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POLICY STATEMENT

The purpose of the *Laboratory Primate Newsletter* is (1) to provide information on care, breeding, and procurement of nonhuman primates for laboratory research, (2) to disseminate general information about the world of primate research (such as announcements of meetings, research projects, nomenclature changes), (3) to help meet the special research needs of individual investigators by publishing requests for research material or for information related to specific research problems, and (4) to serve the cause of conservation of nonhuman primates by publishing information on that topic. As a rule, the only research articles or summaries that will be accepted for the *Newsletter* are those that have some practical implications or that provide general information likely to be of interest to investigators in a variety of areas of primate research. However, special consideration will be given to articles containing data on primates not conveniently publishable elsewhere. General descriptions of current research projects on primates will also be welcome.

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

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

PREPARATION OF ARTICLES FOR THE *NEWSLETTER*.--Articles and notes should be submitted in duplicate and all copy should be double spaced. Articles in the References section should be referred to in the text by author(s) and date of publications, 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].

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Managing Editor: Helen Janis Shuman

EDITOR'S NOTES
THE INTERNATIONAL PRIMATE PROTECTION LEAGUE: IS THE MEDICINE WORSE THAN THE DISEASE?

We noted the existence of the International Primate Protection League (IPPL) in the April, 1975 issue and in the same issue published an appeal on the League's behalf for a moratorium on the purchase of stumptailed monkeys. We felt that an organization whose aim is to promote conservation of nonhuman primates warranted our support by mentioning it in this *Newsletter*. However, we now have enough serious doubts about the IPPL that we recommend withdrawal of support of the League by members of the scientific community. We had some misgivings about the organization from the beginning when we found in some of its early literature, statements about monkey care that we knew to be contrary to fact, as well as some hints of what we interpreted as an anti-laboratory-research bias. Subsequent correspondence with some members of the League and information about it did nothing to dispell our misgivings about the accuracy of statements made by the League and also raised some further questions about its tactics in general. We pointed out in a letter to one of the organizers of the League that they misrepresented certain facts and occasionally made exaggerated claims, seemingly often based on the offhand comments of one individual. We also noted that these practices could only serve to decrease the credibility of the League in general and, worse, do more harm than good to the very cause it is trying to promote. Nevertheless, we still felt that the cause of conservation of nonhuman primates was too important to give vent to our misgivings.

What led us to change our mind was the May, 1975, issue of the IPPL *Newsletter*. We were shocked by it--by its ranting, mud-raking tone, by its illogical stand on at least one vital issue, by its failure to clearly distinguish between fact and opinion, and by its flagrant anti-laboratory-research bias. We have not the space nor the inclination to go into all the particulars here, but we were especially incensed by a note in that issue (on page 8) indicating that the IPPL formally notified the Center for Communicable Diseases that it opposed the proposed Public Health Service regulations that would effectively eliminate the importation of nonhuman primates for use as pets. (See the note on page 15 of this issue of the *Laboratory Primate Newsletter* reporting the adoption of these regulations.) The IPPL attacks the regulations for "...alleging the animals to be public health menaces, and citing a list of diseases which primates can give to man, nearly all of which a 31-day quarantine prevents and all of which have been known for years but not considered sufficient to warrant regulatory intervention till recent efforts by tropical countries to eliminate or reduce export of primates." There is no need to go into the list of serious diseases that nonhuman primates can transmit to man that will certainly not be "prevented" by a 31-day quarantine period. Incidentally, the minimum quarantining period recommended by the National Academy of Science's *Nonhuman Primates: Standards and Guidelines for the Breeding, Care, and Management of Laboratory Animals*

is 30-60 days, depending on the circumstances, and a number of highly qualified investigators recommend a minimum of 90 days. The IPPL note goes on to complain about the speed with which the regulations were to be put into effect and asks, "Why the effort to railroad them into effect quietly?" The note answers its own question with the assurance of Moses presenting the Israelites with the Ten Commandments, "The reason is the world shortage of primates and the clear purpose of the rules is to *divert* all available primates into biomedical activities. It would be naive to think the effect would be to reduce the trade." To represent these badly needed regulations as the selfish workings of a cabal of scientists would be amusing if the IPPL *Newsletter* was not filled with stories about the waste of monkeys by scientists and the horrors scientists are perpetrating on their animals. (We grant that some of these stories may be true, but we object to the IPPL's extreme one-sidedness and indicting of whole classes of individuals.) For a conservation organization to oppose the elimination of the pet trade, which has been accounting for at least half of all imported primates according to all the government statistics we have seen and which constitutes an ever-present and serious public health hazard, strikes us as irresponsible at the very least.

Our impression is that the IPPL is willing to practice every form of yellow journalism at its disposal and to deal very loosely with the facts to promote its cause. We think that the approach the IPPL has apparently chosen to take is at least as bad as the evil which it is trying to counteract.

CONTENTS

SIMILARITIES AND DISSIMILARITIES OF THE REPRODUCTIVE PHYSIOLOGY OF *MACACA MULATTA* AND *M. FASCICULARIS*

W. Richard Dukelow

Michigan State University

Traditionally man has attempted to equate his own development to that of other primates and comparative scientific studies have usually involved the rhesus monkey (*Macaca mulatta*). The choice of this particular macaque was probably due to the availability of the animal in research colonies and, in part, to the pioneering efforts of early investigators (Hartman, Corner, & others) who used this species. In the area of reproductive physiology, the similarity of macaques to man must be tempered with an appreciation for the dissimilarities. For example, in macaques the occurrence of seasonal patterns of reproduction, a shorter gestation, differences in the depth of implantation, bidiscoid placentation, shorter duration of labor, a lesser degree of twinning, and differences in estrogen metabolism all emphasize human-nonhuman primate differences.

Despite these differences, macaques remain a most valuable model for many aspects of human reproduction because of similarities in menstruation, ovulation, fertilization, and embryonic development.

