LABORATORY PRIMATE NEWSLETTER

Volume 8, Number 2

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Edited by

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POLICY STATEMENT

The primary purpose of the *Laboratory Primate Newsletter* is to provide information on maintenance, breeding, and procurement of nonhuman primates for laboratory studies. A secondary purpose is to disseminate general information about the world of primate research. Requests for information, for special equipment, or for animal tissues or animals with special characteristics will be included in the *Newsletter*. 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 the mailing list is open to anyone in the primate field expressing an interest. There is no charge for new issues or the current issue. Back volumes will be furnished free of charge to any library operated by a nonprofit organization with the understanding that they will be kept in the library. Individuals may purchase Volumes 1, 2, 3, and 4 for $4.00 per volume, Volumes 5, 6, and 7 for $2.50 per volume, and back issues for the current year for $0.50 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. As a rule, authors of longer articles will receive five extra copies of the issue in which the article appears; 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 reference 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 reference 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), beginning with the April, 1969 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: Kathryn M. Huntington

CONTENTS

THE PRONUNCIATION OF PRIMATE NAMES

Arthur J. Riopelle and Antonio Martinez Fraga

Tulane University

Delta Regional Primate Research Center

We have been surprised often by the variations we hear in the pronunciations of primate names and even more so by the frequency with which these pronunciations, which sound perfectly natural to us, depart from those found in *Webster's* dictionary. Consider, for example, the dictionary pronunciation of langur (lŭng go͞or'), patas (pȧ tä), Cercopithecus (sẽr kō pĭ thē' kŭs). We have also found ourselves equally guilty of mispronouncing some of the most common primate names. Indeed, after recognizing how often we were wrong, we made it a practice to check the pronunciation and to make a record of it if we found it. From this beginning, we developed the present list, which is derived from the names of primates we found in those primate reference sources that we thought would produce the most comprehensive collection.[1]

The pronunciation reference (and the only reference) we selected was *Webster's Third New International Dictionary* (Unabridged). This is accepted as the standard for many scientific societies. The second and third editions differ primarily only in their diacritical markings, but the system in the second edition is simpler to transcribe; accordingly, we chose the simpler second edition marking system to reproduce here. Pronunciation, however, is that of the third edition.

Many of the primate names could not be found in the dictionary. The names that were found are preceded by an asterisk, and the pronunciation proposed as "correct" for the others is only tentatively offered for criticism and correction.

In making our recommendations, we tried to discern whatever patterns had already been followed in the published pronunciations and to be guided by them. Secondly, we wanted to make the guide explicit and consistent where possible. Most dictionaries nowadays aim to follow current usage rather than to provide a guide to good communication, obviously preferring to emphasize their roles as historical chronicles. The diversity we encountered suggests that oral communication would be improved in the noisy environments of scientific gatherings if the number of alternative pronunciations was diminished. Consistency was

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[1]The list itself was reproduced from the original copy supplied to the *Newsletter*; the names in some cases do not conform to those currently recommended for use in the *Newsletter*.

obtained for names of the genera and above, for these names are coined by scientists of reasonably common background and tradition and with exposure to Greek. Specific and common names tend to reflect the names of scientists and the names in the native h abitat of animals; consequently many languages are involved.

We have already circulated our proposed guide to a number of scientists, and it now incorporates several recommendations they made for specific changes. Our correspondents generally agreed that a modestly useful product might result if additional suggestions and corrections were incorporated after submitting it for preliminary review by a wider group. Accordingly, our intent at this time is to submit the draft to the readers of the *Laboratory Primate Newsletter* for this purpose. Suggestions for pronunciation changes are welcome as are any facts on the etymology of the names and corrections of our own inconsistencies. Hopefully, its publication at this time in preliminary form can lead to a revised version that will be both a reflection of etymologic orderliness and of an encouragement for consistent current usage. We see little virtue in listing the diverse "accepted" variants; on the contrary, virtue is found in consistency.

*PRIMATES	:	prī mā′ tēz
*primate	:	prī′ māt
*PROSIMII	:	prō sĭm′ ē ī
*LEMURIFORMES	:	lē mẽr ĭ fôr′ mēz
*Tupaioidea	:	tū pai oi′ dē a
Tupaiidae	:	tū pai ī′ ĭ dē
Tupaiine	:	tū pai ī′ nē
Tupaia	:	tū pai′ a
T. anambae	:	ä′ năm bē
T. belangeri	:	bĕl ăn′ jĕ rĭ
T. carimatae	:	kâr ĭ mā′ tē
*T. castanea	:	kăs tā′ nē a
T. chinensis	:	chĭ nĕn′ sĭs
T. chrysomalla	:	krĭs ō mȧl′ la
T. chrysogaster	:	krĭs ō găs′ tẽr
T. concolor	:	kŏn′ kŭl ẽr
T. cuyones	:	kü yō′ nĕs
T. demissa	:	dē mĭs′ a
T. discolor	:	dĭs kŭl′ ẽr
T. dissimilis	:	dĭs sĭm′ ĭ lĭs
T. glis	:	glĭs
*T. gracilis	:	grăs′ ĭ lĭs
T. hypocrysa	:	hī pō krĭs′ a
T. javanica	:	jăv ä′ nĭ kă
T. lucernata	:	lü sẽr nā′ ta
T. longipes	:	lŏn jĭp′ ĭz

Key to pronunciation

āle
chaotic
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account
ärm
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ēve
hẹre
ėvent
ĕnd
silent
makẽr
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ĭll
charity
ōld
ȯbey
ôrb

T. lucida	: loo' si da
*T. minor	: mi' ner
T. mollendorffi	: mol en dorf' fi
T. montana	: mon tan' a
T. natunae	: nat u' ne
T. nicobarica	: nik o bar' i ka
T. palawanensis	: pa la wa nen' sis
T. phaeura	: fe ur' a
T. picta	: pik' ta
T. riabus	: re a' bus
T. siaca	: se a' ka
T. splendidula	: splen di' du la
T. tephrura	: tef roo' ra
Anathana	: a na tha' na
A. ellioti	: el i ut' i
A. pallida	: pal' li da
A. wroughtoni	: ro to' ni
Dendrogale	: den dro ga' le
D. frenata	: fre na' ta
D. murina	: mu ri' na
D. melanura	: mel a noo' ra
*Tana	: ta' na
T. cervicalis	: ser vik al' is
T. chrysura	: kris oo' ra
*T. dorsalis	: dor sa' lis
T. lingae	: ling' e

Key to pronunciation

odd
soft
connect
food
foot
out
oil
cube
unite
urn
up
circus
menu
chair
go
sing
~~th~~en
thin
nature
verdure

T. paitana	: pi ta' na
Urogale	: ur o ga' le
U. everetti	: ev er et' i
Ptilocercinae	: til o ser si' ne
Ptilocercus	: til o ser kus
P. continentis	: kon ti nen' tis
P. lowee	: lo' e i
*Lemuroidea	: lem <u>a</u> roi' de <u>a</u>
*Lemuridae	: l<u>a</u> mu' ri de
Lemurinae	: le m<u>a</u> ri' ne
*Lemur	: le' mer
L. catta	: kat' <u>a</u>
L. fulvus	: ful' vus
L. macaco	: m<u>a</u> ka' ko
L. mongoz	: mon' gos
L. rubriventer	: roo bri ven' ter
L. variegatus	: var i e ga' tus
Hapalemur	: hap' <u>a</u> le mer
H. griseus	: gris' e us
H. simus	: si' mus
*Lepilemur	: lep' i le mer
L. mustelinus	: mus tel i' nus
L. ruficaudatus	: roo fi ko da' tus
Chirogaleinae	: ki ro ga le i' ne
Cheirogaleus	: ki ro ga' le us
*chirogale	: ki rag' <u>a</u> le

Key to pronunciation

ale
chaotic
care
add
<u>a</u>ccount
arm
ask
sof<u>a</u>
eve
here
event
end
sil<u>e</u>nt
maker
ice
ill
char<u>i</u>ty
old
obey
orb

*C. major	:	ma'jer
C. medius	:	me'di us
C. trichotis	:	tri ko'tis
*Microcebus	:	mi kro se'bus
M. coquereli	:	kok re'li
*M. murinus	:	mu ri'nus
Phaner	:	fän'er
P. furcifer	:	fur'si fer
Indriidae	:	in dri'i de
*Indri	:	in'dre
*I. indri	:	in'dre
*babacoote	:	ba'ba koot e
Lichanotus	:	li ka no'tus
*avahi	:	a va'he
L. laniger	:	la ni'jer
Propithecus	:	pro pi the'kus
*sifaka	:	se fak'a
P. diadema	:	di a de'ma
P. verreauxi	:	ve rok'si
Daubentonioidea	:	do ben to ni oi'de a
*Daubentoniidae	:	do ben ton i'i de
*Daubentonia	:	do ben to'ne a
*aye-aye	:	i'i
D.madagascariensis	:	mad a gas ker i en'sis
*LORISIFORMES	:	lo ri si for'mez
*Lorisidae	:	lo ri'di de

