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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 $10.00 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 $100/year. (Please make checks payable to the Brown University Psychology Department.) Readers with access to electronic mail may receive a notice when a new issue is put on the Website by sending the message **subscribe LPN-WARN your-own-name** to **listserv@listserv.brown.edu**. (Send the message **subscribe LPN-PDF** to receive PDF files by e-mail; or the message **subscribe LPN-L** to receive the nongraphic contents of each issue.) 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. Latin names of primates should be indicated at least once in each note and article. In general, to avoid inconsistencies within the *Newsletter*, the Latin 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 Pictorial Guide to the Living Primates*, by N. Rowe, Pogonias Press, 1996.

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Cover photograph of a white-handed gibbon (*Hylobates lar*),
taken at the San Diego Zoo by Mark Abbott in 2007

Statistics on Primate Importation into the United States in 2009

Shirley McGreal
International Primate Protection League

The International Primate Protection League (IPPL) has obtained from the U.S. Fish and Wildlife Service (FWS) a Law Enforcement Management Information System, which is a spreadsheet showing the numbers of monkeys imported into the U.S. in 2009. Anyone interested in receiving a copy of the full spreadsheet may contact IPPL [e-mail: *info@ippl.org*]. Each shipment is reported separately. I have organized the material into the tables below.

The crab-eating macaque is not native to China. All animals exported from China were either wild-caught or descended from wild-caught animals, and there are suspicions that wild-caught animals imported into China from other nations such as Vietnam, Laos, and Cambodia are re-exported on false captive-born documents. Such claims are difficult to investigate or prove.

Note that no baboons were imported, and no monkeys were imported from India, Bangladesh, Malaysia, or Nepal.

Some U.S. companies are establishing primate labs in Asia. The largest single exporter of monkeys to the U.S. is the Nafovanny company, Vietnam.

Recent information has shown that Laos is feeding the many huge Chinese primate dealerships with monkeys for breeding or direct export to user nations. British Union for the Abolition of Vivisection investigators secretly filmed inside the largest monkey farm (the Vannaseng Trading Company) in the first exposé of the primate trade in Laos; they also revealed the construction of a new monkey farm. Vannaseng held over 10,000 monkeys. This firm is reportedly Chinese-owned. Photos showed that the animals were housed in unsatisfactory conditions and shipped in small wooden crates.

The total number of primates reaching the U.S. in 2009 was 22,098.

China	13,158
Mauritius	3,199
Vietnam	3,118
Cambodia	1,080
Indonesia	480
Saint Kitts & Nevis	372
Philippines	300
Israel	240
Barbados	72
Peru	20
France	16
Guatemala	16
Guyana	14
Japan	6
New Zealand	3
Great Britain	2
United States	2 (reimported)

Table 1: Source countries

Crab-eating macaque	19, 979
Rhesus macaque	596
African green monkey	154
Owl monkey	20
Spider monkey	16
Mouse lemur	15
Saki	14

Table 2: Species (numbers under 10 omitted)

Covance Research Products Inc.	9,436
Charles River Laboratories, BRF	6,436
SNBL-USA Ltd.	2,040
Worldwide Primates	1,007
Primate Products	848
Harlan Labs	779
Shared Enterprises	420
New Iberia Research Center, Univ. of Louisiana	300
Valley Biosystems	262
Buckshire Corporation	181
Alphagenesis Inc.	178
Three Springs Scientific	80
Wake Forest Univ. School of Medicine	42
Sanofi Pasteur	20

Table 3: Sorted by U.S. importer (companies importing under 20 animals omitted)

Los Angeles, CA	14,623
Chicago, IL	3,717
New York, NY	2,914
Miami, FL	454
San Francisco, CA	300
Buffalo, NY	76
Atlanta, GA	14

Table 4: Sorted by port of entry

Wild-caught	5,277
Claimed born in captivity	(F1 + generations)
Claimed captive-bred	15,825

Table 5: Sorted by status of monkeys

Nafovanny	3,118	Vietnam
Huazhen Laboratory Animal Breeding Centre	2,558	China
Guangxi Weimei Bio-Tech	1,800	China
Bioculture	1,631	Mauritius
Guangzhou Blooming Spring Biotech	1,460	China

Author's address: P.O. Box 766, Summerville, SC 29484 [e-mail: *info@ippl.org*].

Hainan Jinjang Lab Animal Co.	1,149	China
Beijing Puliyuan Trading	1,149	China
Angkor Primates Inc.	1,080	Cambodia
Yunnan Lab Primate	1,021	China
Noveprim	700	Mauritius
Biodia	588	Mauritius
Guangdong Landau Biotechnology	578	China
China National Scientific Instruments	540	China
Wing Freight	480	China
CV. Inquatex	360	Indonesia
Fang Cheng Gang Spring Biotech	360	China
Scientific Primates Filipinas	300	Philippines
Les Campeches	260	Mauritius
Gaoyao Kangda Lab Animals Science and Technology	252	China
B.F.C. (monkey breeding farm)	240	Israel
Beijing Grandforest	240	China
Tianjin Jinxin Import/Export	240	China
Primate Resources International	214	St. Kitts
St. Kitts Biomedical Research Foundation	122	St. Kitts
Beijing Ultimate Bioscience Co.	120	China
Biomedical Research Research (GZ)	120	China
Guangdong Scientific Instruments and Materials	120	China
Guangxi Grandforest Scientific Primate Co.	120	China
Pt. Wanara Satwaloka	120	Indonesia
Suzhou Jin Nuo Import/Export Co.	120	China
Conghua City Yueyuan Animal Breeding Farm at Qigan	120	China
DF Import/Export	110	China
Yongfu County Xingui Yesheng	109	China
Barbados Primate Research Center	108	Barbados
Conghua City Yueyuan Animal Breeding Farm	61	China
Instituto de Investigaciones Tropicales y de Altura	20	Peru
Sanofi Pasteur	20	France

Table 6: Sorted by foreign exporters (companies shipping less than 20 omitted)

Determining whether purported captive-bred monkeys are really wild-caught or legitimately captive-bred is close to impossible. There are no distinctive gut flora. Stress behavior provides suggestions but not definitive proof that an animal is wild-caught. Wildlife authorities have been struggling to find a way to verify claims of captive birth. Exporting wild-caught monkeys on fake captive-born documents would be extremely lucrative for sellers, because captive-born monkeys are more expensive, as the suppliers have more time and funds invested in the animals.

In 1997 a U.S. importer (then known as LABS) imported a series of shipments from Indonesia totaling 1,400 monkeys, several of which included infant monkeys (a misdemeanor under U.S. law) and large numbers of monkeys claimed to be 14-15 years old and supposedly "born in captivity". The monkeys had been born before the Indonesian exporter had established his facility. Indonesian law at the time permitted only export of captive-born monkeys. After years of pressure from animal protection organizations, the U.S. importer and three company employees were indicted on felony (false declaration) charges by the Office of Law Enforcement of FWS. The U.S. company was fined $500,000 for its role in the shipments. Charges against the three indicted officers were dropped.

Unfortunately, crab-eating macaques are threatened with extirpation from many parts of their range. Besides the export trade, the animals are eaten in many countries and also persecuted as "pests". I foresee that, within a few decades, the crab-eating macaque will face the same fate as the passenger pigeon. Flocks of these birds darkened the skies of the eastern U.S. for hundreds of years. Starting in the mid-1800s hunters shot thousands of the birds for food markets in a totally undisciplined, unregulated manner. In 1910 the last free-flying passenger pigeon was shot and in 1914 the last single bird died in Cincinnati Zoo.

* * *

Resources Wanted and Available

"Cryptozoology"

A discussion group, <tech.groups.yahoo.com/group/Crypto_Zoology>, has been established. Cryptozoology is the study of animals and other creatures that have not yet been accepted by science as real. The ultimate goal is to discover new species of animals. Although cryptozoology doesn't get much respect from other scientific disciplines, it has had some spectacular success stories, including the pongo (now known as the gorilla), the okapi (an animal that looks like a cross between a giraffe and zebra), and the coelacanth (a prehistoric fish thought to be extinct). In this discussion group you will find bizarre reports, and discussions of those reports, of strange creatures observed worldwide.

PASA Primates

The Pan African Sanctuary Alliance (PASA, see <pasaprimates.org>) is seeking donations of veterinary equipment and supplies for use at member sanctuaries in Africa. Zoos, wildlife centers or supply houses wishing to contribute should contact the Lincoln Park Zoo's Jill Moyse [e-mail: *JMoyse@lpzoo.org*] or Katrina Scott [e-mail: *kascott@lpzoo.org*]. Any help, including financial donations, would be very welcome and greatly appreciated!

To Squeeze or Not to Squeeze? A Discussion on LAREF, September, 2009

The following discussion took place on the Laboratory Animal Refinement and Enrichment Forum (LAREF). Contributions to the discussion were made by Amy Kerwin, Autumn Sorrells, Eileen Boehle, Judith Schrier, Marcie Donnelly, Sue Rubino, and Viktor Reinhardt. All posted contributions have been edited and expanded by Erik Moreau.

The discussion was started by the following questions:

- Is the squeeze-back mechanism more or less stressful than the pole and collar system for removing a macaque from his cage for an IM (intramuscular) injection? and,
- How are stress levels being measured when using either system or both?

Trust and communication between animal and human through positive reinforcement training (PRT) were mentioned several times as the best means to reduce and eliminate the stress of either restraint system.

Both the squeeze-back and the pole and collar have been well established in the field of laboratory animal science. Variants have also been developed in agriculture (squeeze chute) and for household pets (e.g., collars for dogs and cats). As with any tool for animal restraint, developing a sense of trust and communication between the animal and person will lessen the anxiety and stress level of both parties. One of the most powerful modes of communication with animals is through PRT. Trust comes when communication is established. Strengthening both communication and trust develops a cooperative working relationship.

Communication and trust are most effectively built through desensitization. Desensitization is the process of gradually exposing the animal to a novel or fearful stimulus and pairing it with a neutral or pleasant stimulus. Reinhardt (2003) documents a training protocol in which PRT is used to train macaques for cage-side femoral blood collection while using the squeeze-back mechanism as a tool. Donelly has incorporated the squeeze-back as a means of guiding the animals into proper position for pole and collar training. Rubino makes use of the squeeze-back cage as a matter of health and safety when giving IM injection in the cage. Sorrells, on the other hand, does not make used of the squeeze-back to aid in training. By using PRT only, she has been able to train her macaques to present for injection. Each discussion participant has also stated the importance of a good desensitization to the squeeze-back in order for its use to be minimally stressful while still effective.

By not using the squeeze-back mechanism, Sorrells has been successful in decreasing stress levels. In facilities such as a contract research organization, time is of the essence. Boehle and Klein & Murray (1995) point out that staff experienced with the squeeze-back and comfortable with its proper use help to lower the perceived stress level of this restraint technique.

Fear and anxiety are sources of stress for a restrained nonhuman primate (NHP). Kerwin makes use of the squeeze-back in a dedicated cage, reserving the home cage as a "safe haven". Use of a separate cage for a dedicated purpose cues the animal to what will happen next, resulting in less anxiety of the unknown. Boehle has found that NHPs have been less likely to cooperate entering the chair when past experience was unpleasant, such as restraint for an injection. NHPs have the capacity to remember unpleasant experiences and are usually deceived only once (Fowler, 2008). The use of a ruse and the health and safety of personnel need to be measured carefully.

The health and safety of staff have made the squeeze-back the safest option for administering IM injections to NHPs, Rubino believes. Sainsbury (1989) and Klein & Murray (1995) both weigh-in in favor of the health of safety of personnel.

The health and safety of staff and animals can be established by the efforts of collecting good data and conducting good science. The focus is to lessen the stress of the restraint technique by the use of the squeeze-back and pole and collar. Klein & Murray (1995) warn of the possible exaggeration of a medical condition due to the stress of restraint. Rubino also reminds us that the primary concern when working with research animals is to ensure that biological factors are not affected. A summary of possible physiological parameters affected can be found in Reinhardt (2003).

In scientific research, variables such as stress can lead to the need to repeat an experiment, which leads to the use of more animals. Training by PRT leads to gaining the trust of the animal (Reinhardt, 1995, 2003, Klein & Murray, 1995). Gaining the trust of the animal is best achieved by desensitization because it minimizes the stress of a new procedure (Boehle, Klein & Murray, 1995; Sainsbury, 1989).

The NHPs that we work with are sentient and capable of learning and communicating with us. By listening to and working with the animals during common and routine restraint procedures, we will minimize the stress that the animals may experience.

References

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Comments to Erik Moreau, Charles River Laboratories Preclinical Services Montreal, 22022 Transcanadienne, Senneville, Quebec H9X 3R3, Canada [e-mail: *erik.moreau@crl.com*].

