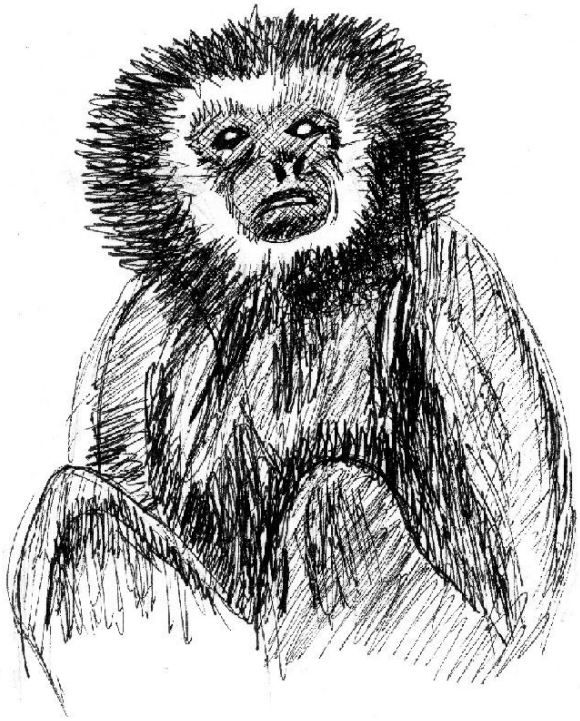
LABORATORY PRIMATE NEWSLETTER

Vol. 44, No. 4 October 2005



Published Quarterly by the Schrier Research Laboratory
Psychology Department, Brown University
Providence, Rhode Island
ISSN 0023-6861

POLICY STATEMENT

The *Laboratory Primate Newsletter* provides a central source of information about nonhuman primates and related matters to scientists who use these animals in their research and those whose work supports such research. The *Newsletter* (1) provides information on care and breeding 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, research articles or summaries accepted for the *Newsletter* have some practical implications or 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 $5.00 each. We are no longer printing paper issues, except those we will send to subscribers who have paid in advance. We will not accept future subscriptions, unless subscribers are willing to pay $60/year within the U.S.; $80/year outside the U.S. (Please make checks payable to Brown University.) Readers with access to electronic mail may receive the nongraphic contents of each issue by sending the message **subscribe LPN-L your-own-name** to **listserv@listserv.brown.edu** (Send the message **subscribe LPN-PEF** to receive PDF files by e-mail; or the message **subscribe LPN-WARN** to receive a notice when a new issue is put on the Website.) Current and back issues of the *Newsletter* are available on the World Wide Web at <http://www.brown.edu/primate>. Persons who have absolutely no access to the Web, or to the electronic mailing, may ask to have paper copies sent to them.

The publication lag is typically no longer than the three 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 tenth of December, March, June, or September, depending on which issue is scheduled to appear next. Reprints will not be supplied under any circumstances, but authors may reproduce their own articles in any quantity.

PREPARATION OF ARTICLES FOR THE *NEWSLETTER.* – Articles, notes, and announcements may be submitted by mail, e-mail, or computer disk, but a printed copy of manuscripts of any length or complexity should *also* be sent by regular mail. Articles in the References section should be referred to in the text by author(s) and date of publication, e.g., 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*, the scientific names used will be those in *Mammal Species of The World: A Taxonomic and Geographic Reference,* 2nd Ed. D. E. Wilson & D. M. Reeder (Eds.). Washington, DC: Smithsonian Institution Press, 1993. For an introduction to and review of primate nomenclature see the chapter by Maryeva Terry in A. M. Schrier (Ed.), *Behavioral Primatology: Advances in Research and Theory* (Vol. 1). Hillsdale, NJ: Lawrence Erlbaum Associates, 1977.

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ACKNOWLEDGMENTS

The *Newsletter* is supported by U. S. Public Health Service Grant RR-00419
from the Comparative Medicine Program, National Center for Research Resources, N.I.H.

Cover illustration of *Hylobates lar* by Anne Richardson,
in memory of Beanie.

The Future of the *Laboratory Primate Newsletter*

Dear Friends and Colleagues,

In Volume 1, number 1 (January, 1962) of the *Laboratory Primate Newsletter*, Allan Schrier wrote: "The primary purpose of the *Newsletter* is an exchange of *practical* information about subhuman primates. Short descriptions of current psychological, psychophysiological, or physiological research will also be accepted. Examples of the kind of information that would be useful include: new drugs, novel aspects of cage design, new products that might be of interest, evaluations of various products, references to or short summaries of articles, off-beat or other, of general interest, experiences in connection with the procurement of monkeys..."

For the first year and a quarter of publication, the Psychology Department here at Brown University supported the *LPN*, providing paper, postage stamps, and the use of a typewriter and mimeograph machine. The current Editor, Judith, did the typing.

In Volume 2, number 2 (April, 1963), Allan stated, "The *Newsletter* is supported in part by a Grant from the National Institute of Mental Health, U.S. Public Health Service." He also thanked Fred Stollnitz for his "considerable help in the preparation of this, as well as previous, issues of the *Newsletter*."

Starting with Volume 7, number 1 (January, 1968), support came from a U.S. Public Health Service Grant from the Division of Research Facilities and Resources (later the National Center for Research Resources), N.I.H., and has continued, through Allan's death, until the present.

However, as many of you have heard, the National Center for Research Resources has declined to continue to support the *LPN* after this year. We have received a "bridge grant" which will end in March, 2006 (Volume 45, number 2). After that, We will be dependent on charity, as it were. The Brown University Psychology Department has offered to let Us keep Our office and computer account. Three of Our readers, who wish to be anonymous, have persuaded their employer (who also wishes to be anonymous) to make an annual donation. Judith has agreed to donate her time and effort. Elva is willing to do the same, but We hope to be able to continue to pay her extremely small salary. The rest of the Editorial Board have always been volunteers.

The *LPN*, as you know, is now nearly completely electronic. About 650 subscribers receive plain text files, and about 40 receive PDF files, by e-mail; another 160 receive a message telling them when a new issue is available on our Website, <www.brown.edu/primate>.

We are hoping (here comes the pitch) that there are a few, or even several, other companies who would be willing to make an annual donation to enable us to continue to keep the *LPN* alive. We would be happy to list such contributors – or keep them anonymous, as they wish.

We would also like to encourage anyone who would like to purchase a complete set (or even a partial set) of back issues. We are now charging $10/issue for back issues, but would certainly set a "bulk rate" for anyone who wanted 25 issues or more.

And please consider buying several copies of one back issue as a classroom tool. Our list of overstocked issues is: <www.brown.edu/primate/too_many.html>.

We would like to thank, again and again, the researchers, veterinarians, and caretakers who send us articles and notices to publish, and the readers who send us encouragement.

Sincerely,
Judith E. Schrier, Editor
Laboratory Primate Newsletter

* * *

Effects of Cage-Mounted Enrichment on Behavior of a Group of Juvenile Baboons (*Papio anubis*)

Jessica Mikels and Janette Wallis
University of Oklahoma and American University of Nigeria

Introduction

Federal law mandates that primates in laboratory settings be afforded care and housing that is beneficial for both their physical and psychological well-being (USDA, 1985). In addition to the legal requirements, there is a significant amount of sound research demonstrating the benefits of enrichment to the health of captive primates (e.g., Bayne, et al., 1991; Brinkman, 1996; Reinhardt, 1990; Watson, et al., 1989; as well as many other articles in the *LPN* and other journals). Many of the currently available enrichment studies have demonstrated the importance of enrichment for singly-caged animals (e.g., Bayne, et al., 1991; Hienz, et al., 1998; Kessel & Brent, 1998). They are in need of more enrichment as their days are often spent somewhat isolated from conspecifics, although the ideal for captive housing of primates is in social groups (National Research Council, 1998). Even with group housing the environment in a laboratory setting can be under-stimulating for such intelligent animals. Therefore, the environment can be further enhanced with varying forms of enrichment (Fritz & Howell, 1993; Schapiro & Bloomsmith, 1994; Taylor, et al., 1997). This can take the form of food treats, climbing structures, and in-cage toys, as well as items mounted to the front of the cage.

The benefit of mounting items to the front of the cage, to be manipulated by the animals through the cage bars, is that these items can be rotated and changed regularly. Enrichment can be moved before the animals become habituated to and bored with the items, which reduces their benefit (Hienz, et al., 2000; Sambrook & Buchanan-Smith, 1996; Tustin, et al., 1996; Watson, et al., 1989). The primary goal of this paper is to present a toy that can be added to the usual enrichment items. It is inexpensive and easy to rotate between cages, which is ideal for facilities with large numbers of animals and/or limited enrichment budgets (Beirise & Reinhardt, 1992; Reinhardt, 1994).

In this study, we observed how a group of juvenile female baboons (*Papio anubis*), housed together for a study unrelated to our own, behaved when they were offered cage-mounted enrichment devices. We compared their behavior with and without the enrichment to see how the presence of the enrichment affected both their social and object-directed behaviors. Our results suggest that offering group-housed primates novel enrichment for a limited amount of time each day provides them with new activities and may help to reduce aggressive behavior.

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Methods

The subjects were eight juvenile female baboons, residing at the University of Oklahoma Health Sciences Center. All were reared by their mothers in large social groups, and were pulled from those groups at approximately two years of age for a short-term, non-invasive study, unrelated to our own. The group was housed in an indoor enclosure measuring 3.5 x 2 x 3.25 m. The interior of the cage was fairly bare, consisting of areas for sitting along the walls. Large swings in the center provided more area for sitting and lounging. The group was fed a diet of Harlan monkey biscuits supplemented with fruits and other food treats.

Observations were conducted at approximately 11:30 a.m., after the morning feeding and cleaning were completed. No food was present during the observations. All occurrences of select social behaviors and behaviors directed at the environment (*Table 1*) were recorded during 20-minute observations in the presence (n=12) or absence (n=14) of the cage-mounted enrichment.

Affiliative social behaviors	Play	play stance, initiate play, play chase, rough and tumble play
	Grooming	all social grooming
	Other affiliative behaviors	approach, lip smack, present, inspect, touch
Agonistic social behaviors	Aggressive behaviors	approach/avoid, chase (non-play), bite, eye flash
	Other agonistic behaviors	approach/move-away, displace
Non-social behaviors	Behaviors directed at the environment	lick or pick at wall, floor, or cage front

Table 1: Behavioral categories and examples of behaviors.

Two sample t-tests, with $p < 0.05$, were used to evaluate how the presence of these enrichment devices affected the subjects' behavior.

Creating the Activity Boards

We referred to these cage-mounted enrichment devices as activity boards. Wire mesh shelving was cut to the desired dimensions and secured in the shape of a box with heavy-duty plastic cable ties (*Figure 1*). The depth of

the boxes was based on how far the animals could reach out of the cage so that the toys were easily accessible, but not so close that the animals could pull them into the cage.

Figure 1: Example of an activity board mounted to the front of the cage.

A variety of items were then attached to these boxes, also using plastic cable ties. We found the cable ties to be easy to work with and quite strong. (These activity boards were offered to animals throughout the building, including adult male baboons.) Some of the items that were attached included: preassembled human infant crib activity centers (manufactured by Fisher-Price, etc.; *Figure 2-A*); responsive toys that would either light up or begin to make noise when a button was pressed (*Figure 2-B, C* and *D*); and toys that could be turned (*Figure 2-C*). On some of the activity boards we included mirrored acrylic. We also attached two-inch PVC caps for sticky treats (caps were left empty for the purpose of this study; *Figure 2-B* and *C*).

Figure 2: Four activity boards, labeled A, B, C and D, demonstrating a variety of different toy combinations.

Boards were then attached to the front of the cages with easy-to-use latch hooks. These also proved to be highly durable, as well as easily and quickly attached and removed (*Figure 1*). Cleaning of the boards was also quite convenient. Most items could be sent through large cage washers still attached. Those items that required batteries were first removed from the board, disinfected by hand, and then reattached once the board was clean.

Results

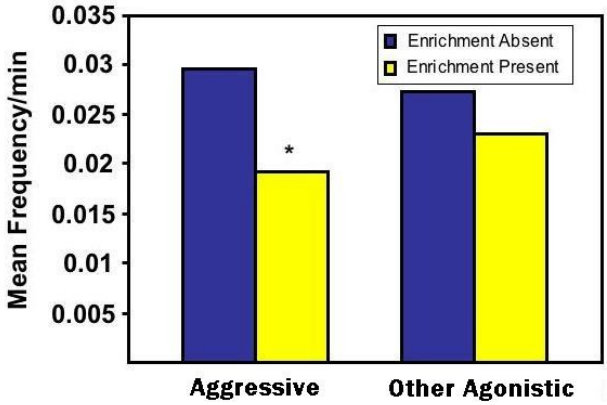

Figure 3: Occurrence of aggressive* ($t = 2.61$, $p < 0.05$) and other agonistic ($t = 0.96$, $p = 0.37$) behaviors with and without activity boards present.

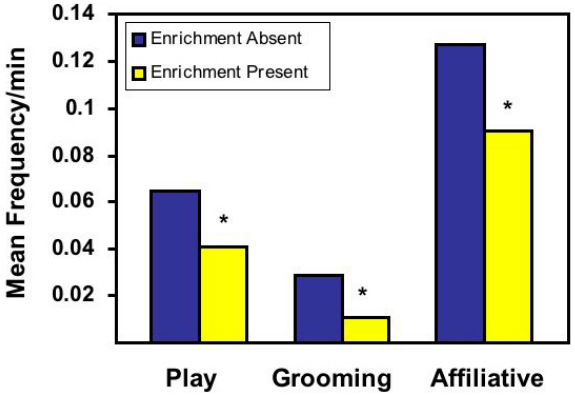

Figure 4: Occurrence of play* ($t = 2.44$, $p < 0.05$), grooming* ($t = 3.47$, $p < 0.05$) and affiliative* ($t = 2.4$, $p < 0.05$) behaviors with and without activity boards present.

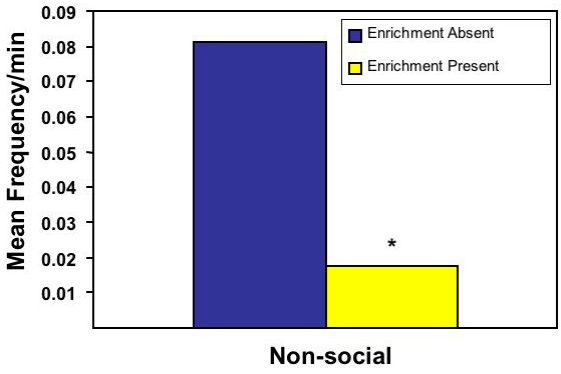

Figure 5: Occurrence of non-social* ($t = 6.16$, $p < 0.0005$) behaviors with and without activity boards present.

Aggressive behaviors* decreased significantly when the enrichment was present ($t = 2.61$, $p < 0.05$). Other agonistic behaviors, however, did not show a significant decrease ($t = 0.96$, $p = 0.37$) (*Figure 3*). Affiliative social

behaviors decreased significantly when the enrichment was present (play behaviors* $t = 2.44$, $p < 0.05$; grooming * $t = 3.47$, $p < 0.05$; and all other affiliative behaviors* $t = 2.4$, $p < 0.05$) (*Figure 4*). Finally, non-social, object-directed behaviors*, including repetitively licking the floor or wall, decreased the most when the boards were present ($t = 6.16$, $p < 0.0005$) (*Figure 5*).

The presence of activity boards significantly altered the social behaviors of this group of baboons, including decreasing their aggressive behaviors. In addition, repetitive, non-social behaviors showed a dramatic decrease when the activity boards were present.

Discussion

Due to the return of this group of females to their natal groups, this study was short-term. However, we did observe significant differences in some behaviors as a result of the presence of the activity boards. Though the decrease in affiliative social behaviors, such as grooming and play, may not be viewed as beneficial to the animals, we feel that offering the activity boards for short amounts of time each day (two hours or less) provides the animals with variety in their environment, which is beneficial. Social behaviors did not remain at a low level; the activity boards simply offered an alternative activity for these animals when they were present. The decrease in aggression is of course beneficial. Though we did not strictly analyze individual access to the boards, our observations suggested that the lower-ranking females in this small group benefited from the presence of the enrichment. Though they did not have priority of access to the enrichment devices, the more dominant females would generally not act aggressively towards them when they were occupied with the boards. Also, we feel that the decrease in repetitive, non-social behaviors is beneficial. These behaviors often appeared to result from boredom and the enrichment offered the animals something else to do.

Activity boards are easy to make and cost little. For a facility with large numbers of animals these factors are important when creating new enrichments. In addition, the cage-front mounting allows for easy removal for cleaning and rotation from cage to cage, providing a novel effect with the enrichment. A further benefit of these enrichment boxes is that they can be assembled in varying ways, making each enrichment box a unique toy for the animals.

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Shifting Gibbons from One Cage to Another

Laurie McGivern
Dallas Zoo

A question about getting gibbons to move from an exhibit area to a holding cage (and back) was raised on the American Zoo Association discussion list. By a "slip of the keyboard", the following response was sent to the Zoo-Biology discussion list, which your Editors monitor. With Laurie's permission, We are publishing this.