Key to pronunciation

odd
soft
connect
food
foot
out
oil
cube
unite
urn
up
circus
menu
chair
go
sing
then
thin
nature
verdure

Lorisinae	: lo ri si′ ne
*Loris	: lo′ ris
L. tardigradus	: tar di grad′ us
Artocebus	: ark to se′ bus
*angwantibo	: ang wan′ te bo
A, calabrensis	: kal a bren′ sis
Nycticebus	: nik ti se′ bus
N. coucang	: koo′ kang
Perodicticus	: pe ro dik′ ti kus
*P. potto	: pot′ o
Galiginae	: ga laj i′ ne
*Galago	: ga la′ go
G. alleni	: al le′ ni
G. crassicaudatus	: kra si ko da′ tus
G. senegalensis	: sen e gal en′ sis
Euoticus	: u o′ ti kus
E. elegantulus	: el e gant′ u lus
Galagoides	: ga la goi′ dez
G. demidovii	: dem i do′ ve i
*TARSIIFORMES	: tar se i for′ mez
*Tarsiidae	: tar si′ i de
*Tarsius	: tar′ si us
T. bancanus	: bang ka′ nus
T. spectrum	: spek′ trum
T. syrichta	: sir ik′ ta
*ANTHROPOIDEA	: an thro poi′ de a

Key to pronunciation

ale
chaotic
care
add
account
arm
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ill
charity
old
obey
orb

Ceboidea	:	se boi de a
*Cebidae	:	se bi de
Cebinae	:	se bi ne
*Cebus	:	se bus
*capuchin	:	kap u chin
C. albifrons	:	al bi fronz
C. apella	:	a pel a
C. capucinus	:	kap oo si nus
C. griseus	:	gris e us
Saimiri	:	si me re
S. boliviensis	:	bo li ve en sis
S. madeirae	:	ma der e
S. oerstedi	:	ur ste di
S. sciurea	:	si u re a
S. usta	:	oos ta
Alouattinae	:	al a wat i ne
Alouatta	:	al a wat a
A. belzebul	:	bel ze bul
*A. caraya	:	ka ra ya
*A. guariba	:	gwa re ba
*A. palliata	:	pal i a ta
A. seniculus	:	se ni ku lus
A. villosa	:	vil os a
Aotinae	:	a o ti ne
*Aotes	:	a o tez
*Aotus	:	a o tus
*douroucouli	:	doo roo koo le

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A. trivirgatus	:	tri vur ga tus
Atelinae	:	at e li ne
*Ateles	:	at e lez
*A. belzebuth	:	bel ze buth
A. fusciceps	:	fu si seps
A. geoffroyi	:	je froi i
A. paniscus	:	pan isk us
*coaita	:	ku i ta
A. rufiventris	:	roo fi ven tri
Brachyteles	:	brak i te les
*miriki	:	me re ke
B. arachnoides	:	a rak noi dez
*Lagothrix	:	lag a thriks
maricamicos	:	ma rek a me kos
L. lagotricha	:	lag a trik a
L. cana	:	ka na
Callicebinae	:	kal i se bi ne
*Callicebus	:	kal i se bus
*titi	:	te te
C. cinerascens	:	sin er a sens
C. cupreus	:	ku pre us
C. gigot	:	jig ot
C. moloch	:	mo lok
C. ollalae	:	ol a le
C. personatus	:	pur sun a tus
C. torquatus	:	tor kwat us

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Pitheciinae	:	pi the she i' ne
*Pithecia	:	pi the' she a
*saki	:	sa' ke
P. monachus	:	mon a' kus
*Cacajao	:	kak a jou'
*uakari	:	wa ka' re
C. calvus	:	kal' vus
C. melanocephalus	:	mel a no sef' a lus
C. roosevelti	:	ro se vel' ti
C. rubicundus	:	roo bi kun' dus
Chiropotes	:	ki ro po' tez
cuxius	:	kuks' i us
C. albinasa	:	al bi nas' a
C. satanas	:	sat' a nas
Callitrichidae	:	kal i trik' i de
Callitrichinae	:	kal i trik i' ne
*Callithrix	:	kal' i thriks
Hapalidae	:	hap a' li de
Hapalinae	:	hap a li' ne
Hapale	:	hap a' li
*marmoset	:	mar' mo set
H. albicollis	:	al bi' ko lis
H. aurita	:	o rit' a
H. chrysoleucos	:	kris o lu' kas
H. flaviceps	:	flav' i seps
H. humeralifer	:	hu mer a lif' er

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H. jacchus	:	jak′ us
H. leucocephala	:	lu ka sef′ al a
H. penicillata	:	pen i sil at′ a
H. petronius	:	pe tro′ ne us
H. santaremensis	:	san tar e men′ sis
Cebuella	:	se bwe′ la
C. pygmaea	:	pig′ me a
*Leontocebus	:	le an ta se′ bus
L. chrysomelas	:	kris o mel′ as
L. chrysopygus	:	kris o pi′ gus
*L. rosalia	:	ro sa′ li a
Marikina	:	mar i ke′ na
M. martinse	:	mar′ tin si
*Mico	:	me′ ko
M. argentatus	:	ar jen ta′ tus
Saguinus	:	sag wi′ nus
S. bicolor	:	bi′ kul er
S. inustus	:	in us′ tus
S. fuscicollis	:	fus i kol′ lis
S. graellsi	:	gra el′ si
S. nigricollis	:	nig ri kol′ is
S. oedipus	:	ed′ i pus
S. leucopus	:	lu ko′ pus
*Mystax	:	mis′ taks
*M. tamarin	:	tam′ a rin
*M. midas	:	mi′ das

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verdure

*M. imperator	: im pe ra' tor
M. labiatus	: la bi a' tus
M. melanoleucos	: mel a no lu' kus
M. peleatus	: pi le a' tus
*M. pluto	: plu' to
M. tripartitus	: tri par ti' tus
M. weddelli	: wed e' le
M. illigeri	: il i jer' e
Oedipomidas	: e di po mi' das
*pinche	: pen' cha
O. spixi	: spiks' e
Callimiconinae	: kal i me ko ni' ne
Callimico	: kal i me' ko
C. goeldii	: gel' de i
Cercopithecoidea	: ser ko pi the koi' de a
*Cercopithecidae	: ser ko pi the si' de
Cercopithecinae	: ser ko pi the si' ne
*Cercopithecus	: ser ko pi the' kus
*guenon	: ga non'
C. aethiops	: e' thi ops
*vervet	: vur' vet
*grivet	: griv' et
C. cephyus	: se' fus
*C. diana	: di an' a
C. l'hoesti	: les' ti
*C. mona	: mo' na

Key to pronunciation

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orb

*C. mitis	: mi' tis
C. neglectus	: neg lek' tus
C. nictitans	: nik' ti tans
C. talapoin	: tal' a poin
C. nigroviridis	: ni gro vir' i dis
*Cercocebus	: ser kȧ se' bus
*mangabey	: mang' gȧ ba
C. albigena	: al bi jen' a
C. aterrimus	: a ter i' mus
C. galeritus	: gal er i' tus
C. atys	: a' tis
C. torquatus	: tor kwat' us
Cynomorpha	: sin o mor' fȧ
Cynopithecus	: sin o pi the' kus
C. niger	: ni' jer
*Macaca	: ma ka' ka
*macaque	: ma kak'
M. assamensis	: as sa men' sis
M. cyclopis	: si klo' pis
M. fuscata	: fus ka' ta
M. irus	: i' rus
M. maura	: mor' a
*M. mulatta	: ma lat' a
*rhesus	: re' sus
M. nemestrina	: ne mes tri' na
*M. radiata	: ra de a' ta

Key to pronunciation

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verdure

*M. silenus	: si le nus	
M. sinica	: sin i ka	
M. speciosa	: spe shi os a	
M. sylvana	: sil van a	
*Papio	: pa pe o	
*baboon	: ba bun	
P. comatus	: ko ma tus	
*P. cynocephalus	: si no sef a lus	
*P. hamadryas	: ham a dri us	
P. doguera	: do ger a	
P. leucophaeus	: lu ko fa us	
*drill	: dril	
*P. sphinx	: sfingks	
*mandrill	: man dril	
Theropithecus	: the ro pi the kus	
*T. gelada	: jel a da	
*Erythrocebus	: e rith ro se bus	
*E. patas	: pa ta	
*E. nisnas	: nis nas	
Comopithecus	: ko mo pi the kus	
Colobinae	: kal o bi ne	
*Colobus	: kal o bus	
*guereza	: ga re za	
C. badius	: ba di us	
C. polikomos	: pol i ko mos	
C. verus	: ver us	

