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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 infomation 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 in *Mammal Species of The World: A Taxonomic and Geographic Reference* J. H. Honacki, K. E. Kinman, & J. W. Koeppl (Eds.). Lawrence, KA: Allen Press and the Association of Systematics Collections, 1982]. 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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Results of a Small-Scale Stumptailed Monkey Breeding Program in a Laboratory

Allan M. Schrier and Morris L. Povar
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The purpose of this paper is to describe informally our experiences during the past approximately nine years in connection with a small-scale harem-type breeding program using stumptailed monkeys *(Macaca arctoides)*. The program has been conducted in the Primate Behavior Laboratory in the Psychology Department.

Our own experience, as well as that of others, has been that, while it is relatively easy to breed rhesus *(M. mulatta)* and cynomolgus monkeys *(M. fascicularis)* in pairs in individual laboratory cages (Valerio & Dalgard, 1975), it is quite difficult to breed stumptailed monkeys in this manner (e.g., Bruggerman and Grauwiler, 1972; Trollope, 1978). Although we had a successful rhesus monkey breeding program involving animals paired in cages in cage racks (Kaye, Povar, & Schrier, 1966), we had far less success under the same conditions with stumptailed monkeys (approximately 8 or 9 live births in 10 pairings in the former case, as compared with approximately 1 in 10 in the latter). There was little published information about such matters in the early 1970's when we became concerned about the continued supply of stumptailed monkeys from the wild due to increasing evidence that their existence in the wild was severely threatened (Harrison, 1971). (And, indeed, in 1976, the government of Thailand, the only significant source of these animals, banned their export for all purposes.) We discussed the matter with investigators in other laboratories and the consensus was that stumptailed monkeys should be maintained in social groups for successful breeding, though the exact conditions were not clear and the results appeared to have been quite variable.

Early in 1975, we replaced the individual cage racks in one of our three colony rooms with two enclosures constructed with commercially available wire-mesh galvanized iron hardware used for dog runs. Each enclosure was approximately 2.5 by 3 by 2 m high. A wire-mesh metal divider with a large sliding door inside the enclosure could be used to divide the cage in half. This proved useful for purposes of gradually introducing new animals, temporarily separating an animal, capturing individuals, and the like. The colony room floor (Dexotex) served as the floor of the enclosure. Parallel sets of 2.5-cm diameter pipe were provided for use as perches. The colony rooms have gutters running along the walls that are pitched toward large drains. The colony room floors are, in turn, pitched toward the gutters. The cages were placed so that a gutter was located along one side. This facilitated cleaning of the pens by hosing of wastes into the gutters and down the drains (while the monkeys would take to their perches). The room was well lighted with fluorescent light from ceiling fixtures. A 12-hr. light-dark cycle and a temperature range of 70-75 deg-F was maintained throughout the year.

Five wild-born females, ranging in age from 3 to 5 years, as estimated by their dentition upon arrival in the laboratory, that had been in the laboratory for about 3 months, were placed in the enclosure with an approximately 9-year-old wild-born male, Dirk. Dirk had been in the laboratory for 6 years, had served as a subject in a number of behavioral learning experiments, and was a proven breeder. Five wild-born females and a male were placed at about the same time in the second enclosure. Four of these had the same background as the five in the first enclosure. The fifth female (Daisy) and the male (Clive) were about the same age and had the same background as Dirk. They were both also proven breeders in the laboratory.

It is common knowledge that intragroup aggression, particularly among females, can be a serious problem when establishing harem-type as well as other social groups (Timmermans, Schouten, & Krijnen, 1981). Thus, the groups were carefully monitored during the first few weeks, and, in fact, one of the females in Clive's enclosure appeared to be in danger of losing her life and was removed. Another female in this enclosure was removed the following year because of illness. Two females (Beula and Kim) that had arrived in the laboratory at the same time as the other females in the enclosure were added to the group in 1977.

The animals are fed only Old-World-monkey-type commercial laboratory monkey biscuits, as has been the case for all of our animals in the Primate Behavior Laboratory since it was founded. They are fed enough once a day that the animals lowest in the dominance order

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are able to get enough to eat. This is a relatively expensive approach to feeding, but alternative methods that are less expensive (e.g., Chamove, 1982) are not as compatible with our cleaning procedures.

The breeding results to date are summarized in Table 1, which shows the approximate age of each adult animal when placed in the enclosure, and the sex and month of birth of each infant each year. Since we hoped to use animals born in the laboratory in future behavioral experiments and also as breeders, we wanted them to develop as normally as possible behaviorally. It is clear from the literature (Goldfoot, 1977; Suomi, 1982) that this means not separating the young from parents and peers for as long as possible. However, the breeding literature also makes it clear that the presence of young animals, particularly nursing young, delays conception. So the desire for good breeding results (at least in the short term) must be balanced against the need for normal development. The animals that were born the first year in the two breeding enclosures were removed when they were about one year old. All of the animals born since then have been kept in the enclosures in which they were born for as long as about 3 years, but not less than 2.

Our female breeding stars are Xena and Amy in Dirk's cage and Kim in Clive's, who have each given birth to four live infants, or on the average one every other year that they have been in the enclosures. One animal in each cage, Peg in Dirk's and Tanya in Clive's

Table 1

Breeding record of Two Harem-Type Enclosures for Stumptailed Monkeys, All Wild Born Except Sonya and Cheri. Approximate Ages When First Placed in the Enclosure is Indicated in Parentheses. X = Not in Enclosure.

Animal	Year								
	'75	'76	'77	'78	'79	'80	'81	'82	'83
Dirk's Pen(9)									
Peg(3)		♀MAR						X	X
Xena(3)		♀MAR	♀DEC		♀OCT		♂MAY		
Kathy(5)	♀OCT		♀NOV		?[b]	♀AUG			
Molly(3)		♂MAY		♂MAR	♀SEP[a]		♀SEP		
Amy(5)	♀OCT		♀OCT		♂SEP		♀MAY		
Sonya(6)	X	X	X	X	X	X	X		♀MAR
Clive's Pen(9)									
KIM(5)	X	X		MAY	♂SEP		♂APR		♀FEB
Ida(5)	♂OCT		♂NOV			♀FEB[a]	♀OCT		
Beula(4)	X	X		♀MAY[a]	♀[b]				
Daisy(9)	♂APR	♀NOV	♂AUG			♂MAR[a]			
Tanya(3)		♀SEP							
Cheri(6.5)	X	X	X	X	X	X	X		

[a] Stillbirth [b] Miscarriage

did not become pregnant again after giving birth to live infants in 1976. We removed them from the enclosures early in 1982 and replaced them with two laboratory-reared females (Sonya and Cheri) later in the year. Daisy in Clive's enclosure has not given birth to a live infant in about 5 years and has not conceived in about 3 years. Since she is now about 18 years old, she may no longer be fertile. Beula in Dirk's enclosure is the only female who has never given birth to a live infant, and, since it now seems doubtful that she ever will, we plan to replace her with another female soon. In all, 28 live animals have been born in the two enclosures since the groups were established. The breeding results could probably have been improved by removing Peg, Tanya, and Beula earlier, but we did not do so because we had no pressing need for more animals.

As can be seen in Table 1, there have been two miscarriages and four stillbirths during the period in question. That means that 84% of the pregnancies resulted in live births, an outcome not greatly different from what appears to be average for macaques (e.g., Small, 1982; Timmermans, Schouten, & Krijnen, 1981; Valerio & Dalgard, 1975). We have had no deaths of any offspring in either of the breeding enclosures, and only one death of a laboratory-born animal outside these enclosures (a 3.5-year old male, from bloat).

