



LEMUR

NEWS

NUMBER 2
JULY, 1996

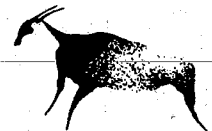
*The Newsletter of the Madagascar Section
of the I.U.C.N./ S.S.C. Primate Specialist Group*

Editors: Roderic B. Mast, Russell A. Mittermeier

PSG Chairman: Russell A. Mittermeier

PSG Deputy Chairman: William R. Konstant

Editorial Assistants: Danielle Mihalko, Jennifer Burkholder



LETTER FROM THE CHAIRMAN IUCN/SSC PRIMATE SPECIALIST

As so often happens with Primate Specialist Group publications, this one has seen unfortunate delays -an inevitable consequence of a volunteer network in which very busy people take time to work on SSC issues above and beyond their day-to-day responsibilities. Rod Mast produced the inaugural issue of *Lemur News* back in May, 1993, and it was very well-received. However, as noted below, Rod's change in CI responsibilities inevitably led to a shift of focus away from Madagascar. Consequently, it has taken us three years to produce this second issue, and also to find a new editor, Jörg Ganzhorn, who hopefully will be able to produce *Lemur News* on the projected twice-a-year schedule. This will bring us up-to-date on all four of our regional newsletters and on our yearly journal, *Primate Conservation*. This decentralization and updating of Primate Specialist Group publications is something that we promised at the IPS Congress in Strasbourg in August, 1992, and it has finally been realized.

As of issue number 3 of *Lemur News*, Dr. Jörg Ganzhorn of the German Primate Center, will take over as editor of this publication. Jörg needs no introduction to the world of lemurologists. He has conducted research in Madagascar for over a decade, and has a wide range of publications on these animals, including a book that is reviewed in this issue. We are delighted that he has agreed to take on this task, and we all look forward to working with him on it in the future.

I would also like to take this opportunity to announce the creation of a new foundation dedicated to conservation of nonhuman primates. This new entity, The Margot Marsh Biodiversity Foundation, was created by the late Margot Marsh of La Jolla, California. Margot was a long-time supporter of the activities of the Primate Specialist Group, as well as a wide variety of other primate conservation activities. She was also a wonderful person with a tremendously strong personal commitment to global biodiversity conservation issues that concern us all. In spite of her broad range of interests, she had a special fondness for primates, and consequently when she died in May, 1995, she left special provision in her will for the creation of this new foundation dedicated exclusively to global primate conservation. The Primate Specialist Group was honored by the fact that many of its goals and activities were mentioned specifically in her will, and that the Chairman was named one of three Board Members for the Foundation. The final legal details are still being worked out, but more information on guidelines, objectives and application procedures will be included in the next issue of *Primate Conservation* as well as future regional newsletters. We are all delighted that Margot Marsh chose to focus her foundation on primates, and believe that her dedication will provide for significant advances in primate conservation and field research as we enter the 21st century.

Finally, on behalf of the entire Primate Specialist Group, I would like to express our thanks to Rod Mast for all the work he has put into *Lemur News*. He got it started back in 1993, and has set a high standard for this publication. We are all grateful to him and look forward to his continued involvement in this publication and in other Primate Specialist Group activities.

Russell A. Mittermeier

President, Conservation International &
Chairman, IUCN/SSC Primate Specialist Group
1015 18th Street, NW Suite 1000
Washington, DC 20036
ph: (202) 429-5660, fax (202) 887-5188
email r.mittermeier@conservation.org

LETTER FROM THE EDITOR

I began this letter on the laptop while en route from Madagascar to the US nearly three years ago — on that long flight that stops in both Lilongwe and Lusaka before arriving to Paris — one of those interminable aircraft incarcerations that always leaves me yearning for the day when technology achieves the *Star Trek* style beam-transporter. At that time, I was Conservation International's Vice President for the Old World, including all our activities in Africa (principally Madagascar), and Asia. Shortly after my return however, my responsibilities at CI shifted continents, and I now focus exclusively on the Andes cordillera (Lee Hannah now oversees Africa programs for CI), a challenging and exciting job, though I do miss Madagascar and lemurs (lemur diversity is low in South Amer-

ica). As a result of this change in my duties back in 1994, *Lemur News* No. 2 has suffered an unplanned and inexcusably lengthy hiatus, for which I deeply apologize to the readers.

But before I describe the current issue and the future of *Lemur News* beyond this, let me return to my original letter of three years ago:

"I've been in Antananarivo and on a trip to the Ankarafantsika Intégral Reserve near Majunga, and though my visit was not entirely primate related [I was investigating CI's involvement in developing an ecosystem conservation program for Ankarafantsika, an ICDP effort that today is operating full steam, with multi-million dollar financing from the German KfW], I was nonetheless able to make a few good contacts and do a bit of lemur-watching at the reserve and in the surrounding villages. In two days, I managed to easily spot six of the seven lemurs native to Ankarafantsika (*Microcebus murinus*, *Lepilemur edwardsi*, *Eulemur f. fulvus*, *Eulemur mongoz*, *Avahi occidentalis*, *Propithecus verreauxi coquereli*), thanks to the help of Robin Crompton. The unseen seventh, *Cheirogaleus medius*, was aestivating and uncooperative. I also spoke with a hunter who was able to provide me with information about primate abundance around the nearby village of Beronono, which lies to the north west of the reserve.

The Ampijoroa station, within the Reserve Forestier Ankarafantsika alongside the south side of the Route National connecting Mahajanga and Tana, is an ideal site for nature tourism as it offers not only a chance to see 6-7 lemurs with great ease (the habituated Coquerel's sifakas do twice-daily shows as they cross the compound en route to and from feeding sites), but also lots of native birds, reptiles (including crocodiles at the nearby lake, and several chameleon species), and other dry forest biota. Especially interesting to see is the captive breeding facility for the angonoka and kapidolo tortoises, two of the world's most rare and endangered chelonians that have been the focus of a program sponsored by the Jersey Wildlife Preservation Trust, CI and others for the past several years. In a place such as Ampijoroa, income from properly managed "lemur tourism" could help meet the economic needs of local people who would otherwise be forced to turn to non-sustainable activities like charcoal production for their livelihoods.

Back in Tana, I also spent an entertaining evening with legendary lemur lady Alison Richard of Yale University, discussing her years of involvement in Malagasy conservation over a bottle (or many?) of Lazan'i Betsileo - our discussion centered on discerning the best-studied lemur sites of the island, and the winner (hands-down in our opinion) was Ranomafana National Park. The take-home messages for me were that *Lemur News* needs to solicit more articles from Ranomafana researchers, and also that Lazan'i Betsileo and cigars are not the recommended fare the night before the Lilongwe-Lusaka-Paris flight.

