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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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Characteristics of Predation by Captive Primates

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For the last several years, the *Laboratory Primate Newsletter* has provided a forum for the exchange of information on predatory behavior in captive primates, including the publication of five reports on this topic (Caine, Vanovitz, Van Tassell, Yee & Mitchell, 1979; Hughes & Lang, 1980; Kessler, Brown & O'Neill, 1980; Rhine, Hopper, Harvey & Bunyak, 1981; Snowden & Pola, 1982). It would appear from these and other reports that many captive primates are exercising their natural predatory inclinations and supplementing their diets with locally available prey. In the past, however, it seems that many of these occurrences have been considered isolated and idiosyncratic incidents, rather than species-typical behavior, and have thus often gone unreported.

In an attempt to gather more information on this topic, we recently published requests for information on captive primate predatory behavior in the *Laboratory Primate Newsletter* (1981, *20* [4]), *Human Ethology Newsletter, Comparative Psychology Newsletter, Animal Keeper's Forum,* and *The International Primatological Society Bulletin*. The results of these surveys are reported here, along with a brief summary of reports of prey capture by captive primates published previously in the *Laboratory Primate Newsletter* and elsewhere.

Twenty responses to the survey were received, most of which reported more than one incident. Many responses contained reports of predation by more than one primate species, or predation upon more than one prey species. The quality of information ranged from precise and detailed to sketchy and anecdotal. A few reports described unsuccessful attempts at prey capture. There were also a few descriptions of reactions by primates to live or freshly killed animals offered as a supplement to the regular diet. Descriptions from responses to the survey, as well as reports from the literature, are presented below according to the category of prey eaten.

Insects

Primates are assumed to have evolved from a common insectivorous ancestor (Sussman, 1978), and at least some species of virtually all families of extant primates (Indriidae is the one exception) are known to commonly prey upon insects and arachnids in the wild (see Gaulin & Konner, 1977, for a review of wild primate diets). However, the literature on captive primate predation contains few reports of insect-eating.

In a recent issue of this *Newsletter,* Snowden and Pola (1982) reported that captive *Cebuella pygmaea* (pygmy marmoset) readily ate offered live crickets. In another report, captive *Callithrix jacchus* (marmoset) were reported to eat offered live locusts and to spontaneously catch and eat moths and flies (Stevenson & Poole, 1976). Lorenz (1969) regularly fed a captive *Callimico goeldii* (Goeldi's marmoset) live locusts, grasshoppers and mealworms. The ingestion of cockroaches by these monkeys, however, was observed to produce a brief but dramatic toxic response (Lorenz, 1972). Jolly and Oliver (unpublished manuscript) found that captive *Lemur fulvus, L. catta,* and *L. mongoz* (but not *L. variegatus)* readily ate locusts and grasshoppers offered to them. Reports from our survey described *Saguinus oedipus* (cotton-top marmoset), *Cebus apella, Saimiri sciureus,* and *Cercopithecus diana* spontaneously preying frequently on a variety of locally available insects. Three reports described the feeding of live insects (crickets) or mealworms as part of the regular captive diet of *Cebus apella, Saimiri sciureus,* and *Nycticebus coucang* (slow loris).

It is surprising that there are so few reports of insect-eating by captive primates. Perhaps this is because many observers may not consider this behavior noteworthy, or because the eating of insects occurs rapidly and usually leaves no remains, thus making it likely to go unnoticed.

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Fish, Amphibians and Reptiles

The one published report of a captive primate catching and eating live fish is for *Galago crassicaudatus* (Welker, 1976). In this case the fish were offered in a water basin. Wild-born animals quickly caught and ate the fish, but captive-born animals required observation and practice for successful capture. One survey response reported that *Cebus apella* kept on a man-made island were seen to catch and consume fish nine times over a three-month period. The fish were consumed over a long period (> 5 hr.) by most members of the group, although captures were made by only one individual at a time. All parts of the fish except bones and scales were consumed.

Lorenz (1971) has described captive *Callimico goeldii, Callicebus moloch* (dusky titi) and *C. torquatus* eating reptiles and amphibians. Some of both laboratory-born and wild *C. goeldii* readily ate live anoles, skinks, and frogs released into their cages. Others, however, ignored the live prey offered. A pair of wild-born *C. goeldii* showed interest in a wild ribbon snake crawling outside their cage. When the snake was caught and released into their cage, the male and female consumed the snake together in less than 10 min. Other animals ignored this same species of snake when offered. Captive *C. molloch* and *C. torquatus* readily ate live lizards and three species of frogs offered to them. Snakes and lizards were killed before eating by a bite to the head and/or neck. The amphibians were eaten without being killed first.

Caine et al. (1979) reported that snake and toad carcasses are sometimes found in the outdoor enclosures of *Macaca mulatta*. Fairbanks (in preparation) described one incident of a frog being eaten by an adult male *Cercopithecus aethiops* (green monkey). This was the only amphibian eaten by this group, although the group preyed regularly on birds and mammals. It was unclear whether the rarity of amphibian predation by this group was a result of preference or of availability. One response to our survey reported that *Saimiri sciureus* kept in a semi-free-ranging environment were seen to prey on bull frogs. These animals ate the legs and body, but not the head, of frogs and did not kill the prey before consumption. The respondent believed this to be a common occurrence, limited by prey availability. Captive *Cercopithecus mitus* were reported to eat a lizard in another survey response, but the details of this incident were not available.

Birds

Birds were the most commonly reported prey item of captive primates both in the literature and in the survey responses. In the most systematic study of captive predation to date, Fairbanks (in preparation) found that, of 61 instances of vertebrate predation by captive *Cercopithecus aethiops,* birds were prey in 27 instances. In this group birds appeared to be preferred prey, as they were the only prey types that were always completely consumed (excepting bones and feathers). In this group, all age/sex classes (except infants) were both captors and consumers of birds. Birds were pounced upon and grabbed, then killed by a bite to the head. Numerous instances of unsuccessful attempts to capture birds were also observed. Bird prey eaten included sparrows and doves. Caine et al. (1979) and Kessler et al. (1980) both described predation by *Macaca mulatta* upon sparrows. In these reports, the details of capture were not clear, but most parts of the birds were consumed except bones and feathers. Hughes and Lang (1980) reported predation upon sparrows by *M. mulatta, M. arctoides,* and *Saimiri sciureus. M. mulatta* were described as killing sparrows by pulling their wings off. Rhine et al. (1981) reported several incidents of predation upon sparrows by captive *M. arctoides*. The alpha male was the most frequent captor, and became more successful with refinement and practice of his technique. Another case of *M. arctoides* preying upon sparrows was reported by Fifield and Stephenson (1978). In this group the prey was consumed by several high-ranking animals.

Jolly and Oliver (unpublished manuscript) described occasional spontaneous predation upon sparrows by *Lemur mongoz* and *L. fulvus*. Three species of live birds were offered to groups of these lemurs and to groups of *L. variegatus* and *L. catta*. *L. mongoz* and *L. fulvus* readily killed and ate most offered birds, but *L. variegatus* and *L. catta* did not. *L. mongoz* and *L. fulvus* did not eat live but immobile chicks. Wild-born animals and animals housed such that sparrows could fly into their cages were more likely to be predators. Pieces of prey were often snatched from the captor by other animals.

Marmosets have also been known to eat birds in captivity. Mallinson (1971) witnessed *Callithrix jacchus* killing sparrows which flew into their cage. The birds were killed by a bite to the head, but were only partially consumed. Lorenz (1969) offered a male *Callimico goeldii* a live finch which it killed by biting the head. Only the head was eaten. A group of these monkeys were regularly fed freshly killed chicks, but they appeared fearful of live chicks.

Blackwell (1969) reported regular predation upon sparrows by an adult female *Hylobates lar* (gibbon), which shared the prey with her young. A possible case of predation upon a hen by several *H. lar* kept on an island was reported by Newkirk (1973), but was based on circumstantial evidence. These apes had previously been seen to steal and eat the hen's eggs. According to Wendt (1972), several species of birds were preyed upon by another group of *H. lar* also kept on an island. These are the only reports of captive apes eating birds.

Reports of predation upon birds were frequent among our survey responses. One observer described several incidents of predation upon sparrows by an adult female *Lagothrix lagotricha* (woolly monkey). Juvenile females shared the prey, but males in this particular group were never seen to eat birds. Three unspecified species of *Cebus* (captive-born) were observed to prey upon pigeons. The birds were pulled apart by several animals attempting to share the meat. There were two separate reports of adult male *Cercopithecus cephus* capturing and eating sparrows. A pair of captive-born *Saguinus oedipus* were observed to eat finches killed by the male. They consumed the viscera first and left the head. Several survey responses described different species of *Cercopithecus* eating birds, leaving feathers and bones in most cases. Details of capture and consumption in these reports were unclear. An adult male *Mandrillus sphinx* was twice seen to grab and eat a sparrow, inserting the entire bird into his mouth and then removing the feathers. A *Macaca fascicularis* male was observed to catch and eat sparrows, eating the visceral area first.

Several unsuccessful attempts at predation upon birds were reported. These included attempts by *Macaca sylvanus, Cynopithecus niger* (Celebes black ape), *Mandrillus sphinx, Hylobates lar,* and *Symphalangus syndactylus* (siamang). There was one report of two female *Saimiri sciureus* killing and eating chicks offered to them.