Two factors have, in recent years, expanded the variety of macaques used in biomedical research. There are, first, the increasing governmental restrictions imposed on exportation of *M. mulatta* from India and, second, the vastly expanded research programs on the biology and usefulness of other macaque species. The traditional argument concerning our depth of knowledge of *M. mulatta* relative to other species is becoming less tenable as research progresses.

Table 1 illustrates comparative reproductive data between our colony of *M. fascicularis* and published values from other macaque colonies.

The similarity of the two species is evident. Menstrual cycle lengths, duration of flow, day of ovulation, characteristics of implantation bleeding, gestation length, and age of maturity are similar in both species. Several differences are noted and bear consideration if applicable to a given experimental situation. The most obvious difference lies in the percent of cycles that are ovulatory. Several years ago Riesen, Meyer, and Wolf (1971) indicated a seasonal anovulatory period in *M. mulatta*. While some *M. mulatta* cycle and ovulate the entire year, the presence of a number of anovulatory animals (during the summer months) in most *M. mulatta* colonies results in a lower ovulatory rate on a yearly

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Table 1
Comparative Reproductive Data

Characteristic	*M. fascicularis*	Reference	*M. mulatta*	Reference
Mean cycle length (days)	30.9 ± 4.7 (595) 28.5 31.3 ± 1.5 (21)	Dukelow (Note 1) Fijiwara & Imamichi (1966) MacDonald (1971)	28 35.4 (523) 29.2 ± 0.7 (74) 32.9 (183)	Hartman (1932) Kerber & Reese (1969) MacDonald (1971) Wallach *et al.* (1973)
Median cycle length (days)	33.0 (129) 32.0 (326)	Jewett & Dukelow (1972) Kerber & Reese (1969)	30.0 (523)	Kerber & Reese (1969)
Modal cycle length (days)	28.0 (272) 28.0 (129) 33.0	Fujiwara & Imamichi (1966) Jewett & Dukelow (1972) Valerio *et al.* (1969)	28.0 (523)	Kerber & Reese (1969)
Menstrual flow length (days)	2.8 ± 1.6 (707) 2.6 (326) 4.2[a] (35) 3.9	Dukelow (Note 1) Kerber & Reese (1969) MacDonald (1971) Valerio *et al.* (1969)	3.3 (82)	MacDonald (1971)
Percent of cycles ovulatory	89.9 (138)	Dukelow (Note 1)	51.9 (183)	van Wagenen (1972)
Cycle length after ovulatory cycle (days)	30.7 ± 4.9 (105)	Dukelow (1975)	30.6 (95)	Wallach *et al.* (1973)
Cycle length after anovulatory cycle (days)	30.9 ± 5.6 (8)	Dukelow (1975)	35.4 (88)	Wallach *et al.* (1973)
Side of ovulation. Left Right	62.7% (74) 37.3% (44)	Dukelow (Note 1)	34.5% (10) 65.5 (19)	Wallach *et al.* (1973)
Day of ovulation. All cycles 25-28 day cycle 31-34 day cycle	 13.7 (12) 16.3 (18)	 Dukelow (1975) Dukelow (1975)	13	Hartman (1933)
Implantation bleeding (day of inception)	19.0 (3) 19.1 (14)	Jewett & Dukelow (1972) MacDonald (1971)	20.2 (13)	MacDonald (1971)
Implantation bleeding (duration)	7.3 (3) 19.1 (14)	Jewett & Dukelow (1972) MacDonald (1971)	13.6 (13)	MacDonald (1971)
Gestation length (days)	168 (18) 164.4 (3) 162.7 (10)	Fujiwara & Imamichi (1966) Jewett & Dukelow (1972) MacDonald (1971)	164 168 (580)	Hartman (1932) van Wagenen (1972)
Age of maturity (years)	3.3	Dukelow (1974)	3.5-4.5	Dukelow (1974)

Note. Numbers in parentheses indicate the number of observations.

[a]Determined by vaginal smear rather than by occult signs of bleeding.

basis (Wallach *et al.*, 1973). In our colony of *M. fascicularis*, nearly 90% of the cycles are ovulatory. For experimental studies of ovulation, clearly *M. fascicularis* more nearly corresponds to the human situation than does *M. mulatta*.

The length of the cycle in *M. fascicularis* is not influenced by whether or not ovulation occurred in the previous cycle. Such a relationship has been suggested in *M. mulatta* (Wallach *et al.*, 1973) but remains to be confirmed. There is a difference between the two species with regard to the side of ovulation. In *M. fascicularis* ovulation occurs more often on the left ovary than on the right whereas the reverse is true in *M. mulatta*. This difference is often found in nature between closely related mammalian species and would probably not be of concern in most reproductive studies.

There are also seasonal patterns of birth that must be considered. In field situations both *M. fascicularis* and *M. mulatta* are considered "seasonal" but the birth seasons occur at different times of the year (Dr. Irvin Bernstein, personal communication). In more captive situations, pregnancies can occur throughout the year in both species as has been noted in publications from several laboratories.

In summary, it would appear that *M. fascicularis* and *M. mulatta* can be used interchangeably in a variety of studies on reproductive physiology with application to human primate problems. Although other macaque species have not been included in the above analysis, literature values indicate the same is true for *M. arctoides* and *M. nemestrina*. It would further appear that in studies where seasonal anovulatory cycles would interfere with research results, *M. fascicularis* is the animal model of choice, rather than *M. mulatta*.

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INFORMATION SHARING SUGGESTED ON CYNOMOLGUS STEREOTAXIC SURGERY

Anyone interested in sharing information on stereotaxic surgery of cynomolgus monkeys (*Macaca fascicularis*), particularly of the superior colliculus, please contact: Dr. Charles Butter, Neuroscience Laboratory, University of Michigan, 1103 E. Huron, Ann Arbor, MI 48104.