Table 2

Breeding Record of Harem-Type Enclosure with Laboratory-Reared Females and Wild-Born Male (Dave). Approximate Ages of Animals When First Placed in the Enclosure is Indicated in Parentheses. X = Not in Enclosure.

Animal	'81	'82	'83
Wendy(6)	♀OCT		♀MAR
Lisa(5.5)		♀SEP	
Meeka(5.5)	X		
Laura(5)	X		♂MAR[a]
Emma(4)	X		♂MAR

[a] Mistreated infant; see text

A good test of the condition of our animals and of our ability to sustain such a breeding program is the ability of our laboratory-reared animals to reproduce. Early in 1981, two of our oldest laboratory-reared females, Wendy and Lisa, became available for use in the breeding program. They were 6 and 5.5 years of age, respectively and had been housed individually in cages for 3 years. They were placed in a third enclosure of the same size and type as the first two which was erected in the same colony room. A wild-born male, Dave, who was approximately 8.5 years of age, and had been used in several behavioral studies was placed in the cage at the same time. Dave was a proven breeder. As can be seen in Table 2, one of these females gave birth to a live infant the first year and again this year. The second animal gave birth to a live infant the second year in the enclosure.

Three more laboratory-reared females, ages 4 to 5.5 years were placed in the enclosure in 1982. One, Laura, gave birth to a live infant this year, but did not care for him properly, holding him upside down and dropping him occasionally. Because the infant appeared to be in poor condition, it was removed from the enclosure for hand rearing, but did not survive. It is not clear whether the infant was in poor health at birth, possibly a factor contributing to Laura's treatment of it, or became ill as a result of her treatment. Emma's baby was born shortly afterward and was stolen by Laura who was no longer lactating. Emma and her infant were removed from the enclosure and placed in an individual cage for a week. With the partition closed and the remainder of the group restricted to half the enclosure, Emma and her infant were then placed in the other half for another week. The partition was then opened and Emma mingled with the others with no further consequences. Also, when Wendy gave birth to her second infant the day after Emma gave birth, there was no further problem with Laura, probably because Wendy was older, had been in the enclosure longer, and had had experience raising an infant.

Of the two laboratory-reared animals placed in the original enclosures, one, Sonya in Dirk's cage, has given birth to a live infant. The fact that Cheri in Clive's enclosure has not yet done so may be related to difficulties encountered in acceptance of her by the group. She was subjected to much physical aggression initially. Only after alternating periods of separation from the group in one half of the enclosure with trial periods within the group was she finally accepted. Except for Laura's, all five animals born to laboratory-reared animals have been well cared for and are all doing well. There seems little doubt that we can successfully breed our laboratory-reared females. It remains to be determined whether any of our laboratory-reared males will also prove to be breeders. With both of the original males approximately 18 years old now, it may be necessary to replace them soon with either somewhat younger wild-born animals or with our older laboratory reared males. We try to determine their

suitability for breeding by observing their behavior when paired with cycling females.

There have been many reports of a tendency for a breakdown in seasonality of breeding in laboratory situations (Chamove, 1981; Timmermans *et al.*, 1981). Figure 1 shows our data on this question. The figure shows the frequency of births in all three enclosures during each month of the year. We have a very clear bimodal distribution, with March and October the peak months of delivery. We do not recall any similar data, though we have not made an extensive search of the relevant literature. Although the October-period-peak may be in part influenced by the time of introduction into the enclosure, the bimodal distribution appears to have persisted, in some cases for over eight years.

Of the live-born and stillborn animals in the two original enclosures, 10 were males and 22 were females, a statistically significant difference based on binomial probabilities ($p < .05$). The N is still too small to determine whether a similar trend is present in the third enclosure.

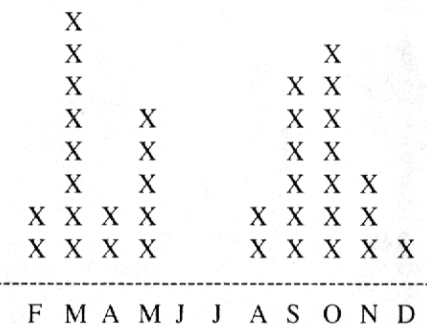

Figure 1. Frequency of births in the three breeding enclosures during each month of the year.

Chamove (1981) has also reported successful breeding of stumptailed macaques in a harem-type of arrangement in a laboratory setting, using procedures that are generally different from those used here.

Acknowledgement

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An Unexpected "Epidemic" of a Rare Stereotypy: Unidentified Stress or Imitation?

A. Rivers, U. Bartecki, J. V. Brown and G. Ettlinger
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Stereotypies have frequently been described in monkeys as a consequence of social isolation/deprivation or of drug treatment (e.g., Berkson, 1976; Berkson & Karrer, 1968; Cross & Harlow, 1965; Ridley & Baker, 1982). Erwin, Mitchell & Maple, (1973), seem to have been the first to observe a relatively rare stereotypy, termed eye-poking ("salute") by them and shown in their Figure 3. We now describe the occurrence of eye-poking (EP) in five of 32 rhesus monkeys.

History

A juvenile male rhesus monkey, named Martin, weighing about 1 kg, arrived in our laboratory in London, U.K., on November 28, 1979, as part of a consignment of six monkeys that had been bred in Birmingham, U.K. Martin was the only monkey of this consignment to exhibit frequent EP. This behavior was immediately noticed because we had not previously noticed it in any other of over 700 monkeys used between 1958 and 1979 in London. In other respects Martin seemed normal.

On September 22, 1980 Martin, together with 24 other rhesus monkeys, was transferred to Bielefeld, W. Germany, by road and sea. The monkeys were housed individually, in pairs or in groups up to four per cage in large cages measuring 1 m by 1 m by 1 m. Unfortunately no precise record was kept of the initial housing of the animals. On enquiry it seemed that at this time no other monkey exhibited EP. By December, 1980 an older female, Tich, was seen to be making similar movements, and two other monkeys, Nimbus and Peena, also showed EP during the spring of 1981. A fifth rhesus monkey, Eberhard (part of another consignment of ten to reach Bielefeld from Birmingham, U.K., on September 16, 1981) was observed to show EP when first tested in a Wisconsin General Test Apparatus (WGTA) during the spring of 1982, at which time there were in all 32 monkeys in the colony. Eberhard also showed EP in its home cage from January, 1983.

Observations

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Representative displays of EP for each monkey, prepared in 1982, are shown in Figure 1. There was some variation, and especially Nimbus sometimes used either hand, whereas Peena brought her closed fist (instead of open hand) to the head.

Systematic observations were made for 150 min during behavioral testing in WGTA and for ten periods of 15 min in the home cage. As a basis for comparison, 2 further monkeys, Max which sucked its penis, and San which sucked the middle finger of the right hand, were also observed (see Table 1). Observations during testing were taken at the time of day (generally between 10.00 and 15.00 hr) when the animals were normally tested. Observations in the home cage were taken for four periods of 15 min in the morning, three periods at midday and for three periods in the later afternoon. These ten periods have been collapsed in Table 1. It can be seen that the incidence of EPs is higher during testing than in the home cage; but the reverse relationship holds for penis- or finger-sucking. Also, the median duration of EPs is shorter than of sucking, suggesting these behaviors are not comparable.