The frequently reported predation upon birds, especially upon sparrows, may be due to the likelihood that these were the most available prey to captive primates. Birds probably enter outdoor primate enclosures more frequently than other types of prey, being attracted by monkey chow and by other food items. This results in birds being on the ground and in close proximity to captive primates, whereas in the habitats of wild primates, birds are perhaps more likely to feed in trees. The capture of birds is likely to be highly visible to keepers and observers, and usually causes general excitement in a captive primate group. In addition, bird prey leave visible remains (feathers and bones) to be found by keepers. Birds are not always preyed upon, however; in fact, they are more often ignored. The immediate circumstances surrounding bird predation, including the roles of preference and availability, are thus unclear.

Mammals

Reports of predation upon mammals are considerably less widespread than reports of bird predation. In Fairbank's (in preparation) lengthy study of predation by captive *Cercopithecus aethiops,* 33 of 61 predatory instances observed or inferred from remains were upon mammals. All mammalian prey were rodents; they included house mice and immature pocket gophers, with mice being by far the more common prey. In this group, rodents were consumed in only 5 instances. Thus, rodents were frequently killed but not eaten, and were therefore considered less desirable prey for consumption than birds. Jolly and Oliver (unpublished manuscript) found that *Lemur fulvus* and *L. mongoz* groups efficiently killed and ate introduced mice, but that *L. catta* would only touch noses with a test mouse. Rhine et al. (1981) described intermittent predation upon mice by a *Macaca arctoides* group.

All other published reports of mammalian predation concerned marmosets or tamarins eating introduced immature mice. These included *Callimico goeldii* (Lorenz, 1969), *Callithrix jacchus* (Stevenson & Poole, 1976), *Saguinus imperator* (emperor tamarin) (Mallinson, 1971), and *Leontopithecus rosalia* (golden lion marmoset) (Brown & Mack, 1978). In most of these cases, mice were killed by a bite to the neck before they were eaten.

Survey responses describing predation upon mammals were also rare. Remains of mice were found in the indoor cage of a pair of bush babies *(Galago crassicaudatus)* on 3 occasions. Another response described the remains of a bat found in the cage of a group of *Cercopithecus aethiops*. An opossum was reported killed by a group *Pan troglodytes,* but was removed before it could be consumed. One respondent provided a description of the consumption of a part of a human finger by four captive *Daubentonia madagascariensis* (aye-aye). A female *Macaca arctoides* was seen to eat only the stomach of an introduced dead mouse pup. Other animals in this group refused this food.

Thus it appears that predation upon mammals by captive primates is relatively rare, perhaps because of the limited availability of this prey type. It should also be noted here that Kortlandt and Kooij (1963) in a preliminary summary of results of a survey similar to ours, reported predation by captive chimpanzees, gorillas, gibbons, baboons, drills and mandrills, macaques, mangabeys, capuchins, woolly monkeys, and spider monkeys. The exact primate species were not specified. Prey species included mice, rats, squirrels, guinea pigs, birds, lizards, and frogs. It is not clear which primates ate which prey, or whether prey were caught spontaneously or were introduced.

Characteristics of Capture and Consumption

In all predatory incidents reported in the literature and in our survey responses where capture was witnessed, capture was always by one animal at a time. The only report of cooperation in prey capture for a wild primate was for *Pan* (chimpanzee) (Teleki, 1973), and Teleki's interpretation of group predatory behavior is controversial (Busse, 1978). Conclusions regarding age/sex classes of captors were less clear. The majority of *Lemur* captors in the Jolly and Oliver (unpublished manuscript) study were adult females. The vast majority of captors in the *Cercopithecus aethiops* group studied by Fairbanks (in preparation) were juveniles, most frequently males. In the literature on many species reviewed here, females were slightly more frequently reported to be captors. In many of these reports, however, the age and sex of the captor and frequency of predation were unspecified. Males, usually adults, were reported as captors in nine of 12 survey responses where the captor was specified. There was a lack of quantitative data and in many survey responses the captor was unspecified or unknown. Data on rank of captors, both in the literature and in our survey responses, are too sketchy to draw any conclusions. Fairbanks (in preparation) found consumption, but not capture, of prey to be correlated with rank in *C. aethiops*. Fifield and Stephenson (1978) also reported consumption of a sparrow to be related to rank in a group of *M. arctoides*. In some cases (Jolly & Oliver, unpublished manscript; Snowden & Pola, 1982; Welker, 1976), wild-born animals were more likely to be initial captors, or were more efficient at capture than captive-born animals. Generally, however, the majority of reports reviewed here revealed no important differences between captive- and wild-born animals in predatory inclination.

The universal method of capture described in all reports where capture was observed consisted of a rapid pouncing upon and grabbing of the prey with both hands. Insects were usually eaten whole, or sometimes by smaller primates in a few bites. The vast majority of prey were killed by a craniocervical bite (Steklis & King, 1978) before consumption. Prey consumed live were more likely to be fish, reptiles, or amphibians than birds or mammals and consumption here often began with the viscera. There was no difference in the frequency of use of the craniocervical bite between captive- and wild-born animals. This result supports the contention of Steklis and King (1978) that the craniocervical bite is part of the natural repertoire of primates and has an evolutionary basis.

Survey responses contained very few reports of food-sharing of prey, but did contain several reports of "stealing" or snatching of pieces of prey from the captor by cage-mates. Fairbanks (in preparation) reported fierce competition for avian prey by *C. aethiops*, with captors frequently losing prey to more dominant animals. Juvenile males and females were the most frequent consumers. Co-feeding with matrilineal kin was frequently observed. Brown and Mack (1978) reported frequent and extensive food-sharing of live introduced mouse pups within family groups of *Leontopithecus rosalia*. Of 82 mice offered, 52 were transferred among animals at least once before consumption began. Other reports in the literature contained only rare descriptions of food-sharing or snatching.

Discussion

Most primates are considered to be omnivorous, with the consumption of animal protein presumed to be a minor but necessary part of the diet (Sussman, 1978). With the exception of *Lemur fulvus* and *L. mongoz*, all primate species reported here to be captive predators are also known to eat some form of animal protein in their natural habitats (Gaulin & Konner, 1977). Predatory behavior appears to be widespread among captive primates, and cannot be considered an artifact of captivity. It is possible that predatory behavior may be exaggerated in captivity in some cases, where some prey (e.g., birds) are more available or easier to capture than in the wild. In this regard, it is unclear whether the more common predation upon birds and insects is a result of prey preference or of increased availability. It is also unclear what circumstances or mechanisms may trigger a predatory response. Potential prey are often ignored by previous captors, and some individual primates are never seen to consume prey. It is difficult to speculate on the possible nutritional significance of captive primate predation. A preliminary survey of the literature on the diets of captive primates (Bilby, 1968; Morris, 1976; Ratcliffe, 1966; Wackernagel, 1966, 1968) indicates that animal protein is very rarely included in captive diets. Most captive diets, however, are thought to include more

than the amount of nonanimal protein considered necessary for good health. It is therefore suggested that predation by captive primates has a behavioral, rather than a territorial basis. Predation by captive primates seems to be an exercise of a natural inclination, which varies according to species, environment, prey availability, and probably other variables as yet unidentified. Some acts of predation appeared to be almost playful in character (Fairbanks, in preparation; Fifield & Stephenson, 1978).

That some captive primates choose to supplement their diets with prey also has implications for management and husbandry. Carcasses left in enclosures that are difficult to clean (e.g., grass- or dirt-floored, outdoors) pose difficulties for keepers and are obvious health hazards. Many wild birds carry avian tuberculosis, which may be transmitted to the primates which consume them, resulting in colony health problems. Some insects which may be eaten by primates are intermediate hosts for intestinal parasites (Lorenz, 1972). Where insect predation by primates is frequent, colony staff may be advised to periodically monitor fecal samples for parasitic load. In spite of these potential problems, no health difficulties directly attributable to predation have been reported for any captive primates.

On the other hand, in some cases it may be desirable to provide opportunities for predation to captive primates where feasible. Predation may serve to supplement captive diets, and may provide opportunities for study of this interesting behavior. The encouragement of predation provides an opportunity for captive primates to exercise their natural predatory inclinations, and in some instances may increase social interaction (Brown & Mack, 1978; Fairbanks, in preparation), or help to elucidate social relationships (Jolly & Oliver, unpublished manuscript). Predatory opportunities could serve educational purposes in zoos, although most zoos are probably still reluctant to display this type of behavior to the public.

In summary, a variety of primates of all age/sex classes are occasional predators in captivity. Predation appears to be a widespread trait among primates (Gaulin & Konner, 1977; Steklis & King, 1978) and, in captivity, may be related to environment and prey availability. Further studies of captive predation by nonhuman primates are needed to identify other variables affecting this behavior.

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Letters: Executive Director of Interagency Primate Steering Committee Returns to California

After almost thirty years of deluding world, state, and federal governments, universities, institutes, and private industry in laboratory animal medicine, I have decided to return to the scene of my earlier ribald career and attempt to live in peace and quiet, pursuing some other less-demanding endeavor. After July 30th, I can be reached at: Dr. Orland Soave, 2315 Eastridge, #722, Menlo Park, CA 94025.

* * *

Philippine Supplier Offers Conditioned Monkeys and Research Facilities

Founded in November, 1978, the Amo Farm is operating as a cynomolgus monkey *(Macaca fascicularis)* conditioning facility, with a present potential output of 3,000 fully conditioned monkeys per year. The station has a holding capacity of 900 animals, distributed in cages of various sizes and designs. The principal goal has been to establish a conditioning facility for wild monkeys in a country of origin in order to produce a high quality animal for biomedical research, with a low mortality rate due to shipping stresses. Guidance, provided in the early stages of the project by the California Primate Research Center, is gratefully acknowledged.

