

# LABORATORY PRIMATE NEWSLETTER

Volume 18, Number 2

April, 1979



**ALLAN M. SCHRIER, EDITOR**

**MORRIS L. POVAR, CONSULTING EDITOR**

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

#### POLICY STATEMENT

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

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

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

#### ACKNOWLEDGMENTS

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

We thank the San Diego Zoo for supplying  
the cover photograph of the  
Goeldi's marmosets (*Callimico goeldii*)

---

**Managing Editor: Helen Janis Shuman**

## CONTENTS

### ARTICLES AND NOTES

- More on Primate Taxonomy, by Richard G. Van Gelder..... 1
- Still More on Primate Taxonomy, by S. L. Washburn..... 5
- Paternal Behavior in a Captive "Harem" Group of *Cynomolgus*  
Macaques (*Macaca fascicularis*), by Kathleen G. Auerbach  
and David M. Taub..... 7
- Giardiasis in Apes and Zoo Attendants.....14
- Monkeypox in a Human in West Africa.....16

### NEWS, INFORMATION, AND ANNOUNCEMENTS

- Endangered Species Office Backlog Grows..... 4
- Pathology of Laboratory Animals Course..... 6
- Malaysia Expected to Announce Ban on Export of Primates.....12
- Workshop on the Conservation of the Orangutan to be Held  
in Rotterdam.....13
- Information Sought on Differences Between Wild-Caught  
and Captive-Bred Primates When Used in Experiments.....15
- NIH Issues New Animal Care and Use Guidelines.....17

### MEETINGS

- Congress of the International Association of Biological  
Standardization to be Held..... 6
- Symposium Announcement: The Use of Nonhuman Primates  
in Vision Research.....18

### DEPARTMENTS

- Laboratory Primate Newsletter Quarterly Survey:  
First Quarter 1978.....19
- Recent Books and Articles.....21
- Address Changes.....30

## MORE ON PRIMATE TAXONOMY

Richard G. Van Gelder

American Museum of Natural History

Washburn's recent comments on primate taxonomy (1978) unfortunately gives primatologists a false impression both of taxonomy and nomenclature. Washburn confuses taxonomy and nomenclature, which are sometimes interrelated but need not always be. Much of the recent work on East African Plio-Pleistocene hominids, for example, has been taxonomy without nomenclature, while many cases of scientific names that require determination of alternative spellings are nomenclature without taxonomy.

Washburn's demeaning tone and statements such as "taxonomists only retard research by raising issues that are not relevant," or that taxonomists are "intellectually irresponsible," or that they are game-playing in a frivolous "playground," or that "Medical research should not be hampered by those who burrow in the literature of more than a hundred years ago, creating confusion where none existed," or that they have "obstructed the understanding and use of primate taxonomy" show that he either does not understand the differences between nomenclature and taxonomy, or that he is ignoring the reasons why changes in names are suggested or required.

The particular example that Washburn cites, the name *Papio*, involves both nomenclature and taxonomy. Despite his claim that the "issues are clear" and that *Papio* is "used and understood by many thousands of scientists," he is quite in error. In fact, I do not know whether, when he refers to *Papio*, he means to include the hamadryas baboon, which some would call *Comopithecus*. Does he include *Mandrillus* in *Papio*? The extent of the genus *Papio* is a taxonomic matter, and, depending upon one's point of view, could also include the gelada (*Theropithecus* to some; Buettner-Janusch, 1966). Cronin and Sarich (1976) indicate that a good case could be made for combining *Theropithecus* with *Papio papio* and *P. hamadryas*, while maintaining *Mandrillus* as a distinct genus, based on molecular systematics. To put it simply, there is not "agreement on usage" so far as the taxonomy of *Papio* is concerned.

There is also another problem with the name *Papio*, and that is a nomenclatural one. While it all may be clear to Washburn, it certainly is not to other primatologists. As Delson and Napier (1976) put it, "For nearly thirty years, since 1947 to be precise, the names of the common or 'savannah' baboons and of the mandrill and drill (or 'forest' baboons) have been in doubt" (p. 46). This doubt is concerned with the

---

Author's address: Department of Mammalogy, American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024.

species to which the name *Papio* actually applies. Delson and Napier (1976) have elucidated the case most excellently, and have spelled out the alternatives for name use.

Washburn seems unaware of the stringent proscriptions that bind the use of scientific names. There is a published set of rules (the *International Code of Zoological Nomenclature*, 1961), an International Commission on Biological Nomenclature to judge the cases, and a mechanism for the publication of comments on each case by anyone who chooses to write. Washburn seems to think that any nomenclaturist can capriciously evoke any prior name, and seems unaware that Article 23B of the *International Code of Zoological Nomenclature* (1961) was promulgated precisely to prevent changes of the sort to which Washburn so vehemently objects. Under this regulation, in essence, a prior name that has remained unused for 50 or more years *is not to be applied*, anyone who finds such a name is to refer it to the commission *for rejection*, and the provision "does not preclude application to the Commission for the preservation of names, important in applied zoology, of which the period of general usage has been less than fifty years" (p. 23). The generic names for baboons seem to come under this last regulation, and the alternative of either following priority or of following general usage is the decision that the commission must make. Until such time as a ruling is made, there may well be confusion of the proper names to be used. The nomenclatural solution, however, will not, and should not, have any bearing on the taxonomic decisions concerning the content of any of the putative genera.

Washburn claims that changes in the names of primates that have taken place in his lifetime have "only obstructed the understanding and use of primate taxonomy." By and large, most of the name changes that have been made in recent decades are not the result of changes solely for nomenclatural reasons, but have resulted from new study of the biology of primates with consequent new view of their relationships, and the application of an appropriate and correct name to reflect this new knowledge. Thus, if one chooses to call the hamadryas baboon *Comopithecus hamadryas*, he is saying that he regards that species as generically distinct from other baboons. If someone calls the hamadryas baboon *Papio hamadryas*, he is saying that he considers that species only specifically (not generically) distinct from some other species of baboons. These are taxonomic judgments.

In complaining about changes of names, Washburn implies that these are being made by taxonomists, somehow distinct from primatologists. But who makes name changes, and why? Of some 320 generic names of mammals that appear in the Meester and Setzer manual on African mammals (1971), 26 (with my addition of *Homo*) are primates. When Allen (1939) published his list for the same continent, he had 373 generic names, of which 27 were primates. About eight per cent of the African genera were primates in the later list, and seven per cent in the former. Over the 32 years between the appearances of these two publications, four of Allen's genera were synonymized (*Mandrillus*, *Comopithecus*, *Allenopithecus*,

and *Erythrocebus*). During the same period, two genera were resurrected, and one was named: *Galagoides*, *Varecia*, and *Allocebus*. None of these name changes were made for nomenclatural reasons. Who were responsible for these changes, which Washburn implies "only retard research"? The "new" genera were brought forth by A. and J. J. Petter, W. C. O. Hill, and J. Meester--of whom the first three are basically primatologists, and the last a taxonomist. Further, at least two of the names that were synonymized were the result of actions by a "committee of primatologists under the direction of Dr. W. C. Osman Hill..." (Dandelot, 1971, p. 5). Although primates make up only about 7 or 8 percent of the genera of African mammals, the synonymized primate names make up almost 15 percent of the changes made in names of all African genera. Of the newly employed names, similarly, those of primates make up nearly 16 per cent of the total, compared with five per cent for African mammal genera as a whole. Washburn may be correct in deploring instability in primate classification, but he is surely laying the blame at the wrong doorstep.

Names changed for nomenclatural purposes and so fixed by the International Commission are stable, and are most unlikely to be subject to future alteration. There is no guarantee, however, that a name fixed by the Commission will be used, and if current classification regards two taxa as synonymous, only one name can be used for what formerly had two. Changing classifications reflect increased research, understanding, and differing views of evolution and relationships. No one is bound by any rules to follow one classification or another, scientists are required, however, to apply the correct nomenclatural appellations to their taxonomic arrangements. Washburn may object to change in classification, but he cannot stop it. It is regrettable that he has chosen to express his uninformed view to primatologists in this *Newsletter*, for many of the readers may have little understanding of the processes of nomenclature or taxonomy, and thus acquire Washburn's prejudices.

#### References

- Allen, G. M. A checklist of African mammals. *Bulletin of the Museum of Comparative Zoölogy at Harvard College*, 1939, 83, 1-763.
- Buettner-Janusch, J. A problem in evolutionary systematics: Nomenclature and classification of baboons, genus *Papio*. *Folia Primatologica*, 1966, 4, 288-308.
- Cronin, J. E., & Sarich, V. M. Molecular evidence for dual origin of mangabeys among Old World monkeys. *Nature*, 1976, 260, 700-702.
- Dandelot, P. Part 3. Order Primates. In J. Meester & H. W. Setzer (Eds.), *The mammals of Africa: An identification manual*. Washington, D.C.: Smithsonian Institution Press, 1971
- Delson, E., & Napier, P. H. Request for the determination of the

generic names of the baboon and the mandrill (Mammalia: Primates, Cercopithecidae). Z.N. (S.) 2093. *Bulletin of Zoological Nomenclature*, 1976, 33, 46-60.