Thank you for all the comments and compliments on *Lemur News* No. 1. In your letters, it was suggested that more information be included on extinct lemurs, hence we have beefed-up the recent publications on sub-fossil species in this issue and also included an article by Laurie Godfrey et al. on extinct lemurs at Ankarana"

In preparing this issue, I have spent the past several months reviewing the many articles submitted over the past three years, and re-establishing contact with authors and Editorial Board members. It has been wonderful to be back in touch with all of you! In addition to the many authors whose material appears in this issue, I would like to extend my gratitude to Alison Jolly, Hilary Simons-Morland, David Meyers, and Eleanor Sterling for their advice and assistance. I must gratefully acknowledge Danielle Mihalko, Jennifer Burkholder, Jocelyn Woodman, Kate Narburgh, Anthony Rylands, and Angela Mast for their editorial assistance, and of course, Stephen Nash, the person who makes it all "look good". A special thanks also goes to Russ Mittermeier for building the fire under me to finally complete this project (a skill at which he excels).

This issue of *Lemur News* will be my last as Editor, and No. 3 will be released under the able editorship of Jörg Ganzhorn of the German Primate Center. Best of luck and thanks in advance to Jörg.

Roderic B. Mast

Vice President, Conservation International
1015 18th Street, NW Suite 1000
Washington, DC 20036
ph: (202) 429-5660, fax (202) 887-5188
email r.mast@conservation.org

Future correspondence relating to *Lemur News* should be directed to Jörg at:

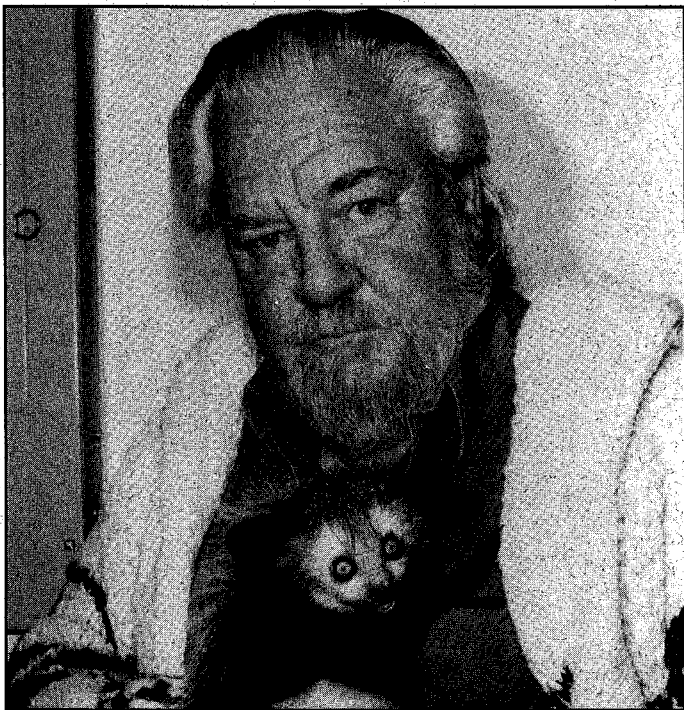
Jörg Ganzhorn
Deutsches Primatenzentrum
Kellnerweg 4
37077 Göttingen
Germany
fax 49 (551) 3851 228
email: jganzho@gwdg.de

or
Russell A. Mittermeier
President, Conservation International
1015 18th Street, NW Suite 1000
Washington, DC 20036
ph: (202) 429-5660, fax (202) 887-0192
email r.mittermeier@conservation.org

APPRECIATION

Gerald Malcolm Durrell (1925-1995), Pioneer in Modern Role For Zoos and Leader in Madagascar Conservation Work

Gerald Durrell, the man widely recognized as the creator of the conservation role for zoos, died January 30, 1995 on Jersey, Channel Islands of complications following liver transplant surgery. A pioneer in breeding endangered species for eventual reintroduction to the wild, Durrell founded his own zoo in 1959 on Jersey, an island in the English Channel. Captive breeding of rare animals was initially denounced by prominent zoologists as unnecessary and irrelevant. Now, it is acknowledged as an important weapon in the fight to save animals from extinction. Wildlife film producer Sir David Attenborough, Durrell's friend for nearly 40 years noted, "when I first talk to people, they say 'Gerry Durrell was our inspiration. Gerry Durrell started the whole thing.' This zoo, this Trust is what Gerry Durrell started - and what a glorious flowering it has turned into!" The breeding center at the Jersey Zoo has scored a number of wildlife conservation successes over the years, notably with golden lion tamarins, Mauritius pink pigeons, and Mauritius kestrels, successes that have earned it several top conservation awards.



Gerald Malcolm Durrell (1925-1995), pictured here with an aye-aye (*Daubentonia madagascariensis*); see the review of his book, *The Aye-aye and I*, by Tom Lovejoy in the Book Reviews And Major New Publications Section (page 22).

Durrell was also a pioneer in recognizing the importance of training local scientists in conservation methods. In 1977, he established the international training program at Jersey, which so far more than 700 students from 80 countries have passed through, including a number of Madagascar's finest young primatologists and conservationists. Many of these students now play key roles in wildlife conservation in parks, government agencies, schools, and zoos in their home countries.

Durrell went on to establish affiliate organizations in the US and Canada. Today these two groups (Wildlife Preservation Trust International and Wildlife Preservation Trust Canada), provide support for field conservation projects on behalf of endangered species in countries all over the world. Dr. Thomas Lovejoy, Honorary Chairman of WPTI and Assistant Secretary of the Smithsonian said, "Gerry Durrell had an extraordinary clarity of vision about the role of zoos and captive breeding. He also generated 'fireflies of humor' to lure the public to concern about animals and about conservation."

Gerry was born in Jamshedpur, India in 1925, the youngest of four children born to Samuel Durrell, a civil engineer, and his wife Louisa. Following the death of his father in 1928, the family lived in England and in Europe, eventually settling on the Greek island of Corfu. Private tutors there educated him in natural history as he collected a menagerie that included dozens of animals from scorpions to eagle owls. At the age of 21, he made his first animal collecting expedition to the British Cameroons. Expeditions to British Guiana, Argentina and Paraguay shortly followed.

At the suggestion of his elder brother, author Lawrence Durrell, Gerald began writing stories of his work with animals, starting with *The Overloaded Ark*, in 1953. His 37 books, including the bestsellers *My Family and Other Animals* (15 million copies sold!), *A Zoo in My Luggage*, *Catch me a Colobus*, *The Stationary Ark* and *The Aye-aye and I* (see Tom Lovejoy's review later in this issue), have been translated into 31 languages. The engaging humor with which Durrell described his adventures made him one of the world's most widely-read authors of animal stories. Durrell's popularity extended into radio and television as well, where he made numerous appearances. Durrell himself presented 12 television series for the BBC and other British channels. The most popular, "The Amateur Naturalist" and "Durrell in Russia," reached worldwide audiences of 150 million viewers.

For his contribution to the conservation of endangered species, Durrell received many international honors, including an honorary degree from Yale University, the Order of the Golden Ark awarded by Prince Bernhard of the Netherlands, and the Order of the British Empire in 1982.

Durrell is survived by his wife, Dr. Lee Durrell, who succeeds him as Honorary Director of the Jersey Zoo. Contributions in memory of Durrell's extraordinary life can be made to the Gerald Durrell Fund for Wildlife, WPTI, 3400 Girard Ave., Philadelphia, PA USA 19104. These funds will be used to provide cash and basic tools to enable graduates of the aforementioned International Training Program to begin conservation programs in their home countries, and to enable ITC staff to keep in closer touch with ex-trainees, providing information, advise and moral support.