At a previous job I worked with a pair of white-handed gibbons that refused to shift from their exhibit area into their holding area. The female was very aggressive and we could not enter the exhibit if she was in it. All of the shift doors (*a* and *b* in figure) in the gibbon area are metal guillotines with a cable attached that threads through overhead pulleys to allow remote operation. My first experience trying to shift them was standing in the public area on a busy Sunday afternoon (contractors were coming on Monday morning) holding a cable that had been threaded through a hole in the holding wall (*f* in figure), with my face pressed against the wall, trying to peer through another ½-inch hole. After about an hour I was successful at trapping the gibbons, but was personally humiliated.

The gibbons had 24-hour access to both their holding and exhibit areas. The male was not difficult to shift, but the female was extremely wary. She would usually wait (even though she dominated) until he ate and started to leave before she would enter. I began by changing the time I fed them and worked with them four or five times a day, possibly more. I would lock them out of holding and clean it first, so they knew what to expect. Then I would put out their morning diet (produce, novel foods, and canned primate diet), let them in, and stand in the doorway and interact with them. The male quickly learned to just go and eat and then come back and visit with me in the chute 3-4 feet from the shift door. The female would hang out just inside the door. To access their feeding platform (*c* in figure) they had to go through a tunnel (*d* in figure, with a built-in squeeze) and through another chute, or drop from the exhibit door (about 6 ½ feet high) to a ground-level chute that led directly to the feeding platform. Even to trap them required that the female be on the ground and through the first door.

If the female didn't shift, I locked them back on exhibit and removed the produce and novel food, leaving them with primate diet only (not a preferred item). I did this every time I tried to shift them. I would also reward the female for venturing away from the shift door, but with small amounts of fruit.

Basically the only fruit and treats she got came from me. It took a couple of months, but she finally relaxed enough so that she would consistently drop down and go in to eat, almost always within a minute of getting access. Of course, initially I made sure that lock-ins were very brief and put a lot of treats in the exhibit for their return.

Zoo personnel were moved around a lot and I didn't work with the gibbons for a year or so. Some of the other keepers had been successful in shifting them, but not everyone was patient enough and, when the weather was nice, found it easier to lure them to their outdoor exhibit and lock them completely out of the building. Retraining them probably took three weeks or so when I returned. Eventually I was able to do quite a bit of tactile work through the mesh and was also able to close them into the squeeze (*e* in figure) for vaccinations and still have them shift reliably.

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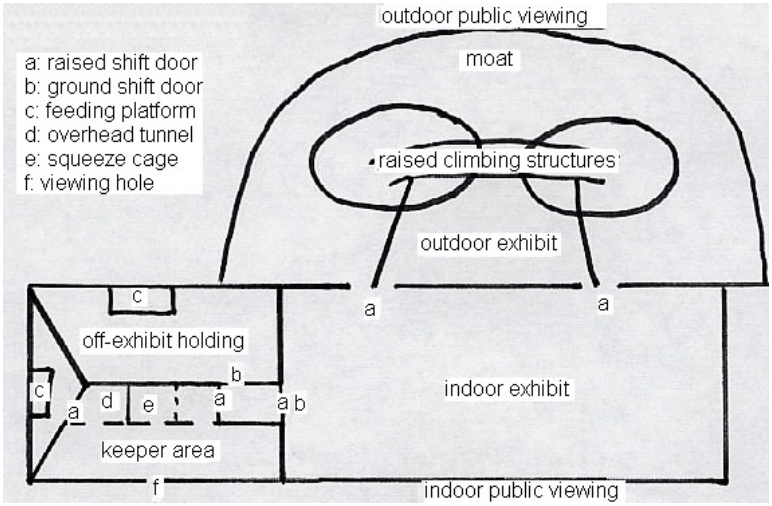

A Level Playing Field: Regulations for Laboratories and Sanctuaries

Joseph M. Erwin
Foundation for Comparative and Conservation Biology

Here at the very beginning I want to congratulate Linda Koebner and Linda Brent on the development of Chimp Haven. They have taken on a tough challenge, but have worked in ways that should result in a sustainable haven for the chimpanzees who come under their care. I also want to praise Patti Ragan for developing the Center for Great Apes in Florida. At the same time I wish success to Carol Noon and others in the "Save the Chimps" organization that obtained the Coulston Foundation's White Sands Research Center in Alamogordo and the chimpanzees that remained there. The new facility in Florida certainly sounds impressive, and I hope it works well and can be made sustainable over the long run.

I am aware that the "Chimp Act" requires that any sanctuary funded under it must be subject to USDA enforcement of the Animal Welfare Act. For some strange reason, chimpanzees in sanctuaries otherwise funded are not protected under the Animal Welfare Act. In my opinion, that should be changed. In fact, it seems to me that ALL chimpanzees and possibly all primates should receive federal protection.

It is just incredible that activists and their organizations should repeatedly bring allegations of AWA violations or inadequate veterinary programs against zoos and research institutions as a means of eroding credibility or status, while institutions run as "sanctuaries" or by anti-science organizations are not required to have any veterinary program at all, or even to meet minimum standards regarding cleanliness and care.

Minimum standards are pretty minimal – and I'm all for attempting to reach optimal practices – but no one, regardless of their intentions, or the urgency of their work or cause, should be exempt at least from meeting or exceeding that bare minimum.

I have been accurately quoted as saying: "It is my impression that there is no chimpanzee on earth from which humans cannot learn something useful – without in any way compromising the health or well-being of any individual chimpanzee." Of course, that is not all I said in an interview that took more than two hours. It seems terribly short-sighted to ban all research on chimpanzees, as if all scientific research were an evil to be shunned.

The point that seems very difficult to get across to some laboratory animal scientists is that chimpanzees are not lab rats. There is no reason that they should be housed or treated as if they were. Just as there are appropriate guidelines for research involving human subjects, there can and should be special considerations regarding the great apes and other primates. Due consideration should be the basis of our ethical responsibility.

Abandoning scientific research and retreating into ignorance is not in the best interests of chimpanzees or other primates. One of our primary obligations to our nearest relatives when they have been removed from nature (and even to some extent while they remain in the wild) is provision of excellent health care, and monitoring health in ways that promote and improve the quality of care that we can provide (See Erwin et al., 2000, 2002a,b).

Housing of chimpanzees in the best of zoos and the best of sanctuaries is entirely compatible with conducting appropriate research that can benefit chimpanzees while amplifying our understanding of them and thus advancing understanding of humans by direct comparison. The use of post-mortem specimens from humans and chimpanzees can be very informative and entirely ethical.

In fact, the case could be made that such investigations are an ethical obligation.

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* * *

Gerald C. Ruppenthal, 1940-2005

Gerald C. Ruppenthal passed away on July 30, 2005, at his home. Gerry was the world's leading expert on raising newborn and infant monkeys under nursery conditions. He was especially noted for developing procedures to save and raise newborn animals that were at risk for medical or behavioral problems due to low birth weight, prematurity, or abuse by their mothers or social group members. These credentials earned him the Senior Research Award for Biology and Conservation from the American Society of Primatologists in 1991.

Gerry was also noted as a dedicated teacher of monkey care and behavior. He trained hundreds of students and professional researchers to handle, care for, and study monkeys while he was the head of the Infant Primate Research Laboratory at the University of Washington from 1971 until 2001, when he moved to Wisconsin. He published numerous articles and edited a book, *Nursery Care of Nonhuman Primates* (1979), which is still the standard reference on nursery care of nonhuman primates. Additionally, he remained a consultant to the National Institutes of Health until his passing.

"Gerry will be sadly missed by all those who knew him both professionally and personally." *From the* Wisconsin State Journal, *August 7, 2005*

* * *

Jan Moor-Jankowski, 1924-2005

Jan Moor-Jankowski, a scientist known for groundbreaking immunology work with chimpanzees and whose life was defined by many impassioned battles, from fighting Nazis in his native Poland to defending press freedoms to exposing animal abuse, died on August 27 at his home in Manhattan. He was 81. The cause was a stroke, his wife, Deborah, said.

Dr. Moor-Jankowski, working mainly at New York University's Laboratory for Experimental Medicine and Surgery in Primates (LEMSIP), was a pioneer in using chimpanzees and other primates for medical research, and his accomplishments included helping develop the first hepatitis B vaccine, conceiving techniques to freeze blood for storage, and carrying out pregnancy studies that drew the attention of drug companies worldwide. He was elected to the French Academy of Medicine in 1995, succeeding Linus Pauling, who had died a year earlier, as the only American member.

Dr. Moor-Jankowski was the founder and first editor of *The Journal of Medical Primatology*. He came to the United States in 1963 and was recruited by NYU to start a primate center (LEMSIP).

He was dismissed by NYU on Aug. 9, 1995, the day after the United States Department of Agriculture, which regulates animal care, told the university that he had reported violations at another of its labs. He had been a member of the university's animal use oversight committee.

At the end of his career, Dr. Moor-Jankowski began to doubt the necessity of using primates for experiments. But his passion for openness and cleanliness in animal research had impressed animal rights groups throughout his career. The militant People for the Ethical Treatment of Animals once gave him 200 coconuts for his chimps. – *by Douglas Martin, in the* New York Times, *September 3, 2005*

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Planned 2006 Revision of *Directory of Graduate Programs in Primatology and Primate Research*

An updated *Directory* will be published in the January, 2006, issue of the *Laboratory Primate Newsletter*. If you wish your program to be represented in this *Directory* or to revise your present entry, please send us the necessary information, following the format shown here as closely as possible. Return the information as soon as possible, but not later than December 1, 2005, to the *Laboratory Primate Newsletter*, Psychology Department, Box 1853, Brown University, Providence, RI 02912 [e-mail: *primate@brown.edu*]. Please note that the *Directory* is not intended for postdoctoral programs, though any such sent to us will be listed separately.

For examples, see the 2004 *Directory* in the *LPN*, *43*[1], 49-56; or see <www.brown.edu/primate/directory.html> or <www.brown.edu/primate/lpn43-1.pdf>.

Recommended format:

1. State:
2. Institution:
3. Division, Section, or Department:
4. Program Name and/or Description:
5. Faculty and Their Specialties:
6. Address for Further Information:

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Primates de las Américas... La Página

Estimados amigos y lectores, en este número se presentan dos resúmenes, el primero realizado en Pará, Brasil y el segundo en Lago Guri, Venezuela. Igualmente, queremos anunciar nuestra despedida de esta sección primatológica al cumplir con nuestro ciclo en esta labor editorial y entrar en plenos procesos de escritura (T. U-H.) y de trabajo de campo (B. U.). Realmente esperamos que en los últimos dos años y medio hayan disfrutado y aprovechado los contenidos que hemos seleccionado para Uds. en cada una de los "Primates de las Américas... La Página". Un cordial saludo, Tania Urquiza-Haas [e-mail: turqheza@yahoo.com) *y Bernardo Urbani [e-mail:* burbani@uiuc.edu*].*

Comportamento de forrageio de juvenis e bionomía em um primata neotropical, o macaco-de-cheiro (*Saimiri sciureus*). Anita Stone, Programa em Ecologia e Biologia Evolutiva, Universidade de Illinois, Urbana-Champaign, EEUU (*anitastone17@yahoo.com*). Tesis de doutorado, 2004. Orientador: Dr. Paul A. Garber, Departmento de Antropologia, Universidade de Illinois, Urbana-Champaign, EEUU.

Uma questão ecológica central refere-se à evolução da idade da primeira reprodução. Os primatas são caracterizados por um crescimento lento e um período juvenil (período entre o desmame e a reprodução) mais longo entre os mamíferos. Porém, as causas e consequências desse prolongado período juvenil não são claras. As explicações propostas incluem fatores ligados diretamente à ecologia alimentar dos juvenis, tais como altos riscos de fome por causa da competição com os adultos do grupo ou o tempo necessário para o desenvolvimento das técnicas de forrageio. Outras explicações sugerem que iniciar o período de reprodução mais cedo pode diminuir o sucesso reprodutivo e que o comportamento de forrageio dos juvenis reflete a necessidade de evitar predadores como uma consequência de ter um longo período pré-reprodutivo. Este estudo examinou o comportamento de forrageio de macacos-de-cheiro, um primata neotropical de pequeno porte que possui um longo período juvenil. O comportamento alimentar de juvenis e adultos selvagens foi examinado em diferentes condições de abundância de recursos e risco de predação durante 14 meses em uma área de estudo na Amazônia Oriental, Brasil. Dados observacionais e experimentais foram coletados sobre a dieta, as técnicas de forrageio e o uso de espaço. Esses dados demonstraram muito pouca competição alimentar e poucas diferenças nas habilidades de forrageio entre adultos e juvenis. Os fatores que mais influenciaram na escolha de dieta e no uso dos recursos pelos juvenis foram as interações sociais entre os próprios juvenis e o risco de predação. Esses resultados, bem como dados comparativos de outros primatas neotropicais, não corroboram as hipóteses que sugerem que o longo período juvenil dos primatas está ligado a maiores pressões de forrageio experimentadas pelos juvenis. Fatores alternativos relacionados a estratégias reprodutivas de machos e fêmeas estão mais diretamente envolvidos na evolução da idade na qual os macacos-de-cheiro atingem a maturidade sexual.

Patrones de actividad y estructura social del mono viudo (*Pithecia pithecia*) en un fragmento de bosque en Venezuela. Natalia Ceballos-Mago, Departmento de Anatomía, Universidad de Cambridge, Reino Unido (*nc284@cam.ac.uk*). Tesis de maestría, 2004. Supervisor: Dr. David J. Chivers. Departmento de Anatomía, Universidad de Cambridge, Reino Unido.

El estudio se realizó en Isla Redonda, un fragmento de bosque de 12,8 ha ubicado en el Embalse de Guri en Venezuela. Este embalse de aproximadamente 3.919 km^2, es uno de los lagos más grandes construidos por el hombre, fue creado durante la construcción de una planta hidroeléctrica que se culminó en 1986. Esta intervención dejó a los monos en condiciones de aislamiento muy particulares rodeados de una matriz de agua. Para este estudio, los monos viudos de Isla Redonda fueron seguidos durante 15 días en agosto de 1994 y durante cuatro meses (abril-julio) en 1995. Se tomaron muestras focales con registro continuo de 10 minutos por muestra focal y se realizaron registros *ad libitum* cuando fue necesario. La mayoría de los monos viudos en la isla conformaron un grupo (n = 6-7 individuos), mientras unos pocos individuos se mantuvieron solitarios (n = 2-3 individuos). Los individuos del grupo frecuentemente persiguieron a los solitarios y algunos individuos intercambiaron su posición de solitarios a miembros del grupo y viceversa. El grupo fue cohesivo, pero 29% de los días de observación (n = 20 eventos), los individuos se separaron en dos o tres sub-grupos. Aunque la composición de los sub-grupos fue variable, dos machos adultos estuvieron juntos en un 70% de los eventos de fisión. La mayor parte de los eventos de fisión ocurrió durante el último mes de la estación seca. Esto parece estar relacionado con la búsqueda y consumo de recursos que se encuentran distribuidos en parches pequeños en la isla durante la estación seca, como es el caso de algunas semillas, insectos y hojas.

Los monos viudos presentaron un corto periodo de actividad (9,6 h). Los largos periodos de inactividad podrían estar relacionados con la ingestión de semillas con altos contenidos de lípidos y fibras. Los individuos del grupo emplearon 42% de su tiempo alimentándose, 37% quietos, 18% desplazándose y 2% en actividades sociales. Los individuos solitarios emplearon más tiempo quietos (46%) que los individuos del grupo. Se registró un patrón constante en la distribución del tiempo durante el periodo de actividad diario y se observó una disminución

del porcentaje dedicado a desplazarse durante el mes de julio que corresponde a la época de lluvia. Los monos viudos están entre los monos menos estudiados, una de las razones es lo difícil que resulta seguirlos y tomar datos por tiempos prolongados durante su periodo de actividad. Aprovechando las condiciones óptimas de observación en Isla Redonda y tomando en cuenta que los individuos no presentaron diferencias significativas en el tiempo invertido en cada actividad a lo largo del día, se realizó un análisis donde se filtraron los datos para simular una situación de observación por cortos periodos diarios. El patrón de distribución del tiempo en alimentación, inactividad, desplazamiento y actividad social obtenido al filtrar los datos, no presentó diferencias estadísticamente significativas con respecto al estimado a partir de largos periodos de observación diarios. Esto sugiere que futuras observaciones de monos viudos por cortos periodos en bosques continuos o en fragmentos de bosques podrían ser usados para estimar el patrón de distribución del tiempo. La flexibilidad en la estructura social observada en los monos viudos de Isla Redonda se propone como un factor que puede ser agregado a la lista de características de esta especie que le permiten sobrevivir por periodos de tiempo relativamente largos en fragmentos de bosques. Esta flexibilidad parece conferir una ventaja selectiva que otorga a los individuos la posibilidad de enfrentar diferentes problemas al mismo tiempo.

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Information Requested or Available

Gorilla Haven Update

There's an update dated "04 July 2005" at <www.gorilla-haven.org>, including a construction update, news on the Taiping 4, and a brief report about Jane Dewar's trip to the Limbe Wildlife Centre in Cameroon and the Petite Evengue in Gabon.