*International Code of Zoological Nomenclature Adopted by the XV International Congress of Zoology*. London: International Trust for Zoological Nomenclature, 1961.

Meester, J., & Setzer, H. W. (Eds.) *The mammals of Africa: An identification manual*. Washington, D.C.: Smithsonian Institution Press, 1971.

Washburn, S. L. Note on primate taxonomy. *Laboratory Primate Newsletter*, 1978, 17 [3], 8.

\*

\*

\*

#### ENDANGERED SPECIES OFFICE BACKLOG GROWS

The *AAZPA Newsletter* (1979, 20 [2], 7) reports that the backlog of work continues to grow in the Endangered Species Permit Office. Before the Interior staff could overcome the backup of permit applications occasioned by the 41-day hiatus resulting from Congressional inaction on reauthorizing the Endangered Species Act, the Endangered Species permit staff was faced with additional burdens and priority demands. In addition, they have two vacancies for permit biologists and five clerical vacancies which cannot be filled because of the President's hiring ban.

As of January 18, 1979, the Endangered Species Permit Office had a backlog of 450 applications compared to a normal workload of 225 pending applications at any given time. Last summer, the average processing time for an endangered species permit was 70 days. Currently, the Interior Department estimates an average processing time of 85 days. The number of permits that have been in the Endangered Species Permit Office over 90 days has almost doubled during the past month.

Although this work backlog has seriously hampered efforts to finalize proposed regulations for freer movement of captive-born endangered species, the Department expects to finalize the proposed captive-born regulations by May 1, 1979.

\*

\*

\*

## STILL MORE ON PRIMATE TAXONOMY

S. L. Washburn

University of California, Berkeley

While Van Gelder (1979) has given a clear and traditional statement on primate taxonomy, I do not think that it meets the basic issues at all. The point may be illustrated by considering the baboons. In 1891, in a summary on primate classification, Flower and Lydekker mention: mandrill, drill, chacma, yellow, hamadryas, anubis (west Africa), and gelada. These were not new discoveries and most of them had been well described long before 1891. Now surely one of the purposes of taxonomy is to provide a stable and useful terminology. What kind of a science is it that has not been able to provide such a terminology for large, easily distinguished forms that have been well known and well represented in museums and zoos for more than 100 years?

The problem lies in the tradition of the taxonomic system, where the aim has been to find the correct names, and this had led to constant changes. Again, look at Flower and Lydekker--gibbons, orangutans, chimpanzees, and gorillas are mentioned, but every scientific name has been changed. Even names which had been in general use for a long period of time (Simiidae, for example) have been changed. One conclusion from the past is that the principles of taxonomy recommended by Van Gelder have not, and cannot, provide a stable nomenclature.

But suppose one of the purposes of taxonomy is to be useful, to help those who are using the primates in research. The names for baboons and macaques could have been frozen 100 years ago because the major kinds were all known at that time. In fact, all the names have been changed, some of them several times. To give a specific example of the change from "useful" to "correct," the name for the crab-eating macaque has been changed from *Macaca cynomolgus* to *M. irus* to *M. fascicularis* without any biological justification. The names all refer to the same group of monkeys, and the search for the correct name has only made it more difficult to do research. But, at present, when changing a name, it is not necessary to even consider the effects of the change on the people who are using the terms. From the point of view of traditional taxonomy, the names should have been changed; from the point of view of utility, they should not. Why should a name be changed unless it can be shown that the change helps the understanding of the primates?

The "stringent proscriptions that bind the use of scientific names" has not brought order to the primates, but a steady flow of changes instead. We have no reason to suppose that it will be different

---

Author's address: Dept. of Anthropology, University of California, Berkeley, CA 94720.



in the future unless it is recognized that the classification is made by human beings and that utility should be a primary consideration.

#### References

Flower, W. H., & Lydekker, R. *An introduction to the study of mammals, living and extinct*. London: Adam and Charles Black, 1891.

Van Gelder, R. G. More on primate taxonomy. *Laboratory Primate Newsletter*, 1979, 18 [2], 1-4.

\*

\*

\*

#### PATHOLOGY OF LABORATORY ANIMALS COURSE

The "Pathology of Laboratory Animals" course will be conducted at the Armed Forces Institute of Pathology (AFIP) from August 13 to 17, 1979.

Military and federal service employees in the veterinary and other medical science fields are requested to consult their agency regulations for appropriate application procedures. Civilian veterinarians and allied scientists are invited to apply and will be considered on a space available basis. Upon application, non-federal and foreign national registrants are required to submit a \$125.00 fee, payable to the Treasurer of the United States. All applications must be received by August 1, 1979 and may be made by writing to: The Director, Armed Forces Institute of Pathology, ATTN.: AFIP-EDE, Washington, DC 20306.

\*

\*

\*

#### CONGRESS OF THE INTERNATIONAL ASSOCIATION OF BIOLOGICAL STANDARDIZATION TO BE HELD

The 16th Congress of the International Association of Biological Standardization is to be held in San Antonio, Texas, September 16-20, 1979. The theme is: Animals: Their Standardization to Improve Research, Production, and Testing of Biologicals. Interested participants should provide appropriate title to either: Dr. S. S. Kalter, Director, Department of Microbiology and Infectious Diseases, Southwest Foundation for Research and Education, P.O. Box 28147, San Antonio, TX 78284; or Dr. C. Huygelen, Recherche et Industrie Thérapeutiques, R.I.T.s.a., 89, rue de l'Institut, B-1330 Rixensart, Belgium.

See the *IABS Newsletter*, No. 34 (December, 1978) for the preliminary program or contact one of the persons indicated above. Registration fee: 100 SwFr (approximately \$55.00 U.S.).

\*

\*

\*

PATERNAL BEHAVIOR IN A CAPTIVE "HAREM" GROUP OF  
CYNOMOLGUS MACAQUES (*Macaca fascicularis*)

Kathleen G. Auerbach and David M. Taub

Bowman Gray School of Medicine

It has long been recognized that, among primates (particularly the Cercopithecidae), adult males perform essential functions such as quelling intratroup fights and directing group movements. With the exception of the monogamously mating primates, males have not been thought to participate directly in the care of the young. Their primary supportive role has been viewed as a protector of the entire social unit, of which the neonate is but one member.

Recently it has been noted that a diversity of interactions occurs between males and infants of many primate species (see reviews by Mitchell, 1969; Redican, 1976; Hrdy, 1976; Taub, 1978). Among the members of the genus *Macaca*, male-infant contact ranges from the intensive and well-developed system of care-taking behavior among Barbary macaques (Taub, 1978, 1979) to the virtual absence of male-infant interaction characteristic of wild rhesus macaques (Lindburg, 1971). Under certain circumstances of laboratory housing, males who ordinarily take little or no interest in infants in the wild may exhibit remarkably intensive interest in, and attention to, infants (Redican, 1975).

From the few reports on cynomolgus or crab-eating macaques (*M. fascicularis*), it is difficult to establish with authority the degree to which males are normally involved with infants in this species, but it appears to be minimal. Infanticide by crab-eating males has been reported among captive groups (Thompson, 1967; Washburn & Hamburg, 1968; Angst & Thommen, 1977), but in her studies of a captive multi-male group, Gilford (1967) reports male "tolerance" of infant approaches and that males often "...play intensively with infants" (36). Shirek-Ellefson (1967) also reports that males living in semi-free ranging groups at the Singapore Botanical Gardens may occasionally play with infants (cited also in Gifford, 1967). Furuya (cited in Itani, 1959) reported a male kidnapping of an infant that ultimately led to the infant's starvation and death. In a study of wild groups in Kalimantan, Wheatley (1978) did not report any instances of interactions between males and infants. Angst (1975) did not report any male-infant interactions among wild troops. He did note that males carried infants among zoo groups, but he believed this to function as an inhibitor to aggression. In this regard, de Waal *et al.* (1976) have reported behaviors between two males and an infant which sounds similar to the "agonistic buffering" behavior reported by Deag and Crook (1971).

---

Authors' address: Department of Psychiatry and Department of Comparative Medicine, Bowman Gray School of Medicine, Winston-Salem, NC 27103.

This preliminary report presents data on paternal behavior in a captive one-male "harem" group of crab-eating macaques.

### Methods and Materials

The Bowman Gray School of Medicine maintains a large cynomolgus macaque breeding facility, composed of 16 "harem" units, each with one male and several females. Each harem breeding unit is housed in an identical indoor-outdoor cage measuring 2.43m × 2.43m × 2.43m.