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TWINNING IN THE POTTO, *PERODICTICUS POTTO*

Peter L. Dalby

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Edward J. Maruska

Cincinnati Zoo

The following is the first report to our knowledge of twinning in the potto (*Perodicticus potto*). An adult male and female potto, believed to have been captured at approximately the same time in Kenya, Africa were received at the Cincinnati Zoo on 29 March 1967. Upon their arrival, they were housed in the "Nocturnal Room", which operates on a reversed 12:12 hours light:dark cycle. After the pair had been together for six years in the approximately 183 cm × 122 cm × 91.5 cm (6 ft × 4 ft × 3 ft) glass-fronted, branch-equipped cage, two dead potto neonates were discovered 16 May 1973 on the cage floor. Since there were no visible signs of trauma, it is believed that the young were abandoned by the female and subsequently died. After checking with the inspection times of the keepers, it is believed that the young were born during the potto day-light hours. This is in agreement with Jolly (1973), who presented evidence that nocturnal prosimians, as a group, give birth predominantly by day.

The fraternal twins, examined after a year of preservation in alcohol, have the following external measurements, in millimeters, with the male first: total length, 100, 101; length of tail vertebrae, 15, 21 (stubby tip in male, but covered with hairs); length of right hind foot, 20, 20; height of ear from notch, 9, 8. No weights are available.

Our observations, when compared to those recorded by Grand, Duro, and Montagna (1964a, 1964b), agree fairly well. We found the male to be well covered with hair, particularly dorsally, with white underfur 5-6 mm length, with longer (8-10 mm) dark guard hairs sparsely intermixed. The posterior half of the female was less haired, particularly in respect to underfur density. In contrast to that found by Grand *et al.*, a strip of light brown hair down the middle of the back was not evident. In addition, the cervical spines so characteristic of pottos were clearly observable as distinct fleshy-like protuberances extending 0.5-1.0 mm above the surrounding skin. Perhaps the alcoholic preparation, with its concomitant dehydration, made the spines more prominent.

Michael and Zumpe (1971) stated that the gestation period for the

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potto is 193 days. Since the birth of the twins, no further offspring were produced until 25 May 1974. The single young, whose birth hour is unknown, was raised by the female with no difficulty. The potto twins are deposited in the VPI & SU Center for Systematic Collections.

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ICLA REFERENCE CENTRE FOR HISTOCOMPATIBILITY TESTING OF NON-HUMAN PRIMATES

The International Committee on Laboratory Animals (ICLA) has established the ICLA Reference Centre for Histocompatibility Testing in Non-Human Primates. The Primate Centre TNO, 151 Lange Kleiweg, Rijswijk, the Netherlands, will serve as such, for the time being.

The primary responsibility of the center will be to: (1) provide information about the state of tissue typing in rhesus monkeys and chimpanzees (possibly other primate species), also in relation to the human histocompatibility systems, (2) provide limited amounts of typing reagents (if available) and/or test other laboratories' reagents for their specificity in relation to the Rijswijk typing sera. At the present time, this again relates to rhesus monkeys and chimpanzees, (3) provide tissue typing services for other laboratories (again within the limit of feasibility regarding time, laboratory help, etc.), (4) train personnel of other laboratories in appropriate tissue typing techniques, and (5) collaborate in other immunogenetic studies concerning the identification of further loci or systems of the so-called major histocompatibility complex of primate species.

Some of these services will be contingent upon the availability of funds to defray costs.

CHRONIC SELENIUM TOXICOSIS IN CYNOMOLGUS MONKEYS

F. M. Loew, E. D. Olfert, and B. Schiefer

University of Saskatchewan

Although the effects of consuming selenium-bearing plants have been recognized in domestic livestock for many years, the relatively narrow limits between the amount necessary for health and the amount capable of causing toxicity have only recently become appreciated (Table 1) (Scott, 1973). When the episode of accidental sodium selenite intoxication described in this report occurred, no previous reports of toxicity in nonhuman primates could be found; only one report of selenium *deficiency* in nonhuman primates was located (Muth *et al.*, 1971). Because the clinical appearance of selenium toxicosis resembled that of a dangerous zoonotic infection of laboratory monkeys, *Herpesvirus simiae* (Keeble, 1960), cognizance of this similarity is important to those concerned with the health of nonhuman primates in research laboratories.

Table 1. Selenium Requirements and Toxicity in Livestock and Poultry Feeds (Buck and Ewan, 1973).

Type of Livestock	Requirement Level	Tolerance Level	Toxic Level
	(ppm of diet)		
Cattle	0.10	2.0	8.0
Sheep	0.10	?	10.0
Swine	0.10	2.5	7.0
Poultry	0.15	5.0	15.0
Turkey	0.20	?	?

The original experiments were supported by Environment Canada and by the Rapeseed Association of Canada. The technical assistance of D. S. Hancock, T. F. Sharby, and K. I. Strausz is acknowledged. The Se procedure, based on X-ray fluorescence, was developed at the Toxicology Laboratory of the Veterinary Services Division of the Alberta Department of Agriculture.

Presented at the International Conference on Heavy Metals in the Environment, Toronto, Ontario, October 27-31, 1975

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History

Eleven laboratory-born and reared cynomolgus monkeys (*Macaca fascicularis*) of both sexes, in excellent clinical health and free of antibody to *Herpes simplex*, were obtained for a nutritional study involving moderately high fat diets. All were housed individually in stainless steel cages and fed a commercial primate diet (Teklad Mills) and water containing ascorbic acid. After two weeks, experimental diets containing 25% fat (weight basis), which supplied about 57% of total calories, were gradually introduced (called Day 1); the diets were formulated according to rhesus monkey (*M. mulatta*) requirements (Kerr, 1972). By Day 14, the animals were consuming only the experimental diets.