NEWS AND ANNOUNCEMENTS

Lemur News from the Parc Botanique et Zoologique de Tsimbazaza

The lemur collection at Parc Botanique et Zoologique de Tsimbazaza (PBZT), has been growing by leaps and bounds the last few years. Due to such growth, in 1995 the staff of PBZT, with the assistance of Dean Gibson, Technical Advisor of the Madagascar Fauna Group, developed a long term master plan for the park's lemur collection.

PBZT has actually been too successful with breeding programs for some of the more common species such as *Lemur catta*, *Eulemur fulvus species*, *Eulemur macaco macaco*, *Haplemur griseus griseus* and *Varecia variegata variegata*. As part of our lemur master plan, we began a contraception program to curtail further reproduction of these species. However, we will continue to exhibit these species for educational purposes. By inhibiting reproduction of the more common species, we are able to concentrate our efforts on the seriously-endangered and less represented species in captivity.

In accordance with the Prosimian Taxon Advisory Group's recommendations, PBZT initiated long term breeding programs for *Eulemur coronatus*, *Eulemur macaco flavifrons*, *Eulemur rubriventer*, *Daubentonia madagascariensis*, and *Haplemur aureus*. PBZT is the only institution to hold *Haplemur aureus* in captivity. The living "type specimens" for this species, captured in Parc National de Ranomafana arrived at PBZT in 1987, and have since produced eight offspring. We are hopeful that our ninth baby *H. aureus* will be born this year.

PBZT has successfully reproduced all of the above mentioned species except *Daubentonia madagascariensis* whose husbandry program is still in the process of

being developed. We are hopeful with diet and housing changes we will successfully reproduce this species soon.

Our goal for exhibition and captive breeding of lemurs includes providing education for the Malagasy people about their natural heritage. The lemur exhibits have just recently been renovated to better display these species along with educational panels written in Malagasy, French and English. PBZT also assists conservation efforts for lemurs by developing in-country breeding populations as well as helping to provide new founders for the American Species Survival Programs (SSP). We have recently established an international breeding agreement with Duke University Primate Center for *Eulemur coronatus* and *Hapalemur aureus* and hope to exchange animals soon. Future plans for PBZT include developing breeding programs and new facilities for *Eulemur mongoz*, *Varecia variegata rubra*, *Hapalemur griseus alaotrensis*, *Hapalemur simus*, *Propithecus verreauxi verreauxi* (see below) and *Propithecus verreauxi coquereli*.

We thank all of our partners for their contributions to our lemur programs.

Albert Randrianjafy, Director and
Gilbert Rakotoarisoa, Chef du Department du Faune
Parc Botanique et Zoologique de Tsimbazaza
Antananarivo, 101
Madagascar



Tsimbazaza Zoo plans to develop breeding programs and new facilities for several lemur species including Verreaux's sifaka (*Propithecus verreauxi*); the baby shown here is believed to be the first captive birth of this species outside Madagascar. The male was born on February 18, 1992 at the Los Angeles Zoo to Caesar (12) and Calpurnia (13), on loan to L.A. Zoo from the Duke University Primate Center. Photo by Neal Johnston.

Worldwide Fund for Nature (WWF) Announces New WWW Site

The World Wide Fund for Nature (WWF), the world's largest independent conservation organization, has just launched its World Wide Web Site, the WWF Global Network. This site provides comprehensive news and information on all aspects of conservation and the environment. Topics include: forests, climate change, marine issues, pollution, species, and sustainable development. The address is: <http://www.panda.org>.

Wisconsin Regional Primate Research Center Library — WWW/Gopher Site

The Wisconsin Regional Primate Research Center Library at the University of Wisconsin coordinates a WWW/Gopher site called PRIMATE INFO NET (PIN). PIN is an electronic information resource intended for people with an interest in the field of primatology. Among the resources accessible in PIN are: Primate Information Center—bibliographic search service, Primate Images, Primate Programs, Primate Meetings Calendar, Veterinary, Resources in Primatology, Primate Newsletters, Primate Taxonomy, Endangered and Threatened Primates, Ethograms—inventories of primate behavioral patterns, Organization and Policy Documents File, Primatological Resources for Children and Young Adults, Animal Welfare Legislation and Policies, Research Data and Services, Educational/Employment Opportunities in Primatology.

To connect to PIN via WWW, use <http://www.primate.wisc.edu/pin>; via Telnet, connect to wiscinfo.wisc.edu and look for link to Primate Info Net; via gopher, connect to night.primate.wisc.edu. We welcome suggestions for improvement to existing menu items on PIN as well as ideas for new files. Note that we are interested in other resources in primatology which would enhance PIN, such as bibliographies, data files and directories. We would also welcome ideas about connections to other WWW sites, such as NetVet, which have related materials. To make suggestions, or for more information about Primate Info Net, contact Larry Jacobsen.

Larry Jacobsen, Head of Library Services
Primate Center Library
Wisconsin Regional Primate Research Center
1220 Capitol Court, Madison, WI 53715-1299
phone (608) 263-3512, fax (608) 263-4031
email jacobsen@primare.wisc.edu

Primate Talk: An On-Line Discussion Forum for Primatology

The Wisconsin Regional Primate Research Center (WRPRC) at the University of Wisconsin at Madison, USA, hosts an electronic mail listserver called Primate Talk. Primate-Talk is an open forum for the discussion of primatology and related subjects. This forum is open to electronic mail users worldwide with an interest in nonhuman primates. Currently there are over 1000 P-T members from 32 countries. Subject matter may include, but is not limited to: news items, meeting announcements, research issues, information requests, veterinary/husbandry topics, job notices, animal exchange information, book reviews. Some special features of P-T include: 1) the Primate-Talk Meetings Calendar, 2) the Primate-Talk Directory of net members, 3) an archive of P-T messages and 4) book announcements.

To sign on and participate you must have an electronic mail address and access to Internet. People with Internet, BITNET or UUCP addresses can communicate with P-T. Users of other networks should contact the WRPRC. If you are interested in joining P-T, send a message to primate-talk-request@primare.wisc.edu. You do not need to put anything in the subject line, but in the message body type: subscribe primate-talk. Messages to the list members are sent to PRIMATE-TALK@PRIMATE.WISC.EDU. For information contact Larry Jacobsen.

Larry Jacobsen (address above)

Conservation International Home Page Wins Three Awards

People seeking in-depth analyses about global biodiversity and tips on creative conservation solutions can turn to Conservation International's new home page on the World Wide Web. The site has won three awards since its recent debut on the

Internet. The Conservation International (CI) home page recently won second place for "outstanding creativity" from the prestigious Mobius Advertising Awards, which honors advertising for television, radio, print and package design. Point Survey awarded the CI home page its "Top 5 percent of the Web" badge. And the site also recently received a "Best of the Web" award from the on-line resource guide Clnet, for "its gorgeous design and timely information."