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Travelers' Health Notes

Imported Case of Marburg Hemorrhagic Fever

Marburg hemorrhagic fever (MHF) is a rare, viral hemorrhagic fever (VHF); the causative agent is an RNA virus in the family Filoviridae, and growing evidence demonstrates that fruit bats are the natural reservoir of Marburg virus (MARV). On January 9, 2008, an infectious disease physician notified the Colorado Department of Public Health and Environment of a case of unexplained febrile illness requiring hospitalization in a woman who had returned from travel in Uganda. Testing of early convalescent serum demonstrated no evidence of infection with agents that cause tropical febrile illnesses, including VHF. Six months later, in July 2008, the patient requested repeat testing after she learned of the death from MHF of a Dutch tourist who had visited the same bat-roosting cave as the patient, the Python Cave in Queen Elizabeth National Park, Uganda. The convalescent serologic testing revealed evidence of prior infection with MARV, and MARV RNA was detected in the archived early convalescent serum. A public health investigation did not identify illness consistent with secondary MHF transmission among her contacts, and no serologic evidence of infection was detected among the six tested of her eight tour companions. The patient might have acquired MARV infection through exposure to bat secretions or excretions while visiting the Python Cave. Travelers should be aware of the risk for acquiring MHF in caves or mines inhabited by bats in endemic areas in sub-Saharan Africa. Health-care providers should consider VHF among travelers returning from endemic areas who experience unexplained febrile illness. – MMWR Weekly, *2009*, 58*[49], 1377-1381*

Malaria Surveillance – United States, 2007

Malaria in humans is caused by intraerythrocytic protozoa of the genus *Plasmodium*. These parasites are transmitted by the bite of an infective female *Anopheles* mosquito. The majority of malaria infections in the United States occur among persons who have traveled to areas with ongoing malaria transmission. In the United States, cases can occur through exposure to infected blood products, congenital transmission, or local mosquito-borne transmission. Malaria surveillance is conducted to identify episodes of local transmission and to guide prevention recommendations for travelers. This report summarizes cases in persons with onset of illness in 2007 and summarizes trends during previous years.

No significant change in the number of malaria cases occurred from 2006 to 2007. No change was observed in the proportion of cases by species causing the infection. U.S. civilians traveling to countries in West Africa had the highest estimated relative case rates. In the majority of reported cases, U.S. civilians who acquired infection abroad had not adhered to a chemoprophylaxis regimen that was appropriate for the country where they acquired malaria.

Persons at risk for malaria infection should take one of the recommended chemoprophylaxis regimens appropriate for the region of travel and use personal protection measures to prevent mosquito bites. Any person who has been to a malarious area and who subsequently has a fever or influenza-like symptoms should seek medical care immediately and report their travel history to the clinician; investigation should always include blood-film tests for malaria with immediately available results. Malaria infections can be fatal if not diagnosed and treated promptly. Recommendations concerning malaria prevention are available from CDC at <wwwn.cdc.gov/travel/contentdiseases.Aspx#malaria> or by calling the CDC Malaria Hotline (telephone: 770-488-7788). Recommendations concerning malaria treatment are available at <www.cdc.gov/malaria/diagnosis_treatment/treatment.htm> or by calling the Malaria Hotline.

This notice has been edited from Surveillance Summaries, *2009, 58[SS02], 1-16,* <www.cdc.gov/MMWR/preview/mmwrhtml/ss5802a1.htm>.

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Planned 2010 Revision of *Directory of Graduate Programs in Primatology and Primate Research*

An updated *Directory* will be published in the July, 2010, 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 June 5, 2010, 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 2006 *Directory* in the *Laboratory Primate Newsletter*, *45*[1], 38-46; or see <www.brown.edu/Research/Primate/directory.html>.

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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Announcements from Publications

***The Enrichment Record* E-Zine**

Jayne Mackta, of Global Research Education & Training LLC, writes: "*The Enrichment Record* is a new quarterly E-Zine designed to serve as a forum where the animal research community can engage in informed discussion regarding the value of environmental enrichment. To sign up for your free subscription, go to <www.gr8tt.com/enrichrecord.html>.

"To facilitate thoughtful participation, the owner of the Linkedin Group called Laboratory Animal Science has agreed to host our official discussion site. This group allows members of the laboratory animal science community and *Enrichment Record* readers to interact over a Web-based platform to compare ideas and methods. To participate, you must have a Linkedin account and join the Laboratory Animal Science Group. It's easy! It's free! It's a safe and secure place where you can say what's on your mind. To get started, go to: <tinyurl.com/Enrichment-Record>."

Journal of Veterinary Medicine and Animal Health

The *Journal of Veterinary Medicine and Animal Health* (*JVMAH*), an open-access journal, publishes high-quality articles in English. All papers published by *JVMAH* are peer-reviewed. *JVMAH* is a very rapid response journal with an issue published every month. The following types of papers are considered for publication:

- Original articles in basic and applied research; and
- Critical reviews, surveys, opinions, commentaries and essays.

Our objective is to inform authors of the decision on their manuscript(s) within four weeks of submission. Following acceptance, a paper will normally be published in the next issue. Instructions for authors and other details are available at <www.academicjournals.org/JVMAH>. Prospective authors should send their manuscript(s) to the address below.

JVMAH is seeking qualified reviewers as members of the review board. *JVMAH* serves as a great resource for researchers and students across the globe. We ask you to support this initiative by joining our reviewers' team. If you are interested in serving as a reviewer, kindly send us your resume. — *Dr. William G. Dundon, Editor*, JVMAH *[e-mail*: JVMAH@acadjourn.org*]*

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Captive Care Grants Available – Great Britain

The Primate Society of Great Britain's Captive Care Working Party is accepting applications for this year's Captive Care grants (deadline 11th April 2010). If you, your students or colleagues are working on research projects relating to the welfare of captive primates, or education projects about the same, and would like more information about these grants, please contact Dr. Sonya P. Hill [e-mail: *ccwp@psgb.org*].

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Workshop Announcements

Advanced Primate Training & Enrichment Workshop

The 3rd Advanced Primate Training and Enrichment Workshop, hosted by Utah's Hogle Zoo, will be held April 12–16, 2010.

This 4 1/2-day workshop is designed for managers, veterinarians, supervisors, keepers, and care staff who are responsible for the care, management, and well-being of nonhuman primates in zoological, sanctuary, or biomedical settings. The workshop builds on the skills and knowledge gained in the Primate Training and Enrichment Workshops, held many times in Bastrop, Texas, and will pursue advanced techniques and methodologies. The instructors have extensive and diverse experience working with many zoological, biomedical, and pharmaceutical facilities in the development and maintenance of comprehensive behavioral management programs for nonhuman primates. Classroom-style instruction will be augmented with practical learning opportunities that include small-group work to develop and evaluate behavioral management programs for animals at the host institutions.

Participants should expect to gain a working knowledge of the necessary elements of behavioral management programs, and of what is required to establish and sustain these programs.

The registration fee ($1200) will include housing (double occupancy); all snacks and meals except two dinners; transportation between the hotel and the zoo (meeting site); workshop notebook and materials; a commemorative t-shirt or tote bag; and all other relevant materials. Registration fees will be adjusted if you prefer a private hotel room or are local and do not need a hotel room.

Instructors will be Mollie Bloomsmith (Yerkes National Primate Research Center), Gail Laule (Active Environments, Inc.), and Steve Schapiro (Univ. of Texas M. D. Anderson Cancer Center). For information, contact: Margaret Whittaker <*indu22@earthlink.net*> or Kimberly Davidson <*kdavidson@hoglezoo.org*>.

Enrichment Extravaganza

The Third Annual Enrichment Extravaganza, an environmental enrichment and behavioral management symposium, will be held on April 15, 2010, at the National Conference Center in East Windsor, New Jersey. The event is sponsored by the New Jersey Association for Biomedical Research and Merck & Co., Inc., and will feature guest speakers, vendors, and breakout sessions. Guest speakers will be: Kathryn Bayne, AAALAC International; Paul E. Kneply, Covance; Georgia Mason, University of Guelph; and Christina Winnicker, Charles River Labs.

For more information and registration, see <www.NJABR.org> or contact Genevieve Andrews-Kelly [732-594-1773; e-mail: *Genevieve_Andrews@merck.com*].

C.L. Davis, DVM Foundation Workshop

The Midwest Division of The Charles Louis Davis, D.V.M. Foundation will present a Workshop on Laboratory Animal Diseases, Wednesday–Friday, April 21–23, in Chicago, Illinois.

The Biologic Resources Laboratory's (BRL) collection of study materials will be available for review, at the BRL, 1840 West Taylor St, Chicago, beginning at 8:30 a.m., April 21 through April 23. The 2 x 2 slide collection includes 14,000 Kodachromes, many of which have been digitized, on laboratory animal diseases and management. In addition, glass micropathology slides with histories and sixty-six T60 video tutorials will be available for individual and/or group study. Microscopes, projectors (2x2 and LCD), DVDs, and VCRs will be available at the BRL.

Members of the senior staff of the BRL will give a Simulated Practical Examination on the morning of April 23, and seminars in the afternoon, covering primate pathology, mouse nomenclature, rat pathology, review of equipment used in biomedical research, review of legislation, and the use of swine as a surgical model.

For the complete text of the announcement and for registration information, contact James E. Artwohl, DVM, Program Director [312-996-1217; e-mail: *jeart@uic.edu*] or the C.L. Davis Foundation [e-mail: *cldavisdvm@comcast.com*].

Environmental Enrichment Workshop – Denmark

AnimalConcepts, in collaboration with the Odense Zoo, will present a four-day Environmental Enrichment Workshop, April 22–25. The Workshop, led by Dr. David Shepherdson of the Oregon Zoo in Portland, Oregon, will cover a wide variety of topics, focusing on the theory and science of environmental enrichment. There will also be practical sessions in the Zoo with different species of animals. The course is open to zookeepers, animal technicians, curators, veterinarians, and students. The combination of theoretical and practical aspects of the workshop will allow you to design, implement, and evaluate an enrichment program at your facility, whether a zoo, animal shelter, or research laboratory.

For details, contact Sabrina Brando [e-mail: *sbrando@gmail.com*] or see <www.animalconcepts.eu/AnimalConcepts/Events/Entries/2010/4/22_Environmental_Enrichment_Workshop_-_Denmark.html>.

CALAS Symposium

The Canadian Association for Laboratory Animal Science (CALAS) invites you to its 49th Annual Symposium, to be held in Quebec City, April 24–27, 2010. For registration and information, see <symposium.calas-acsal.org>.

Gorilla Workshop 2010

Gorilla Workshop 2010, hosted by the Oklahoma City Zoo, will be held May 11–14, 2010. For complete details, see <www.gorillaworkshop.org>.

Association of Primate Veterinarians

The 2010 Association of Primate Veterinarians Workshop will be held October 6–9 at the Emory Conference Center Hotel/Emory Inn, Atlanta, Georgia. See <www.primatevets.org>.

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News Briefs

New Legislative Animal Protection Caucus Formed

The Humane Society of the United States (HSUS) applauds the formation of a new animal protection caucus for California state legislators, one of the nation's first state legislative caucuses dedicated to promoting the passage of humane legislation. The caucus will seek to highlight important issues affecting animals and to educate legislators and their staff on the need for sensible animal protection legislation.

"California has consistently ranked first for its strong commitment to protecting animals with our laws," said The HSUS' California senior state director Jennifer Fearing. "In 2009, California legislators passed landmark bipartisan legislation to upgrade penalties for dog fighting, protect La Jolla's harbor seal habitat, prohibit the cruel and unnecessary docking of cows' tails, and increase fines for poaching our state's wildlife. With the formation of this new caucus, we hope to build on these successes and see even more accomplishments for animals brokered in the least contentious ways possible."

This caucus is modeled on the successful Congressional Animal Protection Caucus, co-chaired by U.S. Reps. Jim Moran, D-Va., and Elton Gallegly, R-Calif., and intends to sponsor nonpartisan forums and briefings, track the progress of relevant legislation, streamline communication among offices with regard to legislation, provide members with dependable information on animal welfare issues, and attempt to build broad coalitions in support of common-sense animal welfare laws.

The new animal protection caucus will kick off with a Capitol reception featuring HSUS president and CEO Wayne Pacelle in early February. – *HSUS press release, January 26, 2010*

Rwanda: NGO to Fund Reforestation Project

Kigali – The Gishwati Area Conservation Program (GACP) will fund a 647-acre reforestation project in Kinyenkanda-Rutsiro District in a bid to save a group of chimpanzees in the area. The surrounding hillsides that have also been devastated by landslides and severe soil erosion will also benefit from the initiative.

"Kinyenkanda must be reforested. This will stabilize the hillsides and reduce erosion into the Sebeya River, helping to restore its clarity and economic usefulness," said Dr. Benjamin Beck, the director of GACP. "Since Kinyenkanda has been added to the Gishwati National Conservation Park, reforestation will provide additional habitat for the 14 chimpanzees and other animals that live in the Park," he added.

The erosion also contaminates Sabeya River posing a health hazard to the local population. "The Sebeya is not only an important source of drinking water for local residents, but it also provides hydroelectric power," Dr. Beck underscored.

The core of Kinyenkanda will be planted with native trees while a 100 meter buffer zone will be planted with fast-growing non-native trees that can be harvested by local residents for fuel wood and charcoal. – *by Moses Gahigi,* The New Times*, February 1, 2010, posted in* <allafrica.com>

New Director for Lemur Conservation Foundation

The Lemur Conservation Foundation (LCF) in Myakka City, Florida, has a new Executive Director, as of February 1. Michael Stern takes over from Penelope Bodry-Sanders, LCF's founder, who is retiring. Bodry-Sanders started the foundation in 1996 to save endangered lemurs from extinction with an inheritance of $35,000 and built it into the thriving conservation organization it is today with assets of $4M. The six-building, Association of Zoos and Aquariums-certified, Myakka City Lemur Reserve sits on a 100-acre campus with two forested animal enclosures and a growing population of more than 40 lemurs. The site includes teaching and living facilities for researchers and scholars, active education programs, and the Mianatra Center for Lemur Studies, including the Anne and Walter Bladstrom Library. Equally significant has been the development of LCF's partnership with Tampolo Forest Station, a sister reserve in Madagascar, along with collaborations with zoos, colleges, and universities. – *Lemur Conservation Foundation Press Announcement. Contact Kate Lippincott, Director Admini-*

stration and Library [941-322-8494; e-mail: librarian@lemurreserve.org*]*

Child Bitten by Snow Monkey in Carencro, Louisiana

The Louisiana Department of Wildlife and Fisheries (LDWF) had to euthanize a 35-pound Japanese snow monkey (*Macaca fuscata*) on February 10 after the monkey bit a three-year-old girl on the hand at a residence in Carencro. The monkey was sedated with a tranquilizer dart, fully anesthetized, and transported to a facility to be tested for herpes B virus, and then it was euthanized in order to test for rabies.