As part of a pilot project to investigate the role of steroid hormones in lactating females on maternal-infant behavior, one such harem breeding group of eight females and five infants was observed during the infants' first three months of life.

Three observational techniques were used: focal-infant samples of 10 minutes each, focal-mother samples of 10 minutes each and *ad libitum* scans (which focused on male-infant interactions, inter-female aggression, female-female grooming bouts and adult heterosexual behavior). A total of 13.28 focal-infant observation hours, 13.40 focal-mother observation hours and 3.5 *ad lib* observation hours were accumulated. During sampling, all interaction involving the focal subject and all group members was recorded sequentially.

Because only one adult male resided in each breeding group, including the study group, all progeny in these harem units were the biological offspring of the resident male; hence it is valid in this case to speak of "paternal" behavior.

### Results

All paternal behavior observed occurred after infants were at least one month old. The kinds of paternal behaviors observed between the infants' second and third months of life included: non-specific contact, grooming, clutching/cuddling and retrieval (Table 1). In over

Table 1. Distribution of Paternal Behaviors Among Individual Infants

INFANT	SEX	PATERNAL BEHAVIORS			
		Non-specific Contact	Grooming	Clutching/ cuddling	Retrieval
#728	M	0	1	1	2
#722	M	1	1	0	0
#703	M	0	0	0	0
#718	M	1	0	0	0
#734	F	0	0	0	0

29 total observation hours, only seven encounters between the male and his offspring were observed, accounting for less than one percent of total observation time (about 65 seconds duration of all summed male-infant interactions).

While the frequency of male-infant interaction was quite small, male #242 directed a majority (57%) of his paternal interactions to one (#728) of the five infants in the group (Table 1). Small sample size notwithstanding, it is important to note that infant #728 was the offspring of the highest ranking female in the group, and that infant #722 (who received the second greatest paternal interest) was the offspring of the second highest ranking female.

The appearance of differential male interest in infants is supported by the pattern of male choice observed during one of the retrieval episodes as described below, from edited observation notes:

Infant #728 climbed to the top of the wire at the front of the cage. After a five-minute interval, he began hooting and screeching, and looking toward his mother (#392). She continued to groom another female, making no overt sign of recognition of the infant's vocalizations. After 4 minutes had elapsed, the male (#242) retrieved the infant, returning with him to an upper perch. The infant stopped vocalizing. Male and infant remained in ventral contact with one another while sitting on the perch. After 30 seconds, the infant was released by the male and climbed up the wire at the front of the cage. Once again, the infant began vocalizing and the male retrieved him a second time.... On the same day, infant #734 began exploring the front of the cage. She climbed to the top and began vocalizing. Her mother glanced at her several times but made no effort to retrieve her. Male #242, seated on the perch between the infant and her mother, made no overt sign that he was aware of the infant's presence. After four minutes of vocalizing, following the male's movement to another part of the cage, the mother (#399) retrieved the infant.

The overall degree of maternal restrictiveness and permissiveness appeared to be an important variable affecting the degree to which the male interacted with infants. Maternal restrictiveness may have been partially responsible for the lack of interactions with the male during the first month of the infants' life. The distribution of maternal contact and retrieval behavior (maternal dependent behaviors) and infant explorative and non-maternal contact behavior (maternal independent behaviors), provides a measure of maternal permissiveness/restrictiveness. Female #392 appeared to be the most permissive female (86% maternal dependent behavior (mdb) vs 14% maternal independent behavior (mib), while female #393 (94% mdb vs 6% mib) and female #395 (95% mdb

vs 5% mib) were moderately permissive and females #399 (97% mdb vs 3% mib) and #400 (100% mdb) were restrictive. The degree of infant involvement with the male is concordant with the degree of maternal permissiveness derived from the above computation.

#### Discussion

From these data it would appear that male cynomolgus monkeys are essentially uninvolved with infants, at least in the early months of their lives. These observations are generally consistent with the pattern of male-infant interaction in this species reported by others. However, it should be kept in mind that the behavior seen in our study group may be partially biased by small sample size (one group, less than 30 observation hours). Also, the age of the infant and maternal restrictiveness may be contributing factors in the low incidence of paternal behavior. For example, non-systematic observations of other harem units at our Center have shown that males may carry ventrally an older (6+ months) infant for up to 15 minutes. It may be too that there are substantial inter-male differences in the extent of their paternal activities.

#### References

- Angst, W. Basic data and concepts on the social organization of *Macaca fascicularis*. In L. A. Rosenblum (Ed.), *Primate Behavior* (Vol. 4). New York: Academic Press, 1975. Pp. 325-388.
- Angst, W., & Thommen, D. New data and a discussion of infant killing in Old World monkeys and apes. *Folia Primatologica*, 1977, 27, 198-229.
- Deag, J. M., & Crook, J. H. Social behaviour and "agonistic buffering" in the wild Barbary macaque, *Macaca sylvana*. *Folia Primatologica*, 1971, 15, 183-200.
- Gifford, D. P. The expression of male interest in the infant in five species of macaque. *Kroeber Anthropological Papers*, 1967, 36, 32-40.
- Hrdy, S. B. Care and exploitation of nonhuman primate infants by con-specifics other than the mother. In J. S. Rosenblatt, R. A. Hinde, E. Shaw, & C. Beer (Eds.), *Advances in the Study of Behavior* (Vol. 6). New York: Academic Press, 1976. Pp. 101-150.
- Itani, J. Paternal care in the wild Japanese monkey, *Macaca fuscata fuscata*. *Primates*, 1959, 2 [1], 61-93.
- Lindburg, D. G. The rhesus monkey in North India. In L. A. Rosenblum (Ed.), *Primate Behavior* (Vol. 2). New York: Academic Press, 1971. Pp. 1-106.
- Mitchell, G. D. Paternalistic behavior in primates. *Psychological*

*Bulletin*, 1969, 71, 399-416.

- Redican, W. K. A longitudinal study of behavioral interactions between adult male and infant rhesus monkeys (*Macaca mulatta*). Unpublished Ph.D. dissertation. University of California, Davis, 1975.
- Redican, W. K. Adult male-infant interactions in nonhuman primates. In M. E. Lamb (Ed.), *The role of the father in child development*. New York: Wiley, 1976.
- Shirek-Ellefson, J. Visual communication in *Macaca irus*. Unpublished Ph.D. dissertation, University of California, Berkeley, 1967.
- Taub, D. M. Aspects of the biology of the wild Barbary macaque (Primates, Cercopithecinae, *Macaca sylvanus* L 1758): Biogeography, the mating system and male-infant associations. Unpublished Ph.D. dissertation, University of California, Davis, 1978.
- Taub, D. M. Dynamics of male care-taking behavior among wild Barbary macaques. Meeting of the American Association of Physical Anthropologists, San Francisco, April, 1979.
- Thompson, N. S. Some variables affecting the behavior of irus macaques in dyadic encounters. *Animal Behaviour*, 1967, 15, 307-311.
- de Waal, F., Van Hooff, J., & Netto, W. An ethological analysis of types of agonistic interaction in a captive group of Java-monkeys (*Macaca fascicularis*). *Primates*, 1976, 17, 257-290.
- Washburn, S., & Hamburg, D. Aggressive behavior in Old World monkeys and apes. In P. Jay (Ed.), *Primates*. New York: Holt, Rinehart and Winston, 1968. Pp. 458-478.
- Wheatley, B. P. The behavior and ecology of the crab-eating macaque (*Macaca fascicularis*) in the Kutai Nature Reserve, East Kalimantan, Indonesia. Unpublished Ph.D. dissertation, University of California, Davis, 1978.

\*

\*

\*

## MALAYSIA EXPECTED TO ANNOUNCE BAN ON EXPORT OF PRIMATES

While we have not seen an official announcement as yet, we have heard from several sources that the Malaysian government will soon place a ban on the export of nonhuman primates for at least two years. The Malaysian newspaper article reproduced below also indicates that this will be the case. No official reason for the impending ban has been given yet. Rumor has it that, in addition to the considerations mentioned in the newspaper article, it is partly related to negative publicity in the Malaysian press about radiation research in the United States by the military. Malaysia is one of the suppliers of cynomolgus monkeys (*Macaca fascicularis*) which some research workers are using in place of rhesus monkeys (*M. mulatta*), export of which was banned by the Indian government some time ago. Our information is that this ban by itself will probably not seriously curtail supplies of cynomolgus monkeys for biomedical research in the United States, but similar bans on export by countries such as the Philippines and Indonesia could virtually wipe out supply of these animals. Since this is one of the few readily obtainable nonhuman primate species that is serving as a general purpose research animal, such an event could have serious consequences for non-human primate research.

It would be useful to have some idea to what extent investigators in the United States are relying on cynomolgus monkeys to carry out their research and readers are requested to contact the Editor of this *Newsletter* about this matter.