Clinical and Laboratory Findings

Five days later, i.e., Day 18, erosions were noticed on the tongue of one monkey, as well as a crusty, hemorrhagic dermatosis on the tail; over the ensuing 21 days nearly all animals developed one or more of these signs as well: loss of nails (onychoptosis), anorexia and lassitude, and leukopenia. All remained negative for *Herpes simplex* antibody. A complete review of the diet revealed an error in mixing such that the selenium (Se) source (sodium selenite, Na_2SeO_3) was added from a pure source instead of the intended 1% pre-mix. The result was diets containing 10.0 ppm Se instead of 0.1 ppm (Cf. Table 1). When the error was discovered, the experimental diets were removed and the commercial diet substituted. Blood and hair obtained on this day (Day 40), at the height of clinical signs, contained 1.12 ± 0.08 (n = 11) and 2.35 ± 0.45 (n = 9) ppm Se respectively. After the next 30 days on the commercial diet, all clinical signs disappeared and samples taken then (Day 70) contained 0.19 ± 0.03 (n = 10) and 1.56 ± 0.25 (n = 11) ppm Se in blood and hair, respectively. The range of blood selenium concentrations in North American humans was reported to be 0.157 to 0.257 ppm (Shamberger & Willis, 1971). Three monkeys were killed on Day 70 and necropsy revealed no lesions which could be attributed to Se. The remaining eight monkeys remained clinically normal.

Discussion

Sodium selenate (1-2 ppm) in drinking water was reported to increase dental caries activity in the presence of a cariogenic diet in *M. fascicularis* (Bowen, 1972). No obvious dental abnormalities were noted in the present episode, but skilled dental examinations were not performed. The reversal of all abnormalities after withdrawal of dietary Se is consistent with reports that chelating agents and other chemicals are only marginally (if at all) of value in treatment (Rosenfeld & Beath, 1964). The similarity of the oral lesions to those of *Herpesvirus simiae* in monkeys suggests that Se toxicity may operate through similar mechanisms.

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NEW PRODUCTS AND SERVICES: FREE LANCE ILLUSTRATIONS OF PRIMATES

Ms. Janet Miyo Kato is doing free lance drawings of primates. She is a graduate of the University of California at Berkeley, where she studied primatology and worked with Dr. Phyllis Dolhinow. She has taken art courses in illustration and a number of courses in anatomy and physiology. The cover drawing for the 1976 volume of this Newsletter will be done by Ms. Kato. For information contact her at 1730 Jackson St., Apt. 400, San Francisco, CA 94109.

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NONHUMAN PRIMATE CONFERENCE IN PERU

The first Inter-American Conference on Conservation and Utilization of American Non-Human Primates in Biomedical Research was held in Lima, Peru, June 2-4, 1975. The conference was a successful first step towards a better understanding by South American countries of the vital need for New World primates by North American biomedical research groups. Equally important, the conference gave U. S. participants an opportunity to understand the problems South American countries envision in their efforts to protect a highly vulnerable and valuable resource.

Five countries--Peru, Colombia, Bolivia, Brazil and the U. S.--were represented by some eighty people. After an inaugural session at which representatives of the government of Peru and the Pan American Health Organization (PAHO) expressed sentiments of welcome, the objectives for the conference were stated by PAHO representatives. This was followed by a series of papers on primatology which provided a comprehensive review of the variety, distribution, and population trends of New World primates within the South America countries where they are known to exist. Causes for depletion in numbers were stressed by each speaker. Destruction of habitat, hunting for consumption as food, and capturing for pets are considered as more serious drains on available resources than export for biomedical research.

The several attempts at surveys of areas to determine an accurate census of primates were discussed at length. It was concluded that these estimates are subject to wide variations and much more must be done in this field. The demand for primates clearly exceeds the numbers which South American countries are presently willing to export. A discussion of ways to ensure adequate supplies in the future include a suggestion that caged breeding colonies and the management of free living populations in the wild might hold great promise, but this was recognized as a long range program.

On the second day, a series of papers were presented which defined the essential role played by New World primates in biomedical research. These included the History of Virus Diseases in South American Monkeys by Luis Melendez (PAHO); Pathogenesis of "Slow Viruses" by Clarence Gibbs (USA); Hepatitis Research by Maurice Hilleman (USA); Cancer Research by David Yohn (USA); Atherosclerosis by Thomas Clarkson (USA); Malaria Studies and Malaria Chemotherapy by Deane (Brazil) and Rothe (USA); Pathology Encountered in New World Monkeys by Norval King (USA); and Use of Primates in Testing and Control of Biologics by Harry Myers (USA).

The program for the final day of the conference dealt with problems of conservation and ecology as well as the development of recommendations to be considered by governments and agencies participating at the meeting.

Fifteen such recommendations were put forward by various individuals attending the conference. These recommendations are being circulated to participants and, after comments or suggested modifications are received, they will be included in the published proceedings. [Based on a note in the *National Society for Medical Research Bulletin*, 1975, *26*, [8], 1 and 3.]

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POSITIONS WANTED

Physical Anthropologist/Behavioral Biologist: Ph.D. in December 1975: University of California, Davis. 1 1/2 years field work in Morocco on primate paternalism. Several years teaching experience plus laboratory research on South American primates. Specialization in primate social behavior and ecology, animal social systems and hominid evolution. Seeks teaching and/or research position. Vita and other materials available on request.--David Milton Taub, Dept. of Anthropology, Univ. of California, Davis, CA 95616.

Experimental Psychologist Specializing in Primate Behavior: Seeking teaching and/or research position. Ph.D. expected June 1976 from Brown University. Research experience includes comparative learning studies of monkeys and apes, intensive work with chimpanzee language project, development of a new split-brain technique for pigeons with related behavioral testing, several psychophysical studies of inhibitory stimulus control. Teaching experience includes statistics, human information processing, introductory psychology, and the supervision of several undergraduate research projects. Teaching interests at graduate or undergraduate level include my major research areas (experimental, comparative, and physiological psychology), particularly methods courses, plus statistics and psychophysics. Vita, publications, and letters of reference available.--Susan M. Essock, Psychology Department, Brown University, Providence, RI 02912. Telephone 401-863-2605.