More Interesting Websites

- Borneo Orangutan Survival Foundation, U.K. (BOS-UK): <www.savetheorangutan.org.uk>
- BOS-UK's petition site: <www.sendthembackhome.org>
- CDC Public Health Image Library (PHIL): <phil.cdc.gov/phil/home.asp>
- International Bioacoustics Council (IBAC) <www.ibac.info>
- International Primate Protection League news archives: <www.ippl.org/archives.htm>
- Photos from the Balikpapan Orangutan Society project in Central Kalimantan: <www.bebo.com/pt2/1987906a808979168b33111957c340752023d61>
- Proceedings of the National Academy of Sciences, U.S.A. "in the News": <www.pnas.org/misc/news.shtml>
- National Centre for the Replacement, Refinement and Reduction of Animals in Research: <www.nc3rs.org.uk>
- Sanctuary Workers and Volunteers Association (SWAVA): <www.swava.org>

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International Workshop: African Primate Reintroduction

The Pan African Sanctuary Alliance (PASA), which represents sanctuaries in 12 African countries, in conjunction with the World Conservation Union (IUCN) and the Conservation Breeding Specialist Group (CBSG), will hold an African Primate Reintroduction Workshop on April 20-22, 2006, in the Netherlands, to gather the latest biological, ecological, virological and technical knowledge.

Apenheul Primate Park will host the workshop at its facility in Apeldoorn, with funding through a grant from the United Kingdom's Department for Environment, Food and Rural Affairs.

This workshop will bring together international scientists who are specialists in the field of behavioral ecology, primatology, and veterinary science, along with reintroduction specialists and virologists.

Three PASA members currently operate reintroduction programs. HELP-Congo began returning chimpanzees to the wild in 1996, and has reported a survival rate of 64 percent with five wild births. The Projet Protection des Gorilles (PPG) facilities in both Congo and Gabon have reintroduced gorillas, with a success rate of approximately 82 percent. It is expected that more than half of PASA's member sanctuaries – which collectively care for over 680 chimpanzees, 85 gorillas, 40 bonobos and literally hundreds of other drills, baboons and monkeys – will embark upon reintroduction programs over the next 10 years.

For more information, contact PASA [e-mail: *PASAapes@aol.com*], or see <www.panafricanprimates.org>.

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Resources Wanted and Available

Animal *Husbandry Manual Register*

The Australasian Society of Zoo Keeping (ASZK) has been working on a *Husbandry Manual Register* which can now be viewed by visiting <www.aszk.org.au> and clicking on the link in the "News and Updates" section.

Until now there has been no "central registry" where information on obtaining manuals can be freely obtained, – often this information is accessible in "Members Only" areas of Websites, unavailable to individual keepers without paying a membership fee. The ASZK is providing this service free of any charge to individuals in an effort to facilitate access to these important documents, and in doing so improve the welfare of the animals in our care.

There are details on where to obtain over 300 manuals across a range of taxons, and the *Register* also includes manuals on rearing, training, enrichment, and husbandry from around the world. Some of these can be freely downloaded directly from the ASZK Website, while for many others a link is provided to the Website where manuals can be downloaded directly. Where electronic versions are not currently known to be available, postal or e-mail contacts are provided. Please note that some of these "non-electronic" manuals may not be free.

More husbandry manual details will be added to the site over time, but if you know of any which are missing from the registry (or any changes in contact details), please contact Geoff Underwood, ASZK International Liaison Officer [e-mail: *Geoff.Underwood@aszk.org.au*].

"We hope that this service benefits both the keeping profession and the animals in our care."

First WPRC Primate Factsheets

The WPRC Library and Information Service is pleased to announce the release of the first set of l7 Primate Factsheets. Species addressed in this original release are *Aotus* spp., *Callithrix jacchus*, *C. pygmaea*, *Gorilla* sp., *Hylobates leucogenys*, *Leontopithecus chrysomelas*, *L. rosalia*, *Macaca arctoides*, *M. fascicularis*, *M. mulatta*, *M. nemestrina*, *M. nigra*, *Pan paniscus*, *P. troglodytes*, *Pongo* sp., *Saguinus Oedipus*,and *Saimiri* sp.

The Factsheets provide in-depth coverage and are organized by taxonomy, geography, morphology, ecology, behavior, and conservation, providing multiple points of access. Features include: distribution maps, hundreds of photographic images, links to audio files, hyperlinked terms that access an extensive glossary, links to related Websites, a link to a current literature search, and more. Each Factsheet is fully cited and includes a list of references; a species expert has been invited to review each Factsheet for accuracy and currency. Links to additional information within Primate Info Net (PIN) and to external sites are imbedded within the Factsheets. See <pin.primate.wisc.edu/factsheets>. Questions and comments about the PIN Factsheets can be directed to <*library@primate.wisc.edu*>.

Resources at the IVIS Website

The International Veterinary Information Service Website has a collection of textbooks, proceedings, and interactive modules that can be useful resources in the veterinary curriculum. Books available include: *Veterinary Toxicology*, by V. Beasley, at <www.ivis.org/advances/Beasley/toc.asp>; and *A Concise Review of Veterinary Virology*, by G. Carter, D. Wise, and E. Flores, at <www.ivis.org/advances/Carter/toc.asp>. New chapters have been added to the latter. These chapters, "Asfarviridae" and "Retroviridae", are available at <www.ivis.org/new.asp>. For the complete list of available books in IVIS, visit <www.ivis.org/newsredir.asp?NL=28&rul=n4>. The IVIS Website also hosts meeting proceedings: <www.ivis.org/newsredir.asp?NL=28&url=n5>.

Internet Primate Aging Database, iPAD

The National Institute on Aging (NIA) and the Wisconsin National Primate Research Center are proud to announce the release of the Internet Primate Aging Database (iPAD), a new tool for researchers interested in studying biomarkers of aging in nonhuman primates, at <ipad.primate.wisc.edu>.

iPAD provides a valuable resource for veterinarians, primate researchers, and the general public, and has already resulted in several papers published in peer-reviewed journals. With more than 500,000 data points from 17 different species at 11 research facilities, registered iPAD users can view normative values of blood chemistry, hematology, and other biomarkers of aging such as body weight. Data points are from routine screening of healthy animals at regular intervals over their lifetimes. In addition to being able to view means and standard deviations, users can access individual data points to statistically and graphically examine at the species-, biomarker-, or site-specific level for their particular research needs and are able to export and manipulate data at will.

While data are continually being added for the sites and species already in the database, the usefulness of iPAD increases as additional data are contributed. We are currently expanding the number of species and measurements included in the database and increasing the number of data points for existing species. Researchers interested in contributing data from non-experimental, healthy primates are encouraged to contact Wendy Newton [e-mail: *wnewton@primate.wisc.edu*] for more information.

News Briefs

Gorilla Attacks Keeper at Lincoln Park Zoo

A male gorilla attacked and bit an intern keeper July 5 at Lincoln Park Zoo after an apparent breakdown of safety protocols placed her in an outdoor gorilla exhibit while the animals were present. Zoo officials blamed the gorilla attack on "human error" but said they have not determined whether the intern, a 32-year-old woman, or one or more of her colleagues was to blame.

The intern, whom zoo officials declined to identify, was not seriously injured when she was attacked shortly before 10 a.m. by Kwan, the 16-year-old silverback leader of a small troop that also includes three adult females.

"Kwan exhibited behavior common to dominant males, shoving the woman down and mouthing her on the left side of her back," the zoo said in a statement. "During the encounter, she received a puncture wound on the left side of her back and a twisted ankle." The incident took place in the moated yard of the largest of three publicly viewable habitats at the Regenstein Center for African Apes, which opened to the public a year ago last week.

Zoo officials are trying to piece together what events led to the intern being in the ape yard while Kwan's group was there, said zoo spokeswoman Kelly McGrath. The attack, she said, was over in moments. The intern yelled that she was under attack, and another keeper sounded an alarm, but by then Kwan and the three females had moved into their indoor exhibit space, McGrath said. Keepers shut the access doors to keep the apes away from the intern, and she limped to safety on her own. – *Chicago* Tribune, *July 6, 2005, by William Mullen*

New NIH OLAW Staff

NIH's Office of Laboratory Animal Welfare (OLAW) has announced the appointment of Ms. Eileen Morgan to the position of Senior Assurance Officer, Division of Assurances. She has over 22 years of experience in biomedical research involving animals and most recently served in the NIH Division of Veterinary Resources, where she was an Animal Resources Program Administrator and Chief of the Facility Management Branch.

Two New Species of Lemur

Biologists have discovered two new species of lemur on Madagascar, bringing the total number of known lemur species to 49.

The first discovery was made when scientists analyzed morphological, genetic and behavioral data from distinct populations of what they thought was the giant mouse lemur. Peter Kappeler, of the German Primate Centre in Göttingen, Germany, found that the populations were actually different species and named the new one *Mirza zaza*.

The second new species is a mouse lemur, identified by morphological and genetic analyses by Robert Zingg of Zoo Zürich in Switzerland. It has been named *Microcebus lehilahytsara*. Surprisingly, it was discovered in Andasibe, a protected area on the east of the island that is considered one of the biologically best-known sites in Madagascar.

The new findings were presented on August 10 at the Congress of the European Federation for Primatology in Göttingen. – *NewScientist.com news service, August 9, 2005*

Countries to Agree to Save Ape Habitats

Nearly two dozen countries were to commit themselves Friday to saving primate habitats and stopping poaching in a historic push to protect the world's dwindling great ape populations. The Kinshasa Declaration is the culmination of a five-day conference held this week in Congo's capital. Experts warn that without urgent action, chimpanzees, orangutans, bonobos, and gorillas in Africa and Asia could disappear within a generation.

Great apes have been threatened for decades by logging, poaching, and conflict worldwide. There are believed to be about 400,000 left Africa and Asia, compared to millions in the 19th century, according to the United Nations.

Last year, experts estimated the population of eastern lowland gorillas in strife-torn eastern Congo had been cut by 70 percent in the past decade. Scientists at the Kinshasa conference specified 100 priority zones, mostly in Africa, with viable populations of the four great apes where intensive efforts could stop their slide to extinction.

However, officials at the conference say that it is only once the declaration is signed that the real work will begin. "It is all too easy to sign up to conventions," said one official. "Now these governments need to send a clear message that poaching will not be tolerated."

Ian Redmond, chief consultant for the U.N.'s Great Apes Survival Project, said the European Union had already committed US$2.4 million to great ape projects. He welcomed the contribution, but said more was needed. "We need to be talking in tens of millions of dollars," Redmond said. – *Copyright by Newsday Inc – by Anjan Sundaram, Associated Press Writer, September 9, 2005*

Positions Available

Licensed Veterinary Technician/Technologist – Bronx

The Bronx Veterans Medical Research Foundation is seeking a highly motivated individual to work in a multi-species research program. The Veterinary Technician (VT) will provide support to the Veterinary Medical Officer. The responsibilities of the VT will be surgery; surgical nursing; animal health assessment; performance of routine laboratory diagnostic procedures; transgenic colony maintenance, and management of a sentinel program. Husbandry responsibilities may be required as deemed necessary by supervisory persons.

The VT also performs a range of diagnostic support duties such as taking, recording, and reporting to the supervisor deviations in vital signs; taking specimens; and labeling specimens for the laboratory. S/he arranges and passes medical instruments and materials to medical/health professionals for a variety of diagnostic tests and procedures; makes gross visual observations and identifies subtle changes regarding the animals' condition; uses appropriate handling procedures for hazardous specimens, chemicals, etc.; adheres to safe laboratory practices for working in bio-safety environments; properly disposes of potentially infectious waste materials or other potentially hazardous waste; prepares samples of blood, tissue, urine or other organic substances, providing specimens that effectively support medical or surgical test, examination, or research procedures; and obtains samples of blood, tissue, organ, or other body fluids or substances.

The VT also ensures that safe and humane processes are used, with critical concern for the donor and for the quality of the specimen; uses standard aseptic procedures and safeguards; prepares slides, smears, cultures, etc., of extremely delicate or otherwise volatile specimens, using critical concern for the quality of the specimen, given the procedure to be used for test or examination; controls receipt, storage, and preparation of specimens; and ensures appropriate accountability for all specimens received/created for test or examination by the laboratory.

Nonhuman primate and transgenic experience is a plus, as are good surgical skills. A NY State license or license-eligiblity is desired. For information or to apply, contact Richard Mann, Veterinary Medical Officer (151), Dept of Veterans Affairs Med. Ctr, 130 West Kingsbridge Rd., Bronx, NY 10468 [718-584-9000, ext 1708; fax: 718-562-9120; e-mail: *richard.mann@med.va.gov*].

Environmental Enrichment Coordinator

The Animal Resources Program (ARP) of Wake Forest University is seeking an Environmental Enrichment Coordinator (EEC) to join their team. Under general supervision from the Program Director, the EEC will serve as liaison between the ARP, the Animal Care and Use Committee, and investigators and staff to apply an environmental enrichment plan for multiple species of research animals. The EEC will assist in the education and training of faculty and staff, serve as an institutional resource for current practices and regulatory requirements, and help devise solutions and modifications to the program to enhance well-being while allowing research requirements to be met. Minimum qualifications include university graduation with a major in the behavioral, biological, and/or physical sciences and two years of related experience; OR, a master's degree in a behavioral, biological, or physical science; a thorough knowledge and competence in working with computers; excellent communication skills (written and verbal); and a service-oriented attitude. Additional desired qualifications: experience working with nonhuman primates, a working knowledge of animal welfare regulations and guidelines, and technician certification by the American Association for Laboratory Animal Science (AALAS). Local travel between several campuses is required.

For consideration, please submit a letter of intent, resume, and the names and contact information of three references to: Janice D. Wagner, Assistant Director – Friedberg Campus, Animal Resources Program, Wake Forest Univ. School of Medicine, Medical Center Blvd., Winston-Salem, NC 27157 [fax: 336-716-1501; e-mail: *jwagner@wfubmc.edu*]. In addition, the Institution requires that you submit an official application online (with attached resume). Please go to
<www.hrfin.wfubmc.edu:8001/hepro/wfuhsjobs.htm>
and select the job category "Laboratory/Animal Care"; then select "Environmental Enrichment Coord" and follow the instructions. Wake Forest University is an AA/EOE.

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Meeting Announcements

The **Association of Primate Veterinarians** will meet November 3-5, 2005, in St Louis, Missouri. See <www.primatevets.org>.

The Anthropological Institute and Museum of the Universität Zürich has organized a **Scientific Symposium** to be held November 4-5, 2005, in honor of the 75th birthday of the famous primatologist and ethologist Professor Emeritus Dr. Hans Kummer. For information, see <www.aim.unizh.ch/Trends/Invitation.html>.

The Scientists Center for Animal Welfare's **IACUC-Advanced Winter Conference**, "Institutional Challenges in a Changing World: How Will IACUC's and Scientists Meet the Challenge?" will be held December 5-6, 2005, in San Antonio, Texas. For information, see <www.scaw.com>.

The **International Primate Protection League** will hold its biennial conference at its headquarters in Summerville, South Carolina, March 24-26, 2006. The program will be announced later. Contact Shirley McGreal [e-mail: *smcgreal@ippl.org*]; or see <www.ippl.org>.

The **Second International Congress of Zookeeping** (ICZ) will be held May 7-11, 2006, in Gold Coast, Queensland, Australia. For more information, please visit <www.iczoo.org>, send a blank e-mail to <*ICZ_News-subscribe@yahoogroups.com*> for regular updates on this event, or contact Geoff Underwood [e-mail: *Geoff.Underwood@aszk.org.au*].

The **2006 International Gorilla Workshop** will be held June 23-26 at the Paignton Zoo, Devon, England. Gorilla workers from all disciplines are invited to register. The deadline for submission of abstracts for presentation and for early registration is December 31, 2005. Further information and registration details are available at <www.paigntonzoo.org.uk/gorillas/gorillaworkshop.htm>.

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Research and Educational Opportunities

Postdoctoral Fellow – Botswana

Dorothy Cheney and Robert Seyfarth are looking for a postdoctoral fellow to join their research project on social behavior and communication of baboons in the Moremi Game Reserve, Okavango Delta, Botswana. The position will be for two years, approximately half of which would be spent in the field and half at the University of Pennsylvania. Applicants should have received the PhD and be ready to go into the field in approximately February, 2006. They should already have extensive field experience studying either nonhuman primates or other animals in their natural habitat and be comfortable working in a very remote area. For reasons of safety and the logistics of field experiments, their most successful applicants in the past have been couples who work together in the field as a team.

"We will give strong preference to such applicants. Unfortunately, however, our grant permits us to pay for only one person's stipend. If you are interested in this position, please refer to our Website, at <www.bio.upenn.edu/faculty/cheney> or <www.psych.upenn.edu/~seyfarth>, which provides an overview of our current research and publications. Interested applicants should then contact one of us by e-mail [*cheney@sas.upenn.edu* or *seyfarth@psych.upenn.edu*] and arrange for two or three referees to write to us, either by e-mail or to: Dorothy Cheney, Dept of Biology, Univ. of Pennsylvania, Philadelphia, PA 19104 [fax: 215-898-8780]."

Behavioral Research Intern – Lincoln Park Zoo

Lincoln Park Zoo is seeking an intern to work at the Regenstein Center for African Apes at Lincoln Park Zoo as part of the Lester E. Fisher Center for the Study and Conservation of Apes. This person will collect observational data for ongoing studies managed by the Behavior Research Specialist and other staff scientists. Scoring behaviors from live observations or video recordings, as well as data organization, data entry, and data management may also be included as part of the duties as necessary. This person will ensure high quality data through careful and diligent work habits.