Maps, photos, and a wealth of detailed background materials provide the user with a vast resource for covering the latest developments in biodiversity protection around the globe. The site provides specifics on the ecological importance of regions where CI works, covering more than 20 countries from Latin America to the Asia-Pacific, Africa and Madagascar. Maps illustrate the Earth's ecological hotspots, as well as the global patterns of human disturbance, revealing how much the planet has been irrevocably changed from its natural state.

Innovative economic strategies for conservation are featured, including a bioprospecting initiative in Suriname, tagua nut carving and marketing in Ecuador and a new rain forest canopy walkway to boost ecotourism in Ghana. The site also covers CI's strategies for scientific and policy initiatives. A regularly updated list of news releases, news tips and CI's bi-monthly newsletter "News From the Front" are also featured, along with a library offering a range of scientific papers and videos. Look for CI's site at <http://www.conservation.org>, or contact CI for additional information.

Todd Randak

Conservation International
1015 18th Street, NW Suite 1000
Washington, DC 20036
ph: (202) 429-5660, fax (202) 887-5188
email t.randak@conservation.org

News From the AZA Prosimian Taxon Advisory Group

The AZA Prosimian Taxon Advisory Group (PAG) will publish the second edition of the Prosimian Regional Collection Plan (RCP) in August 1996. The first edition of the RCP, which provided recommendations for Madagascar prosimians, was published in 1993. The purpose of a RCP is to prioritize taxa to achieve maximum benefit of limited zoo resources, especially space.

The PAG has adopted four population management categories and they are:

1) *Species Survival Plan (SSP)*: a self-sustaining population of 250-400 individuals managed to maintain 90% of the population's original genetic diversity for 100 years. An SSP population can serve as a genetic reservoir for reintroduction as well as a focus for education, research, and in-situ conservation fund-raising programs. SSP populations can be regional or global;

2) *Population Management Plan (PMP)*: a captive population of approximately 25-100 individuals, managed to maximize retention of genetic diversity but with too few individuals to be viewed as a long-term genetic reservoir. PMP populations may be recommended to further research and or educational goals;

3) *Phase-out Taxa*: those taxa that are currently maintained in AZA collections but which are not designated for SSP or PMP status. These taxa are recommended to be phased out through attrition;

4) *Not-In/Do Not Bring In*: taxa that do not occur in AZA institutions and are not currently recommended for a SSP or PMP population.

The PAG used the following criteria to select taxa for designation into one of the four management categories: conservation priority ranking, genetic and demographic viability of existing captive populations, extent of husbandry expertise, public educational value, potential as a flagship species or to gain benefit from conservation action targeted at a sympatric flagship species, and status of breeding programs in other regions.

Lemur taxa designated and already approved for SSP programs are, *Varecia variegata*, *Eulemur macaco*, *E. mongoz*, *Lemur catta*, and *Mirza coquereli*. Taxa recommended for PMPs with the intention of upgrading to SSP's if husbandry research is successful: *Propithecus verreauxi coquereli*, *P. tattersalli*, *P. diadema*, *Haplemur simus*, and *H. aureus*. Other taxa recommended for PMPs are *Daubentonia madagascarensis*, *E. fulvus collaris* and *H. griseus griseus*.

A meeting between the EEP and AZA Primate TAG Chairs took place in Frankfurt Germany in May 1996. The meeting's objective was to increase the number of programs cooperatively managed through the EEP and AZA. The Black Lemur SSP (Ingrid Porton, SSP Coordinator) and EEP (Stephen Standley, EEP Coordinator) have already merged their programs (the two populations are analyzed and managed as one) and the Ruffed Lemur SSP (Ingrid Porton) and EEP (Uta Ruempler) Coordinators have agreed to work toward that goal this year. It is anticipated by the EEP (Achim Johann) and AZA Prosimian TAG Chairs that the majority of the prosimian captive breeding programs will be cooperatively managed in either of two ways; some taxa will be managed as described above in a

joint program while in other cases the regions may select different taxa upon which to concentrate (e.g. AZA may concentrate on *P.v. coquereli* and the EEP on *P.v. coronatus*). The AZA Prosimian RCP also provides a list of the TAG's priority conservation and research projects.

Ingrid Porton

St. Louis Zoological Park
Forest Park
Saint Louis, Missouri 63110
phone (314) 781-0900, fax (314) 647-7969

Center for Biodiversity and Conservation at The American Museum of Natural History

The American Museum of Natural History recently established the Center for Biodiversity and Conservation to lead international efforts to study, protect, and sustainably use the biological resources of the planet. Scientists predict that one quarter of all biological species will be driven to extinction within the next three or four decades. Continued destruction of the world's habitats threatens the very fabric of life on this planet. However, the nature and scope of the threats posed to our biological systems are only beginning to be understood. Sound, impartial, scientific data on past and present life are needed to make informed decisions about issues that directly impact the future of the planet and the survival and well-being of human populations. The Center undertakes research and training efforts to build local institutions in high biodiversity countries, and seeks to translate the information gathered for various audiences, including policy makers and conservation managers. The Center does not duplicate the work of other environmental organizations or university-based programs, but builds on the Museum's unique capacities - its collection of over 30 million specimens that are the necessary foundation for any study of biodiversity or environmental change, its two hundred active scientists, its impressive history of environmental research and advanced training programs, and its international linkages. For example, the Museum fosters the largest and most diverse graduate training program of any institution of its kind. The founding of the Center broadens the Museum's response to the current biodiversity crisis by integrating its scientific perspective with social, economic and political factors.

Eleanor Sterling

Center for Biodiversity and Conservation
American Museum of Natural History

The Institute for the Conservation of Tropical Environments at the State University of New York, Stony Brook

The Institute for the Conservation of Tropical Environments (ICTE) is an educational non-profit organization based at the State University of New York at Stony Brook. The ICTE was established in 1992 by Executive Director Dr. Patricia C. Wright and Deputy Director Dr. William Arens to promote scientific research in the tropics. Currently, we coordinate and catalog the work of over 150 natural and social scientists at Ranomafana National Park, organize and conduct biodiversity surveys and ecological assessments of tropical ecosystems, and train scientists at all levels through field-based courses, collaborations, and academic exchanges. The ICTE is planning to expand its research, conservation, and training programs in Madagascar, to develop new programs in collaboration with Malagasy colleagues, and to begin a new project in Tanzania.

The ICTE maintains offices and staff at State University of New York at Stony Brook and in Antananarivo, Madagascar. These offices provide logistical support, both in the US and Madagascar, to scientists from over 50 US universities and institutions and 13 non-US universities who are planning and carrying out research at the Ranomafana National Park and other locations throughout Madagascar. The ICTE's long-term research program includes ecological monitoring at the Ranomafana National Park and the improvement of the Ranomafana Biological Research Station (established in 1986). The ICTE offers field courses for undergraduates in biodiversity training in Madagascar.