Key to pronunciation

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*Presbytis	:	prez bi' tis
*langur	:	lung goor'
P. ayguda	:	a gu'da
P. carimatae	:	kar i ma' te
P. cristatus	:	kris ta' tus
*P. entellus	:	en tel' us
P. francoise	:	fran swa' si
P. frontatus	:	frun ta' tus
P. johni	:	jon' e
P. melalophos	:	mel a lo' fos
P. obscurus	:	ob skur' us
P. phayrei	:	fa' re
P. pileatus	:	pi le a' tus
P. potenziani	:	po ten zi a' ni
P. rubicunda	:	roo bi koon' da
P. senex	:	se' neks
*Nasalis	:	na sa' lis
N. larvatus	:	lar va' tus
*proboscis	:	pro bas' is
Pygathrix	:	pi' ga thriks
*douc	:	dook
P. nemaus	:	ne' mos
P. nigripes	:	ni grip' ez
Rhinopithecus	:	ri no pi the' kus
R. avunculus	:	a vung' ku lus

Key to pronunciation

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R. roxellanae	: rok se la ne
*Simias	: sim i as
*S. concolor	: kon kul er
Simiidae	: sim i i de
*Pongidae	: pon ji de
Ponginae	: pon ji ne
*Pongo	: pong go
*orangutan	: o rang a tang
P. pygmaeus	: pig ma us
*Pan	: pan
*chimpanzee	: chim pan ze
P. paniscus	: pa nis kus
*P. troglodytes	: trog la di tez
*Gorilla	: go ril a
Hylobatinae	: hi lob a ti ne
*Hylobates	: hi lob a tez
*gibbon	: gib un
*H. agilis	: a jil is
*H. concolor	: kon kul er
*H. hoolock	: hoo lok
H. klosii	: klos e i
*H. lar	: lar
H. moloch	: mo lok
* Symphalangus	: sim fa lan gus
*siamang	: se a mang
S. syndactylus	: sin dak ti lus

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AN INTRAVENOUS ANESTHETIC TECHNIQUE FOR THE LESSER GALAGO *(GALAGO SENAGALENSIS)**

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The work on our colony of *Galago senagalensis* has required the use of a safe, reliable, and easily administered anesthetic agent. A search of the literature revealed insufficient information regarding an anesthetic technique to be used with this small primate. This report will describe our use of ether and pentobarbital sodium (Halatal Solution, Jensen-Salsbery Laboratories, Kansas City, Missouri).

Ether has been used with complete success in connection with minor surgery required in the repair of skin abrasions. However, its use necessitated the involvement of two people, one to control the level of anesthesia while the other was obligated to the surgical procedure. Controlling the level of ether anesthesia is somewhat difficult without the availability of inhalator equipment. The use of ether was abandoned and preliminary work started on establishing a dose level for the injectable anesthetic, pentobarbital sodium.

The galago possesses a large prominent leg vein (the short saphenous vein in *Tarsius*; see Hill, 1955) which runs superficially beneath very thin skin on the caudal aspect of the lower leg. These anatomical features permit easy intravenous injections. The anesthetic was administered with a tuberculin syringe fitted with a 27 gauge needle. The stock solution of Halatal consisted of a 1% solution of pentobarbital sodium. Since the amount of injected anesthetic was small, a sufficient volume of sterile isotonic sodium chloride solution was added to give a total injected volume of approximately 0.5 cc of fluid.

The animals in our colony are on a regular weighing schedule which subjects them to frequent handling. Therefore, even while preparing them for injection, the animals generally did not display an excitement or activity level greater than that observed during a routine weighing procedure.

An animal was easily restrained for the injection procedure by grasping its body, tail, and one pelvic limb in one hand while extending the hind limb to be injected with the free hand. With the animal restrained in this manner, a second person prepared the caudal aspect of the extended limb for injection. Preparation consisted of clipping the hair and washing the skin area at the injection site with 70% alcohol.

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*This research was supported in part by a General Research Support Grant from the College of Veterinary Medicine and N.I.H. U.S. Public Health Service Grant FR-00366-02.

Dosage testing was completed on 20 different galagos, two of which were given a repeat dosage following a substantial weight gain. Initial dose levels were purposely small, allowing an increase to an effective surgical dosage. Ten animals were dosed at the beginning of their active period and ten at the end of their active period. The inactive-active period of our animals is synchronized to a 12-hour light-dark cycle, which is automatically controlled by a timer (Holmes, Haines & Bollert, 1968). Results indicated that the anesthetic tolerance level was greater at the end of the active period than at the beginning of the active period, under conditions of equal doses.

Animals in the beginning of their activity period attained a surgical (Stage III) level of anesthesia following the injection of 1 mg/200 g of body weight (0.10 cc of 1% stock solution/200 g body weight). The animals attained the desired surgical level within 1 to 3 minutes after injection. The animals remained at this level for approximately 25 minutes, and maintained a semiconscious condition for 20 to 30 minutes longer. All animals were recovered and had resumed normal activity within 24 hours. Both small animals (less than 225 g) and large animals (greater than 275 g) reacted to the dose level in the same manner.

The dose level for animals in the end of their active cycle required 1.2 mg/200 g of body weight (0.12 cc of 1% stock solution/200 g body weight) to attain a comparable level of anesthesia. The length of a surgical level and recovery characteristics appeared to be similar to the responses of animals injected at the beginning of their active cycle.

The dosages suggested represent a safe minimal dose for the attainment of a surgical level of anesthesia. However, the previously discussed values for the intravenously administered anesthetic were noted to be affected by the activity of the animal just prior to injection. A highly active or excited animal occasionally did not respond sufficiently to the calculated dosage. In these instances, an additional dose of 0.02 cc of the stock solution was administered. This consistently anesthetized these animals.

We are continuing to evaluate intravenous and intraperitoneal anesthetics for the determination of the appropriate dose levels for various purposes.

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THE INFLUENCE OF SERNYLAN ON THE EEG AND AVERAGE EVOKED POTENTIAL OF THE SQUIRREL MONKEY

Roger K. Thomas, Jr.

University of Georgia

Phencyclidine hydrochloride, sold under the trade name Sernylan (Parke-Davis & Co., Detroit, Michigan), is recommended by the manufacturer "as an immobilizing agent for primates only." The Sernylan brochure describes the anesthetic effects of the drug as being "unlike those produced by classical anesthetics in that even though the animal is incapacitated or completely anesthetized: (1) simple reflexes such as the patellar, palpebral, corneal and pupillary are not completely eliminated; (2) the eyes may remain open; (3) muscle tone is increased in most cases, but where a decrease occurs it is not marked, and (4) respiration and blood pressure are not usually depressed except in deliberate overdosage."

In view of these pharmacological properties of Sernylan, it would appear to be advantageous, where possible, to have electrophysiological data as an aid to estimating the depth of anesthesia induced by this drug. Perhaps the most comprehensive work on the influences of Sernylan on a variety of mammalian species is that of Domino (1964), and this paper should be consulted by the potential user of Sernylan. Domino's work included data on the effect of Sernylan on the electroencephalogram (EEG) and the evoked potentials of several species including rhesus *(Macaca mulatta)* and cynomolgus *(M. fascicularus)* monkeys. The present work examined the influence of Sernylan on the EEG and the averaged evoked potential of the squirrel monkey.

Methods and Results

Data were collected (under similar conditions) from five adult male squirrel monkeys *(Saimiri sciureus*, Gothic type*)*.

The monkeys were prepared for chronic recording by implanting stainless steel screws in the skull. The screws were implanted in pairs at bilateral frontal, parietal, and occipital locations. The screws were joined to a central connector (Amphenol Corp., Chicago, Ill.) by means of stainless steel wire which was insulated with polyethylene tubing. The screws, insulated wire and central connector were embedded in dental acrylic.

The monkeys were restrained in a primate chair (Lehigh Valley Electronics Co., Fogelsville, Pennsylvania) for recording. Recordings of the spontaneous EEG and the averaged evoked potential were done before and after the administration of Sernylan (2 mg/kg intramuscularly; this was the upper limit of the recommended dosage for squirrel monkeys to achieve "reduced response, catalepsis, and analgesia"). A Grass Model VI Electroencephalograph was used for the recordings of the spontaneous EEG.