### Malaysian Newspaper Article.

Kuala Lumpur, Wed.--The government is taking steps to ban the export of the long-tailed macaque or crab-eating monkey for two to three years.

The Director-General of Wildlife and National Parks, Peninsular Malaysia, Encik Mohamad Khan bin Momin Khan, said here yesterday that the Science, Technology and Environment Ministry had approved the proposal for the ban which his department had submitted in October last year.

He said his department was now drafting the law which would be ready in a couple of months.

"It is high time that we give the protected species a break," he said. "Since 1955 when the macaque was made a reserved animal, these monkeys have been captured and exported ceaselessly."

Encik Mohamad said Thailand had banned the export of all primates since March, 1976. India banned the export of the rhesus monkeys in early 1978 and Bangladesh did the same in early 1979.

"We suspected that with the ban by other countries, importers

would concentrate on Malaysia.

"Our fears were proved right when the export of monkeys increased tremendously last year compared with the previous two years."

In 1977, Encik Mohamad said, 6,200 local monkeys were exported while in 1978 the figure was 15,400.

The department did not have exact figures of the macaque population in Peninsular Malaysia, he added.

"The macaques are prolific breeders. But there's always the possibility that they will become an endangered species if their export remains uncurtailed."

Encik Mohamad said the Wildlife Department would study the situation from time to time and would prolong the ban if necessary.

He said the department had enough wildlife rangers to enforce the ban.

At present, the Wildlife Department in the various states issues licences for the capture of between 20 and 100 macaques, he said.

Encik Mohamad also refuted a recent report that indiscriminate deforestation would destroy the monkeys' habitat. [From the *Straits Times*, February 15, 1979.]

\*

\*

\*

#### WORKSHOP ON THE CONSERVATION OF THE ORANGUTAN TO BE HELD IN ROTTERDAM

A two-day workshop on the conservation of the orangutan will be held in Rotterdam on October 15 & 16, 1979. It is being organized by the Gerrit Jan Mulder Foundation of the Erasmus University and by the Royal Rotterdam Zoological and Botanical Gardens. This workshop is intended to bring together all currently available scientific knowledge on the orangutan with a view to promoting its conservation in the wild and improving its reproduction in captivity. The topics for discussion will include: morphology, neuro-anatomy, behavior in the wild and in captivity, infant development, learning ability, breeding in captivity, reproductive physiology, and veterinary problems. A round table discussion on the conservation of the orangutan is also included in the program. Individuals who are interested in participating in the workshop should contact the Gerrit Jan Mulder Foundation (c/o Dr. M. de Vlieger, Academisch Ziekenhuis Rotterdam "Dijksicht," Dr. Molenwaterplein 40, Rotterdam) or the Royal Rotterdam Zoological and Botanical Gardens (Dr. L. E. M. de Boer, Biological Research Department, Van Aerssenlaan 49, Rotterdam).



## GIARDIASIS IN APES AND ZOO ATTENDANTS

An outbreak of giardiasis involving clinical disease in 3 zoo attendants, 2 gibbons, 2 chimpanzees, a gorilla, and an orangutan occurred at the animal nursery building of the Kansas City Zoo in the summer of 1978. *Giardia* cysts, species undetermined, were observed in the feces of the apes and their attendants. The zoo attendants were treated with metronidazole, 750 mg daily for 2 weeks. The apes were started on metronidazole, 250 to 1,000 mg daily; however, administration proved extremely difficult, so treatment was suspended after 3 days.

The index case, a 7-year-old male gibbon was removed from display on July 5, 1978, for management reasons. While confined at the nursery building, this animal had several episodes of loose stools. On July 13 a woman attendant began having loose stools in which *Giardia* cysts were identified. By the first week of August another woman attendant, a 2-year-old organutan, a 2-year-old female gorilla, and two 2-year-old chimpanzees, a male and a female, were experiencing diarrhea and vomiting. *Giardia* cysts were recovered from the feces. Another woman attendant and an 11-month-old gibbon became ill in mid-August.

Epizootiologic investigation revealed that all the gibbons that had been displayed with the index case also were shedding *Giardia* cysts. The 4 asymptomatic attendants of these animals were given metronidazole therapy. As a result of this finding, it was felt that the index case introduced the *Giardia* into the nursery, where a breakdown in hygienic procedures led to the spread between apes and attendants. Changes in personal hygiene practices for the attendants and the nursery apes have been instituted. Despite the fact that the apes were not adequately treated for giardiasis, there had been no additional episodes of illness in these animals or their attendants as of January 1, 1979. (Source: J. Armstrong, BS, MTASCP, R. E. Hertzog, DVM, Kansas City Zoo; R. T. Hall, MD, Childrens Mercy Hospital; G. L. Hoff, Ph.D., Health Department, Kansas City, Missouri.)

*CDC Editorial Note: Giardia*, once considered a harmless parasite of man and animals, is now recognized as a pathogen. Clinical illness following *Giardia* infection is well documented in both the medical and veterinary medical literature. One should not lose sight of the fact, however, that *Giardia* infection does not always cause illness; many persons remain completely asymptomatic throughout a *Giardia* infection and animals frequently show no signs. Why some individuals become ill and others remain asymptomatic remains a mystery, but the message is clear: finding *Giardia* cysts in the stool of a patient with diarrhea cannot be considered *prima facie* evidence that the parasite is the cause of illness. Careful assessment of the clinical symptoms and signs together with appropriate cultures to exclude bacterial (enteropathogenic *E. coli*, *Campylobacter*, *Yersinia*) and viral (rotavirus) infections are necessary to establish a definitive diagnosis.

This report provides suggestive evidence of fecal-oral transmission of *Giardia* between apes and their attendants. Although, most parasitology textbooks indicate that *Giardia* is host specific, collaborative studies between the Center for Disease Control, Environmental Protection Agency, and Wild Animal Disease Center at Colorado State University clearly show that some species of *Giardia* are infective for and produce clinical disease in a variety of animals including humans. These studies leave little doubt about the zoonotic potential of *Giardia*. The largest outbreak of giardiasis in humans attributed to an animal source occurred in Camas, Washington, in 1976. Epidemiologic investigation implicated water as the vehicle of transmission, but no human source of water contamination could be identified. A survey of wild animals in the watershed area revealed several infected beavers. Some of the beavers were taken alive to Colorado State University for cross-transmission experiments using SPF beagle pups. *Giardia* cysts from the beavers were morphologically identical to those obtained from humans in the outbreak and were as infective for pups as *Giardia* of human origin. [From *CDC Veterinary Public Health Notes*, January, 1979, pp. 7-8.]

\*

\*

\*

#### INFORMATION SOUGHT ON DIFFERENCES BETWEEN WILD-CAUGHT AND CAPTIVE-BRED PRIMATES WHEN USED IN EXPERIMENTS

At a recent meeting of the Interagency Primate Steering Committee, it was reported that investigators have observed differences in wild-caught and captive-bred monkeys when employed experimentally. Mention was made especially of behavioral differences, but it was suggested that physiological variations may also exist. In addition, although these observations have been for rhesus, the same may well be true for other species.

The Steering Committee has referred this question to the *Laboratory Primate Newsletter* with the suggestion that the question might be brought to the attention of its readers. With increasing reliance on captive-bred animals for use in research a virtual certainty, the question is clearly a crucial one. Readers with information pertaining to this matter are requested to contact the Editor of this *Newsletter*. While we would be interested in hearing about suggestive data, we would prefer to avoid evidence of an anecdotal nature.

\*

\*

\*

## MONKEYPOX IN A HUMAN IN WEST AFRICA

A 35-year-old man from Omifounfoun Village in Oyo State, Nigeria, developed a rash on November 24, 1978. On December 5 he went to the hospital in Parakou town, Borgou Province, Benin, where medical authorities suspected smallpox or monkeypox. They immediately placed the patient in isolation and took specimens for laboratory analysis. Typical pox-virus particles were seen on electron microscopic examination by the World Health Organization (WHO) Collaborating Center at CDC on December 24, and monkeypox virus was isolated on December 27.

Although the patient's residence is in the Republic of Benin, he reportedly had been visiting in Nigeria for 2 months before the onset of rash. He had no smallpox vaccination scar. There have been no secondary cases reported in Benin. Joint Benin/WHO and Nigeria/WHO investigations are in progress.

*CDC Editorial Note:* Besides this case, 35 cases of monkeypox in humans have been reported from West and Central Africa since 1970; 27 have occurred in Zaire, 4 in Liberia, 2 in Nigeria, and 1 each in the Ivory Coast and Sierra Leone. Twenty-eight cases have been in children 9 years of age or younger. Six patients have died.