"Unfortunately, in this situation, euthanasia was our only option to perform the testing necessary," said LDWF Biologist Maria Davidson. "The little girl's health is the number one priority and getting the test results quickly will help determine if she needs to have any further treatment for the rabies and herpes B virus."

Enforcement Division agents cited the owner of the snow monkey, Tracey Bourque, 39, of Carencro, for allegedly possessing a nonhuman primate without a permit. She faces a fine up to $350, or jail time up to 60 days, or both, plus court costs if convicted. Nonhuman primates were added to the list of potentially dangerous wild quadrupeds in 2006, making it illegal to possess, purchase, sell or import nonhuman primates in Louisiana.

"From a public health standpoint, these wild animals never make good pets and are better off kept in the wild or in a zoo," said State Public Health Veterinarian Dr. Gary Balsamo. "They might seem innocent when they are younger, but once they reach sexual maturity they become very aggressive and dangerous." – *LDWF news release, February 12, 2010*

Gorilla Briefly Escapes Dallas Zoo Enclosure

A 180-pound gorilla at the Dallas Zoo briefly escaped from her living quarters Saturday but was returned to her enclosure before she could venture far. The zoo was closed at the time. Zoo officials said the 19-year-old female, named Tufani, somehow got out of her 40-foot-by-50-foot living area, described as an apartment-like facility with living and sleeping areas, and was discovered when an employee saw her through a window. She was atop the enclosure and would have had to get through at least two additional spaces to reach a public area, zoo spokeswoman Susan Eckert said. A Dallas police SWAT team responded, although zoo personnel tranquilized Tufani and had her back in place within about an hour. In 2004, a 13-year-old gorilla named Jabari cleared a 14-foot wall and mauled three people before he was killed by police. After that, the zoo beefed up security at the exhibit. – *The Associated Press, posted Sunday, February 14, 2010*

World Laboratory Animal Liberation Week

Michael A. Budkie, Executive Director of Stop Animal Exploitation NOW! (SAEN), has announced that World Laboratory Animal Liberation Week (WLALW) will be April 17–25, 2010. He writes: "We have long believed that the USDA does not adequately enforce the very limited requirements of the Animal Welfare Act (AWA). Recently obtained information reveals that things are even worse than we had ever suspected – surpassing even our worst nightmares.

"It is time for everyone who is opposed to the abuse of animals to take a stance against animal experimentation and get involved in the campaign to end this abuse once and for all. The most immediate way to launch, or continue, your opposition to the use/abuse of all species of animals in laboratories is to get involved in World Laboratory Animal Liberation Week 2010.

"The SAEN Website, <www.saenonline.org>, and WLALW's, <www.wlalw.org>, have many resources that will be helpful in your organizing. Sections of SAEN's have fact sheets about product testing, primate experimentation, a general factsheet about animal experimentation, as well as materials focusing on specific labs. Their Government Grants Promoting Cruelty to Animals section contains detailed information including research protocols, grant applications, and journal articles relevant to over 120 different researchers spread throughout 47 laboratories in 24 states.

"The WLALW Website currently contains a sign-up form for this year's event, and listings of events from previous years. It is very important that we are aware of all WLALW events so that we may help in their promotion and media exposure, so please sign up with the details of your events as soon as possible. When your event is posted on our Website, more activists will be able to attend."

ASP Election Results

Randy Kyes, current President of the American Society of Primatologists (ASP), has announced the new slate of officers that has been elected to serve for the next two years: President-Elect: Karen Bales; Executive Secretary: Carolyn Ehardt; and Treasurer: Kim Phillips. All three will take their place on the Board of Directors after the business meeting at the upcoming ASP meeting in Louisville, Kentucky, in June.

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Educational Opportunities

Laboratory Animal Science Management Courses

The Guido Bernardini Foundation (FGB) is a not-for-profit organization established to promote biomedical research by focusing on providing training and continuous professional development for laboratory animal science professionals. The FGB is pleased to announce the upcoming Laboratory Animal Science Management Courses to be held in Milan, Italy, in 2010:

- TC-1: Essential Organization and Procedures in the Modern Laboratory Animal Facility, May 24–28. Registration fee: 500 €.
- TC-2: Best Practices in Washing and Cleansing in the Laboratory Animal Facility, July 27–28. Registration fee: 300 €.
- TC-3: Decontamination: Disinfection and Sterilization in Laboratory Animal Facilities, July 29–30. Registration fee: 300 €.

Registration includes:

- participation in the scientific program;
- coffee breaks;
- meals during the meeting;
- welcome dinner; and
- supplementary material for training courses.

For complete information, see <www.fondazioneguidobernardini.org>, or contact Laura De Francesco, General Secretary, Fondazione Guido Bernardini, Via Caldera 21, 20153, Milano, Italy [02-45076787; fax: 02-45070212; e-mail: *secretary@fondazioneguidobernardini.org*].

Biosafety and Biosecurity Training Course

The Seventh Annual Biosafety and Biosecurity Training Course will be held this summer at the Hilton Fort Collins in Fort Collins, Colorado. The course will start at 8 a.m. July 8, and will run through noon (lunch included) on July 15, 2010.

July 8 and 9 will be animal-oriented. Topics to be covered include large animal Animal Biosafety Level Criteria (ABSL)-2 and -3 facilities design, containment, and management; small animal ABSL-2 and -3 facilities design, containment, and management; veterinary hospital, clinic, and farm and ranch biosecurity (infection control); and nonhuman primate biosafety.

July 13 (afternoon), 14, and 15 will be plant-oriented. July 10, 12, and the morning of the 13th will be general biosafety and biosecurity. Optional for all: Sunday, July 11, will be open for your enjoyment of the Fort Collins and Rocky Mountain National Park areas. Dinner (included in registration) is at the Hilton at 6:30 p.m.

A detailed schedule and faculty biographies are posted at: <www.cvmbs.colostate.edu/mip/crwad/BBTC.htm>. Registration information, tentative schedule, hotel information, and area maps are at: <www.cvmbs.colostate.edu/mip/crwad/BBTC_Info.htm>.

The Course is directed by Dr. Robert P. Ellis. The Course is administered by the Conference of Research Workers in Animal Diseases. For more information, please contact Robert Ellis [970-491-8268; e-mail: *robert.ellis@colostate.edu*].

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Research Opportunities

Summer in Borneo

The Orangutan Foundation International (OFI), the mission of which is to support the conservation and the understanding of orangutans and their habitat, tropical rainforest in Southeast Asia, while caring for and rehabilitating ex-captive orangutans for release into the wild, this year has the "OFI Summer in Borneo Indonesia Volunteer/Study Program". There are three 3-week "Teams",

- June 7 to June 26,
- July 23 to Aug 10, and
- Aug 11 to Aug 30.

For complete details about the program, including the cost, see <www.orangutan.org/ volunteer.php>. If you have questions, contact Sarah Whitaker, Director of Operations, [e-mail: *ofioffice@gmail.com*]. Ms. Whitaker writes: "Please be aware, this is for active individuals ready to get their hands dirty! This is not meant for individuals who want to play with baby orangutans. This is a hands-on construction type of program."

Field Assistant for Monkey Project in Costa Rica

The University of California at Los Angeles's Lomas Barbudal Capuchin Project in Costa Rica has been running for 20 years, and (funding permitting) will continue for many years to come. Each year about six interns are accepted, who stay a full year and participate in data collection. The project currently monitors 11 social groups of monkeys. Virtually all monkeys are well habituated, and their genetic relationships are known, as well as social histories dating back several years in most cases. The primary focus of research currently is life histories, particularly male migration strategies and female counter-strategies to infanticide.

Application instructions are on: <www.sscnet.ucla.edu/anthro/faculty/sperry/jobs.html>. Please

read the detailed guide to working on the monkey project, which will answer virtually all questions, BEFORE applying or contacting the project. Applicants are also strongly encouraged to read the book *Manipulative Monkeys: The Capuchins of Lomas Barbudal* (S. Perry & J. H. Manson, 2008, Harvard Univ. Press), which is a popular science book documenting, not only the first 15 years of scientific research, but also the lifestyle of researchers working at this site.

There are no absolute criteria, and people with a blend of different talents are sought. Some traits that help are good grades (>3.3 GPA), some Spanish language training, computer and auto mechanic skills, and prior experience studying animal behavior and working in the field.

There is no salary or funding, although the field manager position (which pays a real salary in addition to room and board) is always someone selected from the pool of former or current interns. When the project is well funded, it is sometimes possible to pay interns a small amount of money ($100/month) to help defray incidental expenses. Room and board *are* provided, although interns must feed themselves when away on vacation. Upon completion of the 1-year contract, interns qualify for a travel refund of up to $1000 for their plane fares.

Starting dates are flexible, and you should try to apply at least three months before your desired starting date. The next internships will begin in May, June, and August, 2010.

These internships are excellent preparation for graduate school. Interns who finish their terms virtually always receive admission to high-quality graduate programs.

Contact Susan Perry, Dept. of Anthropology, Box 951553, UCLA, Los Angeles, CA 90095-1553 [310-267-4338; fax: 310-206-7833; e-mail: *sperry@anthro.ucla.edu*].

New World Primate Resident Intern

Pacific Primate Sanctuary, Maui, Hawaii, is seeking a Resident Intern. "We need someone with a background and interest in animal husbandry, welfare, conservation, exotic veterinary medicine, biology, and related fields, and willing to help in the office, who is a mature team player with respect for others.

"This person should be a good, clear communicator (written and spoken English) and coordinator with a minimal personal agenda, who seeks mutual growth for all and is able to make a long-term commitment to the primates and the staff.

"The position requires a self-starter and hard worker, humble, compassionate, self-reliant, organized, professional, computer literate, open to learning, capable of problem solving and of completing a task. Our Resident Intern needs to be physically fit, with no communicable diseases or criminal record, with a driver's license and an enjoyment of a rural lifestyle with simple amenities. A one-year commitment is requested. Citizens of foreign countries must secure their own visas and permits independently.

"Responsibilities as an animal caregiver involve providing daily care, enrichment, and nurturing to over 70 monkeys; administering medications; preparing food; cleaning enclosures; and maintaining the Sanctuary facility. Office assistance would include administering the volunteer program (scheduling, processing of applications, advertising); data entry (Mac-Filemaker Pro, Excel, Word); correspondence; record-keeping; fund-raising; grant writing; and public relations. After a training period, managerial duties would be added and more technical training may be available. The position requires an average of 40 hours per week, including on-call duties.

"Pacific Primate Sanctuary is a nonprofit, 501(C)(3), organization. Our staff is 15 volunteer caregivers and a support system of veterinary and other professionals. Since the well-being of the monkeys is our primary focus, they are not on exhibit, the facility is not open to the public, and the animals are not subjected to any medical research. As a result, our organization is not eligible for funding from any governmental agencies nor do we receive funds from admissions. Therefore, we must rely solely upon donations from compassionate individuals and organizations. Our operating budget is extremely small, so we can provide no salary. If you are considering the possibility of seeking grant support on your own, supplementary funds for needs other than housing could be built into your budget.

"We provide housing and utilities. An organic garden and fruit orchard exist on-site. Fully furnished and equipped yurts are adjacent to the Sanctuary on a large piece of rainforest property, with bathroom facilities. You would be trained by experienced members of our staff in all aspects of New World primate care (*Callithrix* and *Cebus*). Observational research could be conducted on this colony of marmosets, tamarins, and capuchin monkeys in a naturalistic environment.

"We'd greatly appreciate receiving a letter of intent, your resume/CV, three letters of reference, and copies of your TB clearance and general health record. Please visit our Website, <www.pacificprimate.org>." – Lucy L. Wormser, Founder and President, Pacific Primate Sanctuary, Inc., 500 A Haloa Rd, Haiku, Maui, Hawaii 96708 [phone and fax: 808-572-8089; e-mail: *pps@aloha.net*].

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Information Requested or Available

Young Orangutan Weight and Height

Luis Soto Rendón, of the Guadalajara Zoo, is looking for some data on orangutan babies, to compare with the Zoo's 26-month-old male. He is hoping for weight and height records on a similar-aged orangutan. He can be contacted at the Zoo, Paseo del Zoológico #600, A. P. 1-1494 C. P. 44390, Guadalajara, Jalisco, Mexico [+52 (33) 3674 4488 / 01 800 000 8000; fax +52 (33) 3674 3848; e-mail: *luiszooto@gmail.com*]. For information about the Zoo, see <www.zooguadalajara.com.mx>.