The stimulus for the averaged evoked response was a light flash of approximately 10 microsec. duration from a Grass Model PS3 Photo-stimulator at an intensity setting described by the manufacturer as being approximately 750,000 candlepower. The stimulus lamp was situated approximately 15 in. directly in front of the monkey's eyes. The evoked potentials reported here resulted from 75 light flashes at irregular intervals of approximately one flash per sec. The averaged response was recorded with a system that consisted of the Grass electroencephalograph, a computer of average transients (the CAT 1000, Technical Measurement Corporation, North Haven, Conn.), and an X-Y plotter (Moseley Division, Hewlett-Packard, Palo Alto, Calif.)

Figure 1 shows the spontaneous EEG and the averaged visually evoked

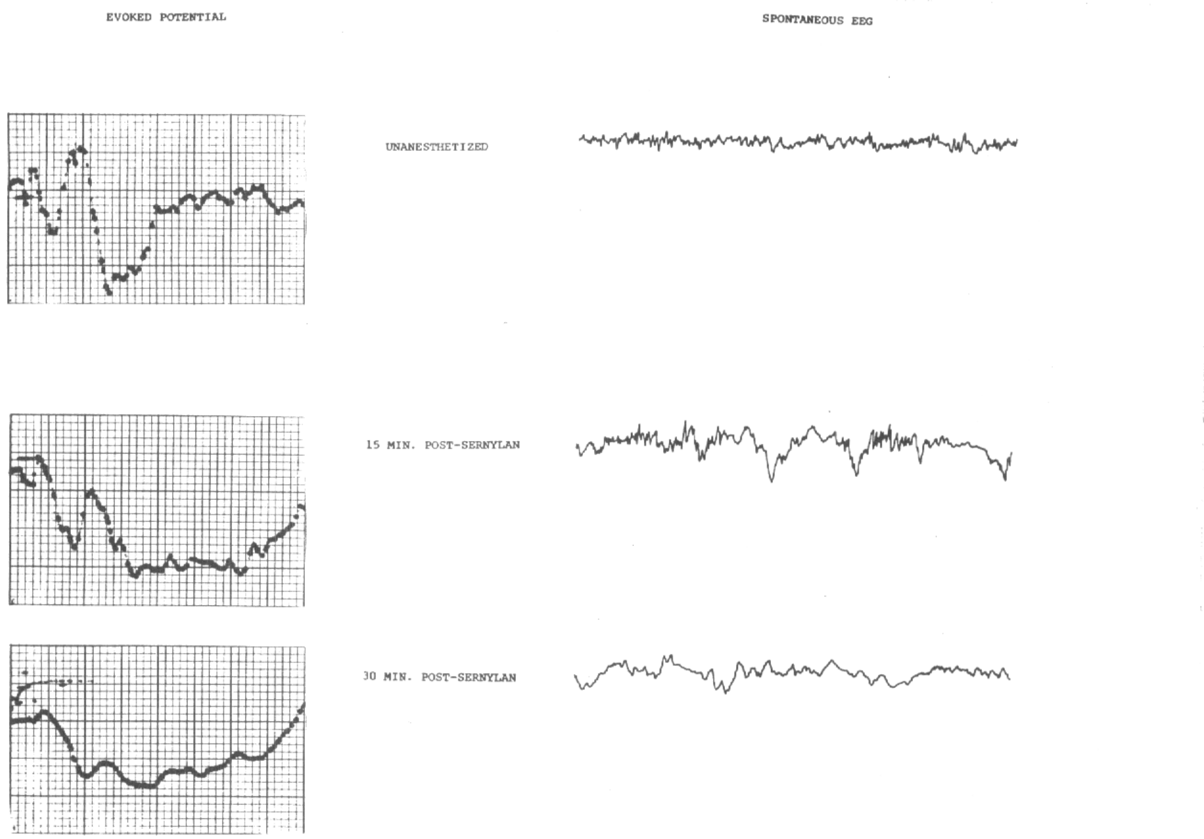

Figure 1. Evoked potentials and spontaneous EEG of a squirrel monkey before and after Sernylan. Evoked potential records are approximately 0.3 sec. duration with the unanesthetized trace representing an amplitude of approximately 150 microvolts. The spontaneous EEG is 5.0 sec. duration, and the unanesthetized trace represents an amplitude of approximately 25-50 microvolts.

response of a squirrel monkey (left occipital location) prior to the administration of Sernylan, 15 min. after administration, and 30 min. after administration of the drug. As may be seen in the figure, there is increased slow wave activity as well as a general increase in amplitude in the EEG 15 min. after the administration of the drug, and 30 min. post-Sernylan, the EEG is not unlike that of the sleeping human (Gergen, 1967, has reported cortical synchronization in the squirrel monkey during drowsiness).

It is apparent from Figure 1 that the evoked potential seen in the unanesthetized monkey is well defined, but the evoked potential is sharply reduced in amplitude 15 min. post-Sernylan, and the amplitude of the evoked potential is further reduced in the 30 min. post-Sernylan record. Similar results were obtained with the five monkeys that were tested.

The squirrel monkey shows many of the pharmacological symptoms described in the opening paragraph (patellar and palpebral reflexes and respiration and blood pressure were not examined); consequently, the electrophysiological data is a valuable aid in estimating the level of anesthesia following the administration of Sernylan.

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Gergen, J. A. Functional properties of the hippocampus in the sub-human primate. In W. R. Adey & T. Tokizane (Eds.) *Progress in Brain Research*. Vol. 27. Amsterdam: Elsevier Publ. Co., 1967.

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LABORATORY-BRED RHESUS FOR SALE

Sixteen laboratory-bred and -reared *M. mulatta* are available for sale. These animals were suckled and raised by their mothers and, after weaning, have been housed in small compatible groups. The fathers and mothers are long-term residents of our breeding colony. No experimental procedures of any kind have been performed on these youngsters. The sex and date of birth of each animal is as follows: Male: 10-20-67, Female: 11-3-67, Female: 12-27-67, Male: 1-17-68, Female: 1-19-68, Male: 1-24-68, Male: 2-12-68, Female: 4-17-68, Female: 7-15-68, Female: 8-24-68, Male: 8-25-68, Male: 9-14-68, Female: 11-16-68, Male: 11-24-68, Male: 11-25-68, Female: 11-28-68.--Sigmund T. Rich, D.V.M., Animal Facility, School of Medicine, University of California, Los Angeles, California 90024. Telephone: Area Code 213 825-5691.

METHOD OF PROTECTION OF DEVICES IMPLANTED IN SKULLS OF SQUIRREL MONKEYS[1]

Eleanor R. Adair

John B. Pierce Foundation Laboratory, New Haven, Connecticut

Anyone who has ever used or observed squirrel monkeys knows that they are extremely active in their home cages. Whether housed singly or in groups, they seem to spend as much time upside down as right side up and to be almost continuously in motion. This situation poses great problems for the experimenter who wishes to implant chronic electrodes, cannulae, thermodes, etc. in the brain without having to resort to continuous postoperative restraint in order to protect protruding hardware.

I have been implanting 18- and 21-gauge thermode tubes in the hypothalamus and mid-brain of squirrel monkeys. These tubes must protrude enough out of the dental acrylic to make watertight connections (via polyethylene tubing) to a liquid perfusion system, and, without some protection, they are flattened and bent over in a matter of days. One solution would have been to design a plastic or metal protective cap that could be screwed onto the acrylic plug. The cap could then be removed prior to an experimental session to expose the protruding thermode tubes. This note describes an alternative procedure, which has the advantage of requiring no additional hardware on the animal's head.

The procedure requires only a bit of artistry with dental acrylic and is diagrammed in Figure 1. It basically involves molding an open

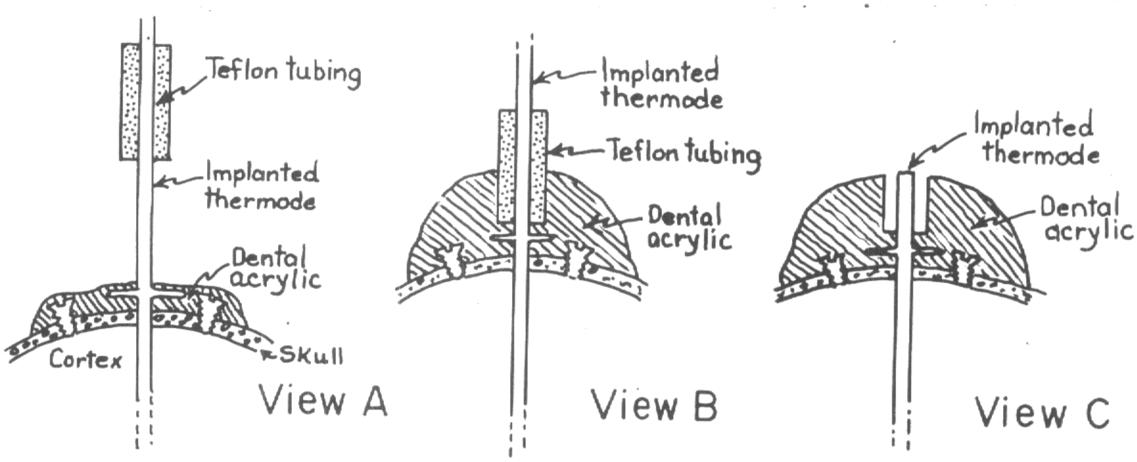

Figure 1. Procedure for molding open "well".