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A LONGITUDINAL STUDY OF THE DEVELOPMENT OF THE PERMANENT DENTITION IN A COLONY OF BABOONS (*PAPIO ANUBIS*)

E. Tagger, M. Tagger, and E. Benhar

Tel-Aviv University and Weizmann Institute of Science

The dentition of a colony of 11 monkeys has now been under study for 2 1/2 years. The animals were followed from the period between the eruption of the first permanent molar and the shedding of the central incisors until the eruption of the canines. The pattern and timing of eruption of the permanent teeth was found to be in accordance with Reed's tables (Reed, 1965).

A number of additional observations were made. Anterior permanent teeth tended to erupt lingually to their predecessors, so that two rows of teeth could be observed in some instances. Gingival recession preceded shedding of the deciduous incisors and assymetric resorption of the roots of these teeth resulted in their exfoliation with rather long segments of the labial surface of the roots still intact. Ground sections showed no disturbances in the apposition and mineralization pattern of the crowns of the deciduous teeth. The neonatal line could be observed. The marginal gingiva of recently erupted teeth was swollen and clinically inflamed; deep sulci or pockets could be probed. This finding was confirmed by the results of the biopsies that showed proliferation of rete pegs in the sulcular epithelium, intercellular vacuolization in the basal layer of the epithelium and intracellular vacuoles in the spinous layer. The connective tissue stroma exhibited round cell infiltration and vasodilation. After completion of the eruption the gingival inflammation gradually subsided.

References

Reed, O. M. Studies of the dentition and eruption patterns in the San Antonio Baboon colony. In H. Vagtborg, (Ed.) *The Baboon in Medical Research*. Austin: University of Texas Press, 1965. Pp. 167-180.

* * *

NEW PUBLICATION: ABSTRACTS IN HUMAN EVOLUTION

This publication contains abstracts selected from the literature of paleontology, primatology, anatomy, human biology, physical anthropology, population genetics, molecular biology, and evolutionary theory. Features include: (1) a bi-monthly, loose-leaf collection of abstracts selected from over 300 sources that sum to about 450 pages per year; (2) over the period of one year, the subscriber receives (a) about 1500 abstracts selected from the broad literature base of human evolution, (b) about 40 critical abstracts of currently important publications, (c) about 40 extensive abstracts of non-current "classics" from the literature of human evolution, (d) topical bibliographies that retrospectively update selected key subjects of human evolution, (d) a cumulative index.

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PRIMATE CENSUS STUDIES IN PERU AND COLOMBIA

During the 1960's and early 1970's, several South American primate species became important as experimental animals in medical research. The vast majority of these came from two countries: Colombia and Peru. Thus, as concern arose for both the conservation and the continued availability of these species, it was natural to focus attention on these two countries. Because of this concern--and the more general one involving primate populations throughout the world--a Committee on the Conservation of Nonhuman Primates was formed within the Institute of Laboratory Animal Resources, NAS-NRC. Receiving funds from the National Institutes of Health and the U. S. Army Medical Research and Development Command, the committee was charged with assessing the status of various primate species in South America.

Primate census studies were conducted in Colombia and Peru during the period 1972-1974. Teams were selected by the Pan American Health Organization (PAHO) under a subcontract with the Academy. The census was completed in 1974, and a report of its findings was prepared and submitted by PAHO. The PAHO report, received in March 1975, has been reviewed by the Committee on the Conservation of Nonhuman Primates. The Committee's findings and recommendations, together with the PAHO report, have been forwarded to the sponsoring agencies. It is anticipated that copies of the report will be available on a limited basis at a later date. [From *ILAR News*, 1975, *18*, [4], 6-7.]

PET MONKEY KILLS BABY IN NEW JERSEY

According to an Associated Press wire dated July 9, 1975, a 20-pound capuchin monkey on July 5, 1975, attacked a 4-year-old boy in a tenement in Jersey City, New Jersey, where he and his parents lived, and killed him. The 22-year-old mother said she and 2 other adults tried to subdue the monkey after it attacked but were unsuccessful. The father had purchased the monkey 3 months before. Police reported that he said the animal had last been fed the day before the attack. The monkey was taken to the Society for the Prevention of Cruelty to Animals' shelter and humanely killed. Rabies tests are underway. Meanwhile the New Jersey Veterinary Association issued a warning against keeping monkeys and other exotic animals as pets. The veterinarians pointed out the fact that these animals do not belong in the home, but in a zoo or the wild. [From *CDC Veterinary Public Health Notes*, June, 1975, p. 3.]

* * *

ANNOUNCEMENT OF AVAILABILITY OF PRIMATES

The Primate Facility of the Biologic Resources Laboratory (BRL), University of Illinois at the Medical Center, Chicago, wishes to inform the national research community that timed pregnant baboons and stumptailed macaques, as well as neonates, juveniles and adults of these and other species are often available for research purposes and fully conditioned and monitored animals can be supplied upon request at a reasonable cost.

Investigators may also wish to avail themselves of the large and completely equipped surgical facility at the BRL in connection with their primate research. Considerable saving of time and funds can often be realized by conducting research activities at the BRL on a contractual basis.

The BRL is a large modern unit capable of housing over 600 primates of six species. Chronic research and breeding colony animals are housed on the upper level of a relatively new section of the laboratory, completely isolated from incoming, quarantine, and acute study animals. At present, the BRL has about 110 breeding females and 15 male baboons with a breeding efficiency of between 70 and 80%. About 60 stumptailed macaques are also maintained as a breeding colony. The facility has a rigidly controlled environment system and the entire laboratory is AAALAC accredited. Complete medical and surgical services are available at the laboratory. All support services are available at the BRL including comprehensive and thorough diagnostic and preventive medicine measures. A well trained and supervised staff exclusively maintains and monitors the health and condition of the primates.--Contact: Dr. R. F. Locke, Director, Biologic Res. Lab., 1840 W. Taylor St., Chicago, IL 60612 or call 312-996-7040.