More Interesting Websites

- Allied Effort to Save Other Primates: <www.aesopmonkeyrescue.org>
- European Group for Zoo Animal Contraception: <contraception@chester.org>
- *Genome Medicine*: <genomemedicine.com>
- Information about the monkey pet trade, including photos of monkey bite victims: <www.petmonkeyinfo.org>
- IUCN/SSC Primate Specialist Group's Best Practice Guidelines for the Prevention and Mitigation of Conflict Between Humans and Great Apes, by Kimberley Hockings and Tatyana Humle: <www.primate-sg.org/BP.conflict.htm>
- IUCN/SSC Primate Specialist Group's Best Practice Guidelines for Surveys and Monitoring of Great Ape Populations: <www.primate-sg.org/BP.surveys.htm>
- List of guidelines for use of animals in cancer research: <www.norecopa.no/sider/tekst.asp?side=68>
- Norecopa: Norway's Consensus-Platform for Replacement, Reduction, and Refinement of Animal Experiments: <www.norecopa.no/sider/tekst.asp?side=4&meny=English>

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World Wildlife Fund's Most Threatened Species in 2010

World Wildlife Fund (WWF) has released its annual list of some of the most threatened species around the world, saying that the long-term survival of many animals is increasingly in doubt due to a host of threats, including climate change, and calling for stepped-up efforts to save some of the world's most threatened animals.

Tiger: There may be as few as 3,200 tigers (*Panthera tigris*) left in the wild. Tigers occupy less than seven percent of their original range, which has decreased by 40 percent over the past ten years.

Polar Bear: The Arctic's polar bears (*Ursus maritimus*) have become the iconic symbol of early victims of climate-induced habitat loss.

Pacific Walrus: The Arctic's Bering and Chukchi Seas are home to the Pacific walrus (*Odobenus rosmarus divergens*), one of the latest victims of climate change.

Magellanic Penguin: Once threatened primarily by oil spills, Magellanic penguins (*Spheniscus magellanicus*) now face a larger threat as fish are displaced by warming ocean currents, forcing the birds to swim farther to find food.

Leatherback Turtle: The largest marine turtle and one of the largest living reptiles, the leatherback turtle, (*Dermochelys coriaceathe*) has survived for more than a hundred million years, but is now facing extinction. WWF aims to conserve leatherback turtle migratory pathways – by working with fisheries to decrease bycatch, by protecting critical nesting beaches, and by raising awareness so that local communities will protect turtles and their nests.

Bluefin Tuna: The Atlantic bluefin tuna (*Thunnus thynnus*) is the source of highest grade sushi. Bluefin tuna fisheries are near collapse and the species is at serious risk of extinction if unsustainable fishing practices in the Eastern Atlantic and Mediterranean are not stopped.

Mountain Gorilla: Scientists consider mountain gorillas (*Gorilla beringei beringei*) to be a critically endangered gorilla subspecies, with about 720 surviving in the wild. More than 200 live in the Virunga National Park, located in the eastern part of the Democratic Republic of Congo, bordering Rwanda and Uganda. War, poaching, and loss of habitat are threats.

Monarch Butterfly: Every year millions of delicate monarch butterflies (*Danaus plexippus*) migrate from the United States and Canada to their winter habitat in Mexico. Well conserved and protected high-altitude pine and fir forests in Mexico and reproductive habitats in the north are essential for the survival of the overwintering of monarchs, which has been recognized as an endangered biological phenomenon.

Javan Rhinoceros: The Javan rhino (*Rhinoceros sondaicus*) is considered the most endangered large mammal in the world, with only two populations known to exist in the wild, for a total number of less than 60 animals.

Giant Panda: The giant panda (*Ailuropoda melanoleuca*) which numbers less than 2500 in the wild, faces an uncertain future. Its forest habitat in the mountainous areas of southwest China has become fragmented, creating small and isolated populations. – *WWF press release, December 2, 2009*

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Animal Specialist Travel Awards – AALAS Meeting

The Americas Regional Committee (ARC) of the International Council for Laboratory Animal Science (ICLAS) announces three traveling fellowship awards sponsored by PMI Nutrition International, LLC-Lab Diets, Charles River's Commitment to Humane Animal Research Through Excellence and Responsibility (CHARTER) Program, and Lab Products, Inc. One award is available to an individual from member countries of the Associations of Central America, Caribbean and Mexico Laboratory Animal Science (ACCMAL). These are Mexico, Guatemala, Nicaragua, Costa Rica, Panama, Trinidad y Tobago, El Salvador, and Honduras. One award is available to an individual from member countries of Federation of South American Societies and Associations of Laboratory Animal Science Specialists (FESSACAL). These are Argentina, Brazil, Chile, Colombia, Ecuador, Uruguay, and Venezuela. One award will select the best remaining candidate from all applications regardless of country.

Each award will sponsor an individual to travel to and participate in the national meeting of the American Association for Laboratory Animal Science (AALAS) to be held October 10–14, 2010, in Atlanta, Georgia, U.S.A. The AALAS meeting is the largest laboratory animal science meeting in the world. It includes seminars, workshops, special-topic lectures, platform sessions, and poster sessions on laboratory animal diseases, biology, experimental techniques, and animal models. The learning resources / technology center includes a variety of videos and computer-based programs. Each year there is an extensive commercial exhibit which contains the latest in equipment and ancillary items for the care and use of laboratory animals.

The recipient should be a biomedical scientist, facility manager, or veterinarian involved with experimental animals who is a member of his/her local or regional laboratory animal science organization. The individual should be a person with the potential to make significant contributions to the teaching, research, or organizational aspects of laboratory animal science in his/her country. Preference is given to individuals who otherwise would not have funding for international travel to a scientific meeting of this kind.

Each award consists of a monetary award (up to a maximum of $2,000) to be used for costs of air travel, housing, and meeting registration associated with the annual AALAS meeting. In addition, a $500 honorarium will be provided for each recipient to cover costs of meals, local travel, incidentals, and any other expenses.

Nominations or applications should be written in English and consist of:

- A cover letter, which should include the candidate's career goals and a statement with detailed information on the reasons why he/she is interested in attending the AALAS Annual Meeting. This statement should indicate what he/she is hoping to gain, how he/she would use the knowledge and experience to be acquired, how that knowledge would be disseminated, where, and to whom, and what benefits will be derived.
- A *Curriculum Vitae*, maximum of 10 pages, with emphasis on laboratory animal science training and experience.
- Proof of proficiency in the English language.
- A letter of recommendation from the employer.
- At least one letter of recommendation from an individual familiar with the qualifications and professional interests and activities of the candidate.
- A letter from the applicant's local or regional association assuring their current membership.

Complete nominations or applications should be submitted by mail, e-mail or fax to: Dr. Harry Rozmiarek, Univ. of Pennsylvania/Fox Chase Cancer Ctr, 6491 Drexel Rd, Philadelphia, PA 19151 [fax: 215-214-4040; e-mail: *rozmiar@pobox.upenn.edu*].

Deadline for submission of applications is April 15, 2010. Questions can be addressed to any of the following ICLAS Americas Regional Committee members:

- Dr. Harry Rozmiarek, U.S.A. [*rozmiar@pobox.upenn.edu*];
- Dr. Rafael Hernández, Mexico [*rhernandez57@prodigy.net.mx*];
- Dr. Denna Benn, Canada [*dbenn@uoguelph.ca*];
- Dr. Cecilia Carbone, Argentina [*ccarbone@fcv.unlp.edu.ar*];
- Dr. Ana Maria Guaraldo, Brazil [*guaraldo@unicamp.br*];
- Dr. Silvia Ortiz, Brazil [*silviabortiz@gmail.com*];
- Dr. Liliana Pazos, Costa Rica [*liliana.pazos@ucr.ac.cr*].

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Recent Books and Articles

(Addresses are those of first authors unless otherwise indicated)

Books

• *Adam's Tongue: How Humans Made Language, How Language Made Humans*. D. Bickerton. New York: Hill and Wang, 2009. [Price: $27.50]

• *Anesthesia for Veterinary Technicians*. S. Bryant (Ed.). Hoboken, NJ: Wiley-Blackwell, 2010. [Price: $69.99]

• *Ape*. J. Sorenson. London: Reaktion Books, 2009. [Price: $19.95]

• *The Ecology of Tropical East Asia*. R. T. Corlett. New York: Oxford University Press, 2009. [Price: $65]

• *The Infanticide Controversy: Primatology and the Art of Field Science*. A. Rees. University of Chicago Press, 2009. [Price: $40]

• *The Intimate Ape: Orangutans and the Secret Life of a Vanishing Species*. S. Thompson. Foreword by J. M. Masson. New York: Citadel Press, 2010. 320 pp. [Price: $15.95, paperback]

• *Planet Ape*. D. Morris & S. Parker. Richmond Hill, ON, Canada: Firefly Books, 2009. [Price: $49.95]

• *Primates in Peril: The World's 25 Most Endangered Primates 2008-2010*. R. A. Mittermeier & S. D. Nash [Eds.]. Arlington, VA: IUCN/SSC Primate Specialist Group, Intl. Primatological Society, Conservation Intl., 2009, <www.conservation.org/2010primates>.

• *Science and Conservation in African Forests: The Benefits of Long-Term Research*. R. Wrangham & E. Ross (Eds.). New York: Cambridge University Press, 2008. [Price: $114.95]

• *Write an Effective Funding Application: A Guide for Researchers and Scholars*. M. W. Walters. Baltimore: Johns Hopkins University Press, 2009. [Price: $45; paperback: $22]

• *Recognition and Alleviation of Pain in Laboratory Animals*. Institute for Laboratory Animals and Research. Washington, DC: National Academies Press, 2009, <dels.nas.edu/animal_pain/report.shtml>.

Field Guides

• *A Field Guide to the Mammals of South-East Asia*. C. M. Francis. London: New Holland, 2008. [Price: £34.99]

Handbooks

• *Best Practice Guidelines for the Prevention and Mitigation of Conflict Between Humans and Great Apes*. K. Hockings & T. Humle. IUCN/SSC Primate Specialist Group, 2009, Occasional paper No. 37, <data.iucn.org/dbtw-wpd/edocs/SSC-OP-037.pdf>.

• *Animal Rights: A Reference Handbook* (2nd ed.). C. J. Sherry. Santa Barbara, CA: ABC Clio, 2009. [Price: $55]

Magazines and Newsletters

• *American Journal of Physical Anthropology*, 2010, *141*[2], <www3.interscience.wiley.com/journal/123233576/issue>.

Contents include: Scramble or contest competition over food in solitarily foraging mouse lemurs (*Microcebus* spp.): New insights from stable isotopes, by M. Dammhahn & P. M. Kappeler; and The interplay between speed, kinetics, and hand postures during primate terrestrial locomotion, by B. A. Patel.

• *American Journal of Primatology*, 2009, *71*[10], <www3.interscience.wiley.com/journal/122564348/issue>.

Contents: Hypervitaminosis A in experimental nonhuman primates: Evidence, causes, and the road to recovery, by J. T. Dever & S. A. Tanumihardjo; Dynamics of circulating concentrations of gonadotropins and ovarian hormones throughout the menstrual cycle in the bonnet monkey: Role of inhibin A in the regulation of follicle-stimulating hormone secretion, by P. S. Suresh & R. Medhamurthy; Macaque-human interactions and the societal perceptions of macaques in Singapore, by J. C. M. Sha, M. D. Gumert, B. P.Y.-H. Lee, L. Jones-Engel, S. Chan, & A. Fuentes; Kinship and social bonds in female chimpanzees (*Pan troglodytes*), by K. Langergraber, J. Mitani, & L. Vigilant; Patterns of reproduction in Malayan silvered leaf monkeys at the Bronx Zoo, by N. Shelmidine, C. Borries, & C. McCann; Intra-community coalitionary lethal attack of an adult male southern muriqui (*Brachyteles arachnoides*), by M. G. Talebi, R. Beltrão-Mendes, & P. C. Lee; Relationship between sexual interactions and the timing of the fertile phase in captive female Japanese macaques (*Macaca fuscata*), by C. Garcia, K. Shimizu, & M. Huffman; Sterile pyuria in a population of wild white-handed gibbons (*Hylobates lar*), by B. A. Beaman, W. J. Hesemeyer, N. J. Dominy, T. Savini, & U. H. Reichard; and Grooming in mandrills and the time frame of reciprocal partner choice, by G. Schino & B. Pellegrini.

• *American Journal of Primatology*, 2009, *71*[11], <www3.interscience.wiley.com/journal/122604538/issue>.

Contents: Functional versus operational menopause: Reply to Herndon & Lacreuse, by S. Atsalis & E. N. Videan; Reconciliation in captive cotton-top tamarins (*Sa-*

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

guinus oedipus), a cooperative breeding primate, by L. Peñate, F. Peláez, & S. Sánchez; Chimpanzee seed dispersal quantity in a tropical montane forest of Rwanda, by N. D. Gross-Camp, M. Masozera, & B. A. Kaplin; Development of microsatellite DNA markers and their chromosome assignment in the common marmoset, by H. Katoh, S. Takabayashi, & T. Itoh; Vigilance in ursine black and white colobus monkeys (*Colobus vellerosus*): An examination of the effects of conspecific threat and predation, by A. J. J. MacIntosh & P. Sicotte; Varying patterns of coexistence of two mouse lemur species (*Microcebus ravelobensis* and *M. murinus*) in a heterogeneous landscape, by R. Rakotondravon & U. Radespiel; Winter ecology of the Arunachal macaque *Macaca munzala* in Pangchen Valley, western Arunachal Pradesh, northeastern India, by U. Mendiratta, A. Kumar, C. Mishra, & A. Sinha; and The fourth level of social structure in a multi-level society: Ecological and social functions of clans in hamadryas baboons, by A. L. Schreier & L. Swedell.