Requirements include a bachelor's degree in biology, zoology, anthropology, animal science, psychology, or a related field. Some experience or equivalent course work in animal behavior is highly preferred. Adequate working skills with Microsoft Excel and the willingness to learn new software and use technology as part of regular duties are necessary, as well as availability for work Monday through Friday, 35 hours per week.

There will be a salary of $10/hour. The appointment is for one year, with the possibility of extension. Please send resume, cover letter, and application to: Lincoln Park Zoo, Human Resources (Primate Research Intern), P.O. Box 14903, Chicago, IL 60614 [fax: 312-742-2299]. Also see our Website at <www.lpzoo.com>. Lincoln Park Zoo is an Equal Opportunity Employer.

Grants Available

Fyssen Foundation Research Grants

The aim of the Fyssen Foundation is to "encourage all forms of scientific inquiry into cognitive mechanisms, including thought and reasoning, which underlie animal and human behavior; their biological and cultural bases; and phylogenetic and ontogenetic development." The Foundation supports research in ethology, psychology, neurobiology, anthropology, ethnology, human paleontology, and archeology.

The Foundation will award research grants to support postdoctoral researchers, under 35 years of age in the biological sciences and under 40 years of age in the human sciences, who wish to work independently by establishing around them a research team to achieve a collective scientific operation in a laboratory *in France*, and who will work in keeping with the Foundation's goals. Priority will be given to researchers who will develop their project in a laboratory other than those in which they received their doctorate and are presently working.

The grant can range from 15,000 to 30,000 Euros without renewal. Financing for equipment above 7500 Euros is excluded. One year after the award, the researchers will have to provide a detailed financial report about the use of the grant and a short scientific report in French.

Applications should consist of: • a "Research Grant" form, downloaded from <www.fondation-fyssen.org>; • a letter from the inviting laboratory, including the original copy; • recommendation letters from two senior scientists outside the inviting laboratory, including original copies; • applicant's CV and list of publications; • description of the research project (5 to 10 pages); • description of the budget; • names of people who have been approached about working on the project; • a list of other financial requests; and • a 1-page summary of the research project in French AND in English. Send 15 copies of the proposal to: Secrétariat de la Fondation Fyssen, 194 rue de Rivoli, 75001 Paris, France. Proposals must be received by October 31, 2005.

Beeson Career Development Awards in Aging

The National Institute on Aging (NIA), the NIH Office of Dietary Supplements (ODS), and several foundations are collaborating on an initiative to sustain and promote the research careers of clinically trained individuals who are pursuing research careers in aging. The program is named after Dr. Paul B. Beeson, who has profoundly influenced the career paths of many physicians, including several who now form the core leadership in geriatric medicine.

This program provides three to five years of mentored career development support to clinically trained faculty members in strong research environments to enable them to gain skills and experience in aging research under the guidance of a mentor or mentors, and to establish an independent program of research in this field. It also includes an annual meeting that allows opportunities to partner with national mentors and fellow awardees.

Eligible principal investigators include individuals with a clinical doctoral degree who have completed specialty training, who are U.S. citizens or permanent residents of the U.S. by the time of award, and who have not received R01 or similar support as a principal investigator.

The proposed training and research must focus on clinically relevant research on aging and/or the aged. The research project may be in the basic sciences, use animal models, or employ primary or secondary data analysis as well as clinical and patient-focused methods. The full range of research methods appropriate to completing the proposed investigation is encouraged, provided that the application makes clear the clinical relevance of the proposed work. ODS/NIH has particular interests in the roles of dietary supplements in preventing and reducing risk factors for disease and in enhancing physical and mental health and performance. ODS is also interested in research exploring the biochemical and physiological effects of supplements and in improved scientific methods for the study of dietary supplements. Research on these interests as they relate to the health and performance of older adults is particularly encouraged.

Ten to 12 awards are anticipated; awards will be made for three, four, or five years; applicants may seek up to $200,000 (direct costs) per year (direct costs requested across all years may be no more than $600,000 for three-year awards; $700,000 for four-year awards; and $800,000 for five-year awards); the anticipated start date is June 1, 2006. Foreign organizations are not eligible to apply .

The PHS 398 application instructions are available at <grants.nih.gov/grants/funding/phs398/phs398.html>. For further assistance contact GrantsInfo [301-435-0714; e-mail: *grantsinfo@nih.gov*]. The letter of intent receipt date is October 24, 2005; the application receipt date is November 23, 2005.

Refinement Awards

The Animal Welfare Institute is offering up to eight $6,000 Refinement Awards to North American residents. Studies aimed at the *refinement of the housing and handling conditions* of animals assigned to research or education will be considered for funding.

Please note that proposals will *not* be funded: • if the data collection procedure inflicts avoidable stress, and/or • the study implies the killing of animals during or after the data collection process.

Applications should be in the form of a letter that elaborates how the study is likely to enhance animal welfare, and outlines in detail the methodology that will be applied to achieve this objective. The application letter must not exceed three pages, and it must include assurance that the applicant: • has day-to-day experience with the housing and handling of laboratory animals, • will personally both collect and analyze the data of the proposed study, and • will submit a final report along with an abstract.

The report may be edited for publication in the *AWI Quarterly*, and award recipients must submit a manuscript summarizing their findings to a scientific or professional journal, newsletter, or magazine.

Please send your application as a Microsoft Word document attachment to Viktor Reinhardt [e-mail: *viktor@snowcrest.net*] by January 27, 2006. Notification letters will be mailed to all applicants by March 31, 2006. Awardees will receive $5,000 of the grant at the beginning of their studies and the remaining $1,000 when they submit their final reports by January 31, 2007.

If you have questions, please contact Viktor by e-mail, using "RA06" as the subject heading.

* * *

Awards Granted: 2005 Animal Welfare Enhancement Award Winners

The Johns Hopkins Center for Alternatives to Animal Testing (CAAT) and the Animal Welfare Institute (AWI) are pleased to announce the winners of the 2005 Animal Welfare Enhancement Awards. The focus of these awards is to improve housing, handling, and/or experimental situations for laboratory animals.

Thanks to an anonymous donor, 10 awardees received $6,000 each for studies aimed at enhancing lab animal welfare. The winning projects will explore a range of refinement issues, including the effects of behavioral training programs, cage size, illumination, cage-changing interval, and environmental enrichment. A complete list of award recipients and their project titles is given below. For project descriptions and for more information about this award program, see <caat.jhsph.edu/programs/AWE/awards.htm>.

2005 Animal Welfare Enhancement Award Recipients: • T. Burke and A. Burwell (University of Arizona): "Effects of cage size and enrichment on rodent behavior and cardiovascular function"; T. Godbey, DVM (University of British Columbia): "Mouse preference for cage changing interval: Are soiled cages affecting mouse well-being?" A. K. Goodwin, PhD (Johns Hopkins University): "Assessment of the behavioral effects of exposure to an expanded environmental enrichment program in baboons"; D. Hickman, DVM, MS (Portland VA Research Foundation, Inc.): "Use of body condition scoring as an endpoint for tumor growth studies"; M. B. Lovern, PhD (Oklahoma State University): "Development and validation of a fecal steroid assay to non-invasively measure hormone levels"; E. L. MacLean and S. J. Roberts (Duke University): "Parsing the variables of illumination and cage height"; C. Nelson, LAT (University of Michigan): "Providing enrichment tools to rodents that are food-chewers"; S. Pack, CAHT, LATG (University of Pennsylvania): "Does increasing environmental enrichment promote recovery in macaques?" K. Schultz (University of Wisconsin, Madison): "Testing the efficiency of a novel training technique for socially housed primates"; A. Sorrells (University of California, San Francisco): "Positive reinforcement training and its implications on physiological and behavioral parameters in squirrel monkeys."

Final reports from the 2004 Animal Welfare Enhancement Award recipients are available at <caat.jhsph.edu/programs/AWE/2004/recipients.htm>.

* * *

Recent Books and Articles

(Addresses are those of first authors unless otherwise indicated)

Books

• *Virtual Reconstruction: A Primer in Computer-Assisted Paleontology and Biomedicine.* C. P. Zollikofer & M. S. Ponce de Leon. Hoboken, NJ: Wiley, 2005. [Price: $89.95]

• *Evolutionary Game Theory, Natural Selection, and Darwinian Dynamics*. T. L. Vincent & J. S. Brown. New York: Cambridge University Press, 2005. [Price: $100]

Children's Books

• *Gorilla Doctors: Saving Endangered Great Apes* (Scientists in the Field Series). P. S. Turner. Boston: Houghton Mifflin, 2005. [Price: $17]

Magazines and Newsletters

• *Centerline,* Summer 2005. [Wisconsin RPRC, 1220 Capitol Ct, Madison, WI 53715-1299]

• *Folia Primatologica*, 2005, *76*[4].

Contents: Habitat quality and range use of white-headed langurs in Fusui, China, by Z. Li & M. E. Rogers; Behavioral development of captive male hybrid cercopithecine monkeys, by E. M. Erhart, C. A. Bramblett, & D. J. Overdorff; Impact of methodological choices on assessments of the reliability of fossil primate phylogenetic hypotheses, by M. Nadal-Roberts & M. Collard; and Chimpanzees use tools to harvest social insects at Fongoli, Senegal, by W. C. McGrew, J. D. Pruetz, & S. J. Fulton.

• *IPPL News*, August, 2005, *32*[2]. [International Primate Protection League, P.O. Box 766, Summerville, SC 29484; e-mail: *info@ippl.org*]

Includes news articles, book reviews, and U.S. primate import statistics.

• *Journal of Medical Primatology*, 2005, *34*[4].

Nephroblastomatosis and nephroblastoma in nonhuman primates, by S. D. Goens, C. M. Moore, K. M. Brasky, P. A. Frost, M. M. Leland, & G. B. Hubbard; Naturally occurring menopause in cynomolgus monkeys: Changes in hormone, lipid, and carbohydrate measures with hormonal status, by K. Kavanagh, J. K. Williams, & J. D. Wagner; Pharmacokinetics and pharmacodynamics of injectable testosterone undecanoate in castrated cynomolgus monkeys (*Macaca fascicularis*) are independent of different oil vehicles, by J. Wistuba, C. M. Luetjens, A. Kamischke, Y.-Q. Gu, S. Schlatt, M. Simoni, & E. Nieschlag; Indirect indicator of transport stress in hematological values in newly acquired cynomolgus monkeys, by C.-Y. Kim, J. S. Han, T. Suzuki, & S.-S. Han; Ontogeny of hematological cell and biochemical profiles in maternal and fetal baboons (*Papio* species), by N. E. Schlabritz-Loutsevitch, G. B. Hubbard, S. L. Jenkins, H. C. Martin, C. S. Snider, P. A. Frost, M. M. Leland, L. M. Havill, T. J. McDonald, & P. W. Nathanielsz; The use of CD34+ mobilized peripheral blood as a donor cell source does not improve chimerism after in utero hematopoietic stem cell transplantation in non-human primates, by L. E. Shields, L. Gaur, P. Delio, M. Gough, J. Potter, A. Sieverkropp, & R. G. Andrews; Evaluation of a timed and repeated perianal tape test for the detection of pinworms (*Trypanoxyuris microon*) in owl monkeys (*Aotus nancymae*), by S. A. Felt & C. E. White; *Demodex* spp. in the hair follicles of rhesus macaques (*Macaca mulatta*), by M. F. Starost, Z. Karjala, L. R. Brinster, G. Miller, M. Eckhaus, M. Bryant, & V. Hoffman; and Granulosa theca cell tumor with luteoma in the ovary of a bonnet monkey (*Macaca radiata*), by P. Nagarajan, R. Venkatesan, M. J. Mahesh Kumar, & S. S. Majumdar.

• *Laboratory Animals*, 2005, *39*[2].

Contents include: A simple method for assessing muscle function in common marmosets, by D. J. Stevens, R. J. Hornby, D. L. Cook, G. D. Griffiths, E. A. M. Scott, & P. C. Pearce; and A novel method for activity monitoring in small non-human primates, by T. M. Mann, K. E. Williams, P. C. Pearce, & E. A. M. Scott.

• *Rainforests.* (Quarterly). (Nature Alert**,** P.O. Box 3830, Bath, BA1 3WX, U.K. <www.naturealert.org>). [Price: £10 (U.K.); £15 (Europe); £20 (rest of world)]

Proceedings

• 22nd Symposium on Nonhuman Primate Models for AIDS. *Journal of Medical Primatology*, 2005, *34*[5-6].

Contents: Introduction, by P. A. Marx; Polyvalent DNA prime and envelope protein boost HIV-1 vaccine elicits humoral and cellular responses and controls plasma viremia in rhesus macaques following rectal challenge with an R5 SHIV isolate, by R. Pal, S. Wang, V. S. Kalyanaraman, B. C. Nair, S. Whitney, T. Keen, L. Hocker, L. Hudacik, N. Rose, A. Cristillo, I. Mboudjeka, S. Shen, T.-H. Wu-Chou, D. Montefiori, J. Mascola, S. Lu, & P. Markham; Simian immunodeficiency virus disrupts extended lengths of the blood-brain barrier, by A. G. MacLean, G. E. Belenchia, D. N. Bieniemy, T. A. Moroney-Rasmussen, & A. A. Lackner; Naturally SIV-infected sooty mangabeys: Are we closer to understanding why they do not develop AIDS? By G. Silvestri; Infection with a molecularly cloned SIVsm virus elicits high titer homologous neutralizing antibodies with heterologous neutralizing activity, by M. Mahalanabis, V. M. Hirsch, N. L. Haigwood; SIV DNA vaccine co-administered with IL-12 expression plasmid

We would like to acknowledge *Primate-Science* as a source for information about new books.

enhances CD8 SIV cellular immune responses in cynomolgus macaques, by J. D. Boyer, T. M. Robinson, M. A. Kutzler, R. Parkinson, S. A. Calarota, M. K. Sidhu, K. Muthumani, M. Lewis, G. Pavlakis, B. Felber, & D. Weiner; Immune mechanisms associated with protection from vaginal SIV challenge in rhesus monkeys infected with virulence-attenuated SHIV 89.6, by C. J. Miller & K. Abel; The pigtail macaque MHC class I allele *Mane-A*10* presents an immundominant SIV Gag epitope: Identification, tetramer development and implications of immune escape and reversion, by M. Z. Smith, C. S. Fernandez, A. Chung, C. J. Dale, R. De Rose, J. Lin, A. G. Brooks, K. C. Krebs, D. I. Watkins, D. H. O'Connor, M. P. Davenport, & S. J. Kent; Early virological events in various tissues of newborn monkeys after intrarectal infection with pathogenic simian human immunodeficiency virus, by A. Miyake, K. Ibuki, H. Suzuki, R. Horiuchi, N. Saito, M. Motohara, M. Hayami, & T. Miura; Highly sensitive SIV plasma viral load assay: Practical considerations, realistic performance expectations, and application to reverse engineering of vaccines for AIDS, by A. N. Cline, J. W. Bess, M. Piatak, Jr., & J. D. Lifson; and Abstracts – 22nd Annual Symposium on Nonhuman Primate Models for AIDS: November 3-6, 2004, San Antonio, TX.

• 52nd Annual Meeting of the Japanese Association for Laboratory Animal Science (JALAS). *Experimental Animals*, 2005, *54*[Supplement].

• Program and abstracts of the 28th annual meeting of the American Society of Primatologists, August 17-20, 2005. *American Journal of Primatology*, 2005, *66*[Suppl. 1].

• African Monkey Symposium – APA Calgary, Canada – August 2004. *International Journal of Primatology*, 2005, *26*{3].

Introduction: Conservation of African monkeys, by L. Magnusson; Significance of riparian forests for the conservation of Central African primates, by A. Gautier-Hion & D. Brugière; Conservation of red colobus and their habitats, by T. T. Struhsaker; Thirty years of research in Kibale National Park, Uganda, reveals a complex picture for conservation, by C. A. Chapman, T. T. Struhsaker, & J. E. Lambert; Protective status, ecology and strategies for improving conservation of *Cercocebus sanjei* in the Udzungwa Mountains, Tanzania, by C. L. Ehardt, T. P. Jones, & T. M. Butynski; Conservation and survival adaptations of Temminck's red colobus (*Procolobus badius temminckii*), in Senegal, by A. Galat-Luong & G. Galat; Update on the search for Miss Waldron's red colobus monkey, by W. S. McGraw; Market hunting in the Taï Region, Côte d'Ivoire and implications for monkey populations, by J. Refisch & I. Koné; Seed-spitting primates and the conservation and dispersion of large-seeded trees, by N. J. Dominy & B. W. Duncan; Comprehensive conservation profile of Tana mangabeys, by J. Wieczkowski; Conservation implications of hybridization in African cercopithecine monkeys, by K. M. Detwiler, A. S. Burrell, & C. J. Jolly; Y-chromosomal markers suitable for noninvasive studies of guenon hybridization, by Anthony J. Tosi, Kate M. Detwiler, & Todd R. Disotell; and Consequences of a one-male harem reproductive system and inbreeding in a captive group of *Cercopithecus solatus*, by M. Charpentier, M. Hossaert-McKey, E. J. Wickings, & P. Peignot.

Reports

• *Medical Records for Animals Used in Research, Teaching and Testing.* American College of Laboratory Animal Medicine Public Statement, <aclam.org/PDF/pub_med_records_2.pdf>.

• *Critical Needs for Research in Veterinary Science*. Committee on the National Needs for Research in Veterinary Science. Washington, DC: National Academies Press. <www.nap.edu/reportbrief/11366/11366rb.pdf>.