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[1]This work was supported by U.S. Public Health Service Contract No. ES00354-01.

"well" around the protruding tube. View A in Figure 1 shows the thermode tube at the start of cementing to the skull. The thermode is still held tightly in the electrode carrier and a thin layer of dental acrylic is applied first around the screws and the washer on the thermode. Then, as is shown in View B, a piece of teflon tubing is pushed down as far as it will go. This should have an inside diameter such that it slides easily over the thermode and a wall thickness appropriate to the "well width" desired. More acrylic is gradually built up around the teflon-enclosed thermode to the desired height. After the acrylic has hardened completely, the teflon tubing is retracted and the thermode cut off flush with the top surface of the acrylic. The resulting acrylic plug resembles View C. Each implanted tube is surrounded by a circular "well" and is completely protected by the strong, hard acrylic. The entire plug can be painted with fast-set epoxy if additional protection is desired.

The monkeys do not knock off the plug. An acrylic mound as high as half an inch remains intact as long as it has a broad base and 3 or more screws anchor it to the skull.

* * *

REQUEST FOR INFORMATION ON PHOTIC INFLUENCES ON REPRODUCTION

I am interested in photic influences on primate reproduction (specifically the rhesus monkey, *Macaca mulatta*). Although considerable work has been done on photoperiodicity in avian reproduction and some with mink, ferrets and fitches, the literature shows a paucity of information on monkeys. I should be indebted for pertinent bibliographical references. Of particular interest to me are the experiences of other primate facilities regarding the effects of controlled vs. random lighting conditions in their breeding quarters.--Frederick E. Birkner, Animal Quarters, Institute of Rehabilitation Medicine, New York University, 400 E. 34th Street, New York, N. Y. 10016.

* * *

REQUEST FOR PRIMATE MATERIAL: PRESERVED OR FROZEN CARCASSES FOR DISSECTION AND PREPARATION OF SKELETONS

Beginning in the summer of 1969, our department will offer a course in primate anatomy, and would like to obtain a wide selection of prosimians, monkeys, and apes of any age for dissection. After use in the anatomy course, these animals will be used to prepare skeletons for use in our other biological anthropology courses. Carcasses may be frozen or preserved in any suitable manner.--Robert B. Eckhardt, Department of Anthropology, The University of Michigan, Ann Arbor, Michigan 48104.

A NOTE ON THE RUMINANT-LIKE DIGESTION OF LANGURS

Charles E. Oxnard

Department of Anatomy, The University of Chicago

The recent report of Bauchop and Martucci (1968) demonstrated in considerable detail the contribution of gastric microbial fermentation of cellulose to digestion in langurs. The study was carried out by investigation of the bacterial fauna and volatile fatty acid constituents of the gastric contents; the findings are of course related to the anatomical peculiarity (large size and complexity) of the stomach that exists in animals of this subfamily *(Colobinae)* of the *Anthropoidea*.

In addition, however, Bauchop and Martucci suggested in their concluding sentence that "bacterial biosynthetic capacities may...benefit the vitamin and nitrogen economy of the host." This second mechanism may be of specific importance in fulfilling the requirements for these animals of vitamin B_{12}.

Vitamin B_{12} is found in practically all animal tissues and fluids, though the concentrations span a wide range. The substance originates from ingestion in the food or from symbiotic organisms within the animal's own digestive tract. The vitamin in the food may itself result from ingestion of animal products; in addition foods may contain the vitamin through being contaminated with other vitamin B_{12}-containing materials such as soil, excreta, decaying food and possibly contaminated water.

Most animals in which the main source of the vitamin is animal food have similar amounts of the vitamin in the serum; for instance man and the pig possess serum levels that range from 100 to 500 μμgms/ml. Those animals (for example, the cow and rabbit) which are more strictly herbivorous and in which therefore the main source of the vitamin is symbionts, possess serum levels that are often much higher than the foregoing--one to many thousands of μμgms/ml. Since the vitamin appears to be absorbed chiefly in the ileum such animals obtain their supplies either from vitamin manufactured proximal to the ileum (e.g. in the stomach in ruminants) or, if from vitamin synthesized in the colon (as probably occurs in all mammals), through its recirculation by coprophagy.

Most of the *Anthropoidea* resemble the first of these two groups for, although they are traditionally regarded as vegetarian, many recent observations have made it clear that most do ingest a small but (in terms of vitamin B_{12} requirements) significant quantity of animal food. They possess characteristic serum vitamin B_{12} levels: 150 to 500 μμgms/ml (Oxnard, 1966).

One group of the *Anthropoidea*, however, the *Colobinae* to which the langurs belong, seems to differ from the others. Vitamin B_{12} estimations performed in six animals (two specimens of *Presbytis obscurus* and four of *P. entellus*) show that these forms maintain serum levels that are high (of the order of 1000 to 3000 μμgms/ml) compared with the remainder of the *Anthropoidea*. It is most unlikely that regular coprophagy occurs in these creatures (although coprophilia in individual captive chimpanzees may give rise to abnormally high serum levels: Oxnard, 1966). The possibility is (Oxnard, 1966) that the vitamin is synthesized by symbionts in the ruminant-like multilobed stomach possessed by these forms; the current investigations of Bauchop and Martucci (1968) substantiate that speculation.

In view of the ready appearance of widespread lesions referable to deficiency of vitamin B_{12} that has been demonstrated in rhesus monkeys in captivity (Oxnard & Smith, 1966), and which may well occur in a number of monkeys in a natural habitat (Foy, Kondi, & Mboya, 1965; Oxnard, 1967), the evolution of the ruminating-like adaptations of langurs may have been of considerably greater importance in the survival of the forms than just as an adaptation to leaf-eating. These species presumably avoid the penalties of near-threshold utilization of vitamin B_{12} such as appears to obtain in rhesus monkeys and baboons, and possibly in many other monkeys and apes.

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Foy, H., Kondi, A., & Mboya, V. Haematologic and biochemical indicies in the East African baboon. *Blood*, 1965, *26*, 682-686.

Oxnard, C. E. Vitamin B_{12} nutrition in some primates in captivity. *Folia Primatologica*, 1966, *4*, 424-431.

Oxnard, C. E. Some occult lesions in captive primates. *American Journal of Physical Anthropology*, 1967, *26*, 93-96.

Oxnard, C. E., & Smith, W. T. Neurological degeneration and reduced serum vitamin B_{12} levels in captive monkeys. *Nature*, 1966, *210*, 507-509.

CONFERENCE ANNOUNCEMENTS: SECOND CONFERENCE ON EXPERIMENTAL MEDICINE AND SURGERY IN PRIMATES

This conference, sponsored by New York University School of Medicine, will be held in the auditorium of Hunter College-Bellevue Department of Nursing Education, 440 East 26th Street, New York, New York, on September 7-12, 1969.

Co-chairmen of the conference will be E. I. Goldsmith, Cornell University Medical College, and J. Moor-Jankowski, New York University School of Medicine. Conference coordinator will be R. G. McRitchie, New York University School of Medicine.

The preliminary program is as follows:

Sunday, September 7.--9:00-10:00 a.m., Registration (continuing); 10:00 a.m., Opening remarks (Dr. Edward I. Goldsmith); 10:15-12:30 p.m., Cross-circulation (Chairman, Dr. Keith Reemstma, University of Utah School of Medicine); 2:00-3:30 p.m., Experimental transplantation in primate animals (Chairman, Dr. Gerald P. Murphy, Roswell Park Memorial Institute); 8:00-10:00 p.m., Immunological response between man and nonhuman primates (Chairman, Dr. N. Raphael Shulman, National Institute of Arthritis and Metabolic Diseases).

Monday, September 8.--9:00-12:30 p.m., Reports from major primate laboratories in the USA (Chairman, Dr. E. I. Goldsmith, Cornell University Medical College); 2:00-5:45 p.m., Reports from major primate laboratories in the USA (Chairman, Dr. Kurt Benirschke, Dartmouth Medical School); 8:00-10:00 p.m., Film session.