• *American Journal of Primatology*, 2009, *71*[12], <www3.interscience.wiley.com/journal/122662732/issue>.

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• The Arthur M. Sackler Colloquium of the National Academy of Sciences, ''In the Light of Evolution III: Two Centuries of Darwin", held January 16–17, 2009. *Proceedings of the National Academy of Sciences, U.S.A.*, 2009, *106*[Suppl. 1], <www.pnas.org/content/vol106/Supplement_1/?etoc>.

Anatomy and Physiology

• Color-tuned neurons are spatially clustered according to color preference within alert macaque posterior inferior temporal cortex. Conway, B. R., & Tsao, D. Y. (Neurosci. Prog., Wellesley Coll., Wellesley, MA 02481 [e-mail: *bconway@wellesley.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2009, *106*, 18034-18039, <www.pnas.org/content/106/42/18034.full>.

"Large islands of extrastriate cortex that are enriched for color-tuned neurons have recently been described in alert macaques using a combination of functional magnetic resonance imaging (fMRI) and single-unit recording. These millimeter-sized islands, dubbed "globs," are scattered throughout the posterior inferior temporal cortex (PIT), a swath of brain anterior to area V3, including areas V4, PITd, and posterior TEO. We investigated the microorganization of neurons within the globs. We used fMRI to identify the globs and then used MRI-guided microelectrodes to test the color properties of single glob cells. We used color stimuli that sample the CIELUV perceptual color space at regular intervals to test the color tuning of single units, and made two observations. First, color-tuned neurons of various color preferences were found within single globs. Second, adjacent glob cells tended to have the same color tuning, demonstrating that glob cells are clustered by color preference and suggesting that they are arranged in color columns. Neurons separated by 50 μm, measured parallel to the cortical sheet, had more similar color tuning than neurons separated by 100 μm, suggesting that the scale of the color columns is <100 μm. These results show that color-tuned neurons in PIT are organized by color preference on a finer scale than the scale of single globs. Moreover, the color preferences of neurons recorded sequentially along a given electrode penetration shifted gradually in many penetrations, suggesting that the color columns are arranged according to a chromotopic map reflecting perceptual color space."

• Recognition memory signals in the macaque hippocampus. Jutras, M. J., & Buffalo, E. A. (Neurosci. Prog., Emory Univ., Atlanta, GA 30322 [e-mail: *elizabeth.buffalo@emory.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2010, *107*, 401-406, <www.pnas.org/content/107/1/401.full>.

"The hippocampus plays a critical role in recognition memory in both monkeys and humans. However, neurophysiological studies have rarely reported recognition memory signals among hippocampal neurons. The majority of these previous studies used variants of the delayed match-to-sample task; however, studies of the effects of hippocampal damage in monkeys and humans have shown that another task of recognition memory, the visual paired-comparison, or visual preferential looking task (VPLT), is more sensitive to hippocampal damage than the delayed matching tasks. Accordingly, to examine possible recognition memory signals in the hippocampus, we recorded the activity of 131 hippocampal neurons in two monkeys performing the VPLT. Eighty-eight neurons (67%) responded significantly to stimulus presentation relative to the baseline prestimulus period. A substantial proportion of these visually responsive neurons (36%) showed significant firing-rate modulations that reflected whether stimuli were

novel or familiar. Additionally, these firing-rate modulations were correlated with recognition memory performance on the VPLT such that larger modulations by stimulus novelty were associated with better performance. Together, these results provide evidence for a neural signal in the hippocampus that may support recognition memory performance."

• Primate-specific origins and migration of cortical GABAergic neurons. Petanjek, Z., Kostovic, I., & Esclapez, M. (Dept of Neurosci,, Croatian Inst. for Brain Res., Sch. of Med., Univ. of Zagreb, Šalata 12, 10000 Zagreb, Croatia [e-mail: *zpetanjek@net.hr*]). *Frontiers in Neuroanatomy*, 2009, *3*[26], <www.frontiersin.org/neuroanatomy/paper/10.3389/neuro.05/026.2009>.

"Gamma-aminobutyric-acidergic (GABAergic) cells form a very heterogeneous population of neurons that play a crucial role in the coordination and integration of cortical functions. Their number and diversity increase through mammalian brain evolution. Does evolution use the same or different developmental rules to provide the increased population of cortical GABAergic neurons? In rodents, these neurons are not generated in the pallial proliferative zones as glutamatergic principal neurons. They are produced almost exclusively by the subpallial proliferative zones, the ganglionic eminence (GE), and migrate tangentially to reach their target cortical layers. The GE is organized in molecularly different subdomains that produce different subpopulations of cortical GABAergic neurons. In humans and non-human primates, in addition to the GE, cortical GABAergic neurons are also abundantly generated by the proliferative zones of the dorsal telencephalon. Neurogenesis in ventral and dorsal telencephalon occurs with distinct temporal profiles. These dorsal and ventral lineages give rise to different populations of GABAergic neurons. Early-generated GABAergic neurons originate from the GE and mostly migrate to the marginal zone and the subplate. Later-generated GABAergic neurons, originating from both proliferative sites, populate the cortical plate. Interestingly, the pool of GABAergic progenitors in dorsal telencephalon produces mainly calretinin neurons, a population known to be significantly increased and to display specific features in primates. We conclude that the development of cortical GABAergic neurons have exclusive features in primates that need to be considered in order to understand pathological mechanisms leading to some neurological and psychiatric diseases."

• Dental development and life history in living African and Asian apes. Kelley, J., & Schwartz, G. T. (Dept of Oral Biology, College of Dentistry, Univ. of Illinois, Chicago, IL 60612 [e-mail: *jkelley@uic.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2010, *107*, 1035-1040, <www.pnas.org/content/107/3/1035.full>.

"Life-history inference is an important aim of paleoprimatology, but life histories cannot be discerned directly from the fossil record. Among extant primates, the timing of many life-history attributes is correlated with the age at emergence of the first permanent molar (M1), which can therefore serve as a means to directly compare the life histories of fossil and extant species. To date, M1 emergence ages exist for only a small fraction of extant primate species and consist primarily of data from captive individuals, which may show accelerated dental eruption compared with free-living individuals. Data on M1 emergence ages in wild great apes exist for only a single chimpanzee individual, with data for gorillas and orangutans being anecdotal. This paucity of information limits our ability to make life-history inferences using the M1 emergence ages of extinct ape and hominin species. Here we report reliable ages at M1 emergence for the orangutan, *Pongo pygmaeus* (4.6 y), and the gorilla, *Gorilla gorilla* (3.8 y), obtained from the dental histology of wild-shot individuals in museum collections. These ages and the one reported age at M1 emergence in a free-living chimpanzee of approximately 4.0 y are highly concordant with the comparative life histories of these great apes. They are also consistent with the average age at M1 emergence in relation to the timing of life-history events in modern humans, thus confirming the utility of M1 emergence ages for life-history inference and providing a basis for making reliable life-history inferences for extinct apes and hominins."

• Basic mathematical rules are encoded by primate prefrontal cortex neurons. Bongard, S., & Nieder, A. (A. N., Animal Physiol., Inst. of Neurobiol., Univ. of Tübingen, 72076 Tübingen, Germany [e-mail: *andreas.nieder@uni-tuebingen.de*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2010, *107*, 2277-2282, <www.pnas.org/content/107/5/2277.full>.

"Mathematics is based on highly abstract principles, or rules, of how to structure, process, and evaluate numerical information. If and how mathematical rules can be represented by single neurons, however, has remained elusive. We therefore recorded the activity of individual prefrontal cortex (PFC) neurons in rhesus monkeys required to switch flexibly between "greater than" and "less than" rules. The monkeys performed this task with different numerical quantities and generalized to set sizes that had not been presented previously, indicating that they had learned an abstract mathematical principle. The most prevalent activity recorded from randomly selected PFC neurons reflected the mathematical rules; purely sensory- and memory-related activity was almost absent. These data show that single PFC neurons have the capacity to represent flexible operations on most abstract numerical quantities. Our findings support PFC network models implementing specific 'rule-coding' units that control the flow of information between segregated input, memory, and output layers. We speculate that these neuronal circuits in the monkey lateral PFC could readily have been adopted in the course

of primate evolution for syntactic processing of numbers in formalized mathematical systems."

• Performance- and stimulus-dependent oscillations in monkey prefrontal cortex during short-term memory. Pipa, G., Staedtler, E. S., Rodriguez, E. F., Waltz, J. A., Muckli, L. F., Singer, W., Goebel, R., & Munk, M. H. (M. H. M., Physiology of Cog. Processes, Max-Planck-Inst. for Biol. Cybernetics, Spemannstraße 38, 72076 Tübingen, Germany [e-mail: *matthias.munk@tuebingen.mpg.de*]). *Frontiers in Integrative Neuroscience*, 2009, *3*[25], <frontiersin.org/integrativeneuroscience/paper/10.3389/neuro.07/025.2009>.

"Short-term memory requires the coordination of subprocesses like encoding, retention, retrieval and comparison of stored material to subsequent input. Neuronal oscillations have an inherent time structure, can effectively coordinate synaptic integration of large neuron populations and could therefore organize and integrate distributed subprocesses in time and space. We observed field potential oscillations (14–95Hz) in ventral prefrontal cortex of monkeys performing a visual memory task. Stimulus-selective and performance-dependent oscillations occurred simultaneously at 65–95Hz and 14–50Hz, the latter being phase-locked throughout memory maintenance. We propose that prefrontal oscillatory activity may be instrumental for the dynamical integration of local and global neuronal processes underlying short-term memory."

• Individual differences in scanpaths correspond with serotonin transporter genotype and behavioral phenotype in rhesus monkeys (*Macaca mulatta*). Gibboni, R. R., III, Zimmerman, P. E., & Gothard, K. M. (K. M. G., Dept of Physiol., Coll. of Med., Univ. of Arizona, Tucson, AZ 85724 [e-mail: *kgothard@email.arizona.edu*]). *Frontiers in Behavioral Neuroscience*, 2009, *3*[50], <www.frontiersin.org/behavioralneuroscience/paper/10.3389/neuro.08/050.2009>.

"Scanpaths (the succession of fixations and saccades during spontaneous viewing) contain information about the image but also about the viewer. To determine the viewer-dependent factors in the scanpaths of monkeys, we trained three adult males to look for 3 sec. at images of conspecific facial expressions with either direct or averted gaze. The subjects showed significant differences on four basic scanpath parameters (number of fixations, fixation duration, saccade length, and total scanpath length) when viewing the same facial expression/gaze direction combinations. Furthermore, we found differences between monkeys in feature preference and in the temporal order in which features were visited on different facial expressions. Overall, the between-subject variability was larger than the within-subject variability, suggesting that scanpaths reflect individual preferences in allocating visual attention to various features in aggressive, neutral, and appeasing facial expressions. Individual scanpath characteristics were brought into register with the genotype for the serotonin transporter regulatory gene (5-HTTLPR) and with behavioral characteristics such as expression of anticipatory anxiety and impulsiveness/hesitation in approaching food in the presence of a potentially dangerous object."

Animal Models

• Cocaine is pharmacologically active in the nonhuman primate fetal brain. Benveniste, H., Fowler, J. S., Rooney, W. D., Scharf, B. A., Backus, W. W., Izrailtyan, I., Knudsen, G. M., Hasselbalch, S. G., & Volkow, N. D. (Dept of Anesthesiology, Stony Brook Univ., Health Sci. Ctr, Level 4, Stony Brook, NY 11794 [e-mail: *Benveniste@bnl.gov*]. *Proceedings of the National Academy of Sciences, U.S.A.*, 2010, *107*, 1582-1587, <www.pnas.org/content/107/4/1582.full>.

"Cocaine use during pregnancy is deleterious to the newborn child, in part via its disruption of placental blood flow. However, the extent to which cocaine can affect the function of the fetal primate brain is still an unresolved question. Here we used PET and MRI and show that in third-trimester pregnant nonhuman primates, cocaine at doses typically used by drug abusers significantly increased brain glucose metabolism to the same extent in the mother as in the fetus (~100%). Inasmuch as brain glucose metabolism is a sensitive marker of brain function, the current findings provide evidence that cocaine use by a pregnant mother will also affect the function of the fetal brain. We are also unique in showing that cocaine's effects in brain glucose metabolism differed in pregnant (increased) and nonpregnant (decreased) animals, which suggests that the psychoactive effects of cocaine are influenced by the state of pregnancy. Our findings have clinical implications because they imply that the adverse effects of prenatal cocaine exposure to the newborn child include not only cocaine's deleterious effects to the placental circulation, but also cocaine's direct pharmacological effect to the developing fetal brain."

• Computer animations stimulate contagious yawning in chimpanzees. Campbell, M. W., Carter, J. D., Proctor, D., Eisenberg, M. L., & de Waal, F. B. M. (Living Links Center, Yerkes NPRC, Emory Univ., 2409 Taylor Lane, Lawrenceville, GA 30043 [e-mail: *matthew.campbell@emory.edu*]). *Proceedings of the Royal Society, B*, 2009, *276*, 4255-4259, <rspb.royalsocietypublishing.org/content/276/1676/4255.full>.