Amo Farm is located in the central Philippines, 1.5 km from the small town of San Rafael, in the province of Iloilo (Panay Island). Iloilo City, one of the major Philippine cities, is 77 km to the south. Iloilo City airport is served by jet service to Manila International Airport.

The station welcomes visiting researchers for prolonged time periods to conduct in-situ behavioral, nutritional, environmental and other studies on the cynomolgus monkey. There is modest accommodation with cooking facilities, office space, and technicians available to the study group. Any number of cynomolgus monkeys can be isolated in a separate cage area or corral.

Inquiries about facilities, conditioning procedures, shipping details should be addressed to: Mr. Jan Vacek, 35 Fountainhead, Suite 1801, Downsview, Ontario, Canada M3J 2V7 (Phone: 416-661-4472), or P.O. Box 523, Iloilo City, Philippines 5901 (Phone: 76870).

* * *

Position Available: Assistant to the Director

Position available January 1, 1983. Postdoctoral or Senior Technician for employment as Assistant to the Director for Colony Management. Position would also require supervision of cage design and financial accounts, as well as permits for import and export of animals. Must have experience in maintenance of primates or other small mammals, in order to supervise, conduct research on, maintain and propagate animals in a large prosimian colony. Send applications with vitae to: Dr. Elwyn L. Simons, Director, Duke Primate Center, 3705 Erwin Rd., Durham, NC 27705.

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News Briefs

Taub Appeal in Process

Edward Taub's appeal of his conviction on the charge of "unnecessarily failing to provide veterinary care" for his monkeys (see News Briefs, January 1982 issue) was scheduled to begin June 14. He has opted for a jury trial this time. One of Taub's biggest problems is money to pay for legal expenses. According to *Science,* he has received $90,000 worth of unreimbursed legal aid from a Washington law firm, one of whose partners is on the board of the Institute for Behavioral Research, which Taub heads. A group of neuroscientists has set up a Biomedical Research Defense Fund, but so far has only raised enough money to pay for mailing expenses. A number of professional associations have expressed support for Taub, but only the American Psychological Association has provided any funds, $5,000 to cover costs of expert witnesses.

Animal Welfare Groups Hold Conference; Rallies at Primate Centers Planned

The "Mobilization for Animal Rights: Conference '81" was held in Ocean City, MD, October 10-12, 1981. According to an announcement distributed by by Animal Rights Network (Westport, CT), the conference was "designed to bring together both rookie and veteran activists to exchange ideas, map out strategies, establish priorities and then leave with a job to do and a rekindling of spirit to carry us into the 80's." The announcement listed 34 participating organizations, including the American Anti-Vivisection Society, ASPCA, American Vegetarians, and IPPL. The tone of aspects of the Conference appeared to be activist: In addition to workshops on factory farming, humane education, and history of the animal rights movement, there were those on research and use of the Freedom of Information Act, campus organizing, demonstrations and rallies/self-defense. The Conference resulted in the formation of a coalition-based coordinating structure, the Animal Rights Mobilization (ARM), according to a subsequent memorandum by Richard Morgan (author of *Love and Anger)* the Project's Coordinator of ARM. ARM's office is in Jonesboro, TN, where Morgan apparently lives.

Morgan's memorandum goes on to say that a unanimous resolution was adopted at the Ocean City meeting calling for "major mass rallies" at the New England, Washington, and Wisconsin Regional Primate Research Centers on April 24, 1983, which is World Day for Laboratory Animals. (It now appears that the California Regional Primate Research Center has been substituted for the Washington Center as a major target.) The group, associated with ARM, that is organizing the rallies is calling itself the Primate Centers Mass Mobilization Task Force, with Richard Morgan also serving as its National Coordinator. According to the memorandum, in preparation for the rallies the task force will be engaged in "coalition-building, research, site logistics, promotion, local, regional, and international organizing...." etc. Reportedly, though by whom and when exactly we have not heard, discussions at the Ocean City meeting included plans for disruption of Primate Center activities and prior infiltration (the inspiration for the latter presumably being Alex Pacheco, now famous or infamous, depending on your point of view, for blowing the whistle on Taub).

Leaflets were recently distributed by a Madison, Wisconsin-based ARM group at the Student Union of the University of Wisconsin, Madison. The leaflets referred to the proposed Primate Center rallies, though most of the space was devoted to graphic descriptions of various research-related abuses of animals in general and at the University. The leaflet included several photographs, including some taken by Alex Pacheco in Taub's lab in Maryland.

Flap over Nim Resolved

For a time, the place for retired sign-language-trained chimpanzees, including Nim Chimpsky, the principal in the program headed by the Columbia University psychologist H. R. Terrace, seemed to be the Institute of Primate Studies, University of Oklahoma at Norman. But the hard times for research that we all know about have hit the Institute, which has had to drastically reduce its population of chimpanzees. (As indicated in another note in this issue of the Newsletter, Roger Fouts, formerly at the Institute, is now at Central Washington University, along with the famous Washoe and several other chimpanzees.) As a consequence, Nim along with a number of other of the Institute's chimpanzees were shipped off to LEMSIP where it was reported that he would be used for "medical research." On learning of this, Terrace and others led a drive, which apparently made the front page of many newspapers around the country (including the Providence and Boston papers) or else was given prominent mention on other pages (including those of the N.Y. Times). Dr. Moor-Jankowski, the Director of LEMSIP, assured one and all that Nim would not be used in any life-endangering research or even research that would make him ill in any way, but the save-Nim forces were unappeased. The last word on the question was that Nim and a

companion would be sent to a Florida wild-animal refuge, where he might have to worry about an occasional alligator, but not about M.D.s or Ph.D.s.

Institutions Adopting Animal Research Ethics Guidelines

There is little question that the various pressures for congressional and local legislation dealing with animal welfare and other activities of animal welfare groups are having the effect of raising the consciousness of animal researchers and institutions involved in animal research concerning the ethics of the research.

As many readers are already aware, in response to similar pressures, the National Institutes of Health established Guidelines for the Use of Experimental Animals (see "Guide for the Care and Use of Laboratory Animals" (Revised 1978), DHEW Publication No. (NIH) 78-23) that all NIH grantees and contractors using live, vertebrate animals in projects or activities supported by NIH are expected to conform to. Further steps related to animal welfare are also specified by NIH rules.

A number of institutions now require all animal researchers to conform to the NIH Guidelines and have, in some cases, considerably broadened the Guidelines and strengthened procedures designed to ensure conformity with them. A recent article (*Lab Animals*, 1982, *11*, [4], 41) by W. M. Blakemore, the Director of Vivaria at the University of Southern California, discusses some of the issues and considerations that led the University to adopt its present two-level animal research review system. An Animal Ethics Review Board has been established that is unusual in that a variety of disciplines are represented on it (including the humanities) as well as the public. The Board is responsible for the delineation and overview of ethical standards at the University. As its first task the Board reviewed many existing standards and codes and finally formulated one for the University. The code is reproduced in Blakemore's article. There is also a Vivaria Advisory Committee, consisting of University administrators and representatives from the faculty of the schools and departments served. The committee advises the President and Director of Vivaria on all phases of animal husbandry and housing of laboratory animals on all USC campuses. (Reprints of Dr. Blakemore's article may be obtained from him at Vivaria, University of Southern California, Los Angeles, CA 90033.)

The University of Wisconsin Regional Primate Research Center has recently adopted new guidelines, entitled "Policy Statement on Principles for the Ethical Uses of Animals." The Policy Statement establishes a mechanism by which all research proposals by Center core scientists and by outside investigators conducting experiments at the Center will be reviewed for "necessity, humaneness, and acceptability." In addition to scientific peers, advocates of animal rights will be appointed by the Center Director to take part in this review process. The Center will continue its long-standing policy of separately judging research proposals for scientific merit.

Walgren Bill under Consideration in House

Representative Doug Walgren (D-PA) introduced H. R. 6245, entitled "Humane Care and Development of Substitutes for Animals in Research Act," on April 29. Following hearings and modifications by the House Subcommittee on Science, Research, and Technology, which Walgren chairs, the bill has been sent to the full Committee on Science and Technology, chaired by Representative Don Fuqua (D-FL), a cosponsor. It is a modification of one with a similar intent that was introduced last year, but which was shelved after meeting with strong opposition from the scientific community. The new bill authorizes that $45 million be spent over a 3-year period for development of alternatives to the use of animals. It requires that institutional animal care committees include at least one veterinarian and one member of the community. It requires accreditation of Federally-funded research institutions by a "private agency," most likely the American Association for Accreditation of Laboratory Animal Care (AAALAC). Currently, accreditation by this group is voluntary. The bill requires scientific peer review panels to evaluate the importance of proposed scientific findings in relation to any distress to the animals involved in the experiments. According to *Science*, one of the major reservations that researchers have about the bill is the requirement for accreditation. Bringing research facilities up to AAALAC standards may be quite costly in many cases, a special concern these days with greatly diminished funds for research. The bill would appropriate $30 million for this purpose, but one estimate puts the overall cost at as much as $500 million. We hear that the bill is unlikely to be introduced in the Senate and is therefore unlikely to become law.

NIH Planning Inspections of Grantees' Facilities

According to William Raub, Director of Extramural Research and Training, NIH is planning a system of periodic site visits, possibly unannounced, to NIH-grant-receiving animal facilities. These would supplement inspections currently carried out by the Department of Agriculture in accordance with the Animal Welfare Act. NIH is also reviewing its current requirements concerning the structure and function of local animal care committees.