The ICTE publishes a semiannual newsletter and can provide information for researchers and students interested in Madagascar. Donations in support of ICTE's activities in Madagascar are welcome and tax deductible. The ICTE is establishing an e-mail database for facilitating communication among the growing number of lemur researchers. If you are interested in being involved, please e-mail your name, address, areas of interest (large categories: species, ecology, behavior, reproduc-

tion, etc.), and, if possible, a list of your lemur publications to David Meyers at the ICTE. Do not hesitate to include questions and we will try to reply with addresses of those who may have the information.

David Meyers and Patricia Wright

Institute for the Conservation of Tropical Environments SBS Bldg., 5th Floor
State University of New York
Stony Brook, NY 11794-4364
phone (516)632-7425, fax (516) 632-7692
Email pwright@datalab2.sbs.sunysb.edu

Georgina Da silva Scholarship for 1996

Donations collected in memory of Dr. Georgina Da silva will make it possible to offer a bursary of £1500 (approx. US\$2250) for the academic year 1996-97. The recipient must: a) be a citizen of a Third World country where primates occur and, b) be studying (or about to study) for a higher degree (MSc or PhD) in any subject relevant to the biology and conservation of primates at an institution of higher education in the United Kingdom. Courses within the general topics of zoology, biology, conservation biology, forestry, biological anthropology and related disciplines will be considered relevant at the discretion of the Committee. The bursary is not intended to cover the full costs of a degree course at a UK institution, but rather to supplement existing sources of funding so as to provide the recipient with additional opportunities to purchase books and/or equipment, to attend conferences or to facilitate the undertaking of a research project in connection with the degree. Candidates who wish to be considered for the 1996 bursary should submit 1) a full curriculum vitae, 2) a statement of not more than 500 words explaining how their proposed degree course will be relevant to the future of primate conservation in their country, 3) letters of recommendation from an academic sponsor in their higher education stating that the candidate has been accepted for a place on a higher degree course, and 4) a statement of their sources of funding for the course. Applications should be posted to Professor R. I. M. Dunbar in time to be received in Liverpool no later than 1 October 1996. Faxed applications will not be accepted. Candidates will be notified of the results of their application via their UK sponsor as soon as possible thereafter.

R. I. M. Dunbar

Georgina Da silva Fund Committee
Dept. of Psychology, University of Liverpool
P.O. Box 147
Liverpool L69 3BX, England

Sophie Danforth Conservation Biology Fund Awards

The Sophie Danforth Conservation Biology Fund was established by the Roger Williams Park Zoo and the Rhode Island Zoological Society to help protect threatened wildlife. Each year grants of up to \$1,000 are awarded to individuals or institutions working in conservation biology. Projects and programs that enhance biodiversity and maintain ecosystems receive the highest funding priority. Field studies, environmental education programs, development of techniques that can be used in a natural environment, and captive propagation programs that stress an integrative and/or multidisciplinary approach to conservation are also appropriate. Proposals for single species preservation, initial surveys, or seed money for technique development are not appropriate. For further information and application forms for the Sophie Danforth Conservation Biology Fund, contact Dr. Anne Savage.

Anne Savage

Director of Research, Roger Williams Park Zoo, Elmwood Avenue
Providence, RI 02905, USA
phone (401) 785-3510 x 335, Fax (401) 941-3988
e-mail bi599132@brownvm.brown.edu

DICE Selects three Malagasy Scientists as Darwin Fellows

Three Malagasy students have been selected as Darwin Fellows by the Durrell Institute of Ecology and Conservation (DICE) and the Wildlife Conservation Society (WCS). The students, Lanto Andriamampianina, Meritiana Raharitsimba, and Marius Rakotondratsima, are receiving two years of support through this new DICE/WCS initiative for the professional development of African conservation biologists. Each student has been awarded a scholarship to complete an M.Sc. in Conservation Biology at DICE and support for conducting a year-long post-degree field research project in Madagascar. Lanto, Tiana, and Marius, are employed as

junior scientists by WCS, working on biological inventories and ecological monitoring through the Projct Masoala. Marius's work has focused on developing new methods for monitoring lemur populations on the Masoala Peninsula (see his article, entitled Suivi Ecologique des Lémuriens Diurnes on page 18 of this issue of *Lemur News*).

Hilary Simons Morland

Assistant Director/Africa Program
Wildlife Conservation Society
185th Street and Southern Blvd.
Bronx, NY 10460
phone (718) 220-5887, Fax (718) 364-4275
email 0002011526@mcimail.com

New Film on Madagascar Wildlife Currently in Production

Andrew Young and Susan Todd of Archipelago Films are in production on a hour-long film about the natural history of Madagascar. The film is part of a 12 hour television series called "The Living Edens", being produced by ABC Kane Productions. It will be broadcast on public television in the US. The Madagascar program is structured around portraits of the eastern rain forest, the western seasonal dry forest, and the southern spiny desert. In each of these ecosystems, the film will use rich visuals and sound, with relatively little narration, to allow the audience to experience the uniqueness of the animals and plants firsthand. The film will also weave in stories of Malagasy people living in these areas. Sequences are currently being filmed with the aye-aye, the black and white ruffed lemur, and the fossa. The film will be completed in June 1997.

Susan Todd and Andrew Young

Archipelago Films
190 Spring Valley Rd.
Ossining, NY 10562
Phone (914)923-9235, Fax (914)923-9075

The L. S. B. Leakey Foundation Grants Program

The L. S. B. Leakey Foundation was formed to further research into human origins, behavior, and survival. Recent priorities have included research into the environments, archaeology, and human paleontology of the Miocene, Pliocene, and Pleistocene; into the behavior, morphology, and ecology of the great apes and other primates species; and into the behavioral ecology of contemporary hunter gatherers. The Foundation provides the following grants: General Research Grants; Special Research Grants including a Fellowship for Great Ape Research, a Fellowship for the Study of Foraging Peoples, and a Paleoanthropology Award; and the Franklin Mosher Baldwin Memorial Fellowships.

The L. S. B. Leakey Foundation

77 Jack London Square, Suite M
Oakland, California 94607-3750, USA.
Tel: (510) 834-3636, Fax: (510) 834-3640.

The Smithsonian Institution's Biological Conservation Newsletter

The Biological Conservation Newsletter, produced by the Department of Botany of the National Museum of Natural History, Washington, D. C., editor Jane Villa-Lobos, can now be accessed through the Smithsonian Institution's World Wide Web site at <http://www.nmnh.si.edu>, selecting "Botany" and then "Publications". The cumulative conservation bibliography files, containing nearly 10,000 references to literature on conservation biology, can be searched or browsed. These references have been obtained from a weekly review of the new journals and books received by the Smithsonian Institution's Botany and Natural History libraries and from suggestions submitted by subscribers to the newsletter. For more information, contact Jane Villa-Lobos.