"People empathize with fictional displays of behavior, including those of cartoons and computer animations, even though the stimuli are obviously artificial. However, the extent to which other animals also may respond empathetically to animations has yet to be determined. Animations provide a potentially useful tool for exploring non-human behavior, cognition and empathy because computer-generated stimuli offer complete control over variables and the ability to program stimuli that could not be captured on

video. Establishing computer animations as a viable tool requires that non-human subjects identify with and respond to animations in a way similar to the way they do to images of actual conspecifics. Contagious yawning has been linked to empathy and poses a good test of involuntary identification and motor mimicry. We presented 24 chimpanzees with three-dimensional computer-animated chimpanzees yawning or displaying control mouth movements. The apes yawned significantly more in response to the yawn animations than to the controls, implying identification with the animations. These results support the phenomenon of contagious yawning in chimpanzees and suggest an empathic response to animations. Understanding how chimpanzees connect with animations, to both empathize and imitate, may help us to understand how humans do the same."

• The effects of four nursery rearing strategies on infant behavioral development in rhesus macaques (*Macaca mulatta*). Rommeck, I., Gottlieb, D. H., Strand, S. C., & McCowan, B. (B. M., School of Vet. Med., Univ. of California, Davis, CA 95616 [e-mail: *bjmccowan @ucdavis.edu*]). *Journal of the American Association for Laboratory Animal Science*, 2009, *48*, 395-401, <www .ncbi.nlm.nih.gov/pmc/articles/PMC2715931>.

"Nursery rearing is the single most important risk factor in the development of severe forms of abnormal behavior, such as self-biting, in rhesus macaques. This practice is common in research laboratories and typically involves continuous pair housing of infants without maternal contact. We examined the effects of variation in peer socialization on the behavioral development of rhesus infants by exposing 32 newborn infants to four different socialization routines: continuously paired; intermittently paired; continuously paired rotationally (partners rotated within the group once a week); and intermittently paired rotationally. Analyses revealed that infants paired intermittently exhibited 'floating limb' and self-biting behavior at significantly higher frequencies than those reared by using any other strategy. Results also suggested that continuous pairing was most effective in reducing the development of abnormal behaviors (that is, self-bite and floating limb), whereas intermittent pairing significantly reduced partner clinging and geckering. A principal component analysis revealed that floating limb behavior and self-biting are strongly associated. Self-biting began as early as 32 days of age, and a negative binomial regression on data of floating limb and self-biting revealed that early development of floating limb behavior predicts self-biting behavior later in development. Despite the significant effects of rearing strategies on the frequency of abnormal behaviors, we note that animals in all 4 treatment groups developed these traits to some degree. We suspect that the solitary incubator environment may be a trigger for the development of abnormal behaviors."

• Gene therapy for red–green color blindness in adult primates. Mancuso, K., Hauswirth, W. W., Li, Q., Connor, T. B., Kuchenbecker, J. A., Mauck, M. C., Neitz, J., & Neitz, M. (J. N., Dept of Ophthalmology, Box 356485, Univ. of Washington, 1959 NE Pacific St, Seattle, WA 98195 [e-mail: *jneitz@uw.edu*]). *Nature*, 2009, *461*, 784-787, <www.nature.com/nature/journal/v461/n7265/ full/nature08401.html>.

"Red–green color blindness, which results from the absence of either the long- (L) or the middle- (M) wavelength-sensitive visual photopigments, is the most common single locus genetic disorder. Here we explore the possibility of curing color blindness using gene therapy in experiments on adult monkeys that had been color blind since birth. A third type of cone pigment was added to dichromatic retinas, providing the receptoral basis for trichromatic color vision. This opened a new avenue to explore the requirements for establishing the neural circuits for a new dimension of color sensation. Classic visual deprivation experiments have led to the expectation that neural connections established during development would not appropriately process an input that was not present from birth. Therefore, it was believed that the treatment of congenital vision disorders would be ineffective unless administered to the very young. However, here we show that the addition of a third opsin in adult red–green color-deficient primates was sufficient to produce trichromatic color vision behavior. Thus, trichromacy can arise from a single addition of a third cone class and it does not require an early developmental process. This provides a positive outlook for the potential of gene therapy to cure adult vision disorders."

• Functional organization of motor cortex of adult macaque monkeys is altered by sensory loss in infancy. Qi, H.-X., Jain, N., Collins, C. E., Lyon, D. C., & Kaas, J. H. (J. H. K., Dept of Psych., Vanderbilt Univ., Nashville, TN 37203 [e-mail: *jon.h.kaas@vanderbilt.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2010, *107*, 3192-3197, <www.pnas.org/content/107/7/3192. full>.

"When somatosensory cortex (S1) is deprived of some of its inputs after section of ascending afferents in the dorsal columns of the spinal cord, it reorganizes to overrepresent the surviving inputs. As somatosensory cortex provides guiding sensory information to motor cortex, such sensory loss and representational reorganization could affect the development of the motor map in primary motor cortex (M1), especially if the sensory loss occurs early in development. To address this possibility, the dorsal columns of the spinal cord were sectioned between cervical levels (C3–5) 3–12 days after birth in five macaque monkeys. After 3–5 years of maturation (young adults), we determined how movements were represented in M1 contralateral to the lesion by using microelectrodes to electrically stimulate sites in M1 to evoke movements. Although

the details of the motor maps in these five monkeys varied, the forelimb motor maps were abnormal. The representations of digit movements were reduced and abnormally arranged. Current levels for evoking movements from the forelimb region of M1 were in the normal range, but the lowest mean stimulation thresholds were for wrist or elbow instead of digit movements. Incomplete lesions and bilateral lesions produced fewer abnormalities. The results suggest that the development of normal motor cortex maps in M1 depends on sensory feedback from somatosensory maps."

Behavior

• The relative roles of kinship and reciprocity in explaining primate altruism. Schino, G., & Aureli, F. (Istituto di Scienze e Tecnologie della Cognizione, Consiglio Nazionale delle Ricerche, 00197 Rome, Italy [e-mail: *gabriele.schino@enea.it*]). *Ecology Letters*, 2010, *13*, 45-50, <www3.interscience.wiley.com/cgi-bin/fulltext/122648834/HTMLSTART>.

"Several hypotheses have been proposed to explain the evolution of altruistic behaviors. Their relative roles in explaining actual cases of animal altruism are, however, unclear. In particular, while kin selection is widely believed to have a pervasive influence on animal behavior, reciprocity is generally thought to be rare. Despite this general agreement, there has been no direct test comparing the relative roles of kinship and reciprocity in explaining animal altruism. In this paper, we report on the results of such a test based on a meta-analysis of allogrooming in primates, grooming being probably the most common altruistic behavior among mammals. In direct contrast to the prevailing view, reciprocity played a much larger role than kinship in explaining primate allogrooming. These results point to a more significant role of reciprocity in the evolution of animal altruism than is generally acknowledged."

• Captive chimpanzees use their right hand to communicate with each other: Implications for the origin of the cerebral substrate for language. Meguerditchian, A., Vauclair, J., & Hopkins, W. D. (W. D. H., Div. of Psychobio., Yerkes NPRC, 954 Gatewood Rd, Atlanta, GA 30322). *Cortex*, 2010, *46*, 40-48, <www.sciencedirect.com/science/journal/00109452>.

"Whether precursors of the left-lateralization for human language can be found in the vocal and gestural communication systems of nonhuman primates remains a topic of intense research, particularly within theoretical discussions of the evolutionary origins of language. Although previous studies in chimpanzees have reported evidence of right-handedness for inter-species food-beg gestures produced exclusively toward humans, some might question the generality of these results to intra-species communicative signals. To address this issue, we recorded hand use in 70 captive chimpanzees for species-typical signals, that could be directed either toward conspecifics or humans. We found evidence of a predominance of right-handedness for species-typical gestures in captive chimpanzees when directed to both humans and conspecifics. Hand preferences during intra-species communication were significantly and positively correlated with gestures directed toward humans. By contrast, hand preferences for gestures did not significantly correlate with hand use for a non-communicative self-directed action. The collective results suggest that (a) evidence of predominance of right-handedness for human-directed gestural communication is not specific to this context and (b) the existence of a specific communicative system involving gestures constitutes an ideal prerequisite for the cerebral substrates of human language and its typical left-lateralization."

• Altruism in forest chimpanzees: The case of adoption. Boesch, C., Bolé, C., Eckhardt, N., & Boesch, H. (Dept of Primatology, Max Planck Inst. for Evolutionary Anthropology, Leipzig, Germany [e-mail: *boesch@eva.mpg.de*]). *PLoS ONE*, 2010, *5*(1): e8901, <www.plosone.org/article/info:doi/10.1371/journal.pone.0008901>.

"In recent years, extended altruism towards unrelated group members has been proposed to be a unique characteristic of human societies. Support for this proposal seemingly came from experimental studies on captive chimpanzees that showed that individuals were limited in the ways they shared or cooperated with others. This dichotomy between humans and chimpanzees was proposed to indicate an important difference between the two species, and one study concluded that 'chimpanzees are indifferent to the welfare of unrelated group members'. In strong contrast with these captive studies, consistent observations of potentially altruistic behaviors in different populations of wild chimpanzees have been reported in such different domains as food sharing, regular use of coalitions, cooperative hunting and border patrolling. This begs the question of what socio-ecological factors favor the evolution of altruism. Here we report 18 cases of adoption, a highly costly behavior, of orphaned youngsters by group members in Taï forest chimpanzees. Half of the adoptions were done by males and remarkably only one of these proved to be the father. Such adoptions by adults can last for years and thus imply extensive care towards the orphans. These observations reveal that, under the appropriate socio-ecologic conditions, chimpanzees do care for the welfare of other unrelated group members and that altruism is more extensive in wild populations than was suggested by captive studies."

• Monkey visual behavior falls into the uncanny valley. Steckenfinger, S. A., & Ghazanfar, A. A. (A. A. G., Neurosci. Inst., Dept of Psych., Princeton Univ., Princeton, NJ 08540 [e-mail: *asifg@princeton.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2009, *106*, 18362-18366, <www.pnas.org/content/106/43/18362.full>.

"Very realistic human-looking robots or computer avatars tend to elicit negative feelings in human observers. This phenomenon is known as the 'uncanny valley' response. It is hypothesized that this uncanny feeling is because the realistic synthetic characters elicit the concept of 'human', but fail to live up to it. That is, this failure generates feelings of unease due to character traits falling outside the expected spectrum of everyday social experience. These unsettling emotions are thought to have an evolutionary origin, but tests of this hypothesis have not been forthcoming. To bridge this gap, we presented monkeys with unrealistic and realistic synthetic monkey faces, as well as real monkey faces, and measured whether they preferred looking at one type versus the others (using looking time as a measure of preference). To our surprise, monkey visual behavior fell into the uncanny valley: they looked longer at real faces and unrealistic synthetic faces than at realistic synthetic faces."

• Thatcher effect in monkeys demonstrates conservation of face perception across primates. Adachi, I., Chou, D. P., & Hampton, R. R. (R. R. H., Yerkes NPRC, Emory Univ, Atlanta, GA 30322 [e-mail: *robert.hampton@emory.edu*]). *Current Biology*, 2009, *19*, 1270-1273, <www.cell.com/current-biology/pdf/S0960982209011956.pdf>.

"Accurate recognition of individuals is a foundation of social cognition. The remarkable ability of humans to distinguish among thousands of similar faces depends on sensitivity to unique configurations of facial features, including subtle differences in the relative placement of the eyes and mouth. Determining whether similar perceptual processes underlie individual recognition in nonhuman primates is important for both the study of cognitive evolution and the appropriate use of primate models in social cognition research. In humans, some of the best evidence for a keen sensitivity to the configuration of features in faces comes from the 'Thatcher effect'. This effect shows that it is difficult to detect changes in the orientation of the eyes and mouth in an image of an inverted face, even though identical changes are unmistakable in an upright face. Here, we demonstrate for the first time that a nonhuman primate species also exhibits the Thatcher effect. This direct evidence of configural face perception in monkeys, collected under testing conditions that closely parallel those used with humans, indicates that perceptual mechanisms for individual recognition have been conserved through primate cognitive evolution."

• Reciprocal face-to-face communication between rhesus macaque mothers and their newborn infants. Ferrari, P. F., Paukner, A., Ionica, C., & Suomi, S. J. (Univ. di Parma, 43100 Parma, Italy [e-mail: *pierfrancesco.ferrari@unipr.it*]). *Current Biology*, 2009, *19*, 1768-1772, <www.cell.com/current-biology/fulltext/S0960-9822(09)01690-X>.

"Human mothers interact emotionally with their newborns through exaggerated facial expressions, speech, mutual gaze, and body contact, a capacity that has long been considered uniquely human. Current developmental psychological theories propose that this pattern of mother–infant exchange promotes the regulation of infant emotions and serves as a precursor of more complex forms of social exchange including perspective taking and empathy. Here we report that in rhesus macaques, mother–infant pairs also communicate intersubjectively via complex forms of emotional exchanges including exaggerated lipsmacking, sustained mutual gaze, mouth-mouth contacts, and neonatal imitation. Infant macaques solicit their mothers' affiliative responses and actively communicate to her. However, this form of communication disappears within the infant's first month of life. Our data challenge the view that the mother–infant communicative system functions in order to sustain proximity and that infants are simply passive recipients in such interaction. Thus, emotional communication between mother and infant is not uniquely human. Instead, we can trace back to macaques the evolutionary foundation of those behaviors that are crucial for the establishment of a functional capacity to socially exchange with others."