Research in veterinary science is critical for the health and well-being of animals, including humans. Food safety, emerging infectious diseases, the development of new therapies, and the possibility of bioterrorism are examples of issues addressed by veterinary science that have an impact on both human and animal health. However, there is a lack of scientists engaged in veterinary research. Too few veterinarians pursue research careers, and there is a shortage of facilities and funding for conducting research. There is an urgent need to provide adequate resources for investigators, training programs, and facilities involved in veterinary research to seize the opportunities to improve and safeguard human and animal health.

Special Journal Issues

• Behavioral ecology and conservation of ruffed lemurs. *American Journal of Primatology*, 2005, *66*[1].

New developments in the behavioral ecology and conservation of ruffed lemurs (*Varecia*), by N. Vasey; Does female dominance facilitate feeding priority in black-and-white ruffed lemurs (*Varecia variegata*) in southeastern Madagascar? by D. J. Overdorff, E. M. Erhart, & T. Mutschler; Activity budgets and activity rhythms in red ruffed lemurs (*Varecia rubra*) on the Masoala Peninsula, Madagascar: Seasonality and reproductive energetics, by N. Vasey; Effects of forest structure and composition on food availability for *Varecia variegata* at Ranomafana National Park, Madagascar, by E. A. Balko & H. B. Underwood; Environmental enrichment to address behavioral differences between wild and captive black-and-white ruffed lemurs (*Varecia variegata*), by F. J. Kerridge; and Preliminary biomedical evaluation of wild ruffed lemurs (*Varecia variegata* and *V. rubra*), by R. E. Junge & E. E. Louis.

• Brazilian Conservation: Challenges and Opportunities. *Conservation Biology*, 2005, *19*[3].

• Immunization procedures and adjuvant products. *ILAR Journal*, 2005, *46*[3].

• Serendipity, science, and animals. *ILAR Journal*, 2005, *46*[4].

• Stress Symposium. *Journal of Evolutionary Biology*, 2005, *18*[4].

• Abstracts presented at the American College of Veterinary Anesthesiologists 29th Annual Meeting, Phoenix, Arizona, 19-25 October 2004. *Veterinary Anaesthesia and Analgesia*, 2005, *32*[4].

• The chimpanzee genome. *Nature*, 2005, *473*[7055].

Contents include: The chimpanzee genome, by C. Gunter & R. Dhand; Timeline: A brief history of chimps, by the Editors; News & Views: The chimpanzee and us, by W.-H. Li & M. A. Saunders; The second inheritance system of chimpanzees and humans, by A. Whiten; A century of getting to know the chimpanzee, by Frans B. M. de Waal; Our chimpanzee mind, by M. Hauser; Molecular insights into human brain evolution, by R. S. Hill & C. A. Walsh; Initial sequence of the chimpanzee genome and comparison with the human genome, by The Chimpanzee Sequencing and Analysis Consortium; A genome-wide comparison of recent chimpanzee and human segmental duplications, by Z. Cheng, M. Ventura, X. She, P. Khaitovich, T. Graves, K. Osoegawa, D. Church, P. DeJong, R. K. Wilson, S. Pääbo, M. Rocchi & E. E. Eichler; Human subtelomeres are hot spots of interchromosomal recombination and segmental duplication, by E. V. Linardopoulou, E. M. Williams, Y. Fan, C. Friedman, J. M. Young, & B. J. Trask; Conservation of Y-linked genes during human evolution revealed by comparative sequencing in chimpanzee, by J. F. Hughes, H. Skaletsky, T. Pyntikova, P. J. Minx, T. Graves, S. Rozen, R. K. Wilson, & D. C. Page; and First fossil chimpanzee, by S. McBrearty & N. G. Jablonski.

Anatomy and Physiology

• A stereotaxic atlas of the monkey frontal lobes. Bangura, N., Greenwood, T., James, J., & Denaro, F. (Biol. Dept, Morgan State Univ., Baltimore, MD 21251). *Cellular and Molecular Biology*, 2003, *49*, 1253-1260.

A stereotaxic atlas of the frontal lobes of *M. arctoides* is presented as a consecutive series of line drawings. It is based on six animals. Alternating serial coronal sections stained with cresyl violet or Luxol Fast Blue were produced for each brain. Representative sections were used to prepare line drawings at one-millimeter intervals at a magnification of 4x. The stereotaxic anterior to posterior range is +43 to +20. This line drawing format can be used to record electrode placement or document the extent of lesions.

• Characterizing gastrointestinal transit time in four lemur species using barium-impregnated polyethylene spheres (BIPS). Campbell, J. L., Williams, C. V., & Eisemann, J. H. (Interdept. Nutrition Prog., Dept of Animal Sci., North Carolina State Univ., Raleigh, NC [e-mail: *Jenny.Campbell@devalcol.edu*]). *American Journal of Primatology*, 2004, *64*, 309-321.

Differences in dietary profiles and gastrointestinal (GI) morphologies observed across lemur species suggest that there may be variation in patterns of digesta flow through the GI tract related to the method of digesta processing. Using radio-opaque BIPS, we characterized such patterns in *Varecia variegata*, *Eulemur fulvus*, *Propithecus verreauxi*, and *Hapalemur griseus* (n = 2 per species). After an initial radiograph was taken under light sedation, the animals were fed the BIPS together with a small meal. Radiographs were then taken on a species-dependent basis up to 48 hr post-dosage. Gastric transit time (time of first exit of BIPS from stomach) oro-rectal transit time (time of first appearance in the rectum), and the difference between them, were measured. These data reveal new information in addition to the total tract transit time, and complement existing knowledge regarding anatomy and diet.

• Use of total dietary fiber across four lemur species (*Propithecus verreauxi coquereli*, *Hapalemur griseus griseus*, *Varecia variegata*, and *Eulemur fulvus*): Does fiber type affect digestive efficiency? Campbell, J. L., Williams, C. V., & Eisemann, J. H. (Address same as above). *American Journal of Primatology*, 2004, *64*, 323-335.

In vivo digestibility and transit of two experimental diets were compared across four lemur species for which gastrointestinal morphology and preliminary data on physiology differ. The results from these captive groups suggest there are large differences in digestive efficiency that are likely related to the varied fiber composition of the free-ranging diet, and the amount of time the digesta are retained in the gut.

• Isolation and identification of fungi from vaginal flora in three species of captive *Leontopithecus*. Moraes, I. A., Stussi, J. S., Lilenbaum, W., Pissinatti, A., Luz, F. P., & Ferreira, A. M. (Univ. Federal Fluminense, Rio de Janeiro, Brazil [e-mail: *fisiovet@vm.uff.br*]). *American Journal of Primatology*, 2004, *64*, 337-343.

"The ability to reproduce in captivity is an essential component of lion tamarin conservation programs. However, infections such as vaginitis, cervicitis, and endometritis are important diseases that may influence the reproduction of these animals. Therefore, it is important to detect continuous or occasional vaginal microbial populations, and to understand their potential role as an endogenous source of infection. Vaginal swabs were collected from 25 female tamarins of the three currently available species (*L. rosalia*, *L. chrysopygus*, and *L. chrysomelas*) at the Center of Primatology in Rio de Janeiro, Brazil. The swabs were processed according to standard mycological protocols, and isolates were biochemically characterized. Fungal isolates were recovered from 16 animals (64.0%). The results showed that 70.6% of the isolated microorganisms consisted of yeast, including three species of *Candida*

(mainly *C. glabrata*). We suggest that this species is a resident member of the normal vaginal flora in *Leontopithecus*. Filamentous fungi (mainly from *Trichosporon*, *Aspergillus*, and *Penicillium* genera) constituted 29.4% of the isolates, and were considered to be transitory contaminants of the genital area. We suggest that colonization of the vaginal environment is related to the endocrine pattern associated with the reproductive status of these animals, but not to parity."

• Rapid plasticity of binocular connections in developing monkey visual cortex (V1). Zhang, B., Bi, H., Sakai, E., Maruko, I., Zheng, J.-h., Smith, E. L., III, & Chino, Y. M. (Y. M. C., College of Optometry, Univ. of Houston, 505 J. Davis Armistead Bldg, Houston, TX 77204-2020 [e-mail: *ychino@uh.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2005, *102*, 9026-9031.

"The basic sets of cortical connections are present at birth in the primate visual system. The maintenance and refinement of these innate connections are highly dependent on normal visual experience, and prolonged exposure to binocularly uncorrelated signals early in life severely disrupts the normal development of binocular functions. However, very little is known about how rapidly these changes in the functional organization of primate visual cortex emerge or what are the sequence and the nature of the abnormal neural events that occur immediately after experiencing binocular decorrelation. In this study, we investigated how brief periods of ocular misalignment (strabismus) at the height of the critical period alter the cortical circuits that support binocular vision. After only 3 days of optically imposed strabismus, there was a striking increase in the prevalence of V1 neurons that exhibited binocular suppression, i.e., binocular responses were weaker than monocular responses. However, the sensitivity of these neurons to interocular spatial phase disparity was not significantly altered. These contrasting results suggest that the first significant change in V1 caused by early binocular decorrelation is binocular suppression, and that this suppression originates at a site(s) beyond where binocular signals are initially combined."

• Time-varying covariance of neural activities recorded in striatum and frontal cortex as monkeys perform sequential-saccade tasks. Fujii, N., & Graybiel, A. M. (A. M. G., Dept of Brain & Cog. Sciences, MIT, 45 Carleton St, E25-618, Cambridge, MA 02139 [e-mail: *graybiel@mit.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2005, *102*, 9032-9037.

"Cortico-basal ganglia circuits are key parts of the brain's habit system, but little is yet known about how these forebrain pathways function as ingrained habits are performed. We simultaneously recorded spike and local field potential (LFP) activity from regions of the frontal cortex and basal ganglia implicated in visuo-oculomotor control as highly trained macaque monkeys performed sequences of visually guided saccades. The tasks were repetitive, required no new learning, and could be performed nearly automatically. Our findings demonstrate striking differences between the relative timing of striatal and cortical activity during performance of the tasks. At the onset of the visual cues, LFPs in the prefrontal cortex and the oculomotor zone of the striatum showed near-synchronous activation. During the period of sequential-saccade performance, however, peak LFP activity occurred 100–300 msec later in the striatum than in the prefrontal cortex. Peak prefrontal activity tended to be peri-saccadic, whereas peak striatal activity tended to be post-saccadic. This temporal offset was also apparent in pairs of simultaneously recorded prefrontal and striatal neurons. In triple-site recordings, the LFP activity recorded in the supplementary eye field shared temporal characteristics of both the prefrontal and the striatal patterns. The near simultaneity of prefrontal and striatal peak responses at cue onsets, but temporal lag of striatal activity in the movement periods, suggests that the striatum may integrate corollary discharge or confirmatory response signals during sequential task performance. These timing relationships may be signatures of the normal functioning of striatal and frontal cortex during repetitive performance of learned behaviors."

• Orofacial somatomotor responses in the macaque monkey homologue of Broca's area. Petrides, M., Cadoret, G., & Mackey, S. (Montreal Neurological Inst., McGill Univ., 3801 University St, Montreal, Quebec H3A 2B4, Canada [e-mail: *pedrides@ego.psych.mcgill.ca*]). *Nature, 2005, 435,* 1235-1238.

"In the ventrolateral frontal lobe of the human brain there is a distinct entity, cytoarchitectonic area 44 (Broca's area), which is crucial in speech production. There has been controversy over whether monkeys possess an area comparable to human area 44. We have addressed this question in the macaque monkey by combining quantitative architectonic analysis of the cortical areas within the ventrolateral frontal region with electrophysiological recording of neuron activity and electrical intracortical microstimulation. Here we show that, immediately in front of the ventral part of the agranular premotor cortical area 6, there is a distinct cortical area that is architectonically comparable to human area 44 and that this monkey area 44 is involved with the orofacial musculature. We suggest that area 44 might have evolved originally as an area exercising high-level control over orofacial actions, including those related to communicative acts, and that, in the human brain, area 44 eventually also came to control certain aspects of the speech act."

• High faecal glucocorticoid levels predict mortality in ring-tailed lemurs (*Lemur catta*). Pride, R. E. (Dept of Ecology & Evolutionary Biol., Princeton Univ., Princeton, NJ 08525). *Biology Letters*, 2005, *1*, 60-63.

"Glucocorticoid levels are commonly used as measures of stress in wild animal populations, but their relevance to individual fitness in a wild population has not been demon-

strated. In this study I followed 93 ring-tailed lemurs at Berenty Reserve in Madagascar, collecting 1089 fecal samples from individually recognized animals, and recording their survival over a 2-year period. I evaluated fecal glucocorticoid levels as predictors of individual survival to the end of the study. Animals with high glucocorticoid levels had a significantly higher mortality rate. This result suggests that glucocorticoid measures can be useful predictors of individual survival probabilities in wild populations. The 'stress landscape' indicated by glucocorticoid patterns may approximate the fitness landscape to which animals adapt."

• Plasticity in primary auditory cortex of monkeys with altered vocal production. Cheung, S. W., Nagarajan, S. S., Schreiner, C. E., Bedenbaugh, P. H., & Wong, A. (Coleman Memorial Lab., Dept of Otolaryngology – Head and Neck Surgery, Univ. of California, San Francisco, CA 94143-0342]. *Journal of Neuroscience*, 2005, *25*, 2490-2503.

Response properties of primary auditory cortical neurons in the adult common marmoset monkey (*Callithrix jacchus*) were modified by extensive exposure to altered vocalizations that were self-generated and rehearsed frequently. A laryngeal apparatus modification procedure permanently lowered the frequency content of the native twitter call, a complex communication vocalization consisting of a series of frequency modulation (FM) sweeps. Monkeys vocalized shortly after this procedure and maintained voicing efforts until physiological evaluation 5-15 months later. The altered twitter calls improved over time, with FM sweeps approaching but never reaching the normal spectral range. Neurons with characteristic frequencies <4.3 kHz that had been weakly activated by native twitter calls were recruited to encode self-uttered altered twitter vocalizations. These neurons showed a decrease in response magnitude and an increase in temporal dispersion of response timing to twitter call and parametric FM stimuli, but a normal response profile to pure tone stimuli. Tonotopic maps in voice-modified monkeys were not distorted. These findings suggest a previously unrecognized form of cortical plasticity that is specific to higher-order processes involved in the discrimination of more complex sounds, such as species-specific vocalizations.

• Social stress in tree shrews as an animal model of depression: An example of a behavioral model of a CNS disorder. Fuchs, E. (Clinical Neurobiology Lab., German Primate Center; Kellnerweg 4, 37077 Göttingen, Germany [e-mail: *efuchs@gwdg.de*]. *CNS Spectrums,* 2005, *10,* 182-190.

"Animal models are invaluable in preclinical research on human psychopathology. Valid animal models to study the pathophysiology of depression and specific biological and behavioral responses to antidepressant drug treatments are of prime interest. In order to improve our knowledge of the causal mechanisms of stress-related disorders such as depression, we need animal models that mirror the situation seen in patients. One promising model is the chronic psychosocial stress paradigm in male tree shrews. Coexistence of two males in visual and olfactory contact leads to a stable dominant/subordinate relationship, with the subordinates showing obvious changes in behavioral, neuroendocrine, and central nervous activity that are similar to the signs and symptoms observed during episodes of depression in patients. To discover whether this model, besides its 'face validity' for depression, also has "predictive validity," we treated subordinate animals with the tricyclic antidepressant clomipramine and found a time-dependent recovery of both endocrine function and normal behavior. In contrast, the anxiolytic diazepam was ineffective. Chronic psychosocial stress in male tree shrews significantly decreased hippocampal volume and the proliferation rate of the granule precursor cells in the dentate gyrus. These stress-induced changes can be prevented by treating the animals with clomipramine, tianeptine, or the selective neurokinin receptor antagonist L-760,735. In addition to its apparent face and predictive validity, the tree shrew model also has a 'molecular validity' due to the degradation routes of psychotropic compounds and gene sequences of receptors, which are very similar to those in humans. Although further research is required to validate this model fully, it provides an adequate and interesting non-rodent experimental paradigm for preclinical research on depression."

• The effect of new alpha males on female stress in free-ranging baboons. Beehner, J. C., Bergman, T. J., Cheney, D. L., Seyfarth, R. M., & Whitten, P. L. **(**Dept of Ecology & Evolutionary Biol., Princeton Univ., Princeton, NJ 08544 [e-mail: *jbeehner@princeton.edu*]). *Animal Behaviour*, 2005, *69*, 1211-1221.

In chacma baboons, *Papio hamadryas ursinus*, young adult males often rise to the top of the dominance hierarchy shortly after immigrating into a new group. Such events are potentially disruptive for pregnant and lactating females because high-ranking immigrant males often commit infanticide. In this preliminary study, we assessed the effects of upheavals in the male hierarchy on the physiology of 18 females in a baboon group living in the Moremi Game Reserve, Botswana. We collected behavioral and hormonal data to examine the effects of two separate events, a natal male take-over and an immigrant male take-over, on female fecal glucocorticoids (fGC). While few females had elevated fGC concentrations in response to the natal male take-over, following the immigrant male take-over there was a significant rise in fGCs, but only among lactating and pregnant females. Analysis of behavioral data indicated that elevated fGC concentrations were unrelated to male aggression towards females, female–female aggression, or rates of female–female grooming. Furthermore, lactating females with a male "friend" during the immigrant male take-over period had a less marked in-

crease in fGCs and lower fGC concentrations overall than females without a male friend. Taken together, these results suggest that male social instability itself does not necessarily elicit a stress response from females. Rather, it is the specific male that rises to the alpha position that prompts a stress response, and only from the females at risk for infanticide. Finally, females with a male friend may perceive themselves to be at a reduced risk of infanticide.