Jane Villa-Lobos

Biological Conservation Newsletter
Dept. of Botany, NHB 166, Smithsonian Institution
Washington, DC 20560 USA
phone (202) 357-2027, Fax (202) 786-2563
email mnhb019@sivm.si.edu

Genetic Research on Differences in *Varecia* underway at the American Museum

Research on the taxonomic status of the ruffed lemur is being conducted in Rob DeSalle's Genetics Laboratory at the American Museum of Natural History (AMNH) in a collaborative project with George Amato and Hilary Simons Morland from the Wildlife Conservation Society (WCS). The project is using DNA obtained from hair and blood samples from wild and captive populations to assess genetic differences between red-ruffed and black-and-white ruffed lemurs, and among the black-and-white coat color varieties. The lab work is expected to be completed by mid-July, 1996. Results of the analysis will be made available to the Madagascar Fauna Group/Duke Primate Center

Ruffed Lemur Release Project, and may be helpful in evaluating the suitability of candidates for release into the Betampona Natural Reserve. The genetics research is being supported by the Madagascar Fauna Group, Conservation International, and the American Museum of Natural History.

Hilary Simons Morland

Assistant Director/Africa Program
Wildlife Conservation Society
185th Street and Southern Blvd.
Bronx, NY 10460
phone (718) 220-5887, Fax (718) 364-4275
email 0002011526@mcimail.com

Madagascar Conservation Community Mourns the Loss of Nasolo Hubert Neomane Rakotoarison (January 29, 1961–June 20, 1996)

The tragic news of Nasolo's fatal car accident has left his friends and colleagues shocked and deeply saddened. He was very well known and highly respected by his peers, as well as the scientific community in Madagascar. Nasolo was an extraordinary person, who with his intelligence and enjoyable personality gave hope for the future conservation of Madagascar's deteriorating flora and fauna. His big smile, friendly disposition and understanding of the "big picture" made him not only a pleasure to work with but also a treasured friend. His death has created a void in Madagascar which will be impossible to fill.

Urs Thalmann from the Universities of Zurich and Mahajanga, a close friend and colleague of Nasolo's writes: "In recent years Nasolo was probably the most renowned young biologist in Madagascar. His intellectual curiosity and abilities, his understanding and knowledge of animals, and his outstanding field experience were paired with an optimistic and charming character, a gracious integrity and reliable personality that had to be admired. This made Nasolo one of the most desired biologists to work with in Madagascar. Very often, professional relationships turned into personal friendships. His future, professional as well as private, looked extremely promising. Most definitely, he would have played a much more important role in the conservation of Madagascar's environment than he already did. No one who knew Nasolo will ever forget him. He has a lasting home in everyone's hearts".

Nasolo was born in Antanimora, Toliara and later raised in Fort Dauphin (Tolagnaro). He moved to Antananarivo in 1982, to attend science courses at the University of Antananarivo. After graduating in 1988 with a degree in biochemistry, he decided to continue studying for a Masters degree examining the ecophysiology of tenrecs. In 1990, he was hired with financial support from the Madagascar Fauna Group for the position of Curator of Small Mammals at Parc Botanique et Zoologique de Tsimbazaza (PBZT).

While maintaining his position at PBZT, Nasolo not only completed his Masters degree in 1992 but also received the 1992 Conservation Award from the American Society of Primatologists. He persisted in developing his expertise by attending additional Ecology and Biology courses at the International Center for Conservation Education and the University of Aberdeen in the United Kingdom. During the same year, Nasolo successfully completed the "Captive Management and Breeding of Endangered Species" summer program at Jersey Wildlife Preservation Trust and further biology courses at the Durrell Institute of Conservation and Ecology (DICE) at the University of Kent. After witnessing such determination and dedication, it was not at all surprising that he began a Ph.D. project in 1994 with Dr. Elke Zimmermann from the German Primate Center, Deutsches Primatenzentrum (DPZ).

What made Nasolo exceptional amongst his peers was his degree of dedication

and true love for the environment of Madagascar. He was an incredibly hard worker, and there were many days he seemed like he would drop from lack of rest. However, this never stopped him from smiling and joking around, nor did it deter his self-motivation or commitment to the environment.

During Nasolo's university time and work at PBZT, he provided organizational and scientific assistance for numerous surveys and field projects throughout Madagascar. Nasolo quickly became a valuable scientist and provided expertise to researchers from Conservation International, World Wildlife Fund, The Smithsonian Institution, and Universities at Aberdeen & Cambridge UK, Osaka Japan, and Zurich Switzerland. Nasolo's field work, professional publications and scientific capabilities helped to bring scientific credibility and recognition to PBZT.

More recently, Nasolo's field work involved collecting behavioral and acoustic communication data for his Ph.D thesis on nocturnal lemurs. He had worked diligently on the physiological ecology of *Cheirogaleus* spp. and later began focusing on researching *Microcebus* and *Lepilemur* spp. To facilitate his field work, Nasolo completed an exchange program in Germany made possible by a scholarship from Deutscher Akademischer Austausch Dienst (DAAD). This trip included a visit to the German Primate Center, DPZ, to develop bioacoustical, behavioral and statistical methods for use in Madagascar.

While in Germany, Nasolo also visited several zoos to gain experience and expertise which could be useful at PBZT. Although he visited many primate collections, Nasolo was very interested in training at Zoo Duisburg with Achim Winkler, EEP species coordinator for the fossa (*Cryptoprocta ferox*). At the time of Nasolo's death, he was developing a collaboration between PBZT and Zoo Duisburg to successfully exhibit and breed fossa at Parc Tsimbazaza. Through assistance provided by biologist Martina Thelen and Zoo Duisburg, Nasolo was enthusiastic about a future fossa program at PBZT. In memory of Nasolo and in appreciation of his friendship and dedication to Madagascar's environment, we at PBZT with the continued assistance from Martina Thelen will continue Nasolo's work in an attempt to make his fossa project a reality.