Discussion

It seems very probable that Martin developed a genuine stereotypy before he came to London in 1979. However one may wonder why four other monkeys came to show the same rare stereotypy within a relatively short period of time (three within six months of transport to Germany, the fourth eighteen months later). Since Eberhard did not participate in the original move during September, 1980, it seems unlikely that the transport *per se* can be held responsible. (In any case, Martin was not in the same crate with Tich, Peena or Nimbus.)

Two possible explanations remain. The monkeys at Bielefeld may be housed under conditions which create some unidentified stress, and each of the remaining four monkeys individually developed a stereotypy. Against such an explanation would be the finding that all four monkeys developed the same stereotypy. No other monkey developed self-biting at this time and only two developed jumping on all fours. A more plausible explanation for the EP observed in the four monkeys other than Martin is that they imitated Martin's EP. It seems strange that four monkeys should develop independently

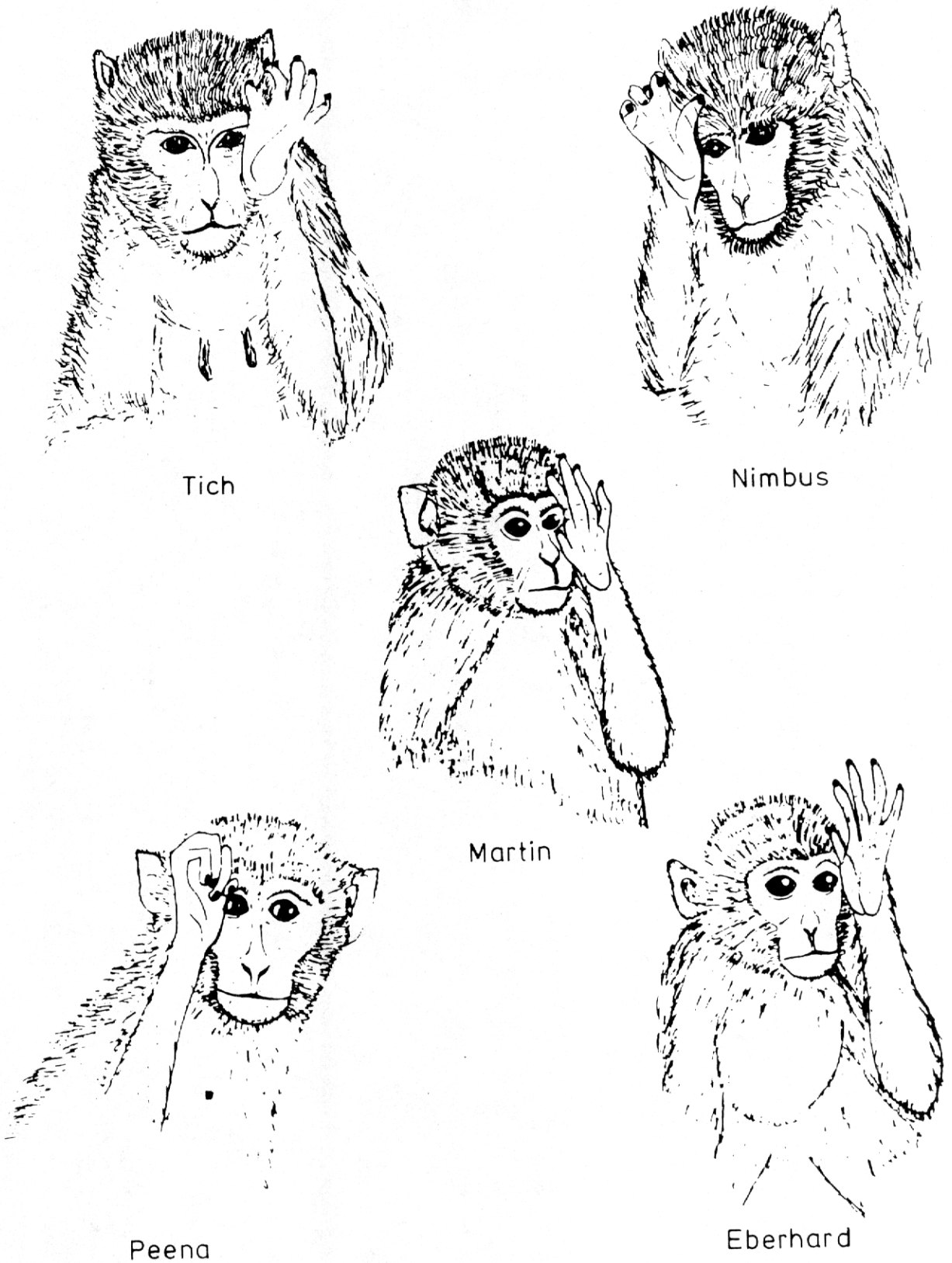

Figure 1. Drawings of 5 monkeys with their most typical form of EP.

Table 1. Incidence of eye-poking (EP) during testing and in home cage: and median and range of durations of EPs.

	Martin	Tich	Nimbus	Peena	Eberhard	Max	San
EPs during 150 min testing in WGTA	411	203	75	24	84	(7)	(41)
EPs during 150 min observation in home cage	58	43	25	17	—	(50)	(45)
Median duration of 10 EPs in home cage, in sec.	5.5	2.5	2.5	5.5	—	(15.5)	(27.0)
Range of durations in sec.	1-26	1-5	1-6	2-8	—	3-26	7-90

Note.—Figures not in brackets represent the number of hand movements identified as EPs, or their duration. Figures in brackets refer to sucking of the penis (Max) or of the finger (San).

the same stereotypy in such a short period of time. Such imitation seems not to have previously been described in monkeys. The reasons for such imitation are not clear to us.

Acknowledgement

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News Briefs

MFA Holds Demonstrations at Primate Centers

As promised (see this *Newsletter*, April, 1983, p. 6, and July, 1982, p. 8), Mobilization for Animals (MFA), a coalition of animal welfare groups, staged demonstrations, attended by various celebrities, at or in the general vicinity of four of the Regional Primate Research Centers on April 24, 1983. The group's goals include complete closing of two of the centers and drastic curtailment of research in the others.

The New England Regional Primate Research Center, associated with Harvard University, and located about 25 miles outside of Boston, was one of the targeted centers. MFA plans called for a rally at the Boston Commons, but heavy rain forced them to use the grand ballroom and balcony of the Park Plaza Hotel instead. Estimates of the number of participants depend on who is doing the counting; they varied from 2,500 to 4,000 persons. Speeches were given by Earl Holliman, Susan Strasberg, and Cleveland Amory. Angie Dickenson was booed off the stage for saying that some animal research was needed. Demonstrators travelled to the Center in 8 to 10 buses and 50 to 60 cars. Late in the afternoon, they held a memorial service in a field across from the Center for the "1,000 animals killed per year." The rally, at the Center lasted about an hour.

The Yerkes Regional Primate Research Center, located on the campus of Emory University in Atlanta, was another of the targeted centers. It was a cold, windy, gray day, perhaps contributing to the relatively small turnout of approximately 300 people at Chandler Park in Atlanta. The speakers included Michael Fox and several other people associated with the animal welfare movement, but several celebrities that had been expected did not show up. Earlier in the day, about 200-250 demonstrators marched to the main gate of Emory University and held a wreath-laying ceremony. Later in the day, a bus with demonstrators attempted to reach the Center, but the campus was closed to them in accordance with University policy, and the bus departed.