• Effects of age and sex on hematologic and serum biochemical values of vervet monkeys (*Chlorocebus aethiops sabaeus*). Sato, A., Fairbanks, L. A., Lawson, T., & Lawson, G. W. (Div. of Lab. Animal Med., David Geffen School of Med., UCLA, Box 951718, Los Angeles, CA 90095-17181. *Contemporary Topics in Laboratory Animal Science*, 2005, *44*, 29-34.

Hematologic and serum biochemical values are of great importance in assessing animal health. Normal reference ranges for vervet monkeys have seldom been reported, making it difficult for clinicians to interpret blood values. The purpose of this study was to determine what effects age and sex have on hematologic and serum biochemical values of vervet monkeys and to establish clinically relevant reference ranges for all life stages of each gender. Blood samples were collected from 140 healthy vervet monkeys of Caribbean origin consisting of 60 females and 80 males. Male and female data were displayed separately within six life-stage categories (yearlings, juveniles, adolescents, young adults, adults, and aged). The effects of sex and age on these values were examined statistically. Significant age-related factors included red blood cell count, hemoglobin, hematocrit, mean corpuscular volume, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration, alkaline phosphatase, albumin, total protein, globulin, direct bilirubin, blood urea nitrogen, creatinine, glucose, calcium, phosphorus, potassium, albumin/globulin ratio, blood urea nitrogen/creatinine ratio, and sodium/potassium ratio values. Significant sex-related values included red blood cell count, hemoglobin, hematocrit, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration, neutrophil count, total bilirubin, direct bilirubin, creatinine, glucose, calcium, phosphorus, total carbon dioxide, chloride, potassium, and sodium/potassium ratio values.

Animal Models

• Normal vaginal flora in chimpanzees (*Pan troglodytes*): Qualitative and quantitative study. Noguchi, K., Tsukumi, K., Udono, T., & Urano, T. (Div. of Microbiol. & Genetics, CARD, Inst. of Resource Dev. & Analysis, Kumamoto Univ., 2-2-1 Honjo, Kumamoto 860-0811, Japan). *Comparative Medicine*, 2004, *54*, 705-712.

Lactobacilli are the predominant microorganisms in the vaginal flora of human beings, and are known to play an important role in protecting them from genital infections. On the other hand, the composition of the vaginal flora differs among laboratory animal species, and lactobacilli are not the predominant vaginal microorganism in many laboratory animals. We speculated that the vaginal flora of chimpanzees would be more similar to those of human beings than to those of other animal species, because chimpanzees are phylogenetically close to human beings, and their reproductive physiology is similar to that of human beings. To clarify our speculation, we examined the development of the vaginal flora in chimpanzees. Streptococci, lactobacilli, and members of the family *Bacteroidaceae* were the most predominant bacteria in the vagina of mature chimpanzees (9 to 22 years old). During development of the vaginal flora of chimpanzees, the total number of bacteria increased with age and reached a plateau just before sexual maturity (5 to 7 years of age; juvenile period). Lactobacilli were already one of the predominant bacteria before sexual maturity. In mature chimpanzees, the total number of bacteria (aerobes and anaerobes) in the vagina was highest during the swelling phase of the menstrual cycle. During the swelling phase in mature chimpanzees, streptococci, lactobacilli, and *Bacteroidaceae* were the most frequently isolated (100%) organisms, and the total number of organisms recovered from vaginal specimens from these three groups was the highest. In mature chimpanzees in which the number of bacteria was the highest, lactobacilli were the predominant bacteria. Taken together, these results suggest that these three bacterial groups (streptococci, lactobacilli, and *Bacteroidaceae*) are indigenous to the vagina of chimpanzees, and chimpanzees would be the most suitable laboratory animals for studying the role of lactobacilli in the vagina of human beings.

• Identification of *Helicobacter* sp. in gastric mucosa from captive marmosets (*Callithrix* sp.; Callitrichidae, Primates). de Mello, M. F., Monteiro, A. B., Fonseca, E. C., Pissinatti, A., & Ferreira, A. M. (Dept of Pathology, Univ. Fede. Fluminense, Rio de Janeiro, Brasil. [e-mail: *marcelafvmello@hotmail.com*]). *American Journal of Primatology*, 2005, *66*, 111-118.

The aim of this study was to identify the presence of *Helicobacter* sp. in the gastric mucosa of captive marmosets. Histologic specimens from the fundic, corpus, and antral gastric regions of six *Callithrix jacchus*, 12 *C. kuhli*, and 12 *C. geoffroyi* specimens were evaluated. The sections were stained with hematoxylin-eosin (H&E) and the Warthin-Starry silver impregnation method, and immunostained with rabbit anti-*H. pylori* polyclonal antibody. *Helicobacter*-like organisms (HLOs) and coccoid forms were present in silver-stained sections from 29 stomachs, whereas immunohistochemistry (IHC) tests revealed bacterial aggregates in 15 stomachs. No statistical difference relative to the presence of *Helicobacter* sp. was found among the gastric regions or marmoset species. Gastric lesions were found in the groups of marmosets that had

positive and negative IHC results, but no correlation between inflammation and *Helicobacter* sp. infection was established. These findings demonstrate that marmosets are susceptible to naturally-occurring *Helicobacter* sp. infection, and open the way to the development of comparative studies on *Helicobacter* sp. infection in humans.

• No regional differences of cytochrome P450 expression in the liver of cynomolgus monkeys (*Macaca fascicularis*). Akahori, M., Takatori, A., Kawamura, S., Itagaki, S., & Yoshikawa, Y. (Dept of Biomed. Sci., School of Agri. & Life Sci., Univ. of Tokyo, 1-1-1 Yayoi, Bunkyo-ku, Tokyo 113-8547, Japan). *Experimental Animals*, 2005, *54*, 131-136.

"Nonhuman primates are frequently used in toxicological studies the results of which are extrapolated to humans, but background data on drug metabolism ability among monkeys derived from different countries has not been published, especially on the key enzyme, cytochrome P450 (CYP450). We assessed the amounts of hepatic CYP450 obtained from cynomolgus monkeys of different ages and from different countries in this study. There were no regional differences of total P450 content, as well as major CYP450 isozymes (CYP 1A, 2A, 2B, 2C, 2D, 2E1 and 3A4) in cynomolgus monkeys by Western blot analysis. Similarly, there were no significant differences with hybrid cynomolgus monkeys, but variations in individual values were large. As for aging, total P450 contents declined in old cynomolgus monkeys (12-32 years of age). These results indicate the usefulness of basic data of hepatic CYP450 obtained from cynomolgus monkeys of different ages and from different countries."

• The endogenous cannabinoid anandamide and its synthetic analog *r*(+)-methanandamide are intravenously self-administered by squirrel monkeys. Justinova, Z., Solinas, M., Tanda, G., Redhi, G. H., & Goldberg, S. R. (S. R. G., Preclinical Pharmacology Sect., Behav. Neurosci. Res. Br., NIDA, NIH, DHHS, Baltimore, MD 21224]. *The Journal of Neuroscience*, 2005, *25*, 5645-5650.

"Anandamide, an endogenous ligand for brain cannabinoid CB_1 receptors, produces many behavioral effects similar to those of Δ^9-tetrahydrocannabinol (THC), the main psychoactive ingredient in marijuana. Reinforcing effects of THC have been demonstrated in experimental animals, but there is only indirect evidence that endogenous cannabinoids such as anandamide participate in brain reward processes. We now show that anandamide serves as an effective reinforcer of drug-taking behavior when self-administered intravenously by squirrel monkeys. We also show that methanandamide, a synthetic long-lasting anandamide analog, similarly serves as a reinforcer of drug-taking behavior. Finally, we show that the reinforcing effects of both anandamide and methanandamide are blocked by pretreatment with the cannabinoid CB_1 receptor antagonist rimonabant (SR141716). These findings strongly suggest that release of endogenous cannabinoids is involved in brain reward processes and that activation of cannabinoid CB_1 receptors by anandamide could be part of the signaling of natural rewarding events."

• Live attenuated recombinant vaccine protects nonhuman primates against Ebola and Marburg viruses. Jones, S. M., Feldmann, H., Ströher, U., Geisbert, J. B., Fernando, L., Grolla, A., Klenk, H.-D., Sullivan, N. J., Volchkov, V. E., Fritz, E. A., Daddario, K. M., Hensley, L. E., Jahrling, P. B., & Geisbert, T. W. (H. F., Dept of Med. Microbiology, Univ. of Manitoba, Winnipeg, Manitoba R3E 3R2, Canada [e-mail: *Heinz_Feldmann@hc-sc.gc.ca*]). *Nature Medicine*, 2005, *11*, 786-790.

Vaccines and therapies are urgently needed to address public health needs stemming from emerging pathogens and biological threat agents such as the filoviruses Ebola virus (EBOV) and Marburg virus (MARV). Replication-competent vaccines against EBOV and MARV were developed based on attenuated recombinant vesicular stomatitis virus vectors expressing either the EBOV glycoprotein or MARV glycoprotein. A single intramuscular injection of the EBOV or MARV vaccine elicited completely protective immune responses in nonhuman primates against lethal EBOV or MARV challenges. Notably, vaccine vector shedding was not detectable in the monkeys and none of the animals developed fever or other symptoms of illness associated with vaccination. The EBOV vaccine induced humoral and apparent cellular immune responses in all vaccinated monkeys, whereas the MARV vaccine induced a stronger humoral than cellular immune response. No evidence of EBOV or MARV replication was detected in any of the protected animals after challenge. The data suggest that these vaccine candidates are safe and highly efficacious in a relevant animal model.

• Nonhuman primate models of asthma. Coffman, R. L., & Hessel, E. M. (Dynavax Technologies, Berkeley, CA 94710 [e-mail: *rcoffman@dvax.com*]). *Journal of Experimental Medicine*, 2005, *201*, 1875-1879.

"Asthma is a complex human disease that does not have an accurate counterpart in any common model organism. Most of our understanding of the immune mechanisms underlying asthma comes from studies in man and mouse. However, there are fundamental differences between the spontaneous disease in man and the experimentally induced counterparts in mice. We advocate more extensive use of nonhuman primate asthma models to reconcile these differences between man and mouse."

• Activation of hypoxia-inducible factors in hyperoxia through prolyl 4-hydroxylase blockade in cells and explants of primate lung. Asikainen, T. M., Schneider, B. K., Waleh, N. S., Clyman, R. I., Ho, W.-B., Flippin, L. A., Günzler, V., & White, C. W. (C. W. W., Dept of Pediatrics, Natl Jewish Med. & Res. Ctr, Denver, CO 80206 [e-mail: *whitec@njc.org*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2005, *102*, 10212-10217.

"Preterm neonates with respiratory distress syndrome (RDS) often develop a chronic form of lung disease called bronchopulmonary dysplasia (BPD), characterized by decreased alveolar and vascular development. Ventilator treatment with supraphysiological O_2 concentrations (hyperoxia) contribute to the development of BPD. Hyperoxia down-regulates and hypoxia up-regulates many angiogenic factors in the developing lung. We investigated whether angiogenic responses could be augmented through enhancement of hypoxia-inducible factors 1α and 2α (HIF-1α and -2α, respectively) via blockade of prolyl hydroxylase domain-containing proteins (HIF-PHDs) in human microvascular endothelial cells from developing and adult lung, in epithelial A549 cells, and in fetal baboon explants in relative or absolute hyperoxia. PHD inhibitor (FG-4095) and positive control dimethyloxaloylglycine (DMOG), selective and nonselective HIF-PHD inhibitors, respectively, enhanced HIF-1α and -2α, vascular endothelial growth factor (VEGF), and platelet-endothelial cell adhesion molecule 1 expression *in vitro* in 95% and 21% O_2. Furthermore, VEGF receptor fms-like tyrosine kinase 1 (Flt-1) was elevated, whereas kinase insert domain-containing receptor/fetal liver kinase 1 (KDR) was diminished in endothelial, but not epithelial, cells. Intracellular Flt-1 and KDR locations were unchanged by PHD blockade. Like VEGF, FG-4095 and DMOG increased angiogenesis *in vitro*, both in 95% and 21% O_2, an effect that could be blocked through either Flt-1 or KDR. Notably, FG-4095 was effective in stimulating HIFs and VEGF also in fetal baboon lung explants. FG-4095 or DMOG treatment appeared to stimulate the feedback loop promoting HIF degradation in that PHD-2 and/or -3, but not PHD-1, were enhanced. Through actions characterized above, FG-4095 could have desirable effects in enhancing lung growth in BPD."

• Development of a new vaccine for the prevention of Lassa fever. Geisbert, T. W., Jones, S., Fritz, E. A., Shurtleff, A. C., Geisbert, J. B., Liebscher, R., Grolla, A., Stroher, U., Fernando, L., Daddario, K. M., Guttieri, M. C., Mothe, B. R., Larsen, T., Hensley, L. E., Jahrling, P. B., & Feldmann, H. (Virology Div., USAMRIID, Fort Detrick, MD [e-mail: *tom.geisbert@amedd.army.mil*]). *PLoS-Med*, 2005, *2*[6], 3 <medicine.plosjournals.org>.

"Recent importation of Lassa fever into Germany, the Netherlands, the United Kingdom, and the United States by travelers on commercial airlines from Africa underscores the public health challenge of emerging viruses. Currently, there are no licensed vaccines for Lassa fever, and no experimental vaccine has completely protected nonhuman primates against a lethal challenge. We developed a replication-competent vaccine against Lassa virus based on attenuated recombinant vesicular stomatitis virus vectors expressing the Lassa viral glycoprotein. A single intramuscular vaccination of the Lassa vaccine elicited a protective immune response in nonhuman primates against a lethal Lassa virus challenge. Vaccine shedding was not detected in the monkeys, and none of the animals developed fever or other symptoms of illness associated with vaccination. The Lassa vaccine induced strong humoral and cellular immune responses in the four vaccinated and challenged monkeys. Despite a transient Lassa viremia in vaccinated animals 7 days after challenge, the vaccinated animals showed no evidence of clinical disease. In contrast, the two control animals developed severe symptoms including rashes, facial edema, and elevated liver enzymes, and ultimately succumbed to the Lassa infection. Our data suggest that the Lassa vaccine candidate based on recombinant vesicular stomatitis virus is safe and highly efficacious in a relevant animal model that faithfully reproduces human disease."

Behavior

• Early experience affects the intergenerational transmission of infant abuse in rhesus monkeys. Maestripieri, D. (Dept of Comparative Human Development, Univ. of Chicago, Chicago, IL 60637 [e-mail: *Dario@uchicago.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2005, *102*, 9726-9729.

Maternal abuse of offspring in macaque monkeys shares some similarities with child maltreatment in humans, including its transmission across generations. This study used a longitudinal design and a cross-fostering experiment to investigate whether abusive parenting in rhesus macaques is transmitted from mothers to daughters and whether transmission occurs through genetic or experiential factors. Nine of 16 females who were abused by their mothers in their first month of life, regardless of whether they were reared by their biological mothers or by foster mothers, exhibited abusive parenting with their firstborn offspring, whereas none of the females reared by nonabusive mothers did. These results suggest that the intergenerational transmission of infant abuse in rhesus monkeys is the result of early experience and not genetic inheritance. The extent to which the effects of early experience on the intergenerational transmission of abusive parenting are mediated by social learning or experience-induced physiological alterations remains to be established.

• The historical socioecology of savanna baboons (*Papio hamadryas*). Henzi, S. P., & Barrett, L. (Dept of Psychology, Univ. of Central Lancashire, Preston, Lancashire PR1 2HE, U.K. [e-mail: *phenzi@uclan.ac.uk*]). *Journal of Zoology*, 2005, *265*, 215-226.

Socioecology has traditionally assumed that differences in social form between species derive from selected responses to particular evolutionary environments, while differences within a species reflect plastic responses to contemporary differences in ecology. The issue of behavioral or social plasticity is particularly salient for primatologists as it ties into conceptualizations of the evolution of cognitive capacity. In this regard, savanna baboons have provided a focus for research by virtue of their eco-

logical plasticity and a problem for researchers by virtue of marked social differences in one subspecies – hamadryas baboons, *P. h. hamadryas* – that cannot be explained solely by reference to current ecology. It is argued that the problem extends beyond hamadryas and that at least some differences between other populations also reflect selected responses to restricted, local evolutionary conditions. Of particular importance to the understanding of contemporary differences in baboon sociality is the extent to which evolutionary environments have constrained group size and perturbed adult sex ratios and, thereby, structured responses to the ever-present threat of infanticide. The view that there is much to be gained from a phylogenetic approach to population differences in behavior is endorsed.

• Sleeping sites of common marmosets (*Callithrix jacchus*) in defaunated urban forest fragments: A strategy to maximize food intake. Mendes Pontes, A. R., & Soares, M. L. (Univ. Fed. de Pernambuco, CCB, Depto de Zoologia, R. Prof. Moraes Rego 1235, Cidade Univ., Recife, PE, Brazil, CEP: 50740–620 [e-mail: *rossano@ufpe.br*]). *Journal of Zoology*, 2005, *266*, 55-63.