Dean Gibson

Madagascar Fauna Group
Antananarivo, Madagascar
email indri@bow.dts.mg

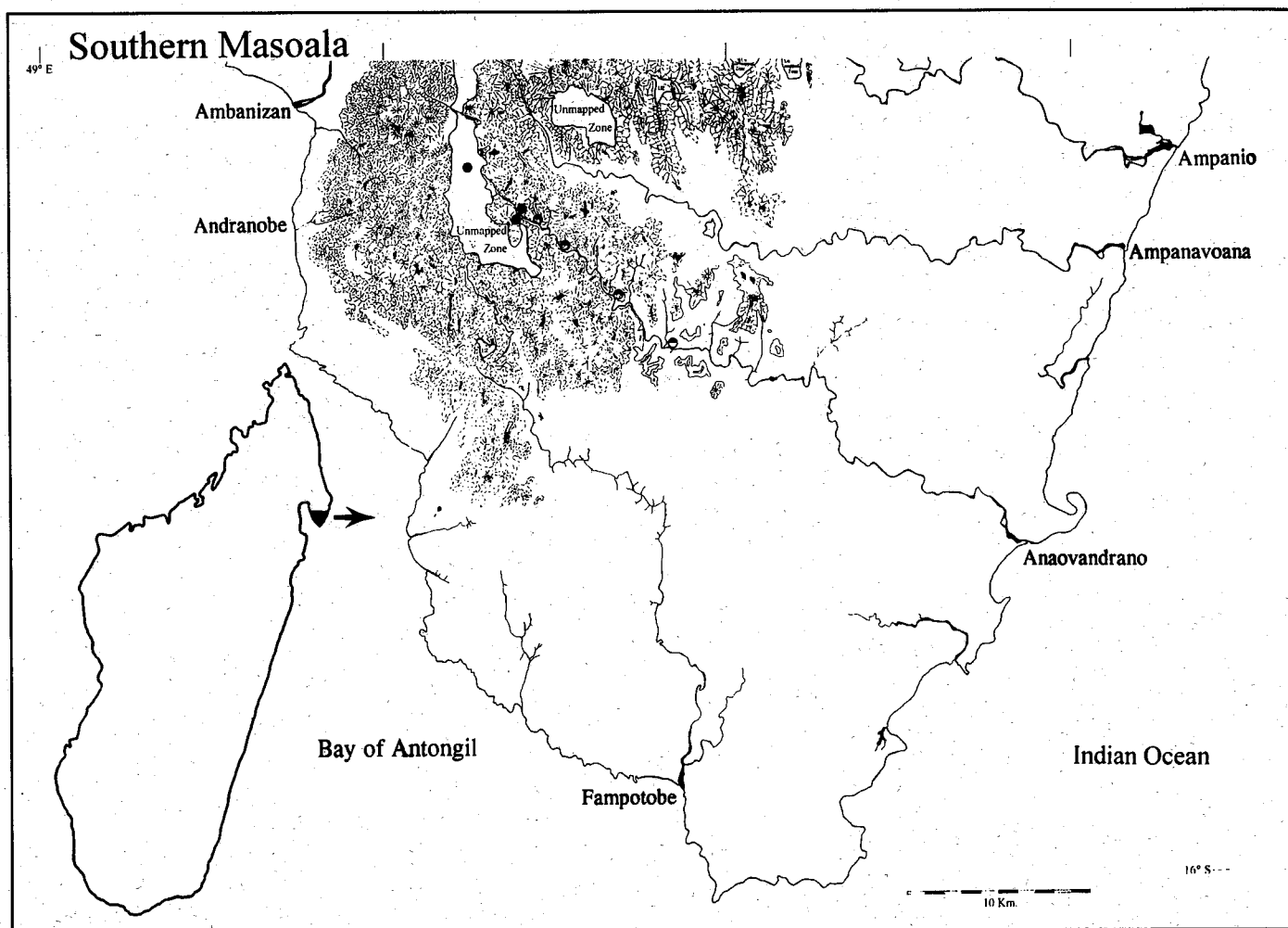
ARTICLES

Clinging to Life: *Varecia variegata rubra* and the Masoala Coastal Forests

During my 17 month stay in Madagascar (October 1993 to February 1995) to study the ecology and behavior of *Varecia variegata rubra*, the red ruffed lemur, and *Lemur fulvus albifrons*, the white fronted lemur, I made a series of visits to coastal and riverine forests and villages on both the east and west sides of the Masoala Peninsula. I spent most of my time in the Andranobe Watershed where I conducted my study. I also surveyed the Anaovandrano Watershed, the least accessible region of the southern Masoala Peninsula (Vasey, 1995a). I learned a great deal from my Malagasy friends and acquaintances in the region about their way of life. From my visits to local forests, I learned first hand about human utilization patterns. One thing that naturally interested me was human impact on local lemur populations. Here I provide an informal report on some of my research and on the conservation status of *V.v.rubra*.

Factors that threaten all Masoala lemur species with extinction is habitat loss and hunting. These conditions are the most serious for *V.v.rubra* which is heavily hunted and occurs only on the Masoala Peninsula and just to the north of it. To this species benefit however, is its great population growth potential relative to other lemurs. *V.v.rubra* bear between one and five infants, most commonly twins or triplets. Thus, they have vibrant population growth where adequate habitat exists and where they are not heavily hunted, conditions found at Andranobe. However, the latter conditions are exceedingly rare in the remaining coastal forests of the Masoala Peninsula. Pressures on the land and on the local people are great, and traditions die hard.

On the Masoala Peninsula, new land is converted daily to tavy (slash and burn agricultural plots) because of the growing need for new households and village expansion in recent decades. Burning takes place between October and December. Lemurs are hunted annually between June and August, but also in May and September in at least two ways: traditionally, via traps set up across *laly* (narrow swaths of cut forest sometimes up to a kilometer long), and with rifles, usually provided by entrepreneurs in nearby towns who then sell lemurs to local markets, other towns, or other cities. On the Masoala Peninsula, many entrepreneurs are



Map of the southern half of the Masoala Peninsula with selected features illustrated. Watersheds are labeled. Rivers — solid lines; terrain 300 m elevation and higher — broken contour lines; terrain 200-300 m elevation in the Anaovandrano Watershed — solid contour lines; temporary shelters — half-filled circles; cleared forest and shelters — solid circles. Most land less than 300 m in elevation and 20 degrees in slope on the Masoala Peninsula is already highly fragmented, and therefore it is no longer a viable option to conserve it. The Anaovandrano Watershed is exceptional in that it still harbors virgin low elevation rain forest. The Andranobe Watershed is exceptional in that it still harbors virgin coastal low elevation rain forest. Map by Natalia Vasey.

partially of Asian extraction - the locally self-identified "meti-chinois". I ate in their restaurants and bought supplies from their local businesses each month so I knew many of them personally and befriended them. Generally, they are not shy or ashamed of their lemur hunting and utilization practices. They recognize that it is against the laws of the land, but laws against hunting lemur are traditionally un-enforced in the region, and therefore remote and abstract to them. This attitude also prevails in many local villages with which I am familiar. Hunting lemurs with rifles is probably the greatest threat to the survival of *V.v.rubra* since introduction of land management plans could probably reduce selective logging and the amount of land local people convert from forest to *tavy*, thereby permitting protected primary forest to remain standing.

I visited *laly* cut at Andranobe and in adjacent coastal valleys during the 1994 hunting season. I was told the Betsimisaraka wood cutters had made certain ones. The Betsimisaraka are employed in the region by local wood mills. Other *laly* cut within Andranobe forests were accomplished by local men from nearby villages. No effective deterrents to creating *laly* or *tavy* within proposed park lands existed at that time. Because of its rare status as relatively pristine coastal lowland rain forest and its vast species diversity and density, Andranobe is of high conservation priority and is included within the proposed park lands. The inability to protect tracts of forest may all be changing for the better soon. A friend recently sent word that the Masoala National Park was to be inaugurated on the 5th of June, 1996. This friend, Marie Berthine Razafindravao, has worked as a village nurse for the Masoala National Park Project since its inception in 1989 and is representative of how devoted many people working on the park project have been. It is hard to live and work in a remote bush village after growing up and being educated in the capital, just as it is hard to go looking for your study animals during the hunting season not knowing for certain if you will find them all. Some things were so hard

really, if you stopped to think about them. But I did not have much time, as my work load in the forest was enormous and there were fundamental survival issues to distract me. It was a deluge of a year at Andranobe, over 5,000 mm of rain fell from January 1994 to December 1994 (Vasey, in prep). Now I am at work on my thesis and adjusting to life back in the developed world which often puts some issues out of mind. All this while though, I have been certain that red ruffed lemurs need immediate conservation action in order to survive, since sustainable development infrastructure in the region is established at a much slower pace than the rate at which natural habitats are being converted via *tavy*, *laly* and rifles. Red ruffed lemurs are clinging to life, clinging to survival.