The Wisconsin Regional Primate Research Center, at the University of Wisconsin, Madison, was a third targeted Center. The rally there began with a march that passed by the Center. Marchers wore black armbands that were dropped into one of two black coffins at one point. Between 1,500 and 4,000 attended (1,500 counted by the Center as they passed by 2,500 announced locally, and 4,000 announced nationally) from eleven states, many from Ohio and Michigan but including people from Missouri, Kentucky, and Texas. The march ended at a large plaza where speakers included Amanda Blake (Kitty from TV's old "Gunsmoke") and Dr. John McArdle, the scientific advisor to the National Anti-Vivisection Society.

The fourth targeted Center was the one at the University of California, Davis. There were estimated to be 2,500 to 3,000 people at Freeborn Hall on the Davis campus. There were a number of emotional crying people present, but the crowd was generally well-behaved, as was the case at all the other rallies. The MC was Bob Barker (of TV's "The Price is Right"). Other celebrities were Donald Doyle, Michael Bell (Parkay commercial), Jamie Leigh-Curtis, Donald Barnes (NAVS), Dodie Goodman, Patricia Forkan (HSUS), and Peter Hamilton. Their demonstration lasted from noon until 4:00 p.m.

There was local newspaper and TV coverage of both sides of the issue in connection with the various rallies, but little in the way of significant national coverage.

MFA Targets Animal Psychology Laboratories for "Actions"

A brochure handed out by MFA at some of the above-mentioned rallies stated that "Most psychologists, and their professional organizations, which should be at the forefront of efforts to ease stress and end suffering, have completely refused to address ethical concerns or require compassionate behavior, except for vapid and meaningless 'guidelines'. Beginning in the fall of 1983, and continuing through the year, Mobilization for Animals will encourage small, decentralized actions at psychology laboratories throughout the world, culminating in a massive, international mobilization at the annual convention of the American Psychological Association in Toronto, Canada, on August 24-28, 1984."

Research Animal Legislation Approval Anticipated

Both the Senate and the House are expected to give approval to the National Institutes of Health renewal authorization which includes amendments concerning the use of laboratory animals in Federally funded research. The Senate Committee on Labor and Human Resources and the House Committee on Energy and Commerce have reported favorably upon their versions (S 773 and HR 2350) of the renewal authorization, and if approved by both chambers, the bills will go to a joint conference committee to iron out the differences in language. Of the amendments pertaining to animals in research the House

amendments are the most far reaching as they cover alternative methods, guidelines for care and treatment of animals, institutional animal care commmittees, and a mandate for an 18-month study of the issues involved in the use of laboratory animals. The Senate amendment only calls for a study of the issues.

The House committee approved an amendment sponsored by Rep. Doug Walgren (D-PA) that: (1) Charges the NIH Division of Research Resources with establishing by June, 1984 a plan for the development of alternative methods. (2) Authorizes a total of $20 million for 3 years to put into effect the plan for developing alternative methods. (3) Charges the Secretary of the US Department of Health and Human Services with developing guidelines for the care and treatment of laboratory animals. (4) Requires that all NIH-funded research involving the use of laboratory animals be monitored by an institutional animal care committee with responsibilities that include at least 2 inspections of the animal facilities each year. The committees are to be composed of at least one veterinarian and one person not affiliated with the institution and not more than 3 persons from the same administrative unit.

The committee also approved an amendment by Rep. Edward Madigan (R-IL) that requires an 18-month study of the issues by the National Academy of Sciences. The study is to include: (1) An assessment of the types, numbers, and purposes for which live animals were used in research during the last 5 years and determine whether the numbers of animals used have increased or decreased. (2) An assessment of the cost and the impact of accreditation requirements on NIH-supported research facilities and an evaluation of the effect accreditation has on protecting animals against inhumane treatment. (3) A review of all Federal and state laws and regulations governing the use of laboratory animals in biomedical and behavioral research (4) An evaluation of NIH efforts to decrease the use of live animals in research and its efforts to assure that animals are treated humanely.

The Senate committee amended its NIH renewal authorization to include a bill sponsored by Sen. Orrin Hatch and Edward Kennedy that also calls for an 18-month study of the issues involving the use of animals in research. The Senate version of the study is the same as the House version except that the House study is limited to only NIH-supported animal research. The Senate study involves all HHS supported animal research. [Information from the *NSMR Bulletin*, 1983, *34*[5], 1]

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Pathology of Laboratory Animals Course

The "Pathology of Laboratory Animals" course will be held at the Silver Spring Holiday Inn, 8-12 August, 1983. 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 1 August, 1983 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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Exchanges and Briefs

Some Queries

The following are some queries from Dr. David C. Olson, Oregon Regional Primate Research Center , 505 N.W. 185th Av., Beaverton, OR 97006.

Coomb's Test. I have never seen a positive Coomb's test in a nonhuman primate suspected of having an immune mediated anemia. I am wondering if the Coomb's sera must be species specific.

Caging. Group formation and cohesiveness seems to be quite strong among nonhuman primates housed indoors in individual cages. This is quickly appreciated anytime someone attempts to remove one of the occupants from the room. Perhaps this observation could be used to argue that standard, individual caging methods do not alter normal, nonhuman primate social behavior.

Limb Contractures. Would like to know if someone has a successful treatment for limb contractures that sometimes develop after physical restraint.

Finicky Eater. Would like to know if someone has a solution for the animal that refuses to eat despite apparently good health.

Thyroid Data. I would like to obtain normal thyroid function data (T_3 , T_4 , FTI, TSH) for infant rhesus macaques and Cebus monkeys.

Some Reports

Marmoset Wasting Syndrome. We are using increased levels of zinc and high protein, low glutin diet for the treatment of Marmoset Wasting Syndrome with some apparent success, although insufficient time has elapsed for any conclusive statement.—Dr. David Renquist, Head, Primate Quarantine Unit, NIH Animal Ctr., Bldg. 102, Rm. 102, Bethesda, MD 20014.

New Antibiotics. We are exploring the use of some new antibiotics which are not yet approved for primate use for the treatment of klebsiella and pseudomonas pneumonias.—Dr. David Renquist (address same as above).

SAIDS. We are working on the experimental transmission of Simian Acquired Immunity Defficiency Syndrome (SAIDS). A recent reference to our work is: Henrickson, R. V., Maul, D. H., Osborn, K. G., Sever, J. L., Madden, D. L., Ellingsworth, L. R., Anderson, J. H., Lowenstine, L. J., & Gardner, M. B. Epidemic of acquired immunodeficiency in rhesus monkeys. *Lancet,* 1983, *1*(8321, 2/19), 388-390.—Dr. Roy V. Henrickson, California Primate Res. Ctr., Univ. of Calif., Davis, CA 95616.

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Information About Mixed-Choice Exhibits Requested

Mixed-species exhibits have become more prevalent in zoos all over the world. However, the majority of research conducted on intertaxa interactions has been done in a laboratory type setting. Due to a lack of communication concerning mixed-species exhibits much valuable information goes unreported. Therefore, we have initiated a survey of mixed-species exhibits of primates. If anyone has observed mixed-species interactions involving primates and feels they can help (even if the information is incomplete), please request our questionnaire. Any help will be greatly appreciated. Contact: Kristine Kokkos, c/o G. Mitchell, Dept. of Psychology, Univ. of Calif., Davis, CA 95616.

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Upcoming Primate Meetings

ASP

Fifth annual meeting of the American Society of Primatologists, East Lansing, Michigan, August 7-10, 1983. Program information is available from the program Chairman: Dr. David M. Taub, c/o Yemassee Primate Center, 414 New St., Beaufort, SC 29902.

IPS

Xth Congress of the International Primatological Society, July 22-27, 1984, Nairobi, Kenya. For information about the Congress contact: IPS Congress Office, Institute of Primate Research, P.O. Box 34505, Nairobi, Kenya. The first notice of the meeting is reproduced in the April, 1983 issue of this *Newsletter*.