SQUIRREL MONKEY BREEDING COLONY BEING ESTABLISHED AT CARIBBEAN PRIMATE RESEARCH CENTER

A squirrel monkey breeding colony is being established by the Caribbean Primate Research Center of the University of Puerto Rico's Medical Sciences Campus under a contract issued by the Division of Research Resources of the National Institutes of Health. Dr. William Kerber, director of the Center, said the $178,000 contract calls for building up to a total population of around 334 animals over an 18-month period. Some 300 of the squirrel monkeys will be females and the rest males, Kerber said.

The colony, to be located at the Center's Sabana Seca site, is expected to produce about 200 infants yearly for medical and other research purposes, Kerber indicated. Additional offspring will be retained by the Center to replace animals lost through death or disease.

All breeding stock will be of a type native to Guyana, South America, according to contract specifications. One purpose of the new contract, in addition to assuring a supply of research animals, is to gather data on how to produce the greatest number of monkeys at the lowest cost. The colony will also be available as a resource for observation-type behavioral studies by graduate students and visiting scientists.

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REGULATIONS FOR IMPORTATION OF NONHUMAN PRIMATES

The U. S. Department of Health, Education, and Welfare has adopted regulations prohibiting importation of nonhuman primates except for scientific, educational, or exhibition purposes. The regulations, published in the *Federal Register*, August 11, 1975, became effective on October 10. In addition to restricting the allowable purposes for which non-human primates may be imported, the regulations require persons receiving these animals within 31 days of importation to register as importers and comply with disease surveillance and reporting requirements. The regulations were developed by CDC because such animals are a significant source of infectious disease in humans, including hepatitis, tuberculosis and parasitic infections (*Morbidity and Mortality Weekly Report*, Vol. 24, No. 11). Many of the reported infections have been severe, and a number have resulted in death or long-term disability.

Requests for information about the regulations should be sent to: Center for Disease Control, Attn.: Bacterial Zoonoses Branch, Bureau of Epidemiology, Atlanta, GA 30333.

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

Primate Behavior (Vol. 4). L. A. Rosenblum (Ed.) New York: Academic Press, 1975. 419 pp. [Price: $29.50]

Contents: Variation of vocal pattern with social situation in the Japanese Monkey (*Macaca fuscata*): A field study, by S. Green; Facial expressions in nonhuman primates, by W. K. Redican; The behavior of marmoset monkeys (*Callithricidae*), by G. Epple; Behavior and malnutrition in the rhesus monkey, by R. R. Zimmermann, D. A. Strobel, P. Steere, & C. R. Geist; The Borneo orang-utan: Population structure and dynamics in relationship to ecology and reproductive strategy, by D. A. Horr; Basic data and concepts on the social organization of *Macaca fascicularis*, by W. Angst.

Primate Behavior and the Emergence of Human Culture. Jane B. Lancaster. New York: Holt, Rinehart & Winston, 1975. 110 pp.

Contents of this paperback are: 1. The evolution of behavior. 2. The social life of Old World monkeys and apes. 3. Social traditions and the emergence of culture. 4. Primate communication and the emergence of language. 5. The human adaptive pattern.

International Zoo Yearbook (Vol. 13). N. Duplaix-Hall (Ed.) London: The Zoological Society of London, 1973. 435 pp.

Section 2, New Developments in the Zoo World includes the following articles: Notes on pregnancy in the sooty mangabey *Cercocebus atys*, by M. Stevenson; A mixed species exhibit of lemurs at the Los Angeles Zoo, by M. Dee & S. Emerson; Observations of maternal behaviour and infant development in the De Brazza monkey *Cercopithecus neglectus* in captivity, by M. Stevenson; Remarks on the breeding and maintenance of colobus monkeys *Colobus guereza*, proboscis monkeys *Nasalis larvatus* and douc langurs *Pygathrix nemaeus* in zoos, by Uwe Hollihn; Play behaviour of a mixed group of juvenile gorillas and organ-utans *Gorilla g. gorilla* and *Pongo p. pygmaeus*, by J. Alcock; The Arnhem Zoo chimpanzee consortium: an attempt to create an ecologically and socially acceptable habitat, by J. A. R. A. M. van Hoof; Computerised data recording for captive and free-living wild animals, by H. H. Roth, I. F. Keymer, & E. C. Appleby. Section 3, Reference section and special surveys, includes: Species of mammals bred in captivity during 1971;

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

Census of rare animals in captivity 1972; Studbooks and world registers for rare species of wild animals in captivity; and Primate birth hour, by A. Jolly.

Films

Cebus monkeys of Barro Colorado Island. Oppenheimer, J. R. (16 mm, 33 min.) From Psychological Cinema Register, Films in the Behavioral Sciences, 17 Willard Bldg., Pennsylvania State Univ., University Park, PA 16802.

Booklets, Pamphlets, and Catalogs

Institute of Laboratory Animal Resources. *Animals for research. A directory of sources of laboratory animals, fluids, tissues, organs* (9th ed.). Washington, D. C.: *National Academy of Sciences,* 1975. 104 pp. [Price: $4.50]

This revised and updated edition, attempting to match research demands for laboratory animals with commercial supply, is a comprehensive guide to sources of vertebrate and invertebrate animal species, fluids, tissues, and organs. All listings provide the complete name and address of each supplier and breeder from whom the animals or materials are available. The directory also includes both common name and scientific name indexes to facilitate the location of needed information. Order from NAS Printing and Publishing Office, 2101 Constitution Ave., NW, Washington, DC 20418.

Disease

A survey of diseases among 100 free-ranging baboons (*Papio ursinus*) from the Kruger National Park. McConnell, E. E., Basson, P. A., De Vos, V., Myers, B. J., & Kuntz, R. E. (Environmental Biology & Chemistry Branch, NIEHS, Research Triangle Park, NC 27709) *Onderstepoort Journal of Veterinary Research,* 1974, *41,* 97-168.