The disease is clinically indistinguishable from smallpox. The most important epidemiologic difference between the two is that monkeypox transmits poorly between humans; in only 2 instances has possible secondary transmission occurred in the same family. Among susceptible family members, the monkeypox secondary attack rate is less than 4%, in comparison to 30%-45% for smallpox.

Thirty-two of the 36 people with monkeypox had never been vaccinated. (Smallpox vaccination protects against monkeypox.) However, since over 50% of children in the areas reporting monkeypox are susceptible to smallpox, the absence of more monkeypox cases is yet another indication that the disease is rare and not very contagious.

Monkeypox virus is an orthopoxvirus that differs from variola virus in several biological characteristics. The source of human monkeypox is unknown, but it is thought to be a zoonosis. The virus was associated with 10 outbreaks in nonhuman primates among captive monkey colonies in European and North American laboratories between 1958 and 1968. Special study groups convened by WHO in 1973, 1976, and 1978 have concluded that monkeypox is not a public health problem. They have recommended that the epidemiology and ecology of this disease be further defined. [From *CDC Morbidity and Mortality Weekly Report*, 1979, 28, 135-136.]

\*

\*

\*

## NIH ISSUES NEW ANIMAL CARE AND USE GUIDELINES

The National Institutes of Health (NIH) recently issued (*NIH Guide for Grants and Contracts*, Volume 7, Number 17, November 10, 1978, pp. 1-8) a revised policy on Responsibility for Care and Use of Animals. The policy became effective on January 1, 1979. It assigns responsibility for humane care and use of animals under NIH grants, contracts, and other awards, and describes requirements and procedures to fulfill these responsibilities. The following specific points are included in the new policy:

Humane care and use of animals in NIH-awarded projects is the responsibility of investigators and the institution receiving an award.

Before receiving NIH awards for projects in which animals or animal facilities are used, the grantee or contractor institution must submit to the Office for Protection from Research Risks (OPRR), Office of the Director, NIH, an assurance that accepts responsibility for humane care and use of animals in projects awarded by the NIH. Further, the institution must assure commitment to comply with the Principles for Use of Animals (contained within the new NIH policy), the "Guide for the Care and Use of Laboratory Animals," the provisions of the Animal Welfare Act, and other applicable laws and regulations.

Each institution shall appoint and maintain an institutional committee to maintain oversight of its animal facilities and procedures. The committee should be composed of at least five members who are knowledgeable regarding the care and use of animals in research, including at least one veterinarian. The names, position titles, and credentials of the committee members will be provided to OPRR and changes in membership will be reported annually to OPRR by the institution.

Each institution shall establish a mechanism to review its animal facilities and procedures for compliance with the provisions of the new policy. Accreditation by the American Association for Accreditation of Laboratory Animal Care (AAALAC) is the best means of demonstrating conformance to those provisions. An alternative to AAALAC accreditation is review, at least annually, of animal facilities and procedures by the institution's committee.

The awardee institution shall maintain records of committee activity, or accrediting body determinations. These records shall be available for inspection by the OPRR or other HEW-authorized representatives.

If the institution's committee or the OPRR determines that the institution is not in conformance to the 'Guide,' an annual report to OPRR indicating progress toward full conformance will be required.

Grant applications and contract proposals shall indicate whether animals are involved in the proposed activity and should state the rationale for using animals. Information should be provided to confirm that the species and numbers of animals are appropriate, that unnecessary

discomfort and injury to animals will be avoided, and that analgesic, anesthetic, and tranquilizing drugs will be used where indicated to minimize stress to the animals.

Review of individual proposals or projects by the institution's committee (or appropriate administrative review) is encouraged but not required. Proposals being reviewed by NIH may be referred to the committee of the applicant institution for review of apparent or potential violation of the Principles or any part of this policy. Approval of the committee will not be required but their findings will be reported to the NIH.

Copies of the policy may be obtained from the OPRR, NIH (Attn. Dr. Roy Kinnard), Room 303, Westwood Building, 5333 Westbard Avenue, Bethesda, MD 20205. [The information in this note is based in part on the original material in the issue of the NIH *Guide* mentioned above and in part on a summary of it in *AAALAC Activities Report*, Vol. 7, December 31, 1978, pp. 1-2.]

\*

\*

\*

#### SYMPOSIUM ANNOUNCEMENT: THE USE OF NONHUMAN PRIMATES IN VISION RESEARCH

The second in a series of symposia on the Use of Nonhuman Primates is now planned for January 27-30, 1980, to be held in San Antonio, Texas, at the Plaza Nacional Hotel. This symposium is sponsored by the Southwest Foundation Forum and the National Eye Institute (NIH). Attendance is limited to 150 interested investigators. The program includes:

1. Organization of Visual System--Retina (Anatomy and Physiology), Lateral Geniculate N., Superior Colliculus, Visual Cortex, Oculomotor, Psychophysics, Cornea, and Lens.
2. Experimental Pathology--Retinal and Vitreous Diseases, Corneal Diseases, Aqueous Dynamics, Glaucoma, Deprivation and Amblyopia, Tumors of the Eye, Effect of Nutrition on the Eye.

Guest lecturers have been invited to provide 30-40 minute overviews of these subjects. Participants wishing to provide informal discussions (10 min.) on pertinent subjects may submit a title and short abstract by September 1, 1979. A registration fee of \$50.00 includes, in addition to attendance at the symposium, two lunches and one dinner. Those interested in participating may contact: S. S. Kalter, Ph.D., Organizing Secretary, Director, Dept. of Microbiology and Infectious Diseases, Southwest Foundation for Research and Education, P. O. Box 28147, San Antonio, TX 78284.

\*

\*

\*

LABORATORY PRIMATE NEWSLETTER QUARTERLY SURVEY:  
FIRST QUARTER 1978

The present report is one of a series summarizing data from the quarterly surveys being conducted by the *Laboratory Primate Newsletter*. The data in Tables 1 and 2 are based on reports from the following facilities: California, Delta, Washington (including the Field Station), Wisconsin, and Yerkes Regional Primate Research Centers, Laboratory for Experimental Medicine and Surgery in Primates (LEMSIP), National Institutes of Health (includes both the Primate Quarantine Unit and the Primate Research Units), and the Southwest Foundation for Research and Education. (See the October, 1978 issue for the previous survey report.)

TABLE 1. MORTALITY SUMMARY BY SYSTEM: JAN. 1-MAR. 30, 1978

SPECIES	Generalized	Integumentary	Musculoskeletal	Respiratory	Cardiovascular	Digestive	Urogenital	Nervous	Endocrine	Neoplasia	Trauma	Unspecified
<i>Pan troglodytes</i>								1				2
<i>Pongo pygmaeus</i>	1											
<i>Macaca arctoides</i>	1				1	6					2	2
<i>M. fascicularis</i>						1						
<i>M. mulatta</i>	2			29 <sup>b</sup>	1	27	4	1			12	19
<i>M. nemestrina</i>	7			10		19	1	1	1		17	1
* <i>M. nigra</i> <sup>a</sup>	1					1						
<i>M. radiata</i>					1	1		1				3
<i>Erythrocebus patas</i>				1		1						
<i>Cercocebus atys</i>	1			2								
<i>Cercopithecus aethiops</i>				2								
<i>Presbytis cristata</i>											5	
<i>Papio cynocephalus</i>				1								
<i>P. hamadryas</i>											1	
<i>P. papio</i>	22			1		4					2	42
<i>P. spp.</i>				1								
<i>Saimiri sciureus</i>	2				2	2					1	1
<i>Cebus spp.</i>											2	9
<i>Saguinus mystax</i>	2			5		2					1	
<i>S. spp.</i>	2											2
TOTALS	41	0	0	52	5	64	5	4	1	0	43	81

<sup>a</sup> also referred to as *Cynopithecus niger*

<sup>b</sup> Includes 14 with tuberculosis

TABLE 2. CENSUS, NUMBER OF BIRTHS, AND MORBIDITY SUMMARY BY SYSTEM:  
JAN. 1-MAR. 30, 1978

SPECIES	Census	Births	Generalized	Integumentary	Musculoskeletal	Respiratory	Cardiovascular	Digestive	Urogenital	Nervous	Endocrine	Neoplasia	Trauma	Unspecified
<i>Gorilla gorilla</i>								1						
<i>Pan troglodytes</i>	291	8	4			10	4	6					2	
<i>Pongo pygmaeus</i>	35	1				3		22						
<i>Hylobates</i> spp.													1	
<i>Macaca arctoides</i>	208	4		2	4			90					15	1
<i>M. fascicularis</i>	256	5	1	1		1		3	1				2	2
<i>M. fuscata</i>													1	
<i>M. mulatta</i>	5589	114	19	86	34	78 <sup>b</sup>	4	279	45	16	2		121	44
<i>M. nemestrina</i>	1158	73	11	3	3	8	73	7		1			36	11
* <i>M. nigra</i> <sup>a</sup>	19	2						1		1				
<i>M. radiata</i>	287	6	3	7	11	2		48	7	4			5	1
<i>M. hybrids</i>		1	1	1									3	
<i>Erythrocebus patas</i>	104		1	1				3					5	2
<i>Cercocebus atys</i>	51		3	3	4								2	
<i>Cercopithecus aethiops</i>	42	1		2	2								3	
<i>Presbytis cristata</i>								3						
<i>Papio cynocephalus</i>	128	5	1			4		6	1					2
<i>P. hamadryas</i>	110	4												
<i>P. papio</i>	38	3						2	2					
<i>P. spp.</i>	1662	83	34					11					98	8
<i>Mandrillus sphinx</i>			4		4									
<i>Saimiri sciureus</i>	573	1	5	3	2	1	1	7		1			19	2
<i>Cebus apella</i>	39	1												
<i>Callithrix jacchus</i>	46	10												
<i>Saguinus mystax</i>	149	2		2				1		1			1	3
<i>S. oedipus</i>	54													
<i>S. spp.</i>	40	3												
TOTALS	10,878	327	87	111	64	107	82	490	56	24	2	0	314	76