"The purpose of this study was to investigate if there was any species-specific type and structure of sleeping sites of common marmosets and their key determinant. The study was conducted in an urban fragment of the Atlantic forest of northeastern Brazil, where a group of common marmosets was followed for 488 h. For this purpose we used *ad lib* observations, performed twice a week, when the animals were entering and leaving the sleeping sites, identified potential predators of the common marmosets through interviews with local people, and identified the trees that provided them with fruit and/or exudate during the study. Five sleeping sites were identified, all invariably in the border of the native forest and the orchard. No predators of common marmosets were seen by local people or recorded during this study, and the sleeping trees were located invariably in the place where there was the highest concentration of feeding trees, regardless of its structure. There was no species-specific type and structure of sleeping places of common marmosets. The key variable defining the choice of a sleeping place was the availability and location of immediate sources of food."

• The monkey in the mirror: Hardly a stranger. de Waal, F. B. M., Dindo, M., Freeman, C. A., & Hall, M. J. (Living Links Ctr, Yerkes NPRC, Emory Univ., Atlanta, GA 30322 [e-mail: *dewaal@emory.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2005, *102*, 11140-11147.

It is widely assumed that monkeys see a stranger in the mirror, whereas apes and humans recognize themselves. In this study, we question the former assumption by using a detailed comparison of how monkeys respond to mirrors versus live individuals. Eight adult female and six adult male brown capuchin monkeys (*Cebus apella*) were exposed twice to three conditions: (*i*) a familiar same-sex partner, (*ii*) an unfamiliar same-sex partner, and (*iii*) a mirror. Females showed more eye contact and friendly behavior and fewer signs of anxiety in front of a mirror than they did when exposed to an unfamiliar partner. Males showed greater ambiguity, but they too reacted differently to mirrors and strangers. Discrimination between conditions was immediate, and blind coders were able to tell the difference between monkeys under the three conditions. Capuchins thus seem to recognize their reflection in the mirror as special, and they may not confuse it with an actual conspecific. Possibly, they reach a level of self–other distinction intermediate between seeing their mirror image as other and recognizing it as self.

• Can squirrel monkeys (*Saimiri sciureus*) plan for the future? Studies of temporal myopia in food choice. McKenzie, T., Cherman, T., Bird, L. R., Naqshbandi, M., & Roberts, W. A. (W. A. R., Dept of Psychology, Univ. of Western Ontario, London, ON, N6A 5C2, Canada [e-mail: *roberts@uwo.ca*]). *Learning & Behavior*, 2004, *32*, 377-390.

In seven experiments, two squirrel monkeys were given choices between arrays of food that varied in the quantity offered. In Experiments 1-5, the monkeys were offered choices between quantities of the same food that varied in a 2:1 ratio. The squirrel monkeys failed to show the temporal myopia effect or a decrease in preference for the larger quantity as the absolute number of food items offered increased. Even when given choices of 8 versus 16 peanuts and 10 versus 20 peanuts, both monkeys significantly preferred the larger quantity. An examination of the monkeys' rates of consumption indicated that 20 peanuts were consumed over a 1- to 2-h period, with eating bouts separated by periods of nonconsumption. In Experiments 6A, 6B, and 7, food was either pilfered or replenished 15 min after an initial choice, so that choice of the smaller quantity led to more total food in the long run. These manipulations caused both monkeys to reduce choice of the larger quantity, relative to baseline choice. The results suggest that squirrel monkeys anticipated the future consequences of their choices.

Care

• Mirrors as environmental enrichment for African green monkeys. Harris, H. G., & Edwards, A. J. (Animal Resources Prog., Wake Forest Univ. School of Med., Medical Center Blvd., Winston-Salem, NC 27157 [e-mail: *hharris@wfubmc.edu*]). *American Journal of Primatology*, 2004, *64*,459-467.

"Stainless steel circular mirrors were employed in an enrichment plan for 105 singly-housed male African green monkeys. We observed 25 randomly selected males to measure mirror use and to assess the mirrors' effectiveness as an enrichment item. We conducted additional mirror-use surveys on all 105 males using fingerprint accumulation as an indicator (rated on a scale of 0 to 4). Use was

defined as either being in contact with the mirror (contact use (CU)) or looking directly into the mirror without contact (non-contact use (NC)). Mirror-use data were collected 10 months after the initial introduction of the mirrors and again at 16 months. The two time points were compared by paired t-tests. No significant difference in use was found between the two data collection points. On average, the monkeys used the mirrors 5.2% of the total time intervals recorded (approximately 3 min/hr). Results from the five fingerprint-accumulation surveys showed that 102 of 105 males (97%) had CU with their mirrors over the survey points. Based on the sustained use of the mirrors over a 6-month period, we concluded that the mirrors were an effective enrichment tool that the vast majority of our monkeys routinely used. Habituation did not appear to occur even a year after the mirrors were introduced."

• Neighbor effect: Evidence of affiliative and agonistic social contagion in captive chimpanzees (*Pan troglodytes*). Videan, E. N., Fritz, J., Schwandt, M., & Howell, S. (Primate Foundation of Arizona, Mesa, AZ 85277-0027 [e-mail: *evpfa@qwest.net*]). *American Journal of Primatology*, 2005, *66*, 131-144.

"Previous studies of captive chimpanzees have demonstrated the 'neighbor effect,' or social contagion, with respect to agonistic vocalizations and behaviors. The present study considers whether there is a relationship between behavior patterns in focal animals and the auditory signals of neighboring social groups. Using focal-group sampling, we collected 172.5 hr of data on 51 subjects (25 females and 26 males) housed in 10 social groups. We performed two-tailed Wilcoxon matched-pairs signed-rank tests to determine whether the relative frequency of the vocalizations (high vs. low) affected the behaviors. In keeping with past research, we found that agonistic noises and vocalizations from neighboring social groups had a significant effect on the rates of focal-group bluff displays, pant-hoots, and aggression ($P<0.05$). In addition, we also found significant relationships between grooming behavior and vocalizations in focal groups, and grooming vocalizations from neighboring groups ($P<0.05$). The results suggest that social contagion is not limited to aggressive behaviors, but also occurs for affiliative behavior patterns."

• Use of low-dose chlorpromazine in conjunction with environmental enrichment to eliminate self-injurious behavior in a rhesus macaque (*Macaca mulatta*). Taylor, D. K., Bass, T., Flory, G. S., & Hankenson, F. C. (Unit for Lab. Animal Med., 018 Animal Res. Fac., 1150 W. Medical Center Dr., Ann Arbor, MI, 48109-0614). *Comparative Medicine*, 2005, *55*, 282-288.

"A 7-year-old, captive-bred, female rhesus macaque was placed in a quarantine facility upon arrival at our institution. At release from quarantine, she was observed pawing at and chewing on her left cheek. Physical examination revealed ulcerative lesions on the buccal surface of the left cheek. Initial differential diagnoses included *Cercopithecine herpesvirus* 1 (B virus)-induced lesions and bacterial infection. Dental abnormalities and cheek pouch foreign body were ruled out during the physical exam. Treatment with 30 mg/kg cefazolin intramuscularly every 12 h was initiated. Twelve days later, the animal presented with a 2 x 2-cm, full-thickness erosion involving the opposite (right) cheek. Treatment with buprenorphine (0.1 mg/kg intramuscularly every 24 h) was initiated. Cultures for B virus were negative, and only nonpathogenic bacteria were isolated from swabs of the lesions. Hematology and serum chemistry profiles were normal. A wedge biopsy of the lesion revealed no definitive etiology. Further observation revealed that the lesions likely resulted from self-injurious behavior (SIB). Treatment with low-dose chlorpromazine (1 mg/kg intramuscularly once daily for 25 days, and then 0.5 mg/kg intramuscularly once daily for 25 days) was initiated. Body weight and condition were maintained during therapy, and serial hematology and serum chemistry profiles were normal. The animal was moved into a different room, and a toy "necklace" was created. The SIB was eliminated, and lesions healed within 35 days. Presently, 20 months after presentation, this animal remains in good health."

Conservation

• Measuring success in primate translocation: A baboon case study. Strum, S. C. (Dept of Anthropology, U.C.-San Diego, La Jolla, CA 92093-0532 [e-mail: *sstrum@ucsd.edu*]). *American Journal of Primatology*, 2005, *65*, 117-140.

Translocation of primates is still a rare event. The translocation in 1984 of two research groups of wild baboons that had been studied for 12 years prior to translocation and observed for 18 years afterwards offers a comprehensive set of data with which to evaluate success. A comparison with indigenous baboon troops at the release site provides an independent control for assessing performance in the release area. Two success criteria are developed with the use of indicator measures that include birth rate, death rate, patterns of mortality and survivorship, body condition, intestinal parasites, and group size. The baboon translocation succeeded according to both criteria: the two troops were saved by the translocation, and they did as well or better than could be expected in their new home. Their performance matched or exceeded that of translocated groups of other primate species.

• Global hotspots of species richness are not congruent with endemism or threat. Orme, C. D. L., Davies, R. G., Burgess, M., Eigenbrod, F., Pickup, N., Olson, V. A., Webster, A. J., Ding, T.-S., Rasmussen, P. C., Ridgely, R. S., Stattersfield, A. J., Bennett, P. M., Blackburn, T. M., Gaston, K. J., & Owens, I. P. F. (I. P. F. O., Div. of Biology, Imperial College of London, Silwood Park, Ascot, Berkshire SL5 7PY, U.K. [e-mail: *i.owens@imperial.ac.uk*]). *Nature*, 2005, *436*, 1016-1019.

"Biodiversity hotspots have a prominent role in conservation biology, but it remains controversial to what extent different types of hotspot are congruent. Previous studies were unable to provide a general answer because they used a single biodiversity index, were geographically restricted, compared areas of unequal size or did not quantitatively compare hotspot types. Here we use a new global database on the breeding distribution of all known extant bird species to test for congruence across three types of hotspot. We demonstrate that hotspots of species richness, threat and endemism do not show the same geographical distribution. Only 2.5% of hotspot areas are common to all three aspects of diversity, with over 80% of hotspots being idiosyncratic. More generally, there is a surprisingly low overall congruence of biodiversity indices, with any one index explaining less than 24% of variation in the other indices. These results suggest that, even within a single taxonomic class, different mechanisms are responsible for the origin and maintenance of different aspects of diversity. Consequently, the different types of hotspots also vary greatly in their utility as conservation tools."

Development and Aging

• Maternal care and development of stress responses in baboons. Bardi, M., Bode, A. E., Ramirez, S. M., & Brent, L. Y. (Dept of Comp. Med., Southwest Fnd. for Biomed. Res., P.O. Box 760549, San Antonio, TX 78245-0549 [e-mail: *mbardi@icarus.sfbr.org*]). *American Journal of Primatology*, 2005, *66*, 263-278.

The ability to mount a successful response to threats is critical for an organism's survival. A key element of the stress response is its nonspecificity toward the stress source, with similar endocrine and behavioral changes expected under a variety of stressors. In this project we utilized an experimental design that accounts for multiple sources of variation to further understand the nature of stress responsivity and its relationship to the early rearing environment. A sample of baboons (n=73) was observed during the early phase of life in their social group, and then tested as juveniles in a challenging situation. Maternal cortisol levels were measured during the peripartum period. The challenging situation (individuals were isolated for a few minutes in a single cage) was designed to be a moderate source of psychological stress. Patterns in individual differences during the stress test were "mapped" by means of multidimensional scaling (MDS). After the observation was made, the subject was sedated and a blood sample was taken to measure cortisol levels. Our results indicate that when juvenile baboons are confronted with a source of psychological stress, they show a multidimensional behavioral response, probably mediated by the activation and synergic interaction among different neurohormonal systems that, ultimately, act on the hypothalamus-pituitary-adrenal (HPA) axis. Different components of the multidimensional, or nonspecific, behavioral response are associated with the quality and quantity of interactions with their mothers during early life. Juveniles whose mothers displayed higher levels of positive interaction were characterized by vigilant but less active reactions to the stress test, whereas juveniles of mothers that displayed high levels of stress-related behaviors had higher cortisol and locomotion levels.

Disease

• Comparative transmission of multiple herpesviruses and simian virus 40 in a baboon breeding colony. Payton, M. E., d'Offay, J. M., Prado, M. E., Black, D. H., Damania, B., White, G. L., & Eberle, R. (R. E., Dept of Statistics, Coll. of Vet. Med., Oklahoma State Univ., Stillwater, OK 74078). *Comparative Medicine*, 2004, *54*, 695-704.

"Little is known about the natural history of herpesviruses indigenous in baboons. Here, we describe the development of ELISAs for five herpesviruses. These assays were used to test more than 950 serum samples collected from approximately 210 infant/juvenile and 130 adult baboons in a captive breeding colony over a period of seven years. Results indicated that baboon cytomegalovirus, lymphocryptovirus, and rhadinovirus are transmitted efficiently within the colony and are acquired at an early age. Baboon alpha-herpesvirus HVP2 and polyomavirus simian virus 40 (SV40) were acquired later and by fewer juveniles than were the other three herpesviruses. More than 60% of baboons acquired HVP2 before reaching sexual maturity, indicating that oral infection of infants and juveniles, rather than sexual transmission between adults, is the predominant mode of transmission for this virus. Antibody to simian varicella virus (SVV) was found in about 40% of baboons. SVV was acquired principally by infants and juveniles; few adults seroconverted despite seronegative adults being in constant contact with infants and juveniles undergoing primary infection. Time of seroconversion was not statistically correlated to specific individual herpesviruses, suggesting that each virus is acquired as an independent infection event rather than multiple viruses being acquired at the same time. Several baboons that were delivered by cesarean section and were housed separate from, but in close proximity to, other baboons remained free of many or all viruses for several years, suggesting that, similar to human herpesviruses, baboon herpesviruses and SV40 are transmitted principally by direct contact."

• Smallpox vaccine-induced antibodies are necessary and sufficient for protection against monkeypox virus. Edghill-Smith, Y., Golding, H., Manischewitz, J., King, L. R., Scott, D., Bray, M., Nalca, A., Hooper, J. W., Whitehouse, C. A., Schmitz, J. E., Reimann, K. A., & Franchini, G. (G. F., Animal Models & Retroviral Vaccines Section, National Cancer Institute, 41/D804, Bethesda, MD 20892 [e-mail: *franchig@mail.nih.gov*]). *Nature Medicine*, 2005, *11*, 740-747.

Vaccination with live vaccinia virus affords long-lasting protection against variola virus, the agent of small-

pox. Its mode of protection in humans, however, has not been clearly defined. Here it is reported that vaccinia-specific B-cell responses are essential for protection of macaques from monkeypox virus, a variola virus ortholog. Antibody-mediated depletion of B cells, but not $CD4^+$ or $CD8^+$ T cells, abrogated vaccine-induced protection from a lethal intravenous challenge with monkeypox virus. In addition, passive transfer of human vaccinia-neutralizing antibodies protected nonimmunized macaques from severe disease. Thus, vaccines able to induce long-lasting protective antibody responses may constitute realistic alternatives to the currently available smallpox vaccine (Dryvax).

• Primate-to-human retroviral transmission in Asia. Jones-Engel, L., Engel, G. A., Schillaci, M. A., Rompis, A., Putra, A., Suaryana, K. G., Fuentes, A., Beer, B., Hicks, S., White, R., Wilson, B., & Allan, J. S. (Washington NPRC, HSB I-039, Box 357330, Seattle, WA 98195 [e-mail: *jonesengel@bart.rprc.washington.edu*]). *Emerging Infectious Diseases*, 2005, *11*, 1028-1035, <www.cdc.gov/ncidod/EID/vol11no07/04-0957.htm>.

"We describe the first reported transmission to a human of simian foamy virus (SFV) from a free-ranging population of nonhuman primates in Asia. The transmission of an exogenous retrovirus, SFV, from macaques (*Macaca fascicularis*) to a human at a monkey temple in Bali, Indonesia, was investigated with molecular and serologic techniques. Antibodies to SFV were detected by Western blotting of serum from 1 of 82 humans tested. SFV DNA was detected by nested polymerase chain reaction (PCR) from the blood of the same person. Cloning and sequencing of PCR products confirmed the virus's close phylogenetic relationship to SFV isolated from macaques at the same temple. This study raises concerns that persons who work at or live around monkey temples are at risk for infection with SFV."

• Marburg and Ebola: Arming ourselves against the deadly filoviruses. Peters, C. J. (Univ. of Texas Med. Branch Biosafety Laboratory, Galveston, TX 77555-0144). *New England Journal of Medicine*, 2005, *352*, 2571-2573.

• How Ebola virus infects cells. Kawaoka, Y. (Dept. of Microbiol. & Immunol., Inst. of Med. Science, Univ. of Tokyo, Tokyo 108-8639, Japan). *New England Journal of Medicine*, 2005, *352*, 2575-2576.

• Septicemia and peritonitis in a colony of common marmosets (*Callithrix jacchus*) secondary to *Klebsiella pneumoniae* infection. Pisharath, H. R., Cooper, T. K., Brice, A. K., Cianciolo, R. E., Pistorio, A. L., Wachtman, L. M., Mankowski, J. L., & Newcomer, C. E. (Dept of Comp. Med., Johns Hopkins Univ. School of Med., Ross 4th Floor, 720 Rutland Ave., Baltimore, MD 21205). *Contemporary Topics in Laboratory Animal Science*, 2005, *44*, 35-37.