Tuesday, September 9.--9:00-12:30 p.m., Reports from major primate laboratories outside the USA (Chairman, Dr. C. H. Kratochvil, USAF); 2:00-5:45 p.m., Comparative biochemical and developmental genetics (Chairman, Dr. Harold A. Hoffman, National Cancer Institute, NIH).

Wednesday, September 10.--The nervous system (Co-chairmen: Dr. A. J. Berman, Brooklyn Jewish Hospital, Dr. Fred Plum, Cornell University Medical College); 9:00-10:30 a.m., Similarities between nonhuman and human primates (Chairman, Dr. Fred Plum); 10:45-12:30 p.m., Perinatal biology and development (Chairman, Dr. A. J. Berman); 2:00-3:30 p.m., Neuroendocrinology (Chairman, Dr. Paul R. McHugh, Cornell University Medical College); 3:45-5:45 p.m., Behavioral physiology (Chairman, Dr. C. H. Kratochvil, USAF); Cocktail reception and dinner (details supplied at a later date).

Thursday, September 11.--9:00-12:30 p.m., Reproduction, perinatal, growth and development studies (Chairman, Dr. Stanley James, Columbia University, College of Physicians and Surgeons); 2:00-5:45 p.m., Reproduction, perinatal, growth and development studies (Chairman, Dr. Wendell H. Niemann, Laboratory for Experimental Medicine and Surgery in Primates [LEMSIP]).

Friday, September 12.--9:00-12:30 p.m., Virology (Chairman, Dr. S. S. Kalter, Southwest Foundation for Research and Education); 2:00-5:45 p.m., Infectious diseases (Chairman, Dr. L. H. Schmidt, Southern Research Institute).

Please address all correspondence to: Dr. J. Moor-Jankowski, New York University Medical Center, 550 First Avenue, New York, New York 10016.

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FEMALE LION-TAILED MACAQUES *(MACACA SILENSUS)* WANTED

I am anxious to obtain a number of female wanderoos, also called lion-tailed or lion-maned macaques *(Macaca silensus)*. These animals are becoming increasingly difficult to obtain and the government of India has placed a ban on their export. The native habitat in the Western Ghat forest is restricted and subject to modification for agricultural development.

This species represents an important link in the genus *Macaca* and as such is of potential research interest in several fields of primatology. These animals are an important logical extension of my own program of behavioral studies and a social group would be highly desirable. I have been able to locate only a few available males at present and am anxious to complete a group which would be used in a long-term behavioral program while maintained in a breeding group. Hopefully, this would be one way to insure the long-term survival and availability of these animals for research.

I would appreciate hearing of the availability of these animals for sale or trade.--Dr. Irwin S. Bernstein, Yerkes Regional Primate Research Center, Field Station--Route 1, Lawrenceville, Georgia 30245.

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REQUEST FOR PRIMATE MATERIAL: NEW WORLD MONKEY CADAVERS

New World monkey cadavers (especially howlers and capuchins) with head and neck intact are wanted for research of the hyoid apparatus. The brain may be removed if so desired.--Dr. R. A. Hilloowala, Department of Anatomy, University of Alabama Medical Center, 1919 Seventh Avenue South, Birmingham, Alabama 35233.

SUPPLY OF SOUTH AMERICAN PRIMATES DISCUSSED*

The Second Symposium on Tropical Amazonian Biology was held in Colombia, South America, early this year. Meetings were held in Florencia and in Leticia on the Amazon in Colombia. At the meeting in Leticia, January 28, 29, and 30, discussions were held on the availability of fauna and also on the possibility of depletion of the fauna through various means, particularly trapping for export.

The subject of conservation necessarily arose, and the approach to the protection of the Amazon region was related seriously to conservation methods and programming. It seemed apparent that biologists were planning severe measures that might restrict all exportation from the region of the Amazon. As a result of preliminary discussions on the subject by conservationists and biologists, both in this country and in South America, considerable concern was raised in the minds of the users of nonhuman primates exported from South America.

Biologists in the United States who were associated with the symposium suggested that no severe steps would be taken in restricting export of primates. On the other hand, evidence coming from South America indicated that strong resolutions were being suggested that would seriously curtail or disrupt exportation of primates to laboratories in the United States.

At the meeting discussions of fauna were conducted by various biologists. Time was also allocated to local primate trapping and compounding personnel to discuss their program. At one point in the meeting a resolution was presented that called for complete cessation of exportation of wildlife, including primates. This resolution was not adopted, however, and subsequent discussions brought about a change in the resolution, placing the matter in the hands of a government agency that would study the situation, highlighting problems and making recommendations based on ecological data. Quite recently, however, word has been received from dealers in Brazil that it is unlawful to export live animals. This confirms the restrictive attitude toward animal trapping and exportation developing in regions of South America.

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*From *ILAR News*, 1969, *12* [4]. The report was made by Alan A. Creamer, Chairman, ILAR Subcommittee on Standards for the Procuring, Compounding, Holding and Transporting of Nonhuman Primates.

NEWSPAPER CLIPPINGS: THE GOATHERD

MIXED IDENTITY DOWN ON THE FARM

Okahandja (South West Africa).--Ahla is convinced that, as goats go, she is a very superior sort. So she arbitrarily assumed leadership of the clan of several score at the Aston farm near here, subjugating even the traditionally masterful billies. This would be of passing interest only to goat watchers except for the obvious fact that Ahla is a large, hairy and long-fanged Chacma baboon. Her coup among the goats of Otjiruse farm burst some myths about baboons (notably that they are inherently vicious to other creatures) and caused a rise of scientific eyebrows. It has also, for nearly 15 years, provided the Astons with a rare servant indeed: an able goatherd who requires neither bed nor board, has no use for payment, and gives little trouble.

She joined the Aston staff in 1954 when an African herder brought to Mrs. Hedwig Aston a baby baboon he found lost in the bush. The baby was given its milk every day among the goats in the small corral where they are penned nightly, and where the very young kids stay while the herd goes out to graze. Soon Ahla was going out with them, riding the back of a she-goat she apparently adopted as mother. From then on her career as a superior goat was set. She took to leading them on their daily excursions and the obsolescent human goatherd was given other tasks. Ahla's solicitude for her flock is remarkable. Only members of the farm may touch her goats. A butcher's mate picked one up one day and promptly got bitten. So one of the farm Africans had to load them into the butcher's truck. In the evenings Ahla makes sure the kids get properly fed. She picks up those bleating for mother, sometimes one under each arm, and delivers them direct--unerringly identifying the parent by scent.

Goats often bear twins and Ahla insists that they share 50-50. She will not allow one twin to start suckling before the other turns up. Some goats have triplets and the extra mouth is passed to a foster-mother with only one kid. This Ahla resents, and she lugs number three back to its rightful mother, where the trio then have to feed in rotation. Occasionally a kid will be left behind, alone in the great outdoors, when the herd comes home. Out goes Ahla to fetch it. Numbers, however, appear to bemuse her. Sometimes she leaves half the herd out there. So her attendant dogs bring them in.

The Astons believe that by day she shoos off jackals and other small predators hungering for young goat. But she cannot cope with the big cats, the leopards and cheetah. Ahla was seen behaving frantically beside a farm road one day and ran across a small hill when people came to investigate. On the other side they found a cheetah devouring one of the goats.

Her one failing, say the Astons, is that she periodically takes leave without notice for a few days, or weeks. Once for two or three months. And then, of an evening, she will casually come in with the herd again. The explanation is probably that Ahla has an involuntary Jekyll and Hyde life: being a healthy she-baboon, she needs the company of baboon males.

Some time ago Ahla produced a baby. It died and she carried it with her until it disintegrated. She is trying again. She vanished for a fortnight recently and, on return, showed an unmistakable sign of a pending Happy Event: morning sickness.

The Star, Johannesburg, March 12, 1969

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INTERNATIONAL PRIMATOLOGICAL SOCIETY NOTES

The International Primatological Society will hold its next meeting in Zurich, August 2-5, 1970, and will honor A. H. Schultz, Professor Emeritus of Anthropology at Johns Hopkins and the University of Zurich. The Anthropological Institute of the University of Zurich has been appointed the organizer of this congress. Please address all inquiries to the secretary's office at the Anthropological Institute, Künstlergasse 15, CH-8001 Zurich.

A resolution was adopted at the meeting in Atlanta expressing appreciation from the membership of the society to Dr. Leonard Carmichael, the immediate past president, and to Dr. C. R. Carpenter, who was last year's secretary for America, for their outstanding work.