The pathological and parasitological findings from 100 free-ranging chacma baboons are described. One of the most striking discoveries was a heretofore unknown coccidian parasite, *Isospora papionis,* and even more important than its presence in the small intestine was its occurrence in skeletal muscles. Serological and histopathological evidence of toxoplasmosis was found in several animals. Other previously unknown parasites encountered included two mites--*Rhinophaga elongata,* an unusually long mite that produced small granulomas in the nasal mucosae, and *Pneumonyssus vocalis,* a mite found in the laryngeal ventricles. A new species of filarid, *Tetrapetalonema papionis,* was found in the subcutis and intermuscular fascia. New records for the chacma baboon of known parasites were *R. papionis,* a mite found only in the maxillary recess, where it stimulated a polyplike growth, and, in the skeletal muscles, cysticerci of *Taenia crocutae,* a tapeworm of hyaenas (*Crocuta crocuta* and *Hyaena brunnea).* Apart from the patholog-

ical changes associated with the above parasites, another important finding was numerous cases of "capture myopathy", a syndrome that resembles Meyer-Betz disease of man. One of the most severe diseases encountered was pulmonary acariasis (*P. mossambicensis*), which at times caused large foci of suppurative pneumonia and diffuse pleuritis. The mite pigment was also found in draining lymph nodes. The most serious diseases of the liver were cytomegaly, which was similar to that produced by mycotoxins in other animal species, multiple granulomatous foci caused by *Hepatocystis simiae* and microgranulomas caused by ova of *Schistosoma mattheei*. Adult schistosomes were also found in the mesenteric vessels. The most important lesion in the central nervous system was an axonal hamartoma, which was found in two cases and involved a large portion of the brain stem. Also of note were a meningioma in the falx cerebelli, a few examples of non-suppurative encephalitis and several cases in which neurons in the medulla oblongata had been replaced by a globular eosinophilic mass. Other tumors found were a fibroma in the subcutis of the face and a basal cell carcinoma in the skin on the back. Both were of local importance only. Developmental anomalies included an accessory spleen, ectopic pancreatic tissue in the duodenum, thymic tissue embedded in the thyroid and parathyroid and microcysts in the thymus, parathyroid, and adenohypophysis. Arteriosclerosis of limited severity was found in the aorta and coronary and renal arteries of many of the older baboons (males and females). Another vascular change related to previous pregnancy was sclerosis of the ovarian and uterine vessels. Degenerative changes were found in the central arteries of germinal follicles in various lymph nodes and the spleen. Other noteworthy findings included the presence of spargana in the skeletal muscles; ranula formation of the ducts of the glands of Ebner; para-ovarian cysts; large intranuclear inclusions in the sub-mandibular salivary gland compatible with those produced by cytomeglaovirus and intranuclear inclusions in the epididymis. Various gastrointestinal parasites were found and their corresponding lesions are described. Selected bacterial studies for shigellae and salmonellae were negative, as were intradermal tests for tuberculosis and serological tests for leptospirosis and brucellosis. The brain, heart, spleen, liver, lungs, and kidneys were mass measured and were compared to the body mass. In all age groups the heart varied the least when expressed as per cent body mass. The brain was the most variable in this regard but changed the least in total mass.

Oncogenic viruses of nonhuman primates: A review. Raflor, C. P. (National Technical Information Service, Springfield, VA 22151. Paper copy $3.25, Microfiche $2.25) *Technical Report No. EB-TR-74084*, Edgewood Arsenal, Aberdeen Proving Ground, Md, 1975. 15 pp. (National Technical Information Service No. AD/A-005 160/7GA)

Contents: I. Introduction. II. Viruses of nonhuman primate origin oncogenic in nonhuman primates. A. *Herpesvirus saimiri*. B. *Herpesvirus ateles*. C. Simian sarcoma virus. D. Yaba poxvirus. E. Focal epithelial hyperplasia of the oral mucosa. III. Viruses isolated from nonhuman primates oncogenic in animals other than nonhuman primates.

A. Simian papova virus. B. Simian adenovirus. IV. Viruses of other than nonhuman primate origin oncogenic in nonhuman primates. A. Rous sarcoma virus. B. Feline fibrosarcoma virus. C. Epstein-Barr virus. D. *Herpesvirus hominis*. E. Molluscum contagiosum. V. Nonhuman primate viruses of questionable oncogenicity isolated from spontaneous tumors. Mason-Pfizer monkey virus. VI. Spontaneous simian tumors possibly with a viral etiology. A. Gibbon lymphosarcoma. B. Rhesus lymphoma.

Erythroblastosis models: A review and new experimental data in monkeys. Wiener, A. S., Socha, W. W., Niemann, W., & Moor-Jankowski, J. (Laboratory for Exp. Med. & Surg. in Primates (LEMSIP) of New York Univ. Sch. of Med., New York, NY 10016) *Journal of Medical Primatology*, 1975, *4*, 179-187.

The current status of *erythroblastosis fetalis* in man and in animals is briefly reviewed with emphasis on present knowledge of nonhuman primates as models for the disease. Our studies in crab-eating macaques indicate that presence in a mother's serum of potent antibodies reactive for red cells of her fetus will not necessarily cause erythroblastosis; in one case the maternal antibodies did not penetrate the placental barrier, and in two cases although the fetal red cells were maximally antibody-coated, they remained undamaged and the disease failed to develop.

Physiology

The progression and evaluation of hematologic and serum biochemical values in the chimpanzee. DiGiacomo, R. F., McDonagh, B. F., Gibbs, C. J. Jr., & Gajdusek, D. C. (Lab. of Slow, Latent and Temperate Virus Infections, National Inst. of Neurological Dis. & Stroke, NIH, Bethesda, MD 20014) *Journal of Medical Primatology*, 1975, *4*, 188-203.