<sup>a</sup> also referred to as *Cynopithecus niger*

<sup>b</sup> Includes 14 tuberculin reactors

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

Books

*Sensory Systems of Primates.* Charles R. Noback (Ed.) New York: Plenum, 1978. 207 pp. [Price: \$25.00]

This is another volume in the *Advances in Primatology* series being edited by W. P. Luckett and C. R. Noback. Contents: Structural organization and communicatory functions of olfaction in nonhuman primates, by G. Epple & D. Moulton. Physical and physiological principles controlling auditory sensitivity in primates, by S. M. Khanna & J. Tonndorf. The anatomical organization of the primate auditory pathways, by N. L. Strominger. Vocal communication in primates, by L. M. Eisenman. Structural and functional aspects of the superior colliculus in primates, by R. P. Pentney & J. R. Cotter. Parallel pathways connecting the primate superior colliculus with the posterior vermis: An experimental study using autoradiographic and horseradish peroxidase tracing methods, by J. T. Weber & J. K. Harting. The organization of visual cortex in primates, by J. H. Kaas. The relevance of endocasts for studying primate brain evolution, by R. L. Holloway.

*Social Play in Primates.* Euclid O. Smith (Ed.) New York: Academic Press, 1978. 324 pp. [Price: \$18.00]

Contents: A historical view of the study of play: Statement of the problem, by E. O. Smith. Sex differences in the acquisition of play among juvenile vervet monkeys, by C. A. Bramblett. The behavior of gonadectomized rhesus monkeys. I. Play, by J. Loy, K. Loy, D. Patterson, G. Keifer, & C. Conaway. Social play in rhesus macaques (*Macaca mulatta*): A cluster analysis, by E. O. Smith & M. D. Fraser. Ethological studies of play behavior in captive Great Apes, by T. Maple & E. L. Zucker. Functions of primate play behavior, by F. E. Poirier, A. Bellisari, & L. Haines. The function of adult play in free-ranging *macaca mulatta*, by J. A. Breuggeman. The question of function: Dominance and play, by D. Symons. Reinforcement theories of exploration, play, creativity, and psychosocial growth, by J. D. Baldwin &

---

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



J. I. Baldwin. Object-play: Test of a categorized model by the genesis of object-play in *Macaca fuscata*, by D. K. Candland, J. A. French, & C. N. Johnson. A longitudinal study of social play in Synanon/peer-reared children, by K. H. Hamer & E. Missakian.

*Play and Aggression: A Study of Rhesus Monkeys.* Donald Symons. New York: Columbia University Press, 1978. 246 pp. [Price: \$20.00]

Contents: Introduction: The concept of function. Materials and methods. Description of rhesus aggressive play. Aggressive play in C group. The structure and function of playchasing and play above the ground. The structure and function of playfighting. Play and the development of skill. Play, learning, and behavioral innovation. Aggression and play. Speculations on play, sports, and war. Other considerations, summary, and conclusions. Appendix 1. Examples of aggressive play. Appendix 2. Calculation of expected values.

*Biology and Behaviour of Marmosets. Proceedings of the Marmoset-Workshop, Göttingen, September 2-5, 1977.* H. Rothe, H.-J. Wolters, & J. P. Hearn (Eds.) Göttingen: Published by H. Rothe, 1978. Soft cover. 260 pp. [Price: DM 52. Order from Hartmut Rothe, Bürgerstrasse 50, 3400 Göttingen, W. Germany]

#### Disease

Systemic pathology of chimpanzees. Schmidt, R. E. (Comp. Pathol. Br., USAF Sch. of Aerospace Med., Brooks Air Force Base, TX 78235) *Journal of Medical Primatology*, 1978, 7, 274-318.

Spontaneous lesions in chimpanzees have been described according to the organ system involved. These lesions have been reported in the literature or noted in chimpanzees at the 6571st Aeromedical Research Laboratory (ARL), Holloman AFB, N. Mex., over a 15-year period. Some of the lesions seen at the ARL were the result of overt clinical disease, while others represent incidental findings, the significance and genesis of which were often obscure. Conditions involving the gastrointestinal tract, especially parasitic diseases, have been and continue to be of the highest frequency, with disorders involving the cardiovascular system next. Infectious diseases have been infrequent, especially in the stabilized colony, and neoplastic conditions have not been seen.

Tuberculosis outbreak in rhesus monkeys immunosuppressed with anti-thymocyte globulin. Fox, J. G., Murphy, J. C., Esser, R. E., Delmonico, F. L., & Cosimi, A. B. (Mass. Inst. of Technol., 37 Vassar St., Cambridge, MA 02139) *Journal of Medical Primatology*, 1978, 7, 264-273.

Tuberculosis lesions were found in necropsied monkeys used in studies involving immunosuppression. Correlations were made between the demonstration of reduced numbers of circulating T cells, the duration of allograft survival and the appearance of T cell-

dependent tuberculin sensitivity. The immunosuppressed state of these monkeys may have resulted in false tuberculin reactions. The report confirms the necessity for sequential tuberculin tests on rhesus monkeys prior to their being used in experiments.

Mycotoxicoses in laboratory animals: Nonhuman primates. Carlton, W. W. & Szczech, G. M. (Dept. Vet. Microbiol. & Pathol., Purdue Univ. Sch. of Vet. Med., West Lafayette, IN 47907) In T. D. Wyllie & L. G. Morehouse, (Eds.), *Mycotoxic fungi, mycotoxins, mycotoxicoses: An encyclopedia handbook*, Vol. 2. New York: Dekker, 1978. Pp. 407-414.

One section of this chapter deal with nonhuman primates. They have not been used extensively in studies of mycotoxic diseases, and most of the studies undertaken have been concerned with the acute toxicity and carcinogenicity of the aflatoxins. Other mycotoxins studied in simians include sterigmatocystin, mycophenolic acid, and the toxin of *Penicillium citreo-viride* Biourge. This section includes 36 references.

The isolation of herpesvirus from trigeminal ganglia of normal baboons (*Papio cynocephalus*). Kalter, S. S., Weiss, S. A., Heberling, R. L., Guajardo, J. E., & Smith, G. C., III. (Southwest Found. for Res. & Ed., PO Box 28147, San Antonio, TX 78284) *Laboratory Animal Science*, 1978, 28, 705-709.

A herpesvirus was isolated from the trigeminal ganglia of 3 of 6 normal baboons. This virus possessed the virologic characteristics of SA8, a herpesvirus known to be indigenous to the baboon.

Galvanized caging as a potential factor in the development of the "fading infant" or "white monkey" syndrome. Obeck, D. K. (Vet. Sci. Div., USAF Sch. of Aerospace Med., Brooks AFB, TX 78235) *Laboratory Animal Science*, 1978, 28, 698-704.

Four rhesus females and their infants were kept in galvanized enclosures, and three were kept in stainless steel caging. All 4 offspring in the galvanized enclosures developed achromotrichia, alopecia, and weakness that varied from moderate to severe while the 3 infants in stainless steel cages were clinically normal. Plasma copper, zinc, and iron values as well as liver copper and zinc values of the infants were compared for the two types of caging. Plasma copper values were significantly lower ( $p < 0.001$ ) in the animals housed in galvanized cages. Plasma zinc and liver zinc levels were significantly elevated in these same animals ( $p < 0.01$  and  $p < 0.05$ , respectively). Significant differences were not detected in liver copper values in the two groups of infants. Copper and zinc levels in the dams' plasma and milk were not statistically different between the two groups.

#### Physiology and Behavior

Diet and serum lipid response of seven species of *Ceropithecus* monkeys: A preliminary study. Bramblett, C. A., Coelho, A. M., Jr., McGill, H. C.,

Jr. (Dept. Anthropol., U. Texas, Austin, TX 78712) *Primates*, 1978, 19, 795-800.