Six common marmosets from a colony of 50 died over a period of 3 weeks, with the predominant finding of gram-negative bacterial septicemia. Four of these animals died peracutely; the other two were found when they were moribund, and they subsequently died despite clinical intervention. Gram-negative bacterial rods were present in the blood vessels of stained tissues from five of the six marmosets. Three marmosets also had severe fibrinopurulent peritonitis. In addition, one of the marmosets with peritonitis also had purulent mesenteric lymphadenitis with large colonies of gram-negative bacterial rods within dialated colonic crypts. *Klebsiella pneumoniae* was isolated from multiple organs in three of the marmosets. Clinical evaluation of the entire colony identified four marmosets with anorexia, nasopharyngeal discharge, and diarrhea. These marmosets were treated with enrofloxacin immediately, and they responded well. *K. pneumoniae* could not be cultured from nasal or fecal samples obtained from the colony animals. Because of the peracute nature of the disease, animals often die before exhibiting clinical symptoms, and antibiotics are seldom helpful. In this outbreak both of the major forms of *Klebsiella* infection appeared in common marmosets: the peracute form with bacteremia and minimal inflammatory reaction around blood vessels, and the chronic form with bacteremia, fibrinopurulent peritonitis, and mesenteric lymphadenitis.

Evolution, Genetics, and Taxonomy

• Progressive proximal expansion of the primate X chromosome centromere. Schueler, M. G., Dunn, J. M., Bird, C. P., Ross, M. T., Viggiano, L., NISC Comp. Sequencing Program, Rocchi, M., Willard, H. F., & Green, E. D. (H. F. W., Inst. for Genome Sciences & Policy, Duke Univ., 101 Science Dr., Rm 2379, Durham, NC 27708 [e-mail: *willa009@mc.duke.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2005, *102*, 10563-10568.

"Previous studies of the pericentromeric region of the human X chromosome short arm (Xp) revealed an age gradient from ancient DNA that contains expressed genes to recent human-specific DNA at the functional centromere. We analyzed the finished sequence of this human genomic region to investigate its evolutionary history. Phylogenetic analysis of >1,500 alpha-satellite monomers from the region revealed the presence of five physical domains, each containing monomers from a distinct phylogenetic clade. The most distal domain contains long interspersed nucleotide element repeats that were active >35 million years ago, whereas the four proximal domains contain more recently active long interspersed nucleotide element repeats. An out-of-register, unequal recombination (i.e., crossover) detected at the edge of the X chromosome-specific alpha-satellite array (DXZ1) may reflect the most recent of a series of punctuating events during evolution that resulted in a proximal physical expansion of the X centromere. The first 18 kb of this array has 97-99% pairwise identity among all 2-kb repeat units. To perform more detailed

evolutionary comparisons, we sequenced the junction between the ancient DNA of Xp and the primate-specific alpha satellite in chimpanzee, gorilla, orangutan, vervet, macaque, and baboon. The striking conservation found in all cases supports the ancestral nature of the alpha satellite at this location. These studies demonstrate that the primate X centromere appears to have evolved through repeated expansion events occurring within the central, active region of centromeric DNA, with the newly added sequences then conferring centromere function."

• Dental microwear texture analysis shows within species diet variability in fossil hominins. Scott, R. S., Ungar, P. S., Bergstrom, T. S., Brown, C. A., Grine, F. E., Teaford, M. F., & Walke, A. (P. S. U., Dept of Anthropology, Univ. of Arkansas, Fayetteville, AR 72701 [e-mail: *pungar@uark.edu*]). *Nature*, 2005, *436*, 693-695.

"Reconstructing the diets of extinct hominins is essential to understanding the paleobiology and evolutionary history of our lineage. Dental microwear, the study of microscopic toothwear resulting from use, provides direct evidence of what an individual ate in the past. Unfortunately, established methods of studying microwear are plagued with low repeatability and high observer error. Here we apply an objective, repeatable approach for studying three-dimensional microwear surface texture to extinct South African hominins. Scanning confocal microscopy together with scale-sensitive fractal analysis are used to characterize the complexity and anisotropy of microwear. Results for living primates show that this approach can distinguish among diets characterized by different fracture properties. When applied to hominins, microwear texture analysis indicates that *Australopithecus africanus* microwear is more anisotropic, but also more variable in anisotropy than *Paranthropus robustus*. This latter species has more complex microwear textures, but is also more variable in complexity than *A. africanus*. This suggests that *A. africanus* ate more tough foods and *P. robustus* consumed more hard and brittle items, but that both had variable and overlapping diets."

• Genetic characterization of Indian-origin and Chinese-origin rhesus macaques (*Macaca mulatta*). Smith, D. G. (California NPRC, Univ. of California, Davis, California 95616). *Comparative Medicine*, 2005, *55*, 227-230.

"Genetic differences between Indian-origin and Chinese-origin rhesus macaques are as great as those between some primate species and can influence the results of experiments in which both are used as animal models for the study of the same human diseases. Unfortunately, many breeding facilities do not know with certainty the origin of the founders of their rhesus breeding colonies. Here I summarize the most definitive of the genetic traits among the microsatellite (STR) loci and mitochondrial DNA sequences that my laboratory previously reported to characterize Indian-origin and Chinese-origin rhesus macaques and then estimate the frequencies of these traits and their reliability as indicators of country of origin. The expression of diagnostic traits at two or more of four different unlinked loci provides a nearly 100% reliability in distinguishing rhesus macaques of Indian and Chinese origin."

• A new generic name for the hoolock gibbon (Hylobatidae). Mootnick, A., & Groves, C. (Gibbon Conservation Center, P.O. Box 800249, Santa Clarita, CA 91380). *International Journal of Primatology*, 2005, *26*, 971-976.

"Contrary to usual practice, the generic nomen *Bunopithecus* is not applicable to hoolock gibbons. We recount the history of its application and explain why it is spurious. We supply a new generic name, list the characters and content of the genus, and compare it to the other three genera of the Hylobatidae."

Field Studies

• Survey of the gastrointestinal parasites of the primate community at Tambopata National Reserve, Peru. Phillips, K. A., Haas, M. E., Grafton, B. W., & Yrivarren, M. (Dept of Psychology, Hiram College, Hiram, OH 44234-0067 [e-mail: *phillipsk@hiram.edu*]). *Journal of Zoology*, 2004, *264*, 149-151.

The main objective of this project was to provide baseline data on fecal parasites of groups of nonhuman primates from Tambopata Research Center, Tambopata National Reserve, Peru. All primate species found in this area were sampled: red howler monkeys (*Alouatta seniculus*), night monkeys (*Aotus vociferans*), spider monkeys (*Ateles bezlebuth chamek*), brown titi monkeys (*Callicebus brunneus*), white-fronted capuchins (*Cebus albifrons*), brown capuchins (*C. apella*), saddleback tamarins (*Saguinus fuscicollis*), and squirrel monkeys (*Saimiri sciureus*). Individuals from four howler monkey troops, three brown titi monkey troops, two squirrel monkey troops and one troop each of night monkeys, spider monkeys, brown capuchins, white-fronted capuchins, and saddleback tamarins were sampled. Fecal samples were collected from July to October 2002 from 86 individuals. A concentration test was used to analyse fecal samples. Results indicate the presence of various protozoans: *Ancyclostoma* sp., *Ascaris* sp., *Strongyloides stercoralis*, *Trichuris trichiura*, *Prosthenorchis elegans*, and *Schistosoma mansoni*.

Instrumentation and Techniques

• Individuals' behaviors following dye-marking in wild black-and-white colobus (*Colobus vellerosus*). Teichroeb, J. A., Marteinson, S., & Sicotte, P. (Dept of Anthropology, Univ. of Calgary, Calgary, Canada [e-mail: *jateichr@ucalgary.ca*]). *American Journal of Primatology*, 2005, *65*, 197-203.

"The ability to recognize individuals is a prerequisite for analyzing social relationships. We marked five adult and subadult *Colobus vellerosus* (three in 2002, and two in 2003) at the Boabeng Fiema Monkey Sanctuary, Ghana, to assess the feasibility of dye-marking black-and-white

colobus, describe their reactions, and compare some of their behaviors with those of unmarked individuals. We used Nyanzol-D, a nontoxic black dye sprayed on the white tail (or white thigh) of the animal with a spray gun or a tree sprayer. Reactions to the marking procedure ranged from moving away and staring at the observer, without interruption in feeding (in one subject), to fleeing about 5 m away (in four subjects). In 234 hr of ad lib. observations (in 2002 and 2003), marks were scratched or otherwise were the object of attention from the bearer or other individuals on only one occasion. In 2002 we collected 22 hr of observations on the three marked monkeys and some unmarked monkeys in 10-min focal samples. Neither the marked nor the unmarked animals attended to the marks during focal samples. Marked and unmarked individuals displayed similar rates of displacement activities (autogrooming, scratching, and yawning). The proportion of scans with at least one near neighbor varied between marked and unmarked subjects, but the direction of the difference was not the same between males and females. The only aggression observed was displacements, and only in one comparison (out of four) did a difference emerge: the marked subadult male received more displacements than the unmarked males. Overall, marked and unmarked individuals did not differ consistently in our measures. Examination of the potential effects of marking should continue, since changes in pelage coloration may have longer-term social effects in species that rely largely on vision."

• Constructing, bootstrapping, and comparing morphometric and phylogenetic trees: A case study of New World monkeys (Platyrrhini, Primates). Couette, S., Escarguel, G., & Montuire, S. (UMR-CNRS 5561, Biogéosci. & Lab. EPHE, Centre des Sciences de la Terre, Univ. de Bourgogne, 6 Bld Gabriel, 21000 Dijon, France [e-mail: *sebastien.couette@u-bourgogne.fr*]). *Journal of Mammalogy*, 2005, *86*, 773-781.

"Morphometric data sets are often phenetically analyzed by using various kinds of spatial, metric, or nonmetric multivariate analyses. Such methods produce results that are difficult to compare directly with molecular or morphological phylogenetic hypotheses, which are usually expressed by using nonspatial tree representations. Therefore, it is useful in a comparative approach to analyze, and above all to visualize, morphometric pairwise relationships as tree structures. For this purpose, several additive or ultrametric methods exist, which often return different topologies for the same data set. Objective criteria are thus needed to identify the tree-building algorithm (or algorithm family) best adapted to the nature and structure of the hierarchical signal under study. Here, we present our 4-step analysis protocol that allows the construction of a morphometric tree, statistically tested for confidence, to perform direct comparisons with a phylogenetic hypothesis. As an example, we apply this protocol to the analysis of an original morphometric data set (geometric 3-dimensional Procrustes analysis of skull morphology) involving 7 species of Callithrichinae, and then compare the resulting tree to a published molecular phylogenetic hypothesis. Differences between the 2 compared trees are qualitatively and quantitatively described, and are interpreted as the result of morphological convergences due to environmental conditions, and especially to morphofunctional constraints linked to diet."

• Validation of an enzyme-linked immunosorbent assay kit using herpesvirus papio 2 (HVP2) antigen for detection of *herpesvirus simiae* (B virus) infection in rhesus monkeys. Yamamoto, H., Ohsawa, K., Walz, S. E., Mitchen, J. L., Watanabe, Y., Eberle, R., Origasa, H., & Sato, H. (Wisconsin NPRC, 1220 Capitol Ct, Madison, WI 53715). *Comparative Medicine*, 2005, *55*, 244-247.

"Serologic testing for antibody to monkey B virus (BV) in macaque sera is problematic due to the biohazardous nature of BV antigens. *Herpesvirus papio* 2 (HVP2), a herpesvirus of baboons, is nonpathogenic to humans and is genetically and antigenically more closely related to BV than is human *herpes simplex* virus 1. This paper describes the results of our in-house laboratory that compared a BV antigen-based enzyme-linked immunosorbent assay (ELISA) by a commercial testing laboratory and an HVP2-based ELISA in our laboratory by using 447 sera from 290 rhesus monkeys. The HVP2-based ELISA identified as positive 99.11% of the sera identified as BV-positive by the BV ELISA. The BV antigen-based ELISA identified as positive 98.21% of the sera identified as BV-positive by the HVP2-based ELISA. The HVP2 ELISA also identified two BV-negative and six BV-equivocal sera as positive. Both ELISAs identified the same 85 negative and three equivocal samples as negative and equivocal, respectively. The high degree of correlation (weighted kappa coefficient, 0.94) between the two tests indicates that the HVP2 ELISA is a sensitive and reliable assay for in-house testing of the BV status of rhesus monkeys."

Miscellany

• Profile of Frans B. M. de Waal. Nuzzo, R. *Proceedings of the National Academy of Sciences, U.S.A.*, 2005, *102*, 11137-11139.

• Misuse of anecdotes in primatology: Lessons from citation analysis. Sarringhaus, L. A., McGrew, W. C., & Marchant, L. F. (W. C. M., Dept of Anthropology, Miami Univ., 70 Upham Hall, Oxford, OH 45056 [e-mail: *mcgrewwc@muohio.edu*]). *American Journal of Primatology*, 2005, *65*, 283-288.

This study analyzes the accuracy of anecdotes cited in behavioral primatology publications. Anecdotes (n = 1 cases) recounting tool use were sought in the four main primatological journals. Citations of anecdotes in the scientific literature that met three criteria were systematically coded for recognition and accuracy. The results showed

that 60% of the time, authors who cited anecdotes did not explicitly acknowledge them as such. To a lesser extent, the citations exaggerated the frequency of anecdotal events or misrepresented their status. For tool use specifically, the actor was misreported more often than the tool or its target. Multiple citations were incorrect more often than single citations. Overall, it seems that citation of anecdotes is problematic and may have far-reaching implications in terms of misleading overgeneralizations. Primatologists should take care in citing singular or rare events.

Reproduction

• Mountain gorilla tug-of-war: Silverbacks have limited control over reproduction in multimale groups. Bradley, B. J., Robbins, M. M., Williamson, E. A., Steklis, H. D., Steklis, N. G., Eckhardt, N., Boesch, C., & Vigilant, L. (L. V., Max Planck Inst., Deutscher Platz 6, D-04103 Leipzig, Germany [e-mail: *vigilant@eva.mpg.de*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2005, *102*, 9418-9423.

To determine who fathers the offspring in wild mountain gorilla groups containing more than one adult male silverback, nearly one-fourth (n = 92) of the mountain gorillas (*Gorilla gorilla beringei*) living in the Virunga Volcanoes region of Africa were genotyped. Paternity analysis of 48 offspring born into four groups between 1985 and 1999 revealed that, although all infants were sired by within-group males, the socially dominant silverback did not always monopolize reproduction within his group. Instead, the second-ranking male sired an average of 15% of group offspring. This result, in combination with previous findings that second-ranking males fare best by not leaving the group but by staying and waiting to assume dominance even if no reproduction is possible while waiting, is not consistent with expectations from a reproductive skew model in which the silverback concedes controllable reproduction to the second-ranking male. Instead, the data suggest a "tug-of-war" scenario in which neither the dominant nor the second-ranking male has full control over his relative reproductive share. The two top-ranked males were typically unrelated and this, in combination with the mixed paternity of group offspring, means that multimale gorilla groups do not approximate family groups. Instead, as long-term assemblages of related and unrelated individuals, gorilla groups are similar to chimpanzee groups and so offer interesting possibilities for kin-biased interactions among individuals.

• Primate spermatogenesis: New insights into comparative testicular organisation, spermatogenic efficiency and endocrine control. Luetjens, C. M., Weinbauer, G. F., & Wistuba, J. (Inst. of Reproductive Med. of the University, Domagkstrasse 11, D-48129 Münster, Germany). *Biological Reviews of the Cambridge Philosophical Society*, 2005, *80*, 475-488.

Owing to the close phylogenetic relationship of Platyrrhini and Catarrhini to man, nonhuman primates are often used as models for the study of male reproductive physiology and endocrinology. This review aims at providing new data and insights into comparative primate spermatogenesis, dealing specifically with quantitative aspects of germinal epithelial organization and germ cell production, and with the roles of gonadotrophic hormones in this process.

• Effect of the enclosure on carriers' body weight loss in the cotton-top tamarin (*Saguinus oedipus*). Sánchez, S., Peláez, F., Morcillo, A., & Gil-Bürmann, C. (Área de Psicobiol., Fac. de Psicología, Univ. Autónoma de Madrid, 28049 Madrid, Spain [e-mail: *susana.sanchez@uam.es*]). *American Journal of Primatology*, 2005, *66*, 279-284.

"Infant carrying in cotton-top tamarins is a costly activity that results in weight loss by the fathers and helpers. However, to date, measures of carrying costs have been obtained in small indoor enclosures. We studied body weight changes in adult and subadult individuals from eight large groups (n>5) for 9 weeks after the birth of infants. Four groups were housed in large indoor/outdoor enclosures (42 m^2 x 3.3 m high), and four were housed in small indoor enclosures (12 m^2 x 2.4 m high). All of the individuals were weighed regularly at least three times a week. Reproductive males lost more weight in the big indoor/ortdoor enclosures (mean=6.51%) than in the small indoor ones, as did male adult helpers (mean=5.59%) and female adult helpers (mean=4.4%). Still-growing subadult individuals also lost weight in the big indoor/outdoor enclosures (mean=3.17%), although the differences did not reach significance (P=0.07). These results support the hypothesis that cotton-top tamarins living in more natural settings experience higher weight loss than those housed under less natural conditions."

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Contents