* * *

Symposium on Cayo Santiago Monkey Colony to be Held at ASP Meeting

A special symposium on current research at the Cayo Santiago monkey colony will be held at the Sixth Annual Meeting of the American Society of Primatologists (see upcoming Primate Meetings). Investigators from the United States, Puerto Rico, Canada, and Great Britain will discuss a range of topics that include infant social development, mating, gerontology, genetics, and behavior. Cayo Santiago, a small island located off the southeast coast of Puerto Rico, is home to over 1,000 free-ranging rhesus monkeys *(Macaca mulatta)*. The core population, which consisted of about 400 rhesus monkeys, was brought over from India in 1938 by the late Dr. C. Ray Carpenter under the sponsorship of the John and Mary Markle Foundation and the government of Puerto Rico. Since 1972, the colony has been used primarily for long-term studies of social behavior and genetic microevolution. Currently, the Animal Resources Program of the National Institutes of Health's Division of Research Resources and the University of Puerto Rico, Medical Sciences Campus, support the colony. Additional information about the symposiumm can be obtained by writing to the Director, Caribbean Primate Research Center, Box 297, Sabana Seca, Puerto Rico 00749.

* * *

ILAR Holds Public Meetings on Laboratory Animal Care and Use

The National Research Council's Institute of Laboratory Animal Resources (ILAR) will hold open meetings in San Francisco, CA and Rosemont, IL on July 11 and 12, 1983, respectively, to receive statements from the public relevant to ILAR's preparation of a new revision of the *Guide for the Care and Use of Laboratory Animals*. The first of the three public meetings planned for this purpose was held May 17, 1983 in Washington, DC. The revision of the "Guide" is being carried out under contract from the National Institutes of Health to the National Academy of Sciences by a 14-member Committee on Care and Use of Laboratory Animals, chaired by Dr. Steven P. Pakes of the University of Texas Health Sciences Center, Dallas, TX.

Oral presentations must be scheduled by the ILAR office and will be limited to five minutes each in order to accommodate as many speakers as possible, while allowing the committee ample time for questions. Each oral presentation should be accompanied by a written statement, which may be of any length. Twenty (20) copies of each written statement should be provided to the Committee at the meeting. Written statements for consideration by the Committee must be submitted by July 29, 1983. They should be sent to Dr. Earl W. Grogan, ILAR, National Research Council, 2101 Constitution Ave., NW, Washington, DC 20418; requests must be received on or before July 6, 1983.

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Recent Books and Articles

(Addresses are those of first authors)

Books

The Orang Utan: Its Biology and Conservation. Leobert E. M. de Boer (Ed.). The Hague: Dr W. Junk Publishers, 1982. 376 ppp. [Price: 175 Dfl. (Approx. US $76.)]

Based on papers presented at the "Workshop on the Conservation of the Orang Utan," held October, 1979 in Rotterdam. Contents: 1. Distribution and evolution of the orang utan, *Pongo pygmaeus* (Hoppius), by G. H. R. von Koenigswald. 2. The orang utan in captivity, by M. L. Jones. 3. Genetics and conservation of the orang utan, by L. E. M. de Boer. 4. Red cell enzyme variation in the orang utan: Electrophoretic characterization of 45 enzyme systems in Cellogel, by P. Meera Khan, H. Rijken, J. Wijnen, L. M. M. Wijnen, & L. E. M. de Boer. 5. Glucose-6-phosphate dehydrogenase (G6PD) variation in the orang utan, by J. Th. Wijnen, H. Rijken, L. E. M. de Boer, & P. Meera Khan. 6. Orang utan haemoglobins: A short review, by L. E. M. de Boer, & P. Meera Khan. 7. Haemoblobin polymorphisms in Bornean and Sumatran orang utans, by L. E. M. de Boer, & P. Meera Khan. 8. The chromosomes of the orang utan and their relevance to the conservation of the species, by L. E. M. de Boer, & H. N. Seuánez. 9. Veterinary aspects of the maintenance of orang utans in captivity, by D. M. Jones. 10. The physiology of reproduction of the orang utan, by J. J. van der Werff ten Bosch. 11. Causes of non-breeding and the development of the secondary sexual characteristics in the male orang utan: A hormonal study, by S. Kingsley. 12. Reproductive behavior and endocrinology of orang utans, by R. D. Nadler. 13. Social potential expressed in captive, group-living orang utans, by S. D. Edwards. 14. Orang utan behavior and its management in captivity, by T. L. Maple. 15. Mating behaviour of wild orang utans, by C. Schürmann. 16. Orang utans as seed dispersers at Tanjung Puting, Central Kalimantan: Implications for conservation, by B. M. F. Galdikas. 17. Orang utan conservation in Sumatra, by habitat protection and conservation education, by R. J. Aveling. 18. How to save the mysterious 'man of the rain forest'? by H. D. Rijksen. 19. Epilogue, by L. E. M. de Boer.

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.

The Woman that Never Evolved. Sarah Blaffer Hrdy. Cambridge, MA: Harvard University Press, 1981. Softcover. 256 pp. [Price: $6.95]

The author calls on evolutionary theory and recent field observations of primates in an attempt to dispel some of the prevalent views about the nature of females and female sexuality, and suggests new hypotheses about the evolution of women. Contents: 1. Some women that never evolved. 2. An initial inequality. 3. Monogamous primates: A special case. 4. A climate for dominant females. 5. The Pros and cons of males. 6. Competition and bonding among females. 7. The primate origins of female sexuality. 8. A disputed legacy. Afterword. Taxonomy of the primate order. Notes. Index.

Bibliographies

Behavioral observations of feral and free-ranging New World monkeys: A bibliography (1940-1979). Jean Balch Williams. Seattle: Primate Information Center, 1983. 185 Citations with Species Index. [Price: $6.00. Send orders to: Primate Information Center, Regional Primate Research Center SJ-50, University of Washington, Seattle, WA 98195]

Behavioral observations of feral and free-ranging New World monkeys: *A bibliography (1980-1982)*. Jean Balch Williams. Seattle: Primate Information Center, 1983. 75 Citations with Species Index. [Price: $5.00. Ordering information same as in previous reference.]

Catecholamines and corticosteroids in nonhuman primtes during stress: A bibliography. Benella Caminiti. Seattle: Primate Information Center, 1983. 135 Citations with Primate and Subject Indexes. [Price: $6.00. Ordering information same as in previous reference.]

Colony breeding of African monkeys: A bibliography (2nd ed.). Benella Caminiti. Seattle: Primate Information Center, 1983. 114 Citations with Species Index. [Price: $6.00 ($5.00 prepaid). Ordering information same as in previous reference.]

Fertility and birth rates among feral or free-ranging nonhuman primates: A bibliography. Benella Caminiti & Jean Balch Williams. Seattle: Primate Information Center, 1983. 151 Citations with Primate Index. [Price: $7.00 ($6.00 prepaid) Ordering information same as in previous reference.]

Disease

Red-bellied tamarins *(Saguinus labiatus):* Hematologic reference values and hemopathologic responses. Hawkey, C. M., Knight, J. A., Taffs, L. F., Appleton, H., Hart, M. G., & Jones, D. M. (Zool. Soc. of London, Regent's Park, London NW1 4RY, England) *American Journal of primatology,* 1983, *4*, 33-43.