To become a member of IPS, write to the treasurer, Dr. H. Sprankel, Department of Primatology, Max Planck Institute for Brain Research, Deutschordensstrasse 46, D-6, Frankfurt, Germany, and include a check for $3 (no cash, please), payable to First National City Bank, to the account of International Primatological Society, 202 908 Grosse Gallus Strasse 16, D-6, Frankfurt, Germany. A copy of your letter should be sent to Dr. H. Preuschoft, Waldeckstrasse 3, D-74, Tubingen, Germany, so that he may file your name in the membership list.

A membership list will be forwarded soon to all members. Any change of address should be reported promptly to Dr. Preuschoft.

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TALAPOINS MAY BE UNAVAILABLE FOR PURCHASE AT PRESENT

Two recent articles in this *Newsletter* (Cooper & King; Schrier & Povar, both in the October, 1968 issue) stimulated great interest in talapoin monkeys *(Cercopithecus talapoin)*. We have recently been advised that political upheavals in the countries of origin of these monkeys have made them unavailable at present. There is no indication at this time when they will again be available to importers.--The Editor.

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

BOOKS

Atlas stéréotaxique du cerveau de babouin (Papio papio). Riche, D., Christolomme, A., Bert, J., Naquet, R. Paris: Centre de la Recherche Scientifique, 1968.

May be purchased for 120 francs from Bureau 3A, Service de Presse, 15, Quai Anatole France, Paris 7, France.

Taxonomy and phylogeny of Old World primates with references to the origin of man. Chiarelli, B. (Ed.) Torino, Italy: Rosenberg & Sellier, 1968.

Contents include: The Importance of Primate Studies in Anthropology by V. Correnti; The Genera of Old World Apes and Monkeys by W. C. O. Hill; Evolution of the Brain in Old World Primates by L. Bianchi; The Phylogenetical Evaluation of Some Characters and Some Morphological Trends in the Evolution of the Skull in Catarrhine Primates by C. Vogel; The Maxillary Incisors and Evolution of Old World Monkeys by D. R. Swindler; The Ear Bones and the Vertebral Column as Indications of Taxonomic and Postural Distinction Among Old World Primates by M. Masali; Phylogeny and Taxonomy of the Catarrhine Primates from Immunodiffusion Data. I. A Review of the Major Findings by M. Goodman; Phylogeny and Taxonomy of the Catarrhine Primates from Immunodiffusion Data. II. Computer Approach to Analyzing the Species Comparison in Modified Ouchterlony Plates by G. W. Moore and M. Goodman; Taxonomic and Phylogenetic Interest of the Study of Serum Proteins of Old World Primates Using Bi-dimensional Electrophoresis on Starch-gel by A. M. F. Conti and B. Chiarelli; Quantitative Immunochemistry and the Evolution of the Anthropoidea by V. Sarich; Quantitative Relative Determination of the Nuclear DNA in the Old World Primates by M. G. M. Romanini; Carylogical and Hybridological Data for the Taxonomy and Phylogeny of the Old World Primates by B. Chiarelli; Parasites and the Phylogeny of the Catarrhine Primates by H. J. Kuhn; The Phylogenetical Position of the Hylobatinae by G. H. R. von Koenigswald.

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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.

Conference on nonhuman primate toxicology. Miller, C. O. (Ed.) Warrenton, Virginia: Airlie House, 1968.

Contents include: Introductory Remarks by L. H. Schmidt; Why Research on the Subhuman Primates? by H. F. Dowling; Management of a Nonhuman Primate Colony for Toxicological Evaluations by L. H. Schmidt; Qualitative and Quantitative Relationships Between Toxicity of Drugs in Man, Lower Mammals, and Nonhuman Primates by F. Coulston; Role of Nonhuman Primates in Predicting Metabolic Disposition of Drugs in Man by C. C. Smith; Role of Nonhuman Primates in Evaluating Toxicology of Stimulants and Depressants by M. H. Seevers; The Use of Nonhuman Primates in Assessing Toxicological Effects on the Central Nervous System (Behavior) by H. H. Reynolds; Studies in Reproduction *(Macaca mulatta)* by G. van Wagenen; Teratogeny in Nonhuman Primates by J. G. Wilson; Utility of Nonhuman Primates for Evaluating Hematotoxicity by S. Saslaw; Skin Manifestations of Drug Toxicity as Revealed in Nonhuman Primates by A. Malley; A Behavioral Method for the Study of Ototoxicity in Nonhuman Primates by W. C. Stebbins & J. E. Hawkins; Enteric Effects of Drug Toxicity as Revealed in Nonhuman Primates by R. M. Diener; Special Manifestations of Drug Toxicity as Revealed in Nonhuman Primates: Aerosols by N. Nelson; Programs and Interests of the National Institutes of Health in the Use of Nonhuman Primates in Medical Research by W. H. Eyestone.

DISEASE

Natural herpes simplex infection in the owl monkey *(Aotus trivirgatus)*. Meléndez, L. V., España, C., Hunt, R. D., Daniel, M. D., & García, F. G. (New England Regional Primate Research Center, Harvard Med. Sch., Southborough, Mass.) *Laboratory Animal Care*, 1969, *19*, 38-45.

Herpesvirus hominis was isolated in 2 different laboratories from owl monkeys with a spontaneous highly fatal disease. The virus was recovered from conjunctival and nasal secretions, tongue, salivary glands, heart blood, lung, spleen, adrenal glands, and kidney, indicating that these animals died of a generalized infection. The virus was identified as *Herpesvirus hominis* by the production of a characteristic cytopathic effect in tissue culture, well defined intranuclear inclusion bodies, and its reaction against specific antisera. The disease was reproduced experimentally in healthy owl monkeys which died of a systemic disease 6-8 days after corneal scarification with one of the viral isolates. Human contacts were most likely responsible for the natural disease which occurred in owl monkeys.

Antibodies to human and simian viruses in the gorilla *(Gorilla gorilla)*. Kalter, S. S., Ratner, J. J., Rodriquez, A. R., Heberling, R. L.

& Guilloud, N. B. (Div. Microbiol. & Infect. Dis., Southwest Found. Res. & Educ., San Antonio, Texas 78206) *Laboratory Animal Care*, 1969, *19*, 63-66.

Two sera collected on 14 gorillas approximately one year apart were tested for antibodies to various viruses of human and simian origin. Included among the viruses were the 3 polioviruses; 5 coxsackie type B viruses, A9 and A20; 7 echovirus types; 3 parainfluenza; 3 reoviruses; mumps; measles; human adenovirus (group antigen); respiratory syncytial; psittacosis-lymphogranuloma venereum group; Western, Eastern, and St. Louis encephalitis; lymphocytic choriomeningitis; influenza A and B; vaccinia; and 7 simian viruses. *Coxiella burnetti* and *Mycoplasma pneumoniae* were also included. Relatively few serologic positives were noted. Vaccination against the polioviruses resulted in antibody to these viruses. Natural infection was noted primarily with the reoviruses, especially type 3. Other serapositives included: coxsackievirus types A9 and A20, echovirus types 7 and 12, parainfluenza type 3, mumps and measles. The general lack of antibody is not understood at this time, but is not considered to be a reflection of the handling of these animals, nor their ability to produce antibody.

Helminth parasites of the tamarin, *Saguinus fuscicollis*. Cosgrove, G. E., Nelson, B., & Gengozian, N. (Biology Div., Oak Ridge Nat. Lab., Oak Ridge, Tenn.) *Laboratory Animal Care*, 1968, *18*, 654-656.

More than 40 species of parasites have been encountered in necropsies of 455 tamarins *(Saguinus fuscicollis* and *S. nigricollis)*. Twenty of these species have been identified, and their incidence is tabulated here. Observations on the persistence of selected species of parasites during varying period of host stay in the colony are recorded.

PHYSIOLOGY AND BEHAVIOR

Immunologic responses to blood transfusions in subhuman primates. La Salle, Marjorie, and deLannoy, C. W., Jr. (Dept. Immunology, Oregon Reg. Primate Res. Cen., Beaverton, Ore. 97005) *American Journal of Veterinary Research*, 1969, *30*, 429-434.

Procedures for collecting blood for transfusions and for typing and cross matching of donor and recipient erythrocytes were developed in connection with a blood-banking service established at the Oregon Regional Primate Research Center. Typing serums were prepared by isoimmunization and heteroimmunization of rhesus monkeys. Blood from 10 rhesus monkeys and 3 pig-tailed macaques comprised the standard panel of test cells for determining specificity of antiserums from immunized monkeys. Each serum from the recipient of a transfusion was tested for agglutinins for the donor cells. Positive test serums were then titrated against the panel of erythrocytes.

FACILITIES, CARE AND BREEDING

The establishment of a *Macaca mulatta* breeding colony. Valerio, D. A., Courtney, K. D., Miller, R. L., & Pallotta, A. J. (Bionetics Res. Labs., Inc., Falls Church, Va.) *Laboratory Animal Care*, 1968, *18*, 589-595.