Summary statistics of various hematologic and serum biochemical measures are presented for a colony of 74 chimpanzees (*Pan troglodytes*). Covariance analysis of longitudinal values revealed a progression of some measures with maturity. Equations for evaluating these measures as they relate to the health of individual colony members and new additions to the colony were formulated. From these equations, confidence bounds (95%), which can be regarded as normative ranges, were established for each of the measures. The literature on hematologic and serum biochemical values in the chimpanzee, especially as they pertain to the evaluation and progression of values, is reviewed.

Blood groups of pygmy chimpanzees (*Pan paniscus*): Human-type and simian-type. Moor-Jankowski, J., Wiener, A. S., Socha, W. W., Gordon, E. B., Mortelmans, J., & Sedgwick, C. J. (Laboratory for Exp. Med. & Surg. in Primates (LEMSIP), New York Univ. Sch. of Med., New York, NY 10016) *Journal of Medical Primatology*, 1975, *4*, 262-267.

Blood grouping of nine pygmy chimpanzees revealed them to be human-type group A_1M, $\underline{Rh}_o$, and simian-type v.D, CCef, g, H, I, K. L. Only group N^c was polymorphic. *Pan paniscus* red cells can be easily dis-

tinguished from those of *Pan troglodytes* by the serological characteristics of human-type blood groups A and M. Also, the distribution of the simian-type blood group systems V-A-B and C-E-F are strikingly different in the two species.

Facilities and Care

Semisynthetic diets for adult *Macaca nemestrina*. (Letter) Spiller, G. A. & Amen, R. J. (Dept. of Nutritional Science, Inst. of Agriscience & Nutrition, Syntex Research, Palo Alto, CA 94304) *Journal of Medical Primatology*, 1975, *4*, 268-269.

This note describes results from 12 male pig-tailed monkeys that have been kept for over a year on a series of semisynthetic liquid diets.

Breeding

Menstrual cycle and some other related aspects of Japanese monkeys (*Macaca fuscata*). Nigi, H. (Japan Monkey Ctr., Inst. of Primatology, Inuyama, Aichi 484, Japan) *Primates*, 1975, *16*, 207-216.

Almost all the monkeys in this study had regular menstrual cycles only in the mating season, and had no menstrual cycles, or only irregular ones, in the non-mating season. The average length of the menstrual cycle in the mating season was 26.3 ±5.4 days. Many monkeys had a tendency to have their own individual and relatively regular cycles. Ninety out of 108 monkeys kept in the air conditioned quarters for five years showed "periodical changes" essentially coincident with the changes of outdoor season, and this fact suggests that the rhythm of the seasonal change of Japanese monkeys remains for a relatively long period even if the monkeys are kept in air conditioned quarters where room temperature and lighting are kept constant throughout the year. Vaginal smear, cervical mucus, sexual skin, etc. were observed in relation to ovulation. These characters showed cyclic changes with menstrual cycles in about half of all cases observed, but ovulation occurred even in the cases in which no cyclic change was observed. Therefore, it was not necessarily easy to estimate the ovulation by observing these characters.

Aspects of reproduction and reproductive behaviour in *Macaca arctoides*. Trollope, J. & Blurton Jones, N. G. (Dept. of Growth & Develop., Inst. of Child Hlth., Univ. of London, London WCIN 1EH, England) *Primates*, 1975, *16*, 191-205.

Observations are reported from 7 years of breeding *M. arctoides* in a small caged colony. From a stock of two males and six females 18 offspring have been born and 17 reared despite leaving young with the mother for approximately 2 years and restricted access between sexes. Overt menstrual bleeding is inconspicuous and external signs of estrus are minimal. Color change and slight swelling indicate the cycling condition, not the stage of the estrous cycle. Mean length of cycles was 29.4 days. Copulatory ties have been observed on 15 occasions.

Pregnancies lasted 168-183 days. The mean of five exactly timed pregnancies was 178 days. All 17 successful births occurred at night. Caging mother, latest offspring, and previous offspring together proved successful. The age of menarche of females born in the laboratory has steadily decreased through the period of captivity. Sexual behavior is first seen long before puberty in both sexes, some aspects of its development are described. Two sub-adult males appeared to have failed to develop mature sexual behavior until it was found that their incompetence was a reversible effect of the presence of an adult male.

Conservation

Lion tailed macaque. Mittermier, R. A., Ruiz, H. D., & Luscombe A. (Museum of Comp. Zoology & Dept. of Anthro., Harvard Univ., Cambridge, MA 02138) *Oryx*, 1975, *13*, 41-49.

The Peruvian yellow-tailed wooly monkeys, last seen by scientists in 1926 and feared extinct, was rediscovered by the authors in the area of the lower Andes where it was last seen. They were able to bring back a live juvenile that was being kept as a pet, and also four skins and three skulls which they got from a hunter who had shot the animals for meat. The authors urge the need to create a reserve for this rare endemic monkey in Peru and plan further exploratory trips to decide the best area.

Can the Tana mangabey survive? Homewood, K. (Zoological Soc. of London, Regent's Park, London NW1 4RY, England) *Oryx*, 1975, *13*, 53-59.

Found in only one small area in northeast Kenya, the Tana mangabey is both seriously depleted and highly endangered. Numbers are estimated at under 1500. The author, who spent two years on a field study in the Tana River area, shows how the combination of increased pressure from the growing human population and the long-term effects of new hydroelectric and irrigation schemes will affect especially the food supply of this monkey, which has adapted itself to a complicated river regime that may now be destroyed.

The longevity record for *Colobus*. Hill, C. A. (San Diego Zoological Garden, P. O. Box 551, San Diego, CA 92112) *Primates*, 1975, *16*, 235.

A male *Colobus polykmoso kiknyuensis* died in 1964 after establishing a captive longevity in the San Diego Zoo of about 23.5 years. Actual life span was 4-7 years longer. A female of this species died in the same year after achieving a captive record of close to 24 years. Actual life span was probably about 26 years.

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