Hematologic reference values have been established for captive adult red-bellied tamarins by carrying out full blood counts and fibrinogen estimations on 25 clinically normal animals. The reference values were used to identify abnormal changes in the blood of 9 clinical cases. Hypochromic anemia, neutrophilia, and raised fibrinogen levels were found in animals with self-inflicted injuries, dermatitis, and ileocecal intussusception. Target cells and jaundiced plasma were noted in a case of yersiniosis. Two animals in which generalized muscle wasting was the main abnormal clinical sign were severely anemic, and in one of these cases a significant number of Heinz bodies was present. The findings in these two animals were compared with those in common marmosets *(Callithrix jacchus)* with possible wasting marmoset syndrome.

Natural and experimental simian cytomegalovirus infections at a primate center. Swack, N. S., & Hsiung, G. D. (Virology Lab., Veterans Admin. Med. Ctr., W. Haven, CT 06516) *Journal of Medical Primatology,* 1982, *11*, 169-177.

Simian cytomegalovirus infections were studied in captive, naturally infected primates and in experimentally infected rhesus monkeys. Neutralizing antibody to simian cytomegalovirus was prevalent in selected species of Old World monkeys. Naturally infected, rhesus monkeys shed virus in their urine during the entire 2-yr period of study. Similarly, experimentally infected rhesus monkeys showed neutralizing antibody and viruria for more than two years. The indirect fluorescent antibody procedure was found more sensitive than the neutralization antibody technique but appeared less specific for antibody to cytomegalovirus strains.

Hepatocytis Parasitemia in wild Kenya vervet monkeys *(Cercopithecus aethiops).* Turner, T. R., Lambrecht, F. L., & Jolly, C. J. (Dept. Human Genetics, Univ. Mich. Med. Sch., Ann Arbor, MI 48104) *Journal of Medical Primatology,* 1982, *11*, 191-194.

Blood smears of 159 vervet monkeys from 3 sites in Kenya were stained with Giemsa and examined for *Hepatocystis* parasites. The populations differ in incidence of parasitemia, ranging from 0-62% affected individuals. These differences are probably due to altitude and local environmental conditions.

Identification of *Campylobacter jejuni* in *Macaca fascicularis* imported from Indonesia. Morton, W. R., Bronsdon, M., Mickelsen, G., Knitter, G., Rosenkranz, S., Kuller, LaR., & Sajuthi, D. (Reg. Prim. Res. Ctr., Univ. of Wash., Seattle, WA 98195) *Laboratory Animal Science,* 1983, *33*, 187-188.

Campylobacter jejuni was selectively cultured in 33 (66%) of 50 *Macaca fascicularis* that had been imported from Indonesia. As there was no published information on the incidence of *Campylobacter* infection in nonhuman primates from Indonesia, a survey was conducted to determine the presence and incidence of *C. jejuni* in 50 macaques before they were exported from Indonesia. The organism was positively identified in 18 (36%) of the specimens examined. Repeat cultures after importation and during the quarantine period produced 37 of 48 (77%) positive results. Stool cultures from 57 other *M. fascicularis* and *M. nemestrina* in more preliminary stages of captivity in Indonesia produced only two positive identifications. These findings suggest that *C. jejuni* is not a natural pathogen of macaques in Indonesia, but it infects them after capture.

Pterygodermatites nycticebi (Nematoda: Spirurida) in Golden Lion Tamarins. Montali, R. J., Gardiner, C. H., Evans, R. E., & Bush, M. (Dept. Pathol., Nat. Zool. Pk., Smithsonian Inst., Wash., DC 20008) *Laboratory Animal Science,* 1983, *33*, 194-197.

Pterygodermatites nycticebi (syn *Rictularia nycticebi),* a spirurid nematode first described in the slow loris *(Nycticebus coucang),* recently has been associated with morbidity and mortality in the golden lion tamarin *(Leontopithecus rosalia rosalia)* collection at the National Zoological Park. Adult worms were found in the lumen of the small intestine with their anterior ends embedded in the mucosa. Larvae, when present, were deeper in the submucosa. A few heavily infected animals developed profound weakness, anemia, and hypoproteinemia. Infective larvae of *P. Nycticebi* developed in laboratory-reared German cockroaches *(Blatella germanica)* that were fed tamarin feces containing eggs of *P. cycticebi.* Wild-caught German cockroaches also were found to harbor these infective larvae which implicates this ubiquitous pest as an intermediate host. Effective control of *P. nycticebi* has been achieved by regular fecal screening of all callitrichids for spirurid eggs and biannual prophylaxis with mebendazole at 40 mg/kg, as well as a rigorous cockroach extermination program.

Stress-effects in *Microcebus murinus.* Perret, M. (Lab. d'Ecologie Generale, ERA410, 4, Ave. du Petit Chateau, 4-91800 Brunoy, France) *Folia Primatologica,* 1982, *38*, 63-114.

Histological investigations were made over a

10-yr period on 164 lesser mouse lemurs that died spontaneously in captivity. The principal lesions found were chronic nephrosis with nephritis which affects 90% of the animals, myocardial necrosis, respiratory insufficiency induced by interstitial pneumonia, fatty changes in the liver, and splenic and gastric lesions. The following are associated with these pathologies: progressive hypothyroidism, stable hypercorticism, slight medulloadrenal hyperactivity, and sexual disorders such as testicular atrophy in males and estrous cycle disturbance or uterine tumor in females. All these data were treated by correspondence analysis; this showed that, except for some rare cases of death which can be attributed to massive parasitic infestation or generalized cancer, the whole captive population of lesser mouse lemurs is suffering from a syndrome that leads to renal insufficiency and death. Most of the observed pathologies are considered as being associated, with aging in mammals. But captive *Microcebus murinus* died between 3 and 4 yr of age, whereas their potential life survival is 13 yr. Our hypothesis is that these pathologies arise due to an overload of cortico- and medullo-adrenal secretions. The above-mentioned hormonal imbalance could be induced by stress factors occurring in captivity, the most important of which would be social stress.

Physiology and Behavior

The hemogram, serum biochemistry, and electrolyte profile of the free-ranging Cayo Santiago rhesus macaques *(Macaca mulatta)* Kessler, M. J., & Rawlins, R. G. (Caribbean Primate Res. Ctr., PO Box 1053, Sabana Seca, PR 00749) *American Journal of Primatology*, 1983, *4*, 107-116.

64 male and 33 female free-ranging rhesus monkeys *(Macaca mulatta)* from one of 6 social groups on the island of Cayo Santiago, Puerto Rico, were surveyed to establish normal values for the hemogram and serum biochemicals and electrolytes for the colony. Mean values are reported by sex for each of 3 age groups (2-3, 4-9, ≥ 10 yr). All adult females (≥ 4 yr) were pregnant. There were significant differences for a number of variables compared to the range reported in the existing literature, and among the age and sex groups in the sampled population.

Self-aggression in macaques: Five case studies. Pond, C. L., & Rush, H. G. (Unit for Lab. Ani. Med., 010 Ani. Res. Fac., Univ. Mich. Med. Sch., Ann Arbor, MI 48109) *Primates*, 1983, *24*, 127-134.