Approximately 1,300 *Macaca mulatta*, pregnant and non-pregnant, were imported to establish a breeding colony. A high incidence of mortality and fetal wastage occurred among the imported pregnant monkeys. The babies that survived were of a lower birth weight than the offspring of laboratory bred monkeys. This was true for either natural or Cesarean-derived babies. Neither the high incidence of initial abortions nor Cesarean sections among the imported pregnant monkeys affected future delivery of live births or fecundity. The imported pregnant monkeys that survived were good breeders, and their breeding proficiency was equal to the monkeys which were imported nonpregnant.

Viable premature birth of *Macaca mulatta*: A review and case report. Van Pelt, L. F., St. Geme, J. W., Jr., & Keyser, P. E. (Dept. Los Angeles County Veterinarian, Los Angeles, Calif.) *Laboratory Animal Care*, 1968, *18*, 648-649.

Published reports of birth in *Macaca mulatta* are reviewed with special emphasis on prematurity and the clinical criteria used to define it. The infant described in this report was clearly an example of premature birth, based on the birth weight (290 gm, the lowest recorded birthweight for a surviving *M. mulatta*), and the duration of gestation (142 ± 1.5 days). In addition, this case is remarkable in that the infant overcame extreme prematurity without medical intervention.

Notes on pregnancy, delivery, and infant survival in captive squirrel monkeys. Hopf, S. (Max Planck Inst. Psychiatry, Dept. Primate Behavior, Munich) *Primates*, 1967, *8*, 323-332.

A survey is given on 13 pregnancies in captive squirrel monkeys including 3 reported elsewhere. Observations of sexual behavior suggest a gestation period of 24 to 26 weeks which confirms former estimations. In 8 pregnancies the presentation of the fetus was determined by X-ray and measurements on fetal growth are given. Three deliveries were observed and motion pictures in artificial or infrared light were taken. Behavior and physical changes during pregnancy, and behavior of mother, infant, and group members during delivery and early postnatal period are described. Of the

6 live born infants 4 did not survive the weaning period and 2 have not yet been weaned. Attempts to provide the monkeys with sufficient protein and to eliminate accidents are discussed.

Adequacy of liquid diets for maintenance of pig-tailed monkeys. Rahlmann, D. F., Pace, N., & Grunbaum, B. W. (Dept. Physiology-Anatomy, U. California, Berkeley, Calif.) *Laboratory Animal Care*, 1968, *18*, 631-636.

Two commercial liquid formula diets were each fed to pig-tailed monkeys as the sole source of water and nutrients for a period of 126 days. All of the 4 monkeys in the test were in positive nitrogen balance and continued to gain weight while on these diets. Water balance appeared to be adequate, and there was no indication of significant gastrointestinal dysfunction. Minor disturbances were noted when the transition was made from the liquid rations back to the standard dry diet with water *ad libitum*, but in general it was concluded that both liquid formula diets tested were adequate to maintain the pig-tailed monkey in good health for continuous periods of at least 18 weeks.

Experience with cubed diets for laboratory primates. Short, D. J. (Nat. Inst. Med. Res., The Ridgeway, Mill Hill, London, N.W.7, England) *Symposium of the Zoological Society of London*, 1968, *21*, 13-20.

Experience with feeding a cubed compound diet to monkeys from 1949-65 is described. Results of a breeding colony during the year 1962 are analyzed. Results of experiments with different diets for newly imported monkeys are shown.

ECOLOGY, FIELD STUDIES, AND TAXONOMY

Indoles, amino acids and imidazoles as an aid to primate taxonomy. Smith, I. (Courtauld Inst. Biochemistry, Middlesex Hosp. Med. Sch., London, England) In J. G. Hawkes (Ed.) *Systematics Association Special Volume No. 2. Chemotaxonomy and Serotaxonomy*. London: Academic Press, 1968. Pp. 29-37.

Analysis by paper chromatography-electrophoresis of urine and blood specimens of primates shows that distinctive species-specific patterns exist. In blood these appear as quantitative changes whereas in urine major qualitative differences appear, particularly in the indoles but also in the amino acids and imidazoles.

INSTRUMENTS AND TECHNIQUES

A commutator and cable for squirrel monkeys. Anschel, S. (Max-

Planck-Institut für Psychiatrie, München) *Physiology and Behavior*, 1968, *3*, 591-592.

A 9-channel commutator for bioelectrical recording and brain stimulation of squirrel monkeys was described. Important features of the commutator include: compact size, sealed construction, adjustable ball bearing tension, and minimal artifact. Detailed instructions for constructing a highly flexible spiral cable to be used in connection with the commutator were also given.

Techniques for telemetry of chimpanzee sleep electroencephalogram. Kripke, D. F., & Bert, J. (Aeromed. Res. Lab., Holloman Air Force Base, New Mexico 88330) *Journal of Applied Physiology*, 1968, *25*, 461-462.

To obtain sleep recordings of adult chimpanzees under undisturbed conditions, a method was devised to record electroencephalogram, electromyogram, electrooculogram, and electrocardiogram by FM telemetry. Animals were chronically implanted with stainless steel electrodes, and telemetry transmitters were placed in a Fiberglas box fixed above the skull. Multichannel physiological recordings of three adult chimpanzees were obtained.

A machine for milking baboons. Buss, D. H., & Kriewaldt, F. H. (Dept. Organic Chemistry, Div. Biol. Growth & Development, Southwest Foundation Res. & Educ., San Antonio, Texas) *Laboratory Animal Care*, 1968, *18*, 644-647.

A simple milking machine has been developed which facilitates the milking of baboons and minimizes trauma to their mammary tissue. Its use increased the yield but did not affect the composition of the milk, except to raise the pH and ash content slightly. This effect was ascribed to incomplete rinsing of the teat-cup after sterilization.

Technique of long term cranial electrode implantation in *Macaca mulatta*. Sawyer, D. C., Rice, E. A., & Koegel, E. (Dept. Anesthesia, Sch. Med., U. California, San Francisco, Calif. 94122) *Laboratory Animal Care*, 1968, *18*, 660-665.

An implantable cranial electrode was designed to permit measurement of oxygen concentration of cerebrospinal fluid and of the electrical activity of the brain for a 6-month period in *Macaca mulatta*. The design and surgical technique are presented. The majority of implanted animals were used in terminal experiments 30-60 days following surgery. The longest period of implant was 225 days, and none of the electrodes were removed by the animals during the implantation period.

A device for measuring cigarette smoking in monkeys. Pybus, R. J., Goldfarb, T. L., & Jarvik, M. E. (Albert Einstein Coll. Med., Yeshiva U., 1300 Morris Park Avenue, Bronx, N. Y. 10461)

Journal of the Experimental Analysis of Behavior, 1969, *12*, 88-90.

Smoking behavior has been investigated very little in humans and almost not at all in animals. This paper describes a smoking device which embodies the disc-stepping principle of commercially available pellet feeders. A similar automatic machine for loading and smoking cigarettes has been produced by the American Machine and Foundry Corporation for collection and measurement of smoking products, but the technical requirements and cost are extremely high, and the machine was not designed for actual puffing by humans or animals. The present apparatus was built from readily available parts and offers a convenient and inexpensive way to study smoking behavior in animals. The device enables monkeys to smoke cigarettes in a manner approximating that seen in human beings, but obviates the need for human visual observation or lighting of cigarettes.

An inexpensive isolator for juvenile monkeys. Morton, H. L., Duvall, D., & Vallancourt, R. J. (Lederle Labs., American Cyanamid Co., Pearl River, N.Y.) *Laboratory Animal Care*, 1969, *19*, 111-112.

An isolator designed to house juvenile rhesus or African green monkeys is described. The unit consists basically of a 55-gallon steel drum to which is attached a vinyl plastic canopy. The isolator is relatively inexpensive and is recommended for specific-pathogen-free work.

Implantation of multilead electrode assemblies and radio stimulation of the brain in chimpanzees. Delgado, J. M. R., Bradley, R. J., Johnston, V. S., Weiss, G., & Wallace, J. D. (Dept. Psychiatry, Yale U. Sch. Med., New Haven, Conn.) Technical Report No. ARL-TR-69-2, 6571st Aeromed. Res. Lab., Holloman Air Force Base, New Mexico, 1969.

This report describes the technology developed for intracerebral implantation of multiple electrodes in the chimpanzee and subsequent multichannel radio stimulation and telemetric recording of brain activity. In conjunction with this study a photographic-histological technique has been evolved for serial analysis during stereotaxic sectioning of the brain.

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