* * *

WHO Issues Primate Statement

An informal Consultation on the WHO International Primate Resources Program was convened in Geneva on 9-12 November, 1981 by the World Health Organization. Seventeen scientists from all over the world attended the sessions. The consultation adopted a policy statement on the use of nonhuman primates for biomedical purposes which had originally been developed for IUCN by the Primate Specialist Group of the SSC, and had been endorsed by the SSC in its 55th meeting at New Delhi in February, 1981 and subsequently approved by the IUCN Bureau.

The policy statement was jointly issued by the WHO and the Ecosystem Conservation Group (ECG) which is made up of members from: the United Nations Environment Program (UNEP), the Food and Agriculture Organization of the United Nations (FAO), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and IUCN. The ECG in 1981 agreed that such a policy statement was needed and requested IUCN to develop it. The joint policy statement also represents the IUCN position and is reprinted below.

The World Health Organization and Ecosystem Conservation Group Policy Statement on the Use of Nonhuman Primates for Biomedical Purposes is as follows:

The ECG and WHO recognize that nonhuman primates play an important role in biomedical research and testing, and that their use as experimental animals has made a significant contribution to advances in human health and disease control.

The ECG and WHO are committed to maintaining the current diversity of the Order Primates and to ensuring the survival of representative, self-sustaining populations of all species in their natural habitats.

A total of 76 primate taxa are currently considered endangered, vulnerable, or rare by the IUCN. Since these taxa are either in serious decline or already at very low and precarious population level, any exploitation of them threatens their continued survival. Therefore, the ECG and WHO strongly recommend that:

(1) endangered, vulnerable, and rare species be considered for use in biomedical research projects only if they are obtained from existing, self-sustaining captive breeding colonies (i.e., in captive breeding, all animals are required to be at least F2 generation);

(2) species categorized as status unknown or indeterminate also not be considered for use in such research projects until adequate data indicate that they are not endangered, vulnerable, or rare.

Members of more than 30 species of nonhuman primates, the majority of them wild-caught, are currently being used worldwide in biomedical research and testing. However, sustained yield trapping strategies for wild primates, based on long-term ecological field studies and adequate demographic data, have not yet been developed for any primate species. Continuing habitat loss in most areas where primates occur makes demographic projections difficult and unreliable in most cases. The ECG and WHO, therefore, recommend that:

(1) wild-caught primates be used primarily for the establishment of self-sustaining captive breeding colonies, the eventual goal of which should be to captive-breed most or all (depending on species) of the primates used in research;

(2) populations of the apparently common primate species be trapped only in:

(a) special management areas where demographic data are available, where the populations are continually monitored to avoid overexploitation, and where sustained yield trapping strategies are being developed and tested;

(b) areas where the animals are living in agricultural or other man-modified environments and have been shown to be agricultural nuisances that would otherwise be destroyed; or

(c) areas where the habitat is already being destroyed, where the primates would otherwise be killed or would die from starvation or stress, and where translocation is not a viable alternative.

To minimize impact on free-living populations, the ECG and WHO urge that trapping, holding, and shipping techniques be perfected to the point that accidental death, destruction of habitat, disruption of family groups, and other forms of wastage are kept to an absolute minimum.

The ECG and WHO urge researchers and their funding agencies to assist in the control of international commerce in primates by requiring proper export and import documentation on all animals that they purchase or otherwise obtain, and to refuse animals obtained in contravention of CITES and/or protective legislation in the source countries. (For further details and copies of this statement, write to: Chief, Biologicals, WHO, Geneva, Switzerland.) [From *IUCN Bulletin,* 1982, *13* (New Series) [No. 1-3], 6. Only minor editorial changes were made for this *Newsletter.]*

Monkeys Available for Studies on Atherosclerosis and Hypertension

The Division of Heart and Vascular Disease, National Heart, Lung, and Blood Institute (NHLB), is supporting, through contract, a program to breed and maintain nonhuman primates for studies of atherosclerosis and hypertension. This program was prompted by several factors: growing evidence of the value of nonhuman primates as models for studies of the pathophysiology of atherosclerosis, hypertension, cerebrovascular disease, and dyslipoproteinemia; impending shortages in nonhuman primates from import sources; and knowledge that colony-reared animals are better characterized than are wild-caught animals.

At present, all of the colonies have facilities for on-site utilization of animals. A limited number of animals are available for distribution. The individual contact for each resource, species available, and areas of study are listed below:

Dr. E. T. Angelakos, Hahnemann Medical College, 85 North 15th St., Philadelphia, PA 19102. Area of study: Hypertension. Species: *Cercopithecus aethiops* (African green monkey).

Dr. Thomas Clarkson, Bowman Gray School of Medicine, Wake Forest University, Winston-Salem, NC 27103. Area of study: Artherosclerosis. Species: *Macaca arctoides* (stumptailed macaque), *Macaca fascicularis* (cynomolgus macaque). *Macaca mulatta* (rhesus macaque), *Erythrocebus patas* (patas monkey).

Dr. Elizabeth Gard, Litton Bionetics, 5516 Nicholson Lane, Kensington, MD 20795. Area of study: Artherosclerosis. Species: *Macaca arctoides* (stumptailed macaque), *Macaca mulatta* (rhesus macaque), *Erythrocebus patas* (patas monkey), *Cercopithecus aethiops* (African green monkey).

Dr. Howard Hartley, Harvard Medical School, New England Regional Primate Research Center, One Pine Hill Drive, Southborough, MA 01772. Area of study: Hypertension. Species: *Papio cynocephalus* (yellow baboon), *Macaca fascicularis* (cynomolgus macaque).

Dr. Henry McGill, Jr., Southwest Foundation for Research and Education, PO Box 28147, San Antonio, TX 78284. Area of study: Atherosclerosis, hypertension. Species: *Papio hamadryas* (sacred baboon).

NHLB invites requests to use the available resources. Priority will be given to NHLB- and NIH-supported grantees, but meritorious requests from others will be considered. The requests, in letter form, should include the title and number of the NHLB/NIH grant or other support for the research; the name(s) of the senior investigator(s); a short description of the research project; a specification of the animals required, including number, age, sex, or other special characteristics; and a statement indicating whether animals are to be studied at the resource site or transferred to the investigator's institution. The entire request should not exceed two typewritten pages and should be addressed to the specific resource contact. A copy of the request should be sent to Ms. Nanci Parsons, Project Officer, National Institutes of Health, National Heart, Lung, and Blood Institute, Room 4C10, Federal Building, Bethesda, MD 20205. The investigator will be notified in writing of the outcome of his/her request.

It is emphasized that users of any resource must at least share the cost of such use. These funds will help defray the costs of developing and maintaining the resources.

For additional information about a specific resource, make direct contact with the director of the appropriate program. Requests of a general nature should be addressed to Ms. Parsons. [From *ILAR News*, 1982, *25* [2], 16-17.]

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Director for Caribbean Primate Research Center Sought

The position of Director, Caribbean Primate Research Center, Medical Sciences Campus, University of Puerto Rico is available to qualified applicants. Candidates must have an advanced degree (M.D., D.V.M., Ph.D.) in the biomedical sciences with proven administrative and research skills. The Center maintains over 1600 nonhuman primates at three separate stations, including the free-ranging colony of rhesus macaques on Cayo Santiago. The Center is supported by a core grant from the Animal Resources Branch and a breeding contract from the NINCDS, both of the National Institutes of Health, as well as University funds. The new Director will be encouraged to develop a graduate program in primatology and pursue independent research. Salary and faculty rank will be commensurate with qualifications and experience. Candidates should forward their curriculum vitae to: Dr. Karlis Adamsons, Chairman, Search Committee, Department of OB-GYN, University of Puerto Rico, School of Medicine, San Juan, Puerto Rico 00936. (809) 753-3225. The University of Puerto Rico is an affirmative action/equal opportunity employer.

* * *

Brazilian Primate Program Initiated

Through a grant of $20,000 from the Merck Family Fund the Wildlife Preservation Trust International has awarded funds to save and breed in captivity three species of Brazilian primates.

The grant, made to Dr. Adelmar Coimbra-Filho of the Rio de Janeiro Primate Center (CPRJ), will provide funds for the rescue of three highly endangered callitrichid species, Geoffroy's white-faced marmoset *(Callithrix geoffroyi)*, the buff-headed marmoset *(C. flaviceps)* and the buffy-tufted-ear marmoset *(C. aurita)*. Of the three species, the CPRJ breeding colonies for *flaviceps* and *aurita* will be the only ones in the world.

Under this program, animals will be rescued from forest regions slated for destruction. Only 1% of the original Atlantic coastal forest still exists in Brazil. This wide-spread destruction has endangered 12 of the 17 primate species in Brazil. Dr. Coimbra-Filho currently has 7 of these species in his breeding facility. [From: *On the Edge*, 1982, No. 2, p. 12. (Newsletter of the Wildlife Preservation Trust).]

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New Organization Formed: Friends of Washoe

Friends of Washoe is a recently formed, non-profit organization dedicated to communication research and enrichment for captive chimpanzees. Its immediate goal is to secure funds for a 50 by 100 yard outdoor recreation area for the five chimpanzees presently in residence at Central Washington University. This project is partially funded by a grant from the National Science Foundation and is directed by Dr. Roger Fouts. The chimpanzees in residence are Washoe, l6 years, Loulis, 3 years (her adopted son), Moja and Tatu, 8 and 5 year-old females, and Dar, a 5 year-old male. The organization's long-range goal is to secure funds that will enable captive chimpanzees to be relocated in a several hundred acre outdoor compound. Contributions from individuals are needed. Address for further information and for contributions: Friends of Washoe, Central Washington University, Ellenburg, WA 98926.