Spontaneous self-aggressive behaviors were observed in 5 adult male rhesus monkeys *(Macaca mulatta)* housed at a university facility. All were individually caged, were free of intercurrent disease, and were being utilized in ongoing research studies. The self-aggressive behaviors observed included self-biting, self-clasping, self-slapping, self-rubbing and threatening of body parts. In several cases, wounds were inflicted and medical treatment was required due to the severity of the lesions. A review of the animals' clinical histories revealed an increased level of self-aggressive behavior in 4 of 5 monkeys during such stressful or stimulating conditions as movement of the animal to a new cage, movement of animals out of the room or escape of other monkeys from their cages. In contrast, 1 monkey exhibited self-aggressive behavior both clinically and experimentally in the absence of environmental stimuli or human contact. Clinical management of self-aggressive monkeys included housing monkeys only with physically smaller primates, decreasing the level of environmental stimuli, and drug therapy. Haloperidol was used with success in one animal that exhibited severe self-aggressive behavior.

Facilities and Care

The Argentine Primate Center (CAPRIM). Colillas, O. J. (Centro Argentino de Primates, Buenos Aires and Corrientes, Argentina) *Journal of Medical Primatology*, 1982, *11*, 134-137.

The Argentine Primate Center (CAPRIM) was founded in 1972 under the auspices of the Foundation of the Buenos Aires Neurobiology Institute and with the support of the National Research Council of Argentina. Since then, several buildings have been completed, covering 3,000 square meters and including laboratories, library, housing for monkeys, housing for staff and visitors, cage storage, workshops and a power generating plant. The buildings are distributed over an area of 85 hectares in San Cayetano, Province of Corrientes in the Northeast of Argentina. From the Center's inception, groups or pairs of *Alouatta caraya* have been kept under different types of captivity, and for different periods of time, for the purpose of reproduction and adaptation. Since then varying numbers of the following species have been added: *Cebus apella*, a Bolivian variety of *Saimiri sciureus*, *Callithrix jacchus*, and *Aotus trivirgatus*. CAPRIM's facilities include laboratories for histopathology, hemochemistry, hemopathology, microbiology, chemical analysis of vegetables, surgery, radiology, photography, herbarium, a unit for behavior studies, and units adapted for the study of biologic rhythms. Since 1980, with the support of the Argentine Program for Primate Resources, the library has been publishing the "Argentine Primatological Bulletin" which supplies technical and scientific information on different aspects of primate biology to researchers involved in other fields of work but nevertheless interested in monkeys.

CAPRIM's own activities are organized into 5 areas: *Primatological Medicine, Physiology of Reproduction, Cooperation on the design of models in monkeys for studies on human infectious pathology, Cytotaxonomy - Cytogenetics and mutagenesis, Platyrrhine Ecology.*

Deep woodchip litter: Hygiene, feeding, and behavioral enhancement in eight primate species. Chamove, A. S., Anderson, J. R., Morgan-Jones, S. C., & Jones, S. P. (Prim. Res. Lab., Psychol. Dept., Univ. of Stirling, Stirling, Scotland) *International Journal for the Study of Animal Problems,* 1982, *3*, 308-318.

67 animals from 8 primate species were used to assess improved husbandry techniques. The presence of woodchips as a direct-contact litter decreased inactivity and fighting, and increased time spent on the ground. Placing food in the deep litter led to further behavioral improvement. The use of frozen foods improved food distribution and reduced fighting in most situations, especially when it was buried in the litter. With time, the litter became increasingly inhibitory to bacteria. The results suggest that inexpensive ways of increasing environmental complexity are effective in improving housing for primates.

Breeding

Reproductive performance of a laboratory breeding colony of patas monkeys *(Erythrocebus patas).* Sly, D. L., Harbaugh, S. W., London, W. T., & Rice, J. M. (Division of Animal Care, Vanderbilt Univ. Med. Ctr., Nashville, TN 37232) *American Journal of Primatology,* 1983, *4*, 23-32.

Reproductive statistics were gathered over a 5 1/2-yr period on a colony of *Erythrocebus patas.* Pregnancies occurred throughout the year under laboratory conditions with a suggestion of a mating peak in the late fall and early winter. Menstrual cycles were monitored and found to average 30.6 days in length. Production of timed-mated pregnancies indicated that breeding on days 10, 11, and 12 after menstruation was more likely to result in pregnancy than on other days. The gestation length was found to average 167.2 da in 142 harem-bred females and 167.5 da in 11 timed-mated pregnancies. 62% of all pregnancies resulted in live births; 28% of the conceptions terminated with in-utero death of the fetus. Stillborn infants were delivered in 9% of the pregnancies. Infant mortality during the first 6 mo of life was 10.2%. Females raised in the colony conceived their first offspring at approximately 3 yr of age and males were able to sire infants at 3 yr, 8 mo.

Use of a radioreceptorassay (RRA) for human luteinizing hormone/chorionic gonadotropin (hLH/CG) for detection of early pregnancy and estimation of time of ovulation in macaques. Booher, C. B., Prahalada, S., & Hendrickx, A. G. (Calif. Prim. Res. Ctr., Univ. Calif., Davis, CA 95616) *American Journal of Primatology,* 1983, *4*, 45-53.

A radioreceptorassay (RRA) for macaque luteinizing hormone (LH)/chorionic gonadotropin (CG) was adapted from the clinical RRA for human LH/CG, Biocept-G™, for the purposes of detection of pregnancy prior to day 20 of gestation and for estimation of the time of ovulation in rhesus and cynamolgus macaques. The short (90 min), simple assay procedure and the low inter- and intraassay coefficients of variation (7.3 and 3.7%, respectively) allow use of this assay in an economical, predictive, as well as retrospective, capacity for estimation of the time of ovulation in rhesus monkeys. The sensitivity, reliability, species nonspecificity, simplicity, and rapidity of performance of this RRA for LH/CG are features which add up to a useful new management tool for breeding macaques for research purposes.

Perinatal hypothermia and maternal temperature declines during labor in pigtailed macaques *(Macaca nemestrina).* Ruppenthal, G. C., Goodlin, B. I., & Sackett, G. P. (Infant Prim. Res. Lab. WJ-10, Univ. Wash., Seattle, WA 98195) *American Journal of primatology,* 1983, *4*, 81-92.

Body temperature, respiration, and heart rate were recorded for 90 perinatal pigtailed macaques within the first hr after birth. Hypothermia and corresponding depressed respiration and heart rate were evident in all animals. Regression analysis revealed that time-since-birth accounted for most of the observed variance in all measures. Temperatures of 3 pregnant females were monitored during labor and delivery. Declines in maternal temperature during labor suggested that depressed maternal temperature influenced the observed hypothermia in newborns. Increases in ambient (cage) temperatures during labor indicated that the females were emitting heat while declining in temperature.

Maintenance of high-density lipoprotein blood levels prior to spontaneous abortion in pig-tailed macaques *(Macaca nemestrina).* Schiller, H. S., Sackett, G. P., Frederickson, W. T., & Risler, L. J. (Dept. of Lab. Med., Univ. Wash., Seattle, WA 98195) *American Journal of primatology,* 1983, *4*, 127-133.

Blood was drawn throughout the first half of the pregnancies of 24 pig-tailed macaques to evaluate longitudinal high-density lipoprotein (HDL) changes. In all 15 normal pregnancies, HDL decreased at least 50%; the mean value for the group fell from 0.45 gm/l to 0.17 gm/l. HDL began to fall after about 4 wk of pregnancy. However, no comparable HDL change occurred in 9 pregnancies that terminated in spontaneous abortions.

This lack of an HDL decrease was unexpected. Subsequent studies showed that the predominant decrease was in the HDL_2 subfraction. The data indicate that the normal physiologic metabolism or utilization of HDL is aberrant early in pregnancies ending in spontaneous abortions and may be due to a dysfunctional fetal-placental unit.