Disease

• Rabies virus-based vaccines elicit neutralizing antibodies, poly-functional $CD8^+$ T cell, and protect rhesus macaques from AIDS-like disease after SIV_{mac251} challenge. Faul, E. J., Aye, P. P., Papaneri, A. B., Pahar, B., McGettigan, J. P., Schiro, F., Chervoneva, I., Montefiori, D. C., Lackner, A. A., & Schnell. M. J. (M. J. S., Thomas Jefferson Univ., 1020 Locust St, JAH-309, Philadelphia, PA 19107 [e-mail: *Matthias.Schnell@jefferson.edu*]). *Vaccin*e, 2009, *28*, 299-308, <linkinghub.elsevier.com/retrieve/pii/S0264410X09015813>.

Highly attenuated rabies virus (RV) vaccine vectors were evaluated for their ability to protect against highly pathogenic SIV_{mac251} challenge. *Mamu-A*01* negative rhesus macaques were immunized in groups of four with either: RV expressing SIV_{mac239}-GagPol, a combination of RV expressing SIVmac239-Env and RV expressing SIV_{mac239}-GagPol, or with empty RV vectors. Eight weeks later animals received a booster immunization with a heterologous RV expressing the same antigens. At 12 weeks post-boost, all animals were challenged intravenously with 100 $TCID_{50}$ of pathogenic $SIV_{mac251\text{-}CX}$. Immunized macaques in both vaccine groups had 1.3–1.6-log-fold decrease in viral set point compared to control animals. The GagPol/Env immunized animals also had a significantly lower peak viral load. When compared to control animals following challenge, vaccinated macaques had a more rapid induction of SIV_{mac251} neutralizing antibodies and of $CD8^+$ T cell responses to various SIV epitopes. Moreover, vaccinated macaques better maintained peripheral memory

$CD4^+$ T cells and were able to mount a poly-functional CD8+ T cell response in the mucosa. These findings indicate promise for RV-based vectors and have important implications for the development of an efficacious HIV vaccine.

• African great apes are natural hosts of multiple related malaria species, including *Plasmodium falciparum*. Prugnolle, F., Durand, P., Neel, C., Ollomo, B., Ayala, F. J., Arnathau, C., Etienne, L., Mpoudi-Ngole, E., Nkoghe, D., Leroy, E., Delaporte, E., Peeters, M., & Renaud, F. (Lab. Génét. et Evol. des Maladies Infectieuses, 34394 Montpellier Cedex 5, France [e-mail: *prugnoll@mpl.ird.fr*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2010, *107*, 1458-1463, <www.pnas.org/content/107/4/1458.full>.

"*Plasmodium reichenowi*, a chimpanzee parasite, was until very recently the only known close relative of *Plasmodium falciparum*, the most virulent agent of human malaria. Recently, *Plasmodium gaboni*, another closely related chimpanzee parasite, was discovered, suggesting that the diversity of *Plasmodium* circulating in great apes in Africa might have been underestimated. It was also recently shown that *P. reichenowi* is a geographically widespread and genetically diverse chimpanzee parasite and that the world diversity of *P. falciparum* is fully included within the much broader genetic diversity of *P. reichenowi*. The evidence indicates that all extant populations of *P. falciparum* originated from *P. reichenowi*, likely by a single transfer from chimpanzees. In this work, we have studied the diversity of *Plasmodium* species infecting chimpanzees and gorillas in Central Africa (Cameroon and Gabon) from both wild-living and captive animals. The studies in wild apes used noninvasive sampling methods. We confirm the presence of *P. reichenowi* and *P. gaboni* in wild chimpanzees. Moreover, our results reveal the existence of an unexpected genetic diversity of *Plasmodium* lineages circulating in gorillas. We show that gorillas are naturally infected by two related lineages of parasites that have not been described previously, herein referred to as *Plasmodium GorA* and *P. GorB*, but also by *P. falciparum*, a species previously considered as strictly human-specific. The continuously increasing contacts between humans and primate populations raise concerns about further reciprocal host transfers of these pathogens."

• A virus-like particle vaccine for epidemic Chikungunya virus protects nonhuman primates against infection. Akahata, W., Yang, Z.-Y., Andersen, H., Sun, S., Holdaway, H. A., Kong, W.-P., Lewis, M. G., Higgs, S., Rossmann, M. G., Rao, S., & Nabel. G. J. (G. J. N., Vaccine Research Ctr, NIAID, U.S. NIH, Bethesda, MD 20892-6612 [e-mail: *gnabel@nih.gov*]). *Nature Medicine*, 2010, *16*, 334-338, <www.nature.com/nm/journal/v16/n3/abs/nm.2105.html>.

"Chikungunya virus (CHIKV) has infected millions of people in Africa, Europe and Asia since this alphavirus reemerged from Kenya in 2004. The severity of the disease and the spread of this epidemic virus present a serious public health threat in the absence of vaccines or antiviral therapies. Here, we describe a new vaccine that protects against CHIKV infection of nonhuman primates. We show that selective expression of viral structural proteins gives rise to virus-like particles (VLPs) *in vitro* that resemble replication-competent alphaviruses. Immunization with these VLPs elicited neutralizing antibodies against envelope proteins from alternative CHIKV strains. Monkeys immunized with VLPs produced high-titer neutralizing antibodies that protected against viremia after high-dose challenge. We transferred these antibodies into immunodeficient mice, where they protected against subsequent lethal CHIKV challenge, indicating a humoral mechanism of protection. Immunization with alphavirus VLP vaccines represents a strategy to contain the spread of CHIKV and related pathogenic viruses in humans."

• Methicillin-resistant *Staphylococcus aureus* colonization in personnel attending a veterinary surgery conference. Burstiner, L. C., Faires, M., & Weese, J. S. (J. S. W., Dept of Pathobiol., Ontario Vet. Coll., Univ. of Guelph, Guelph, Ontario N1G 2W1, Canada [e-mail: *jsweese@ovc.uoguelph.ca*]). *Veterinary Surgery*, 2010, *39*, 150-157, <www3.interscience.wiley.com/cgi-bin/fulltext/123272881>.

To evaluate the prevalence of, and risk factors for, methicillin-resistant *Staphylococcus aureus* (MRSA) colonization in veterinary personnel, a cross-sectional study was made of 341 conference attendees at the 2008 American College of Veterinary Surgeons Symposium in San Diego, California. Nasal swabs were collected and tested using selective culture for MRSA. Isolates were typed and risk factors were evaluated using questionnaire data. 17.3% of subjects (17% veterinarians and 18% technicians) were MRSA positive. Colonized individuals originated from five different countries, predominantly the U.S. and Canada. Contact with small ruminants in the preceding 30 days (odds ratio [OR] 2.2), living with a person diagnosed with MRSA in the preceding year (OR 19.8), and working in a clinic where there is a specific person in charge of the infection control program (OR 2.2) were associated with colonization using multivariable analysis. The high rate of colonization identified here provides more evidence that MRSA exposure is likely an occupational risk for veterinary personnel. The equal rates in small animal and large animal personnel were surprising and contradict earlier studies indicating greater rates among equine personnel. The association of MRSA and small ruminant contact has not been reported previously. MRSA is an important emerging pathogen in veterinary medicine and is a concern for both patients and veterinary personnel. The high colo-

nization rate indicates the need to understand and control the spread of MRSA in veterinary clinics.

• Personal protection by long-lasting insecticidal hammocks against the bites of forest malaria vectors. Sochantha, T., Van Bortel, W., Savonnaroth, S., Marcotty, T., Speybroeck, N., & Coosemans, M. (M. C., Inst. of Trop. Med., Nationalestr. 155, B-2000 Antwerpen, Belgium [e-mail: *mcoosemans@itg.be*]). *Tropical Medicine & International Health*, 2010, *15*, 336-341, <www3.interscience.wiley.com/cgi-bin/fulltext/123237097/HTMLSTART>.

"In Southeast Asia, malaria vectors bite outside the houses before bedtime, and forest dwellers rarely use insecticide-treated nets (ITNs). Thus, we tested the protection of long-lasting insecticidal hammocks (LLIH) using Olyset™ technology against exophagic vectors in two forest villages of Cambodia. In each village, we conducted two entomological surveys (middle and end of the rainy season), each lasting 10 consecutive nights. These comprised human landing collections during the whole night by people sitting outside in the hammocks. Five households were selected per village, and for each household, two fixed positions were allocated: one for the control and one for the treated hammock. In total, 6449 mosquitoes were collected from control hammocks compared to 4481 in treated hammocks. Personal protection conferred by the hammocks was 46% (CI 95%: 35–55%) against the bites of *Anopheles minimus*. A significant reduction of *An. dirus* bites (46% CI 95%: 25–62%) was only observed at the end of the rainy season. *An. maculatus* and *Culex* bites were only reduced in one of the two study sites. Even if this LLIH is not inducing full protection against the bites of malaria vectors, it could prove effective in protecting forest workers and villagers before sleeping time. LLIH can be an additional and valuable tool in eliminating artemisinin-resistant malaria in the region."

Evolution, Genetics, and Taxonomy

• Convergent evolution of anthropoid-like adaptations in Eocene adapiform primates. Seiffert, E. R., Perry, J. M. G., Simons, E. L., & Boyer, D. M. (Dept of Anatomical Sciences, Stony Brook Univ., Stony Brook, NY 11794-8081 [e-mail: *erik.seiffert@stonybrook.edu*]). *Nature*, 2009, *461*, 1118-1121, <www.nature.com/nature/journal/v461/n7267/abs/nature08429.html>.

"Adapiform or 'adapoid' primates first appear in the fossil record in the earliest Eocene epoch (~55 million years [Myr] ago), and were common components of Palaeogene primate communities in Europe, Asia and North America. Adapiforms are commonly referred to as the 'lemur-like' primates of the Eocene epoch, and recent phylogenetic analyses have placed adapiforms as stem members of Strepsirrhini, a primate suborder whose crown clade includes lemurs, lorises and galagos. An alternative view is that adapiforms are stem anthropoids. This debate has recently been rekindled by the description of a largely complete skeleton of the adapiform *Darwinius*, from the middle Eocene of Europe, which has been widely publicized as an important 'link' in the early evolution of Anthropoidea. Here we describe the complete dentition and jaw of a large-bodied adapiform (*Afradapis* gen. nov.) from the earliest late Eocene of Egypt (~37 Myr ago) that exhibits a striking series of derived dental and gnathic features that also occur in younger anthropoid primates—notably the earliest catarrhine ancestors of Old World monkeys and apes. Phylogenetic analysis of 360 morphological features scored across 117 living and extinct primates (including all candidate stem anthropoids) does not place adapiforms as haplorhines (that is, members of a *Tarsius*–Anthropoidea clade) or as stem anthropoids, but rather as sister taxa of crown Strepsirrhini; *Afradapis* and *Darwinius* are placed in a geographically widespread clade of caenopithecine adapiforms that left no known descendants. The specialized morphological features that these adapiforms share with anthropoids are therefore most parsimoniously interpreted as evolutionary convergences. As the largest non-anthropoid primate ever documented in Afro-Arabia, *Afradapis* nevertheless provides surprising new evidence for prosimian diversity in the Eocene of Africa, and raises the possibility that ecological competition between adapiforms and higher primates might have played an important role during the early evolution of stem and crown Anthropoidea in Afro-Arabia."

• Evolution of the second orangutan: Phylogeny and biogeography of hominid origins. Grehan, J. R., & Schwartz, J. H. (Buffalo Museum of Science, 1020 Humboldt Pkwy, Buffalo, NY 14211-1293 [e-mail: *jgrehan@sciencebuff.org*]). *Journal of Biogeography*, 2009, *36*, 1823-1844.

"To resolve the phylogeny of humans and their fossil relatives (collectively, hominids), orangutans (*Pongo*) and various Miocene great apes, and to present a biogeographical model for their differentiation in space and time, maximum parsimony analysis was used to assess phylogenetic relationships among living large-bodied hominoids (humans, chimpanzees, bonobos, gorillas, orangutans) and various related African, Asian and European ape fossils. Biogeographical characteristics were analyzed for vicariant replacement, main massings, and nodes. A geomorphological correlation was identified for a clade we refer to as the 'dental hominoids', and this correlation was used to reconstruct their historical geography. Our analyses support the following hypotheses: (1) the living large-bodied hominoids represent a monophyletic group comprising two sister clades: humans + orangutans, and chimpanzees (including bonobos) + gorillas (collectively, the African apes); and (2) the human–orangutan clade (dental hominoids) includes fossil hominids (*Homo*, australopiths, *Orrorin*) and the Miocene-age apes *Hispanopithecus*, *Ouranopithecus*, *Ankarapithecus*, *Sivapithecus*, *Lufeng-*

pithecus, *Khoratpithecus* and *Gigantopithecus* (also Plio-Pleistocene of eastern Asia). We also demonstrate that the distributions of living and fossil genera are largely vicariant, with nodes of geographical overlap or proximity between *Gigantopithecus* and *Sivapithecus* in Central Asia, and between *Pongo*, *Gigantopithecus*, *Lufengpithecus* and *Khoratpithecus* in East Asia. The main massing is represented by five genera and eight species in East Asia. The dental hominoid track is spatially correlated with the East African Rift System (EARS) and the Tethys Orogenic Collage (TOC). Humans and orangutans share a common ancestor that excludes the extant African apes. Molecular analyses are compromised by phenetic procedures such as alignment and are probably based on primitive retentions. We infer that the human–orangutan common ancestor had established a widespread distribution by at least 13 Ma. Vicariant differentiation resulted in the ancestors of hominids in East Africa and various primarily Miocene apes distributed between Spain and Southeast Asia (and possibly also parts of East Africa). The geographical disjunction between early hominids and Asian *Pongo* is attributed to local extinctions between Europe and Central Asia. The EARS and TOC correlations suggest that these geomorphological features mediated establishment of the ancestral range."