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Upcoming Primate Meetings

The IXth Congress of the International Primatological Society, August 8-13, 1982, Atlanta, GA USA. This will be a joint meeting of the International Primatological Society, American Society of Primatologists, and the International Society for Human Ethology. The Congress is being coordinated by the Yerkes Regional Primate Research Center. The Congress Chairman is Dr. Frederick A. King. Write to the Congress Office, Yerkes Regional Primate Research Center, Emory University, Atlanta, GA 30322 USA for a booklet containing the following information and forms: (l) Outline of the general organization of the Congress; (2) Forms for proposals for symposia, workshops, oral or poster presentations, and film or videotape presentations; (3) Forms for registration and hotel reservations; (4) Information about side trips, post-Congress trips, the meeting site, and so on.

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Cebid Cadavers Needed

Cebid cadavers (frozen or preserved), especially *Ateles, Alouatta, Lagothrix,* and *Cebus,* are needed for dissertation research. The specimens need not be complete, only the hip and pelvic musculature and the tail must be intact. If you have animals available now or will have in the future, please contact: Linda Levitch, Department of Anthropology DH-05, University of Washington, Seattle, WA 98195.

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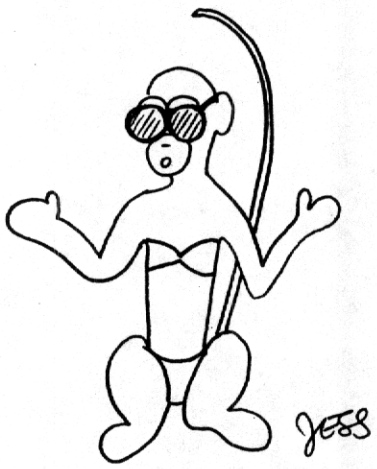

"ATLANTA? I THOUGHT YOU SAID ATLANTIC CITY!"

Recent Books and Articles

(Addresses are those of first authors)

Books

Primate Evolutionary Biology: Selected Papers (Part A) of the VIIIth Congress of the International Primatological Society, Florence, 7-12, July, 1980. A. B. Chiarelli and R.S. Corruccini (Eds.). Berlin: Springer-Verlag, 1981. 119 pp. [Price: $26]

Contents: The homologies of the lorisoid internal carotid artery system, by H. Butler; Comparison of eocene nonadapids and *Tarsius,* by P. Schmid; Clinal size variation in *Archaeolemur* spp. on Madagascar, by L. R. Godfrey & A.J. Petto; The anatomy of growth and its relation to locomotor capacity in *Macaca,* by T. I. Grand; Morphological and ecological characters in sympatric populations of *Macaca* in the Dawna Range, by A. A. Eudey; Specialization of primate foot reflected in quantitative analysis of arthrodial joints of anterior tarsals, by D. K. Messmann; Morphology of some of the lower limb muscles in primates, by A. Prejzner-Morawska & M. Urbanowicz; Morpho-functional analysis of the articular surfaces of the knee-joint in primates, by C. Tardieu; Outlines of the distal humerus in hominoid primates: Application to some Plio-Pleistocene hominids, by B. Senut; Structural-functional relationships between masticatory biomechanics, skeletal biology and craniofacial development in primates, by O. J. Oyen & D. H. Enlow; Comparison of morphological factors in the cranial variation of the Great Apes and man, by B. Jacobshagen; Enamel prism patterns of European hominoids—and their phylogenetical aspects, by N. I. Xirotiris & W. Henke; The structural organization of the cortex of the motor speech areas of the human brain and homologs on the ape's brain, by M. S. Vojno.

Primate Behavior and Sociobiology: Selected Papers (Part B) of the VIIIth Congress of the International Primatological Society, Florence, 7-12, July, 1980. A. B. Chiarelli and R. S. Corruccini (Eds.). Berlin: Springer-Verlag, 1981. 182 pp. [Price: $34]

Contents: Social organization of tree shrews *(Tupaia glis),* by T. Kawamichi & M. Kawamichi; Social behavior and incest mechanisms of tree shrews *(Tupais glis)* Diard 1820, by K. Richarz; Lemurine social and territorial organization in a northwestern Malagasy forest (Restricted area of Ampijoroa), by R. Albignac; Factors influencing choice and social utilization of resting places in captive pottos *(Perodicticus potto* M.), by G. Clauss, H. Hultsch, F. Duvall II, & D. Todt; The lateral balancing of handedness tested in slowly and rapidly moving Lorisidae, by D. Todt, A. Kraberger, & P. Heermann; Adaptive strategies adopted by a free-ranging troop of vervets when placed in a specially designed enclosed environment, by S. G. Tollman; Comparative studies of gregariousness and social structure among seven feral *Macaca fuscata* groups, by T. Koyama, H. Fujii, & F. Yonekawa; Behavioral differences between feral group-reared and mother-reared young Japanese monkeys, by K. Kondo, T. Minami, & N. Itoigawa; Effects of prior experience with infants on behavior shown to unfamiliar infants by nulliparous rhesus monkeys, by S. D. Holman & R. W. Goy; Studying effects of maternal care in rhesus monkeys at different levels of resolution, by H. Dienske, E.-A. van Luxemburg, G. de Jonge, J. A. J. Metz, & L. G. Ribbens; Genetic, maternal, and environmental influences on social development in rhesus monkeys, by S. J. Suomi; Personality and dominance behavior in stump-tailed macaques, by V. J. Nash & A. S. Chamove; Natural and dependent rank of female crab-eating monkeys *(Macaca fascicularis)* in captivity, by C. Welker; Sexuality of aging monkeys *(Macaca radiata),* by G. D. Jensen, F. L. Blanton, & E. N. Sassenrath; Uses of long-range calls during ranging by Guinea baboons, by R. W. Byme; On the function of allogrooming in Old-World monkeys, by C. Goosen; Problems in representing behavioral space-time, by D. Quiatt, J. Everett, S. Luerssen, & G. Murdock; Courtship and mating behavior of wild orangutans in Sumatra, by C. L. Schurmann; Responses of wild chimpanzees to potential predators, by C. E. G. Tutin, W. C. McGrew, & P. J. Baldwin; Piagetian assessment on cognitive development in chimpanzee *(Pan troglodytes),* by M. Mathieu & G. Bergeron; Brain, sociobiology, and evolution in primates, by H. Hemmer; A case of male adoption in a troop of Japanese monkeys *(Macaca fuscata fuscata),* by L. D. Wolfe; Parasitic selection and group selection: A study of conflict interference in rhesus and Japanese macaque monkeys, by C. Boehm.

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 reference, 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.

Primate Brain and Evolution: Methods and Concepts. Este Armstrong and Dean Falk (Eds.). New York: Plenum, 1982. 332 pp. [Price: $39.50]

Proceedings of a satellite symposium of the International Primatological Society meeting, held July 4-5, 1980 in Turin, Italy, and of a symposium at the annual meeting of the American Association of Physical Anthropologists, held April 19, 1980, in Niagra Falls, New York. Contents: CONSIDERATIONS OF HOMOLOGY AND THE VISUAL SYSTEM. Some questions and problems related to homology, by C. B. G. Campbell; Reconstructing the evolution of the brain in primates through the use of comparative neurophysiological and neuroanatomical data, by J. Allman. ALLOMETRIC CONSIDERATIONS. Some cautionary notes on making inferences about relative brain size, by L. Radinsky; Allometric approaches to the evolution of the primate nervous system, by R. D. Martin; The relativity of relative brain measures and hominid mosaic evolution, by R. L. Holloway & D. G. Post; Allometry, brain size, cortical surface, and convolutedness, by H. J. Jerison. ONTOGENETIC PERSPECTIVES. Encephalization and obstetrics in primates with particular reference to humane evolution, by W. Leutenegger; The role of brain maturation in the evolution of the primates, by G. A. Sacher; The development of the primate pulvinar, by M. P. Ogren. APPROACHES FROM CYTOARCHITECTONICS. Mosaic evolution in the primate brain: Differences and similarities in the hominid thalamus, by E. Armstrong; Brain organization and taxonomic relationships in insectivora and primates, by R. Bauchot; Quantitative cytoarchitectonics of the cerebral cortices of several prosimian species, by K. Zilles, H. Stephan, & A. Schleicher; Role of architectonics and connections in the study of primate brain evolution; by A. M. Galabruda & D. N. Pandya. A PALEONEUROLOGICAL PERSPECTIVE. Mapping fossil endocasts, by D. Falk; Early primate brain evolution, by J. A. Gurche; A study of cerebral vascular evolution in primates, by G. C. Conroy; Asymmetries of the brains and skulls of nonhuman primates, by M. LeMay, M. S. Billig, & N. Geschwind. THEORETICAL OVERVIEWS. Neurobiological aspects in the phylogenetic acquisition of speech, by C. R. Noback; On the origin and progressive evolution of the Triune brain, by P. D. MacLean.

