primate Ctr., PO Box 557, Yemassee, SC 29945) *Folia Primatologica*, 1980, *33*, 262-272.

In a colony of squirrel monkeys of Brazilian origin, 40% of all first pregnancies occurred among females aged 3.5-4 yr; 57% of all first pregnancies occurred between the ages of 3.5 and 5 years while 62% occurred between the ages of 2.5 and 4 yr. A total of 79% of all first pregnancies occurred among females between the ages of 2.5 and 5 years. 70% of all first pregnancies and 67% of all second pregnancies were unsuccessful. Females with unsuccessful first pregnancies were those most likely to have an unsuccessful second pregnancy, and vice versa. The most common reproductive event in the season immediately following first pregnancy was a failure to become pregnant (33%).

Induction of maternal-infant bonding in rhesus and cynomolgus monkeys after Cesarean delivery. Lundblad, E. G., & Hodgen, G. D. (Pregnancy Res. Unit, Nat. Inst. of Child Hlth. & Human Develop., Bethesda, MD 20205) *Laboratory Animal Science*, 1980, *30*, 913.

Following Cesarean section, five infants were swabbed with secretions from their dams' vagina. All five infants were accepted and nursed by their dams. Eleven other infants delivered by Cesarean section were not swabbed with vaginal secretions, and only one of the eleven infants was accepted and nursed by the dam.

Effect of folic acid supplementation on pregnancy in the squirrel monkey (*Saimiri sciureus*). Rasmussen, K. M., Thenen, S. W., & Hayes, K. C. (Dept. of Nutrition, Harvard Sch. of Public Hlth., Boston, MA 02115) *Journal of Medical Primatology*, 1980, *9*, 169-184.

Supplementation of squirrel monkeys with folic acid improved hematologic and folate status, maternal weight gain during pregnancy, and infant birth weight. Thus, the folate content in the stock diet (1.4 µg/g) did not meet the requirement for pregnancy. Low plasma vitamin B_{12} values suggest that vitamin B_{12} in the stock diet (22ng/g) also was not adequate. Changes with folic acid supplementation are similar to those for human subjects, indicating that the squirrel monkey is an appropriate model for folic acid deficiency in pregnancy in man.

Parturition in the slender loris (*Loris tardigradus lydekkerianus*). Kadam, K. M., & Swayamprabha, M. S. (Dept. of Zool., Central College, Bangalore 560001, India) *Primates*, 1980, *21*, 567-571.

The process of the birth of an infant slender loris has been observed under caged conditions--probably for the first time. The total time taken for the complete emergence of the fetus was 4 min and 34 sec. Three hours and 4 min later, the placenta was expelled and was completely devoured by the mother. Both head and breech presentations are normal and involve no manipulation from the mother. Detailed observations have been made on the pre-parturitional and post-parturitional changes in the mother.

Life span in captive nocturnal prosimians (*Perodicticus potto*) with reproductive and mortality records. Cowgill, U. M., & Zeman, L. B. (Dept. of Biol. Sci., 148 Crawford Hall, Univ. of Pittsburgh, Pittsburgh, PA 15260) *Primates*, 1980, *21*, 437-439.

Three pottos survived captivity 4 to 19 years. The female that died recently was probably 21 years old at the time of her death since she was at least primiparous at the time of her capture in December, 1959. During her captive lifetime she had given birth to three single individuals and one set of twins. Her mate is still alive and is believed to be at least 20 years old, having survived 19 years of captivity. Regular copulatory behavior was noted within one month of her death. These data suggest a somewhat longer life span for this species than had been previously recorded in the

scientific literature.

Social influences on first reproductive success and related behaviors in the saddle-back tamarin (*Saguinus fuscicollis*, Callitrichidae). Epple, G., & Katz, Y. (Monell Chemical Senses Ctr., 3500 Market St., Phil., PA 19104) *International Journal of Primatology*, 1980, *1*, 171-183.