Four social groups of *Cercopithecus* monkeys, including *aethiops*, *cephus*, *diana*, *mitis*, *mona*, *neglectus*, and *petaurista* (48 individuals), were fed a diet containing 0.68 mg cholesterol per kcal. Blood samples were analyzed for serum cholesterol and triglycerides. Elevations in serum cholesterol appear to be individualistic and exhibit only slight differences between species and social groups.

Determination of age in the Japanese monkey from growth layers in the dental cementum. Wada, K., Ohtaishi, N., & Hachiya, N. (Prim. Res. Unit, Kyoto Univ., Inuyama, Aichi 484, Japan) *Primates*, 1978, 19, 775-784.

The teeth of 14 Japanese monkeys (*Macaca fuscata*) were examined to establish an exact method of determining age by histological observation of dental cementum. The cementum showed annual growth layers, which were especially remarkable in the incisor root and in the molar cementum deposited at the junction of the roots. The layer of cementum formed in winter appears as a dark layer in stained sections and as a translucent layer in unstained ground sections. In the incisor the first dark and light layers are formed at the age of three years, whereas in the molar they do not appear at a definite age. The layers are thick and clear in the upper medial incisor. A method of determining the age of Japanese monkeys using this information is described.

Infant behaviors in mother-reared and harem-reared baboons (*Papio cynocephalus*). Young, G. H. & Hankins, R. J. (Dept. of Anthropol., St. U. of NY Coll. at Oneonta, Oneonta, NY 13820) *Primates*, 1979, 20, 87-93.

Seven groups of socially living baboons between the ages of 0 and three months were observed. Six groups were harems containing one adult male (the biological father), the nursing mothers and their infants, and adult females without offspring. The other group consisted only of nursing mothers and their infants. All 7 groups were housed in identical outdoor enclosures 45m x 27m x 23m. Fourteen behavioral categories were tested. The hypothesis that behavioral sex differences in infant baboons are influenced by the presence of an adult male was not supported by the test results. Sex differences were not detected in either the mother-reared infants or in harem-reared infants. Mother-reared infants (n=13) had significantly greater scores for contact aggression and non-contact aggression categories, whereas harem-reared infants (n=12) scored significantly higher for locomotion, non-aggressive social behaviors, exploration, and rough-and-tumble play.

Pubertal age, weight, and weight gain in the individual female New World monkey (*Cebus albifrons*). Wilen, R. & Naftolin, F. (Dept. Obs. & Gyn., McGill Univ., Royal Victorial Hosp. Women's Pavilion, 687 Pine Av. West, Montreal, Quebec, Canada H3A 1A1) *Primates*, 1978, 19, 769-774.

From February 1972 to August 1974 10 immature *Cebus albifrons* monkeys were weighed and vaginal swabbing performed at monthly or shorter intervals to determine age and weight at the onset of puberty. The average weight ( $\pm$  S.E.M.) at birth and at puberty was  $226 \pm 5.8$  g and  $1,617 \pm 32.45$  g, respectively. The average age at puberty was  $3.59 \pm 0.17$  years. The average weight velocity for all 10 monkeys shows the maximum rate of weight gain to occur shortly after birth and decrease rapidly to its smallest prepubertal increment at nine months of age (weaning). From nine months there is a post-weaning weight spurt which reaches its greatest velocity at an average age of 15 months. Thereafter, the weight velocity decreases to its lowest level. Individual weight velocity curves of each of the 10 animals show a slight prepubertal weight spurt which is not obvious in the average growth curve.

The problem of age estimation and skeletal age: A critical review. Michejda, M. (NIH, Primate Res. Unit, Vet. Res. Br., Bethesda, MD 20205) *Journal of Medical Primatology*, 1978, 7, 257-263.

This report discusses the special importance of being able to determine skeletal age of primates. It points out that there are presently no published systematic standards of reference for skeletal age of any species. The author describes a project in progress, the purpose of which is to prepare a radiographic atlas which will consist of a complete set of radiographic standards of skeletal age in *Macaca mulatta*.

#### Pharmacology and Anesthesia

Comparison of ketamine with the combination of ketamine and xylazine for effective anesthesia in the rhesus monkey (*Macaca mulatta*). Banknieder, A. R., Phillips, J. M., Jackson, K. T., & Vinal, S. I., Jr. (Aerospace Med. Res. Lab., Wright-Patterson AFB, OH 45433) *Laboratory Animal Science*, 1978, 28, 742-745.

The addition of xylazine to ketamine hydrochloride was found to enhance analgesia, anesthesia, and muscle relaxation in rhesus monkeys. At 0.10 ml/kg body weight, this combination provided adequate anesthesia for such procedures as cisternal puncture, lumbar spinal puncture, insertion of urinary catheters, finger amputations, and tattooing. The combination of ketamine and xylazine did depress the heart rate, respiration rate, and body temperature more than the administration of ketamine alone. The period of anesthesia also was prolonged, but the monkeys regained consciousness more rapidly at the end of the anesthetic period.

Chemical and physical restraint of nonhuman primates. Cohen, B. J. & Bree, M. M. (Unit for Lab. Ani. Med., Univ. of Michigan Med. Sch., 010 Animal Res. Fac., Ann Arbor, MI 48109) *Journal of Medical Primatology*, 1978, 7, 193-201.

Numerous publications on primate restraint and anesthesiology have appeared in recent years. This reflects the striking growth of

interest in medical primatology and of efforts to improve restraint agents and methods to facilitate humane use of primates in research. For access to earlier literature, readers should consult recent textbooks, reviews on chemical or physical restraint, and other valuable publications on these subjects that have appeared since 1965. This brief review considers publications, principally since 1971, that deal with chemical or physical restraint. Previously unpublished data are presented on the clinical use in primates of CI 744 (Telazol), a new dissociative anesthetic that until recently has been available only for investigational use.

### Breeding

Rectal probe electroejaculation of primates. Gould, K. G., Warner, H., & Martin, D. E. (Yerkes Reg. Pri. Res. Ctr., Emory Univ., Atlanta, GA 30322). *Journal of Medical Primatology*, 1978, 7, 213-222.

The technique of rectal probe electroejaculation has been developed to permit collection of semen using equipment proven safe, simple, and effective on the 30 primate species so far tested. This paper provides information on the construction and operation of this equipment, together with electrical parameters applicable to primate species. Seminal emission or ejaculation occurs in all species when alternating current is delivered at 0.25mA/mm<sup>2</sup> electrode area. The most effective frequency is 20 Hz, and the most acceptable anesthetic is ketamine hydrochloride.

Timing of births and reproductive success in rhesus monkey social groups. Wilson, M. E., Gordon, T. P., & Bernstein, I. S. (Yerkes Reg. Fld. Stat., 2409 Collins Hill Rd., Lawrenceville, GA 30245) *Journal of Medical Primatology*, 1978, 7, 202-212.

Analysis of 6 years of birth records (228 potential reproductive years) from 71 female rhesus monkeys, housed in social groups in outdoor compounds, revealed several variables which influenced the reproductive pattern. The timing of conception in this seasonally breeding species was influenced by age, parity, and reproductive outcome the previous year, but not by social rank. In contrast, high social rank did confer an advantage in higher conception and lower infant mortality rates.

Evaluation of caged mating behavior in *Macaca fascicularis*. Jewett, D. A. & Dukelow, W. R. (Endocrine Res. Unit, Michigan St. Univ., East Lansing, MI 48824) *Journal of Medical Primatology*, 1978, 7, 228-236.

Studies were undertaken to characterize the basic behavioral parameters of a breeding colony of *Macaca fascicularis* under caged conditions. The female Reproduction Performance Index and the Success Ratio were found to correlate with mating behavior relating to cyclicity in females with cycles of less than 30 days. These evaluations proved to be useful in the selection of animals based on sexual vigor.

Urinary chorionic gonadotropin levels in pregnant golden lion tamarins: Preliminary observations. Kleiman, D. G., Gracey, D. W., & Hodgen, G. D.

(Sect. on Endocrinology, Endocrin. & Reprod. Res. Br., NICHD, NIH, Bldg. 18, Rm. 101, Bethesda, MD 20205) *Journal of Medical Primatology*, 1978, 7, 333-338.

We have established the interval over which urinary chorionic gonadotropin can be detected by a radioimmunoassay during pregnancy in the golden lion tamarin. Preliminary findings indicate the potential value of this radioimmunoassay system for (1) diagnosis of pregnancy at about 4 weeks after fertilization; (2) estimation of the expected time of delivery; and (3) identification of individual monkeys having an apparent high risk of spontaneous abortion.

A case of patas-vervet hybrid in captivity. Matsubayashi, K., Hirai, M., Watanabe, T., Ohkura, Y., & Nozawa, K. (Inst. of Pri. Res., Kyoto Univ., Inuyama, Aichi 484, Japan) *Primates*, 1978, 19, 785-793.