Symposia

Proceedings of the Symposium on the Biology of Peninsular Malaysian Primates, Universiti Pertanian Malaysia, Serdang, June 1981. Kavanagh, M., Vidyadaran, M. K., & Nordin, M. (Eds.), *Malaysian Applied Biology*, 1981, *10*, 71-249. [Published by The Malaysian Society of Applied Biology, c/o Faculty of Science, Universiti Kebangsaan Malaysia, Kuala Lumpur. Exact price unknown, but in the vicinity of $10]

Contents: The Malaysian primates research programme: An overview, by D. J. Chivers; The funding, co-ordination, and administration of the Malaysian primates research programme, by M. Kavanagh; Management of the Universiti Pertanian Primate Unit, by M. K. Vidyadaran; A report on gastro-intestinal helminth parasites found in *Macaca fascicularis* in Peninsular Malaysia, by T. S. Janagi; Urolithiasis and pyelonephritis in *Macaca fascicularis*—A case report, by A. R. Omar & F. Noor; Cytogenetic studies on three species of primates in Malaysia, by T. A. Bongso & M. Hilmi; Sexual dimorphism in neutrophils of three species of primates, by T. A. Bongso & M. Hilmi; Do Old World primates have oestrus?, by E. B. Keverne; Long-term plasma progesterone profiles in captive macaques *(Macaca fascicularis)*, by H. S. Tan & M. R. Jainudeen; Social status and plasma progesterone profiles of female long-tailed macaques, by M. Kavanagh, H. S. Tan, & V. Thambyrajah; The effects of digestibility-reducing compounds in leaves on food selection by some Colobinae, by P. G. Waterman & G. M. Choo; Voluntary food intake and digestion in Malaysian primates with special reference to the intake of energy and protein, by M. Nordin; The nutritive value of *Ficus* in the diet of Lar gibbon *(Hylobates lar)*, by S. Vellayan; The primate trade in Malaysia, by M. Nordin & H. Samian; A comparison of behaviours in captive and wild banded langurs, by N. Sewellenggam; The present distribution and status of the slow loris in Peninsular Malaysia, by E. Barrett; Findings on the behavioural ecology of the pig-tailed macaque, by J. O. Caldecott; The effects of selective logging on the social structure of resident primates, by A. D. Johns; Effects of natural habitat differences and disturbance on the abundance of Malaysian primates, by C. W. Marsh & W. L. Wilson.

Is there a Cerebral Hemisphere Asymmetry in Non-human Primates? B. Preilowski & H.-C. Engele (Eds.). Tubingen: First Editor, 1981. 73 pp. [Price: $3. Send checks or International Postage Coupons to: Bruno Preilowski, Dept. of Psychology, University of Tubingen, Gartenstrasse 29, D-7400 Tubingen, Federal Republic of Germany.]

Proceedings of a symposium held during the VIIth Congress of the International Primatological Society, Bangalore, India, Jan. 8-12, 1980. Contents: Is there a hemispheric specialization in nonhuman primates?, by B. Preilowski; Morphological cerebral asymmetries in primates, by M. J. LeMay & N. Geschwind; Handedness and laterality in monkeys and humans, by J. M. Warren; The study of laterality in nonhuman primates: Problems and promises for an explanation of lateral cerebral asymmetries, by B. Preilowski.

Directories

Animal Resources, A Research Resources Directory (4th ed.). (NIH Publication No. 80-1431.) Rockville, MD: Research Resources Information Center, 1981.

This new completely revised 56-page publication is designed as a guide for scientists seeking sources of assistance and collaboration involving animals in biomedical research. The directory identifies animal diagnostic laboratories, animal information projects, animal reference centers, special colony and model study centers, and NIH's major primate research centers currently supported by DRR. The directory identifies the resources provided, research emphasis or application, the principal investigator or director, and address and telephone number. A contact person is indicated for each resource. Included is a geographic index listing the resources by state and within each state. A map shows the locations of the primate research centers and animal diagnostic laboratories throughout the country. A single free copy may be secured by writing to the Research Resources Information Center, 1776 East Jefferson St., Rockville, MD 20852 or by request from the Office of Science & Health Reports, Division of Research Resources, National Institutes of Health, Bethesda, MD 20205.

Bibliographies

Bibliography on tuberculosis in nonhuman primates (1960-1981). Benella Caminiti. Seattle: Primate Information Center, 1982. 215 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]

Colony breeding of prosimians (including Tupaiidae): A bibliography. Benella Caminiti. Seattle: Primate Information Center, 1982. 191 Citations with Primate Index. [Price: $6.00. Ordering information same as in previous reference.]

Behavioral observations of feral Asian leaf-eating monkeys: A bibliography. Jean Balch Williams. Seattle: Primate Information Center, 1982. 186 Citations with Species Index. [Price: $6.00. Ordering information same as in previous reference.]

Hypertension in nonhuman primates: A bibliography of case reports and experimental studies (1971-1981. Benella Caminiti. Seattle: Primate Information Center, 1982. 148 Citations with Primate Index. [Price: $6.00. Ordering information same as in previous reference.]

Behavioral observations of feral colobus monkeys: A bibliography. Jean Balch Williams. Seattle: Primate Information Center, 1982. 123 Citations with Primate index. [Price: $5.00. Ordering information same as in previous reference.]
Intergroup migration of nonhuman primates: A bibliography. Jean Balch Williams. Seattle: Primate Information Center, 1982. 226 Citations with Primate index. [Price: $6.00. Ordering information same as in previous reference.]

Disease

Sudden death associated with atherosclerosis in a gorilla. Gray, R., O'Neal, R. M., & Jordan, F. B. (Sch. of Med., Univ. of Miss. Med. Ctr., Jackson, MI 39216) *Journal of the American Veterinary Medical Association,* 1981, *179,* 1306-1307.

A necropsy of a 29-year-old female mountain gorilla that died in a zoo suggested that the death was the result of severe coronary artery disease, similar in all respects to that seen in humans.

Raccoon ascarid larvae as a cause of fatal central nervous system disease in subhuman primates. Kazacos, K. R., Wirtz, W. L., Burger, P. P., & Christmas, C. S. (Dept. of Vet. Microbiol., Path. & Publ. Hlth., Purdue Univ., West Lafayette, IN 47907) *Journal of the American Veterinary Medical Associationn,* 1981, *179,* 1089-1094.

To assess the danger of *Baylisascaris procyonis* (the common roundworm of raccoons) to subhuman primates, as well as the zoonotic potential of the parasite, 4 squirrel monkeys were inoculated by stomach tube with 5,000 or 10,500 infective *B procyonis* eggs. Fulminating severe CNS disease developed at 10-15 days after inoculation, and the monkeys died or were euthanized at 12-19 days. Necropsies were performed. It was concluded that *B procyonis* should be considered a threat to the health of subhuman primates and an important potential zoonosis in situations in which infection of monkeys or human beings could take place.

Fatal herpesvirus infection in patas monkeys and a black and white colobus monkey. Loomis, M. R., O'Neill, T., Bush, M., & Montali, R. J. (Los Angeles Zoo, 5333 Zoo Dr., Los Angeles, CA 90027) *Journal of the American Veterinary Medical Association,* 1981, *179,* 1236-1239.

Fatal herpesvirus infections were diagnosed in 3 patas monkeys and 1 black and white colobus monkey over a 4-week period. Herpesvirus was isolated from 1 patas monkey and from the colobus monkey. Both isolates had growth characteristics similar to *Herpesvirus hominis* and *H simiae*. The isolate from the colobus monkey antigenically appeared to be *H simiae* or *H simiae*-like, whereas the isolate from the patas monkey could not be conclusively identified with the antisera used. All affected animals were housed in close proximity to rhesus monkeys, the carrier host of *H simiae*.

Intraocular granulomas associated with tuberculosis in primates. West, C. S., Vainisi, S. J., Vygantas, C. M., & Beluhan, F. Z. (Sect. of Comp. Ophthal., Univ. of IL Eye & Ear Infirmary, 1855 W. Taylor St., Chicago, IL 60612) *Journal of the American Veterinary Medical Association,* 1981, *179,* 1240-1244.

Intraocular granulomas associated with tuberculosis were observed in *Ateles geoffroyi* and *Macaca mulatta*. Bacterial cultures from lung tissues at the time of necropsy confirmed the presence of *Mycobacterium bovis* and *M. tuberculosis,* respectively. The absence of generalized clinical signs in spite of systemic dissemination of the organisms in these cases and the public health significance of tuberculous infections emphasize the importance of proper observation and diagnostic procedures in primate colonies and display collections.

Spontaneous malignomas in *Tupaia* (tree-shrew). Darai, G., Zoller, L., Hofmann, W., Moller, P., Schwaier, A., & Flugel, R. M. (Inst. für Medizinische Virologie, University of Heidelberg, Im Neuenheimer Feld 324, 6900 Heidelberg 1, FRG) *American Journal of Primatology,* 1982, *2,* 177-189.

Nine spontaneous malignomas of the tree shrew were detected and analyzed during an observation period of nine years. The tumors were histopathologically examined and classified. All malignomas developed in imported *Tupaia* only. From the tumor cells of two different animals new *Tupaia* herpesviruses were isolated. This is the first report on spontaneous malignomas of *Tupaia* in captivity.

A comparison of neutralization tests for the detection of antibodies to *Herpesvirus simiae* (Monkey B virus). Boulter, E. A., Kalter, S. S., Heberling, R. L., Guajardo, J. E., & Lester, T. L. (S. S. Kalter, Southwest Foundation for Res.. & Ed., PO Box 28147, San Antonio, TX 78284) *Laboratory Animal Science,* 1982, *32,* 150-152.

Neutralization tests used in one laboratory in the USA and one laboratory in England to detect antibodies to *Herpesvirus simiae* have been compared. Complete concordance in results was obtained with 53 (90%) of 59 monkey sera. The remaining six sera all had titers no greater than 1:3. Four were positive only in the American test, and two were positive only in the British test. The importance of using complement if maximum sensitivity is to be achieved in detecting antibodies to this virus has been confirmed.