Sexual behavior and reproduction of *Cercocebus albigena johnstonii* in Kibale Forest, western Uganda. Wallis, S. J. (Dept. of Applied Sci., No. East Surrey Coll. of Technol., Reigate Rd., Ewell Surrey, U. K.) *International Journal of Primatology*, 1983, *4*, 153-166.

Gray-cheeked mangabeys live in multimale social groups. Two groups of these monkeys were studied extensively over a period of 22 mo, and a further 8 groups were observed opportunistically. The data were found to agree broadly with those presented by other workers on captive animals. The behaviors of the mangabeys during precopulation and copulation were found to be broadly similar to those of the macaque. The data show gestation periods of between 184 and 189 days. A mean interbirth interval was calculated to be 33.33 + 15.87 mo.

A pelvimetry method for predicting perinatal mortality in pregnant squirrel monkeys *(Saimiri sciureus)*. Aksel, S., & Abee, C. R. (Div. of Reproductive Endocrinol., Dept. Obs. & Gyn., Coll. Med., Univ. S. AL, Mobile, AL 36688) *Laboratory Animal Science*, 1983, *33*, 165-167.

High perinatal mortality has impaired the reproductive performance of female squirrel monkeys in captivity. A pelvimetry method as a potential predictor of pregnancy outcome was devised to evaluate the bony pelvic structures of females for which records of previous pregnancies were available. By utilizing lateral and anteroposterior radiographic views of the pelvis, the inlet, the midpelvis, and the outlet were measured. In the colony, 21 females had livebirths, 13 delivered dead term fetuses (stillbirths), and 6 aborted. Comparison of the pelvic outlet of the females with liveborn fetuses (1.81 ± 0.12 cm) with those which had stillbirths (1.64 ± 0.09 cm) revealed a highly significant difference($p<.001$). Discriminant analysis demonstrated a 95.2% predictability of females which had liveborn and a 92.1% rate in females with stillborn fetuses. Pelvimetry may be a useful tool in predicting pregnancy outcome, as narrow pelvic outlets were consistently observed in females that delivered stillborn infants.

A retrospective study of infant mortality of cotton-top tamarins *(Saguinus oedipus)* in captive breeding. Kilborn, J. A., Sehgal, P., Johnson, L. D., Beland, M., & Bronson, R. T. (Harvard Med. Sch., New England Reg. Prim. Res. Ctr., One Pine Hill Dr., Southborough, MA 01772) *Laboratory Animal Science*, 1983, *33*, 168-171.

50 of 156 (32%) colony bred cotton-top tamarins were stillborn, and 31 (20%) died within the first week after birth. The stillbirth rate was related to litter size and parity in captivity. A higher percent of single births were stillborn (69%) compared to those of twin births (26%) ($p<.005$). A higher percent of infants born of the first litter in captivity (42%) were stillborn than those of subsequent litters (23%) ($p<.025$). Stillbirths were not related to season of birth or sex of infant. Survival of live infants was unrelated to season of birth, sex, litter size, or number of litters.

Birth sex ratios and social rank in rhesus monkey mothers. Simpson, M. J. A., & Simpson, A. E. (MRC Unit for the Development & Integration of Behaviour, Madingley, Cambridge, CB3 8AA, UK) *Nature*, 1982, *300*, 440-441.

Data on primate birth sex ratios are presented that have been collected over 20 yr on a captive colony of rhesus monkeys. High ranking rhesus mothers were more likely to give birth to daughters than sons, while the remaining mothers were more likely to bear sons. An hypothesis to account for the survival value of such an outcome is presented and a mechanism for adjusting birth sex ratios in macaques is suggested.

Influence of the social group on reproduction in female *Microcebus murinus* (Miller, 1777). Perretl, P. M. (Laboratoire d'Ecologie Générale, Museum National d'Histoire Naturelle, 4 avenue du Petit Château, F-91800 Brunoy, France) *Zeitschrift* für *Tierpsychol.*, 1982, *60*, 47-65.

Microcebus murinus is a photoperiod-dependent polyoestrous seasonal prosimian. In captivity, females kept isolated or paired with a male undergo 3 oestruses (April, June, August) during the breeding season. When 2, 3, or 4 pairs are kept together, a 25% decrease in occurrence of the 2nd and 3rd seasonal oestrus is noticed. Life in social groups induces: resorption or abortion in about 50% of grouped females; a high infant mortality (50% of newborn young); and a significant modification of sex ratio (excess of males). Finally, the body weight gain is significantly reduced during the first 2 mo of life in offspring of grouped females.

Ecology and Field Studies

The black-tailed marmoset *(Callithrix argentata melanura)* recorded from Paraguay. Stallings, J. R., & Mittermeier, R. A. (Florida State Museum, Univ. of Florida, Gainesville, FL 32611) *American Journal of Primatology*, 1983, *4*, 159-163.

The black-tailed marmoset occurs in central-western Brazil and adjacent parts of Bolivia, and is the

only member of the genus *(Callithrix)* to occur naturally outside Brazil. Data presented in this paper extend the range of this marmoset at least 200 km to the southwest into yet another country, Paraguay.

Ecology and population dynamics of the pygmy marmoset, *Cebuella pygmaea*. Soini, P. (Proyecto Primates, Iquitos, Peru) *Folia Primatologica*, 1982, *39*, 1-21.

The pygmy marmoset population of a 3-km^2 sample area of Amazonian lowland forest was censused and monitored intensively between September, 1976 and January, 1978. Floodplain forest constituted the habitat of *Cebuella* and supported a population density of 51.5 independently locomoting individuals (ILI) per square km. About 83% of the population lived in stable troops; made up of 1 breeding female, her mate, and her maturing offspring of up to 4 successive litters. Some troops contained 1-2 additional adult members. The births showed 2 annual peaks and the interbirth intervals ranged between 5 and 7 mo. Infant survival was about 67%. Exudates (sap and gums) of trees and vines, insects and arachnids constituted the principal food resources of the population.

Instruments and Techniques

Automatic watering device for owl monkeys. Atwell, R., & Renquist, D. M. (NIH, Div. of Res. Serv., Vet. Resources Br., Bldg. 14G, Rm 102, Bethesda, MD 20205) *Laboratory Animal Science*, 1983, *33*, 198.

An automatic watering valve designed for chickens was used and found effective for owl monkeys.

Taxonomy

Two new species of night monkeys, genus *Aotus* (Cebidae, Platyrrhini): A preliminary report of *Aotus* taxonomy. Hershkovitz, P. (Field Museum of National History, Chicago, IL 60605. *American Journal of Primatology*, 1983, *4*, 209-243.

The 9 allopatric species of *Aotus* recognized represent 2 natural groups distinguished by karyotype, color, and pelage patterns. Correlated with these group characters are reported differences in serum proteins and degrees of susceptibility of immunity to experimental infection with malarial parasites. The primitive gray-neck species group of *Aotus* contains *A. brumbacki* (new species), *A. lemurinus* (with subspecies *lemurinus* and *griseimembra)*, *A. trivirgatus*, and *A. vociferans*. The derived red-neck group contains *A. nancymai* (new species), *A. miconax*, *A. infulatus*, and *A. azarae* (with subspecies *Azarae* and *boliviensis)*. Only the two new species are described but a key to the species and subspecies gives the diagnostic characters of each. The gray-neck group occurs almost entirely north of the Amazon, the red-neck group almost entirely south. The distributional exceptions are enclave populations resulting from river bend cutoffs. Formation of an enclave population of *A. nancymai* is discussed and available information on the biology of this species is reported.

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SELF-PORTRAIT OF A WOMAN WHO HAS BEEN AROUND MONKEYS TOO LONG!