Some aspects of sociosexual behavior and the age at which maturing females experienced their first evident pregnancy and at which maturing males caused their first evident pregnancy were recorded in *Saguinus fuscicollis* cohabiting from 6 months of age with either an adult or a maturing sex partner. A number of pair combinations and trios were studied. Maturing females cohabiting with an adult male conceived significantly earlier than maturing females cohabiting with a male of their own age. Maturing males cohabiting with adult females sired offspring at a significantly earlier age than males cohabiting with a female of their own age.

Husbandry and reproduction of the white-faced saki, *Pithecia pithecia*, in Riverbanks Zoological Park. Shoemaker, A. H. (Riverbanks Zoological Park, 500 Wildlife Parkway, Columbia, SC 29210) *Proceedings of the Southeast Regional American Association of Zoological Parks and Aquariums*, in press.

White-faced sakis have been exhibited at Riverbanks Park since 1974 with varying degrees of success. From our experiences, stress-related problems initiated by human intrusion and inadequate housing are the two biggest causes of mortality. Larger exhibits away from human interference seem to provide both security and sufficient space for exercise and normal movements. Although a low humidity may be harmful, an excessively high humidity may also be unacceptable and evaporation from normal servicing appears to be sufficient. Chopped fruits and vegetables, seeds, and nuts, coupled with commercial chows, have proven successful over a six year period and need no improvement. A social grouping of one adult male and female and 1-2 young is most satisfactory, with other combinations of adults likely to cause stress and unnecessary mortality.

Instruments and Techniques

A multipurpose transfer cage for baboons. Bennett, B. T., Bush, D. E., & Kowalczyk, M. (Biologic Resources Lab., Univ. of Illinois Med. Ctr., 1840 W. Taylor St., Chicago, IL 60612) *Laboratory Animal Science*, 1980, *30*, 1022-1023.

A three tiered combination squeeze and transfer cage for baboons was constructed. With this cage one employee could perform tasks previously requiring two or three animal handlers.

Conservation

Scientific issues and regulation of primate use. Rowman, A. N. (Inst.

for Study of Anim. Problems, 2100 L St., NW, Washington, DC 20038) *International Journal for the Study of Animal Problems*, 1981, *2*, 37-43.

Some of the patterns of use of nonhuman primates in the USA and Europe are outlined and a few specific examples of inappropriate and/or unnecessary use are described. The primate research resources program in the USA is examined and some suggestions as to how the program could be made more responsive to humane and conservation concerns are presented.

Breeding and use of nonhuman primates in the USA. Held, J. R. (Div. of Res. Serv., NIH, Bethesda, MD 20205) *International Journal for the Study of Animal Problems*, 1981, *2*, 27-37.

Several species of nonhuman primates, each possessing specific characteristics of particular value, are used by the United States biomedical community in a wide variety of health-related activities. These animals are man's closest relatives and are indispensable in the effort to understand and control human health problems. The destruction of primate habitats and embargoes on export of primates from source countries have decreased the supply of these animals. Continuation of many ongoing and new activities contributing to the improvement of human health is threatened by inadequate and erratic supply of these resources. In the U.S., a program has been developed to meet health needs for primates by: 1) ensuring the most effective use of primates; 2) developing domestic production of primates; and 3) contributing to conservation programs to ensure a stable supply and long-term availability of primates from their countries of origin.

Observations on two rare and endangered populations of red colobus monkeys in East Africa: *Colobus badius gordonorum* and *Colobus badius kirkii*. Struhsaker, T. T., & Leland, L. (Makerere Univ., Kampala, Uganda) *African Journal of Ecology*, 1980, *18*, 191-216.

Ecological and behavioral observations on two rare and endangered red colobus subspecies made during brief surveys in 1977, are summarized. Information is given on physical appearance, food habits, social group size and composition, social behavior and reproduction, vocalizations, associations with other primate species and conservation status. On the basis of coat color, facial pattern and vocalizations, it is concluded that *gordonorum* and *kirkii* are more closely related to one another than previously thought by many authorities. Both of the red colobus populations surveyed are severely threatened by habitat destruction. Unless immediate protection is afforded these areas, these populations have little chance of surviving.

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