Viral infections common to human and nonhuman primates. Soave, O. (Interagency Primate Steering Committee, NIH, Bethesda, MD 20205) *Journal of the American Veterinary Medical Association,* 1981, *179,* 1385-1388.

This is a brief review of information on viral infections that are common to human and nonhuman primates.

Fatal fasting syndrome of obese macaques. Bronson, R. T., O'Connell, M., Klepper-Kilgore, N., Chalifoux, L. V., & Sehgal, P. (Tufts Univ. Sch. of Vet. Med., Div. of Diag. Lab., 305 South St., Jamaica Plain, MA 02130) *Laboratory Animal Science,* 1982, *32,* 187-192.

A retrospective study of clinical and pathological data showed that 42 generally obese macaques died after losing approximately 30% of body weight. The mean duration of illness for 29 monkeys whose clinical histories were known was 17 days. All animals had severe fatty change of livers and proximal convoluted renal epithelium. Some also had partial or complete renal tubular atrophy. Other common lesions were pancreatic ectasia, pancreatitis, or focal pancreatic necrosis often with fat necrosis. These lesions constitute fatal fasting syndrome and were the only ones present in 10 cases. Twenty additional fatal lesions were present in six cases; nonfatal ones were present in 14 cases. The most common of the latter were fecal impaction and traumatic lesions from fighting after being recaged in new social groups. Of 15 animals studied clinically, 13 were azotemic. Other clinico-pathologic findings were not contributory. One of 10 rhesus monkeys followed prospectively after being transferred from a single cage to a gang cage, died 74 days later with no lesions apart from those constituting the syndrome. A biopsy survey of 31 clinically normal obese macaques showed that only 3 had mildly fatty livers. These data suggested that obese macaques becoming anorexic for any reason die from this syndrome when body weight loss is approximately 0.1 kg/day.

Calcium bilirubinate gallstones in an aged rhesus monkey *(Macaca mulatta)*. Kessler, M. J. (Caribbean Primate Res. Ctr., Univ. of Puerto Rico, Sch. of Med., PO Box 1053, Sabana Seca, PR 00749) *American Journal of Primatology,* 1982, *2,* 291-294.

Severe gallstone disease was found at necropsy in a 24-year-old female monkey which died of pyelonephritis. Reports of spontaneous cholelithiasis in rhesus monkeys are rare. This is the first description of gallstone disease in a nonhuman primte caused by calcium bilirubinate choleliths.

Physiology and Behavior

Hematology of common marmosets *(Callithrix jacchus)*. McNees, D. W., Ponzio, B. J., Lewis, R. W., Stein, F. J., Sis, R. F. & Levy, B. M. (Dept. of Biochem. & Biophys., College of Agriculture, Texas A&M Univ., College Station, TX 77843) *Primates,* 1982, *23,* 145-150.

The hematology of the common marmoset was investigated to provide reference values for the normal animal. Red blood cell counts, white blood cell counts, hemoglobins, mean cell volumes, and differential white blood cell mean values were determined for Texas A&M colony-born animals and those obtained from the wild. Three analyses were completed on each of 31 animals, which included 16 colony-born and 15 wild-born marmosets. The hematological mean values found for marmosets were similar to those mean values reported for humans. The ranges for the hematology values were much narrower in the colony-born marmosets, and the average white blood cell count was significantly lower in these animals. This indicated that it is possible to produce and maintain a more uniform animal in the colony environment and, consequently, these animals are more suitable than wild-born animals for use as models for human research.

Age estimation from dental eruption in infant and juvenile baboons *(Papio* sp). Relethford, J. H., Coelho, A. M., Jr., & Lawrene, W. A. (A. M. Coelho, Jr., Primate Ethology Lab., Dept. of Cardiopulmonary Dis., Southwest Found. for Res. & Ed., PO Box 28147, San Antonio, TX 78284) *American Journal of Primatology,* 1982, *2,* 205-209.

Two regression methods are proposed for estimating age in nonhuman primates from deciduous dental eruption data. The first method consists of stepwise multiple regression using dental eruption state (present/absent) of each tooth as independent variables. The second method uses the total number of teeth erupted as an independent variable in an exponential model. We applied both methods to a sample of 175 well nourished infant and juvenile baboons *(Papio* sp), housed in an outdoor breeding corral, and ranging in age from birth to 763 days. From this sample, 129 animals were used to compute the regression formulae, and 46 animals were used for cross validation. Both models show good overall fits and high predictive accuracy with the independent cross validation sample.

Sequence and age of eruption of deciduous dentition in the baboon *(Papio* sp). Lawrence, W. A., Coelho, A. M., Jr., & Relethford, J. H. (A. M. Coelho, Jr., Primate Ethology Lab., Dept. of Cardiopulmonary Dis., Southwest Found. for Res. & Ed., PO Box 28147, San Antonio, TX 78284) *American Journal of Primatology,* 1982, *2,* 295-300.

A detailed eruption sequence and associated age of eruption for deciduous dentition in baboons *(Papio* sp) are presented in this paper. The sequence was determind by evaluation and comparison of the number and kinds of teeth present in nine age cohorts comprising the study sample of 88 males and 87 females who ranged in age from birth to 763 days. Eruption was assessed visually as present or absent. Several statistical methods used to derive the ages associated with the eruption sequence are described. The basic eruption sequence in the sample population is $i^{1,}$ $i_{1,}$ $i_{2,}$ $i^{2,}$ $c,$ $\bar{c};$ $m^{1,}$ ($m^{2,}$ $m_{2),}$ $M_{1,}$ M^{1} Both sexes show the same pattern, with the exception of the second deciduous molar, where males show a sequence of $m_{2,}$ $m^{2,}$ while females show the opposite. Posterior dentition shows the greatest gender-specific variation in average age of eruption.

Longitudinal observations of care and development of infant titi monkeys *(Callicebus moloch)*. Fragaszy, D. M., Schwarz, S., & Shimosaka, D. (Dept. of Psychol., San Diego State Univ., San Diego, CA 92182) *American Journal of Primatology,* 1982, *2,* 191-200.

The purpose of this study was to describe patterns of infant care and development in family groups of the monogamous titi. Three infant titis were observed with their natal family groups over the first six months of life. Field observations of extensive male involvement with infants were confirmed. However, mothers and siblings also carried infants at times and interacted with them in affiliative ways. It is suggested that substantial male care of young titi infants leads to several important consequences for the infant's social development, including the development of a stronger attachment to the father than the mother.

Animais predados ou rejeitados pelo Sauí-Piranga, *Leontopithecus r. rosalia* (L., 1766) na sua área de ocorrência primitiva (Callitrichidae, primates). Coimbra-Filho, A. F. (R. Artur Araripe, 60/902 Gávea - Rio de Janeiro (RJ) Brazil). *Revista Brasileira de Biologia,* 1981, *41,* 717-731.

Animal species preyed upon by species of Callitrichidae are very difficult to identify in the habitats of these simians. However, this paper describes a simple, objective method that may simplify the investigation of those species preyed upon or rejected by these and other primates that live in dense forests. Some of the species ingested by the golden lion-tamarin, *Leontopithecus r. rosalia,* are listed as well as those rejected. Other aspects of the subject are commented on.

Breeding and Rearing

Reproductive failure in macaques. Small, M. F. (Calif. Primate Res. Ctr., Univ. of Calif., Davis, CA 95616) *American Journal of Primatology,* 1982, *2,* 137-147.

Reproductive failure among captive and free-ranging macaques is common. Many females experience amenorrhea or anovular cycles. Females who successfully conceive often lose the conceptus before implantation. After implantation, fetuses are aborted because of maternal, paternal, fetal, or placental abnormalities. Death postpartum is likely if infants are premature or if animals are subject to social stress, especially trauma. Based on published reports, reproductive failure among macaques includes an average of 16.3% abortions, 9.9% stillbirths, 21.9% neonatal deaths, and 15.2% infant deaths.

Conditions of failure and recovery of maternal behavior in captive squirrel monkeys *(Saimiri).* Hopf, S. (Dept. of Primate Behavior, Max-Planck Inst. of Psychiatry, Kraepelinstr 2, D-8 München 40, Federal Republic Germany) *International Journal of Primatology,* 1981, *2,* 335-349.

This paper deals with the functioning and malfunctioning of maternal behavior in relation to external and social conditions. During developmental studies in captive squirrel monkey groups, 49 mother-infant pairs were observed. There were several cases of maternal inadequacy subsequent to (1) postnatal transportation, (2) exaggerated social investigation by immatures, and (3) premature allomothering. Brief mother-infant separations by humans did not yield such failures. One female consistently prevented nursing with at least three of her five viable offspring. Complete or partial failure of maternal behavior did not preclude subsequent recovery and/or adequate allomothering.

The development of seasonal variation in gonadal hormones and body weight in the maturing squirrel monkey. Kaplan, J. N., Chen, J., Smith, E., & Davidson, J. (Developmental Psychobiology Program, SRI International, Menlo Park, CA 94025) *International Journal of Primatology,* 1981, *2,* 369-380.