A female patas monkey (*Erythrocebus patas*) housed with two males of different species, a Hamadryas baboon (*Papio hamadryas*) and a vervet monkey (*Cercopithecus aethiops pigerythrus*), gave birth to a female offspring in a semi-open enclosure on June 11, 1975. Karyological analyses and electrophoretic examinations were carried out in order to determine the real father of the hybrid. From the results of these observations it was concluded that the father of the hybrid individual was *Cercopithecus aethiops*. Additionally, somatometric and hematological investigations were performed.

Daytime births in captive patas monkeys. Chism, J., Rowell, T. E., & Richards, S. M. (Dept. Anthropol., Univ. Calif., Berkeley, CA 94720) *Primates*, 1978, 19, 765-767.

Daytime births in two patas colonies were the rule rather than the exception.

#### Ecology and Field Studies

Further observations on the golden langur (*Presbytis geei* Khajuria, 1956), with a note to capped langur (*Presbytis pileatus* Blyth, 1843) of Assam. Mukherjee, R. P. (Zool. Survey of India, 8-Lindsay St., Calcutta 700016, India) *Primates*, 1978, 19, 737-747.

In continuation of the field work that was initiated in the summer of 1973 another field trip to the same area of Goalpara district was undertaken in the winter of 1973 and later a survey of Manas sanctuary was made in the winter of 1976 to collect further information about the golden langur. This report incorporates the results of these two field studies and includes such information as the characteristics of the study area, total number of langur groups observed, their size and composition, food items utilized by them during winter months, inter-group and inter-specific relationships, etc. It also includes, incidentally, observations of the capped langur in the Manas sanctuary and remarks on allopatry of distribution of golden and capped langurs in this sanctuary. The range of distribution of golden langurs on the Indian side and present status and future of these monkeys are discussed. The social organization

of the golden langur has been compared with that of other langurs and the concentrations of the former in Jamduar and Raimona forests during the winter months have been compared with those in summer months.

Predatory behavior among wild chimpanzees of the Mahale Mountains. Nishida, T., Uehara, S., & Nyundo, R. (Dept. of Anthropol., Fac. of Sci., U. of Tokly, Hongo, Bunkyo-ku, Tokyo, 113 Japan) *Primates*, 1979, 20, 1-20.

Eighteen predatory and two cannibalistic episodes were observed among wild chimpanzees of the Mahale Mountains. The prey consists mainly of juveniles of medium-sized mammals, 6 species of which were recorded as prey fauna for the first time in this study. Predatory behavior of Mahale chimpanzees seems more opportunistic and primitive than has ever been observed in the Gombe National Park in terms of capture technique, size of prey, cooperation in hunting, sexual difference in capture frequency, degree of consumption and extent of meat sharing.

Foods and feeding behavior of wild black-capped capuchin (*Cebus apella*) Izawa, J. (Japan Monkey Ctr., Kanrin, Inuyama, Aichi, 484 Japan) *Primates*, 1979, 20, 57-76.

The *Cebus apella* observed fed mainly on fruit and insects. Feeding behavior varied according to the kind of food.

*Leontopithecus rosalia chrysopygus* (Mikan, 1823) o Mico-Leão do Estado de São Paulo (Callitrichidae-Primates). Coimbra-Filho, A. F. (Rua Artur Araripe 60/902, Gavea, Guanabara, Brazil) *Silvicultura em S. Paulo*, 1976, 10, 1-36.

This article, written in Portuguese, deals with the golden lion marmoset of the state of Sao Paulo, Brazil. Aspects of taxonomy, habitat, behavior in the wild, and conservation are discussed.

Gorillas--A survey. Cousins, D. (No address given) *Oryx*, 1978, 14, 374-376.

This is the second part of a survey of the status of the three gorilla races made in 1974 and deals with eastern lowland and volcano gorillas. The first part covered the western lowland race, in Nigeria, Cameroon, Gabon, Equatorial Guinea, Cabinda Congo (Brazzaville), and the Central African Republic.

#### Taxonomy

*Hylobates lar* (Linnaeus, 1771), *H. entelloides* (I. Geoffroy St. Hilaire, 1842) and *H. hoolock* (Harlan, 1834), (Mammalia, Hylobatidae): Proposal to place these names on the official list of specific names in zoology. Z.N. (S.) 1884. Groves, C. P. (Dept. of Prehistory & Anthropol., Australian Nat. Univ., Canberra, A.C.T. 2600, Australia) *Bulletin of Zoological Nomenclature*, 1977, 34, 75-79.

Taxonomy and evolution of the *sinica* group of macaques: I. Species and subspecies accounts of *Macaca sinica*. Fooden, J. (Div. of Mammals, Field Museum of Natural History, Roosevelt Rd. at Lake Shore Dr., Chicago, IL 60605) *Primates*, 1979, 20, 109-140.

Based on a study of 116 museum specimens and a review of relevant literature, a new species account of *Macaca sinica*, the Sri Lanka toque macaque, is presented. External and cranial characters of the species are described and analyzed. A summary of natural history of the species includes information on habitats, arboreal-terrestrial preferences, predators, diet, relations with other primate species, density, troop size and composition, home range area, and reproductive biology. Two subspecies of *M. sinica* are recognized, northern *M. s. sinica* (Linnaeus, 1771) and southwestern *M. s. aurifrons* (Pockock, 1931). Geographic ranges of these two sub-species meet in a 50-200 km broad contact zone in which representatives of both subspecific phenotypes are encountered (35 *s. sinica* phenotypes; 8 *s. aurifrons* phenotypes in 43 contact zone specimens examined). An annotated gazetteer of known macaque localities in Sri Lanka provides information concerning available museum specimens and field reports by collectors or observers. Comparative study of three remaining species in the *sinica* group (*M. radiata*, *M. assamensis*, & *M. thibetana*) is in progress.

#### Instruments and Techniques

The "EE-000 Machine"--An apparatus which controls a videotape recorder by detecting specific vocalisations. Humphreys, J. A., Mackintosh, J. H., Chance, R. J., & Chance, M. R. A. (Sub-Dept. of Ethol., The Med. Sch., Edgbaston, Birmingham 15, England) *Primates*, 1978, 19, 761-764.

This paper describes a device for detecting a specific vocalization in *Macaca fascicularis*. It is used to control a videotape recorder and therefore to record behavior following the vocalization. It is activated if two pre-set frequencies occur in a particular order and within a specified time interval. The running time of the VTR is also pre-set and can be varied within wide limits. The circuitry is relatively simple, being based on readily available integrated circuits. In use the machine has proved to be sensitive and to show a high level of specificity.

#### Conservation

The FPS mountain gorilla project--a report from Rwanda. Harcourt, A. H. & Curry-Lindahl, K. (Dept. of Applied Biol., Pembroke St., Cambridge, CB2 3DX, England) *Oryx*, 1978, 4, 316-324.

The basis for the present study was the need for up-to-date information on the situation of the Virunga volcano gorillas in connection with the Fauna Preservation Society's (FPS) plan to launch a major Mountain Gorilla Project to help Rwanda to guard the gorillas and the Parc National des Volcans. The article consists of extracts



from the report of the mission that went to Rwanda to collect the information in question.

\*

\*

\*

#### ADDRESS CHANGES

Edwin J. Andrews  
Vice Pres. of Res. & Dev.  
Hancock Labs., Inc.  
4633 E. LaPalma Ave.  
Anaheim, CA 92807

Harold R. Bauer  
Rockefeller University  
Field Ctr. for Ecol. & Ethol.  
Tyrell Rd.  
Millbrook, NY 12545

Stephen H. Cramlet  
4730 Rocklin Rd.  
Rocklin, CA 95677

Clement C. Darrow, II  
Highway 17M  
Chester Acres  
Chester, NY 10918

Donald D. Holmes  
Dir. of Lab. Ani. Res.  
Coll. Vet. Med.  
Oklahoma State Univ.  
Stillwater, OK 74074

Kenneth R. Kaemerer  
117 Berwyn Rd.  
Pittsburgh, PA 15237

Stephen T. Kelley  
331 S. 24th St.  
Kingsville, TX 78363

James C. S. Kim  
Toxicol. Sect.  
Hlth., Safety & Human Factors Lab.  
Eastman Kodak Co.  
Rochester, NY 14650

Mark R. Ross-Miller  
Analytical Res. Labs., Inc.  
13203 Verdura Ave.  
Downey, CA 90242

L. J. Serrano  
Director of Animal Research  
Frederick Cancer Res. Ctr.  
PO Box B  
Frederick, MD 21701

O. A. Soave  
2315 Eastridge #722  
Menlo Park, CA 94025

Kathleen R. Sommer  
4025 Osby  
Houston, TX 77025