• Chimpanzee and human Y chromosomes are remarkably divergent in structure and gene content. Hughes, J. F., Skaletsky, H., Pyntikova, T., Graves, T. A., van Daalen, S. K. M., Minx, P. J., Fulton, R. S., McGrath, S. D., Locke, D. P., Friedman, C., Trask, B. J., Mardis, E. R., Warren, W. C., Repping, S., Rozen, S., Wilson, R. K., & Page, D. C. (Dept of Biology, Massachusetts Institute of Technology, 9 Cambridge Center, Cambridge, MA 02142 [e-mail: *dcpage@wi.mit.edu*]). *Nature*, 2010, *463*, 536-539, <www.nature.com/nature/journal/v463/n7280/pdf/nature08700.pdf>.

"The human Y chromosome began to evolve from an autosome hundreds of millions of years ago, acquiring a sex-determining function and undergoing a series of inversions that suppressed crossing over with the X chromosome. Little is known about the recent evolution of the Y chromosome because only the human Y chromosome has been fully sequenced. Prevailing theories hold that Y chromosomes evolve by gene loss, the pace of which slows over time, eventually leading to a paucity of genes, and stasis. These theories have been buttressed by partial sequence data from newly emergent plant and animal Y chromosomes, but they have not been tested in older, highly evolved Y chromosomes such as that of humans. Here we finished sequencing of the male-specific region of the Y chromosome (MSY) in our closest living relative, the chimpanzee, achieving levels of accuracy and completion previously reached for the human MSY. By comparing the MSYs of the two species we show that they differ radically in sequence structure and gene content, indicating rapid evolution during the past 6 million years. The chimpanzee MSY contains twice as many massive palindromes as the human MSY, yet it has lost large fractions of the MSY protein-coding genes and gene families present in the last common ancestor. We suggest that the extraordinary divergence of the chimpanzee and human MSYs was driven by four synergistic factors: the prominent role of the MSY in sperm production, 'genetic hitchhiking' effects in the absence of meiotic crossing over, frequent ectopic recombination within the MSY, and species differences in mating behavior. Although genetic decay may be the principal dynamic in the evolution of newly emergent Y chromosomes, wholesale renovation is the paramount theme in the continuing evolution of chimpanzee, human and perhaps other older MSYs."

• Bonobos exhibit delayed development of social behavior and cognition relative to chimpanzees. Wobber, V., Wrangham, R., & Hare, B. (Dept of Human Evolutionary Biol., Harvard Univ, 11 Divinity Ave, Cambridge, MA 02138 [e-mail: *wobber@fas.harvard.edu*]). *Current Biology*, 2010, *20*, 226-230, <www.sciencedirect.com/science/journal/09609822>.

"Phenotypic changes between species can occur when evolution shapes development. Here, we tested whether differences in the social behavior and cognition of bonobos and chimpanzees derive from shifts in their ontogeny, looking at behaviors pertaining to feeding competition in particular. We found that as chimpanzees (n = 30) reached adulthood, they became increasingly intolerant of sharing food, whereas adult bonobos (n = 24) maintained high, juvenile levels of food-related tolerance. We also investigated the ontogeny of inhibition during tasks that simulated feeding competition. In two different tests, we found that bonobos (n = 30) exhibited developmental delays relative to chimpanzees (n = 29) in the acquisition of social inhibition, with these differences resulting in less skill among adult bonobos. The results suggest that these social and cognitive differences between two closely related species result from evolutionary changes in brain development."

• Mammalian biodiversity on Madagascar controlled by ocean currents. Ali, J. R., & Huber, M. (M. H., Earth & Atmospheric Sci. Dept, Purdue Univ., West Lafayette, IN 47907 [e-mail: *huberm@purdue.edu*]). *Nature*, 2009, *463*, 653-656, <www.nature.com/nature/journal/v463/n7281//full/nature08706.html>.

"Madagascar hosts one of the world's most unusual, endemic, diverse and threatened concentrations of fauna. To explain its unique, imbalanced biological diversity, G. G. Simpson proposed the 'sweepstakes hypothesis', according to which the ancestors of Madagascar's present-day mammal stock rafted there from Africa. This is an important hypothesis in biogeography and evolutionary theory for how animals colonize new frontiers, but its validity is questioned. Studies suggest that currents were

inconsistent with rafting to Madagascar and that land bridges provided the migrants' passage. Here we show that currents could have transported the animals to the island and highlight evidence inconsistent with the land-bridge hypothesis. Using palaeogeographic reconstructions and palaeo-oceanographic modelling, we find that strong surface currents flowed from northeast Mozambique and Tanzania eastward towards Madagascar during the Palaeogene period, exactly as required by the 'sweepstakes process'. Subsequently, Madagascar advanced north towards the equatorial gyre and the regional current system evolved into its modern configuration with flows westward from Madagascar to Africa. This may explain why no fully non-aquatic land mammals have colonized Madagascar since the arrival of the rodents and carnivorans during the early-Miocene epoch. One implication is that rafting may be the dominant means of overseas dispersal in the Cenozoic era when palaeocurrent directions are properly considered."

• Evolution and biogeography of primates: A new model based on molecular phylogenetics, vicariance and plate tectonics. Heads, M. (Buffalo Museum of Science, 1020 Humboldt Pkwy, Buffalo, NY 14211-1293 [e-mail: *michael.heads@yahoo.com*]). *Zoologica Scripta*, 2010, *39*, 107-127, <www3.interscience.wiley.com/cgi-bin/fulltext/122680933/HTMLSTART>.

The ages of the oldest fossils suggest an origin for primates in the Paleocene (≈56 Ma). Fossil-calibrated molecular clock dates give Cretaceous dates (≈80–116 Ma). Both these estimates are minimum dates although they are often 'transmogrified' and treated as maximum or absolute dates. Oldest fossils can underestimate ages by tens of millions of years and instead of calibrating the time-course of evolution with a scanty fossil record, the geographical boundaries of the main molecular clades of primates are calibrated here with radiometrically dated tectonic events. This indicates that primates originated when a globally widespread ancestor (early Archonta) differentiated into a northern group (Plesiadapiformes, extinct), a southern group (Primates), and two south-east Asian groups (Dermoptera and Scandentia). The division occurred with the breakup of Pangea in the Early Jurassic and the opening of the central Atlantic (≈185 Ma). Within primates, the strepsirrhines and haplorhines diverged with volcanism and buckling on the Lebombo Monocline, a volcanic rifted margin in south-east Africa (Early Jurassic, ≈180 Ma). Within strepsirrhines, lorises and galagos (Africa and Asia) and lemurs (Madagascar) diverged with the formation of the Mozambique Channel (Middle Jurassic, ≈160 Ma). Within haplorhines, Old World monkeys and New World monkeys diverged with the opening of the Atlantic (Early Cretaceous, ≈130 Ma). The main aspects of primate distribution are interpreted as the result of plate tectonics, phylogeny and vicariance, with some subsequent range expansion leading to secondary overlap. Long-distance, trans-oceanic dispersal events are not necessary. The primate ancestral complex was already widespread globally when sea-floor spreading, strike-slip rifting and orogeny fractured and deformed distributions through the Jurassic and Cretaceous, leading to the origin of the modern clades. The model suggests that the topology of the phylogenetic tree reflects a sequence of differentiation in a widespread ancestor rather than a series of dispersal events.

Field Studies

• Status of Bengal slow loris *Nycticebus bengalensis* (Primates: Lorisidae) in Gibbon Wildlife Sanctuary, Assam, India. Das, N., Biswas, J., Das, J., Ray, P. C., Sangma, A., & Bhattacharjee, P. C. *Journal of Threatened Taxa*, 2009, *1*, 541-580, <www.threatenedtaxa.org/ZooPrintJournal/2009/November/nabajit.htm>.

"Gibbon Wildlife Sanctuary (GWLS) in the Jorhat District of Assam in northeastern India is rich in primate diversity with seven species. The plains alluvial semi-evergreen forest patches with high canopy cover support a variety of fauna. In October–November 2008, we carried out a survey to estimate the population status of Bengal slow loris in GWLS, a species for which little data are available in India, and whose conservation status has only recently been changed from Data Deficient to Vulnerable. We estimated population abundance of 0.18 loris individuals/km using reconnaissance-survey and transects methods."

General

• Japanese macaques as laboratory animals. Isa, T., Yamane, I., Hamai, M., & Inagaki, H. (Section for NBR Promotion, Natl Inst. for Physiological Sciences, 38 Nishigonaka Myodaiji, Okazaki, Aichi, 444-8585, Japan) *Experimental Animals*, 2009, *58*, 451-457, <www.jstage.jst.go.jp/browse/expanim/58/5/451/_pdf >.

The Japanese macaque (*Macaca fuscata*), along with rhesus and long-tailed macaques, is one of the *Macaca* species. In Japan, it has been preferred for use as a laboratory animal, particularly in the field of neuroscience, because of its high level of intelligence and its gentle nature. In addition, the species has a relatively homogeneous genetic background and field researchers have accumulated abundant information on the social behavior of wild Japanese macaques. As future neuroscience research will undoubtedly be more focused on the higher cognitive functions of the brain, including social behavior among multiple individuals, the Japanese macaque can be expected to become even more valuable as a laboratory animal in the near future. The Ministry of Education, Culture, Sports, Science and Technology has launched a National BioResource Project (NBRP) to establish a stable breeding and supply system for Japanese macaques for laboratory use. The project is in progress and should lead to the establishment of a National Primate Center in Japan, which will

support the supply of monkeys as well as social outreach and handling of animal welfare issues.

Reproduction

• Opposites attract: MHC-associated mate choice in a polygynous primate. Setchell, J. M., Charpentier, M. J. E., Abbott, K. M., Wickings, E. J., & Knapp, L. A. (Evolutionary Anthropology Research Group, Dept of Anthro., Durham Univ., Dawson Bldg, South Rd, Durham DH1 3LE, U.K. [e-mail: *joanna.setchell@durham.ac.uk*]). *Journal of Evolutionary Biology*, 2010, *23*, 136-148, <www3.interscience.wiley.com/cgi-bin/fulltext/122674989/HTMLSTART>.

"We investigated reproduction in a semi-free-ranging population of a polygynous primate, the mandrill, in relation to genetic relatedness and male genetic characteristics, using neutral microsatellite and major histocompatibility complex (MHC) genotyping. We compared genetic dissimilarity to the mother and genetic characteristics of the sire with all other potential sires present at the conception of each offspring (193 offspring for microsatellite genetics, 180 for MHC). The probability that a given male sired increased as pedigree relatedness with the mother decreased, and overall genetic dissimilarity and MHC dissimilarity with the mother increased. Reproductive success also increased with male microsatellite heterozygosity and MHC diversity. These effects were apparent despite the strong influence of dominance rank on male reproductive success. The closed nature of our study population is comparable to human populations for which MHC-associated mate choice has been reported, suggesting that such mate choice may be especially important in relatively isolated populations with little migration to introduce genetic variation."

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Meeting Announcements

The **4th International Primate Genomics Conference** will be held April 13–16, 2010, at the Seattle Art Museum, hosted by the Washington National Primate Research Center. The theme is "Systems Biology & Translational Research". The conference Website is <www.seattleprimategenomics.com>, and online registration is open.

A **Southern California Primate Research Forum**, "Mate Choice in Humans and Nonhuman Primates", will be held April 24, 2010, at Cal State Fullerton. See <scprf.ucsd.edu>.

The **International Conference on Diseases of Zoo and Wild Animals 2010** will be held May 12–15 at the Zoo Aquarium of Madrid, Spain, sponsored by the Leibniz Institute for Zoo and Wildlife Research and the European Association of Zoo and Wildlife Veterinarians. For information, see <www.zoovet-conference.org>.

The Animal Behavior Society will hold its **47th Annual Animal Behavior Meeting** at the College of William and Mary, Williamsburg, Virginia, July 25–31, 2010.

From Cage to Clinic: Primate Research for Regenerative Medicine, will be held August 16–18 in Kunming, Yunnan, China, sponsored by the National Engineering Research Center of Biomedicine and Animal Science and Kunming Biomed International. See <kbimed.com/html/events/2009/1228/17.html>.

The **61st National Meeting of the American Association for Laboratory Animal Science (AALAS)** will be held October 10–14, 2010, in Atlanta, Georgia. The deadline for abstract submissions is June 1. See <nationalmeeting.aalas.org>.

Beyond the Genome: The True Gene Count, Human Evolution and Disease Genomics, will be held at the Joseph B. Martin Conference Center, Harvard Medical School, Boston, Massachusetts, October 11–13, 2010. Topics will include:

- The number of genes in a genome;
- Microbiomes in human and other environments;
- Insights into human evolution from high-throughput sequencing; and
- Sequencing cancer genomes.

Keynote speakers will be Elaine Mardis, Washington University School of Medicine, and Steven Salzberg, University of Maryland. The deadline for submission of abstracts is June 25. For more information, contact Tomi Alalade [e-mail: *Tomi.Alalade@biomedcentral.com*], or see <www.beyondthegenome2010.com>.

The **American Anthropological Association** will hold its 2010 meeting November 17–21 at the Marriott New Orleans and Sheraton New Orleans hotels. See <www.aaanet.org/meetings>.

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