Captive-born squirrel monkeys of three different subtypes (Colombian, Bolivian, Peruvian), ranging in age from 1 to 4.5 years for males and 1 to 3.5 years for females, were examined at 3-month intervals throughout the year for seasonal changes in levels of plasma testosterone and progesterone and in body weight. Cyclical activity of testosterone in males began between 2 and 3 years of age but became more defined by the time the animals were 3-4 years old. Peak values occurred in February and May and corresponded to the time of year in which adults normally mate. Elevations of progesterone occurred initially at approximately 2.5 years of age in February and May, and mainly in females of the Colombian subtype. However, unlike levels of testosterone in males of this age, which declined in August and November (following the typical breeding season), levels of progesterone in females continued to increase during these months. Seasonal changes in body weight were also found in males but these changes were less evident than, and did not correlate with, hormonal changes.

Japanese monkey group translocation: Effects on seasonal breeding. Gouzoules, H., Gouzoules, S., & Fedigan, L. (Rockefeller Univ., Field Res. Ctr., Millbrook, NY 12545) *International Journal of Primatology,* 1981, *2,* 323-334.

A 150-member troop of Japanese monkeys *(Macaca fuscata)* was translocated from its temperate native habitat, near Kyoto, Japan, to a 42-ha enclosure near Laredo, TX, in February, 1972. The seasonal timing and distribution of 430 births recorded over the period 1954-1971 were compared to those of 186 births recorded in Texas from 1973 to 1979. Despite striking climatological and environmental differences between the pre- and the postranslocation sites, the timing of the birth season remains unchanged, although the distribution of births was altered. These findings, considered in light of other published data on the seasonality of mating in macaques, suggest that a phenomenon akin to social drift may account for much of the intertroop variation that occurs.

Fertility in the male gorilla *(Gorilla gorilla)*: Relationship to semen parameters and serum hormones. Gould, K. G. & Kling, O. R. (Yerkes Reg. Prim. Res. Ctr., Emory Univ., Atlanta, GA 30322.) *American Journal of Primatology*, 1982, *2*, 311-316.

Circulating levels of steroid and protein hormones were measured in 17 adult male lowland gorillas. The population included both fertile and infertile males as identified by previous siring of offspring and presence or absence of spermatozoa in the ejaculate obtained by rectal probe electrostimulation. Correlations were sought between levels of testosterone, dihydrotestosterone, androstenedione, estrone, estradiol, progesterone, 170H-progesterone, dihydroepiandrosterone, luteinizing hormone, follicle-stimulating hormone (FSH), and potential fertility status. The results identify normal circulating levels of these hormones, and indicate that aspermatogenesis and infertility are not necessarily associated with any alteration in levels of gonadal steroids. There is an association of aspermatogenesis with elevation of FSH. Levels of adrenal androgens are more similar to other nonhuman primates than to the human, which is of interest because in other aspects of reproductive physiology so far investigated the gorilla has proved to resemble the human more closely than it does the other nonhuman primates.

Weights and neonatal growth of ring-tailed lemurs *(Lemur catta)* and ruffed lemurs *(Lemur variegatus)*. Benirschke, K. & Miller, C. J. (Res. Dept., Zool. Soc. of San Diego, PO Box 551, San Diego, CA 92112) *Journal of Zoo Animal Medicine*, 1981, *12*, 107-111.

Normal birth weights of ringtailed lemurs appear to be between 55 and 70 g. Animals with lesser birth weights were found to be premature as judged by their renal development. Normal birth weights of ruffed lemurs appear to be between 80 and 125 g, regardless of whether they are twins or triplets. The histologic character of the renal cortex at necropsy seems to be a useful measure for judging fetal maturity, as is the case in humans.

Birth intervals in *M. sylvanus* of Gibraltar. Burton, F. D. & Sawchuk, L. A. (Social Sciences Div., Scarborough College, Univ. of Toronto, 1265 Military Trail, West Hill, Ontario, M1C, 1A4, Canada) *Primates*, 1982, *23*, 140-144.

The length of the birth interval in *Macaca sylvanus* of Gibraltar was defined and one-year intervals were found to be normative. The effect of infant loss on the interbirth interval was assessed and found to have no influence. Variability in the birth interval in comparable species is noted.

Parturition behaviour in pluriparous Java-macaques *(Macaca fascicularis)*. Kemps, A. & Timmermans, P. (Dept. of Comp. & Phys. Psychol., Univ. of Nijmegen, Montessorilaan 3, PO Box 9104 HE Nijmegen, The Netherlands) *Primates*, 1982, *23*, 75-88.

This study presents a quantitative description of the parturition behavior shown in captivity by five pluriparous feral Java-monkeys. Three distinct phases in the parturition process are demarcated: a phase just before the actual birth, in which bearing down contractions occur, called Prepartus; the birth itself, called Partus; and a phase immediately after birth, in which severing of the umbilical cord and expulsion of the placenta occur, called Postpartus. The first signs of imminent childbirth are hollow postures of the back, stretching of legs, walking to and fro and touching the vulva. Characteristic parturitional postures are squatting and sitting, hollow and arched backs. Other parturition behaviors are stretching, reaching for support, anogenital investigation, licking, manipulation and inspection of their own body and birth-products and consuming of the placenta. Periparturitional behavior is mainly characterized by changes in frequency, intensity and orientation of behavior, which also occur outside the context of delivery. The newborn baby has a grab-grip reflex and a clamp reflex, which results in a strong ventro-ventral body contact with its mother.

A case of adoption of a howler monkey infant *(Alouatta villosa)* by a female spider monkey *(Ateles geoffroyi)*. Estrada, A. (Estaçion de Biologia, Tropical "Los Tuxlas" Instituto de Biologia, Universidad Nacional Autonoma de México, Apartado Postal 94, San Andrés Tuxtla, Veracruz, México) *Primates*, 1982, *23*, 135-137.

A case of adoption of a 1-month-old howler infant by an adult female spider monkey living in captivity and its development over a six-month period are reported. The female had adopted a spider monkey infant two years before the interspecific adoption reported here. The female displayed a strong maternal response toward the howler infant and also produced milk and fed the infant.

Interlineage genetic differentiation among rhesus macaques on Cayo Santiago. McMillan, C. & Duggleby, C. (Dept. of Anthropology, State Univ. of New York at Buffalo, Amherst, NY 14261) *American Journal of Physical Anthropology*, 1981, *56*, 305-312.

An analysis was done of the patterning of genetic distances between female lineages of rhesus macaques *(Macaca mulatta)* on Cayo Santiago. The distances (Nei, 1972) were calculated pairwise between all lineages using data from the

G, H, I, J, K, L, P and Q blood group systems. Distances between lineages were found to be greater in 1972 than in 1976. Partial correlation coefficients were computed between genetic distances and troop boundaries, controlling for the combined size of the lineages being paired. None of the variance in genetic distances was explained by whether paired lineages were in the same or in different troops. A hypothesis of lineage-specific mating is offered as one explanation of the continued genetic differentiation between lineages within each troop.

Reproduction of cynomolgus monkeys *(Macaca fascicularis)* in harems. Timmermans, P. J. A., Schouten, W. G. P., & Krijnen, J. C. M. (Psychologisch Lab., Katholieke Univ. Nijmegen, Montessorilaan 3, Nijmegen, The Netherlands) *Laboratory Animals*, 1981, *15*, 119-123.

Adult monkeys caught in the wild were housed in 2 harems and used for breeding during 7 successive years. Monkeys born in captivity and reared in the parental groups or in peer groups were also used for breeding. The live birth production rate amounted to 80% and reproduction was stable over the 7 year period. All but one of the females born in captivity showed normal maternal behavior towards their firstborn infants. Aggression between females, breech deliveries, infanticide and reluctance of the male to copulate with females which grew up in his harem, were significant factors that reduced productivity.

Instruments and Technique

Venipuncture and vaginal swabbing in an enclosure occupied by a mixed-sex group of stumptailed macaques *(Macaca arctoides)*. Bunyak, S. C., Harvey, N. C., Rhine, R. J., & Wilson, M. I. (R. J. Rhine, Psychol. Dept., Univ. of Calif., Riverside, CA 92521) *American Journal of Primatology*, 1982, *2*, 201-204.

Procedures are described for vaginal swabbing and venipuncture in a gang-caged, mixed-sex group of stumptailed macaques. The design of the gang cages facilitated venipuncture and swabbing which were done without undue disturbance of the vivarium routine, without seriously stressing colony members, and without interfering with the monkeys' established social relationships.

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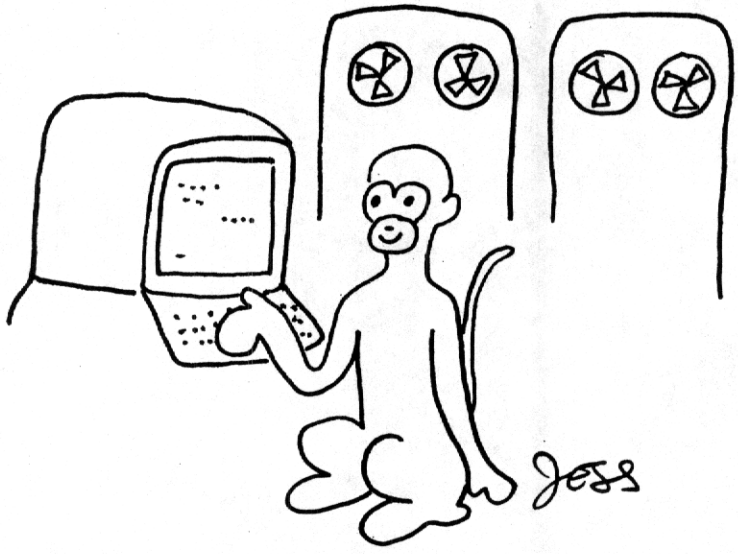

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