The results of my survey of the Masoala interior (Anaovandrano Watershed — see map), are not heartening. *V.v.rubra* do not appear to be that dense there, at least not as dense as in the remaining west coast forests at Andranobe. They may be patchily distributed, as patchily distributed as some of their forest resources perhaps (Vasey, 1995a; in prep). They appear to be reliant on a variety of large trees. These tree species may not necessarily be rare in the forest, but large mature individuals of some species (i.e., *Canarium madagascariensis*) are rare to absent in some forests due probably to geographic floral variation or selective logging. It may be that *V.v.rubra* flourishes best in coastal rain forests where there is lots of natural habitat disturbance and re-growth. Ecologically, *V.v.rubra* appears to be a primordial rain forest beast, highly tuned to seasonal and annual variation in climate (e.g., rainfall, temperature, cyclones) and the distribution of preferred foods, as well as their own reproductive events (Vasey, 1995b, 1996a; in review). They do not have the resiliency to inhabit a wide variety of habitats such as their sympatric relation, *L.fulvus*, species of which form a ring around the entire island and inhabit a wide array of habitats.

In summary, much of the lemur news I have reported here is sobering, but I would say the cup is half full, not half empty. Research and conservation in the region has had humble, and sometimes small scale beginnings, such as my own establishment of a study site for the Masoala lemurs. Much has been learned and advances have been made, both from mistakes and successes. And now, thanks to the efforts of innumerable individuals, the establishment of a National Park seems certain, making the protection of many unique and endangered plants and animals more secure. The coastal study site I established has great potential for long term demographic and ecological study of lemurs and other arboreal animals for a variety of reasons: a number of *V.v.rubra* and *L.f.albifrons* individuals are marked, a trail system has been installed and mapped, *V.v.rubra* and *L.f.albifrons* feeding trees have been permanently marked, and by last word, Andranobe is now officially protected. I encourage anyone contemplating work in the area to make use of the established infrastructure and the baseline data my assistants and I collected.

Natalia Vasey

Department of Anthropology, Washington University
St. Louis, Missouri 63130
phone (314) 726-5524, fax (314) 935-8535
email nvasey@artsci.wustl.edu

References

- Kremen, C et al. 1995. Proposition des Limites du Parc National Masoala. PCDI Masoala, unpublished document.
- Vasey, N 1995a. Human Resource Use and Habitat Availability for Red Ruffed lemurs (*Varecia variegata rubra*) in the Anaovandrano River Watershed. In: Patterson BD, Goodman SM, Sedlock JL (eds): Environmental Change in Madagascar. Chicago: Field Museum, p 36.
- Vasey, N (in prep) Community Ecology and Positional Behavior of Two Living Fossils, *Varecia Variegata Rubra* and *Lemur Fulvus Albifrons*, on the Masoala Peninsula, Madagascar, PhD Thesis, Washington University.
- Vasey, N (in prep) How many red ruffed lemurs are left? A survey in the Masoala Peninsula interior and estimates of *V.v.rubra* population density and effective population size.
- Vasey, N 1995b. Ranging Patterns, community size and community organisation of red ruffed lemurs, *Varecia variegata rubra*, at Andranobe, Masoala Peninsula, Madagascar. In: International Conference on the Biology and Conservation of Prosimians Abstracts, Chester Zoo, 1995.
- Vasey N 1996. Feeding and ranging behavior of red ruffed lemurs (*Varecia variegata rubra*) and white fronted lemurs (*Lemur fulvus albifrons*). Am J. Phys Anthropol 22: 225.
- Vasey, N (in review) Social Structure, Ranging Pattern, and Social Organisation of *Varecia variegata rubra* and Implications Concerning its Breeding System. Folia Primatol. (Special Edition covering the International Conference on the Biology and Conservation of Prosimians, Chester Zoo, England, 1995.)

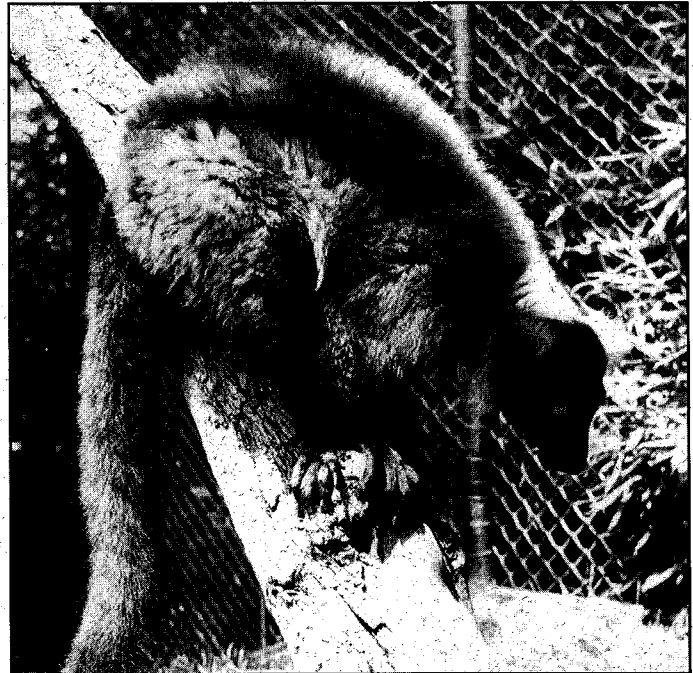
Red Ruffed Lemur (*Varecia variegata rubra*): A Rare Species from the Masoala Rain Forests

The Masoala peninsula is isolated: there are no roads or bridges, it has the worst weather of Madagascar (250 days of rain for a total of 4200 mm each year), and the transportation of material is very arduous and unsafe. This explains why only a few, generally short term, studies have been carried out by primatologists on Masoala. On the other hand these very reasons have contributed to keep human population density at relatively low levels when compared to other regions of Madagascar. In the last forty years the forest of the flat eastern side of the peninsula has disappeared (Green and Sussman, 1990). Until recently, restrained human activity and the hilly nature of the central and western parts made possible the survival of a substantial portion of the original forest together with that of many botanical and animal species. At the present rate of clearance, however, this good fortune could not last for long, and rare species like red ruffed lemurs (*Varecia variegata rubra*) could disappear with their unique and restricted habitat very quickly.

The black and white, and the red ruffed lemur are the two subspecies of the monospecific genus *Varecia*. In *Lemurs of Madagascar: An Action Plan For Their Conservation*, the red ruffed lemur (*Varecia variegata rubra*), the rarer of the two subspecies, is listed in the highest priority rating for conservation action. Its habitat is restricted to the Masoala peninsula east of the Antainambalana river and it does not occur in any protected area (see photo). How many red ruffed lemurs live on the Masoala peninsula? Only very few investigations have been carried out, giving only a partial view of the conservation status. Information is too incomplete to attempt an estimate on the population size of this species in its area of distribution.

Between December 1990 and December 1991, I carried out a field study in the

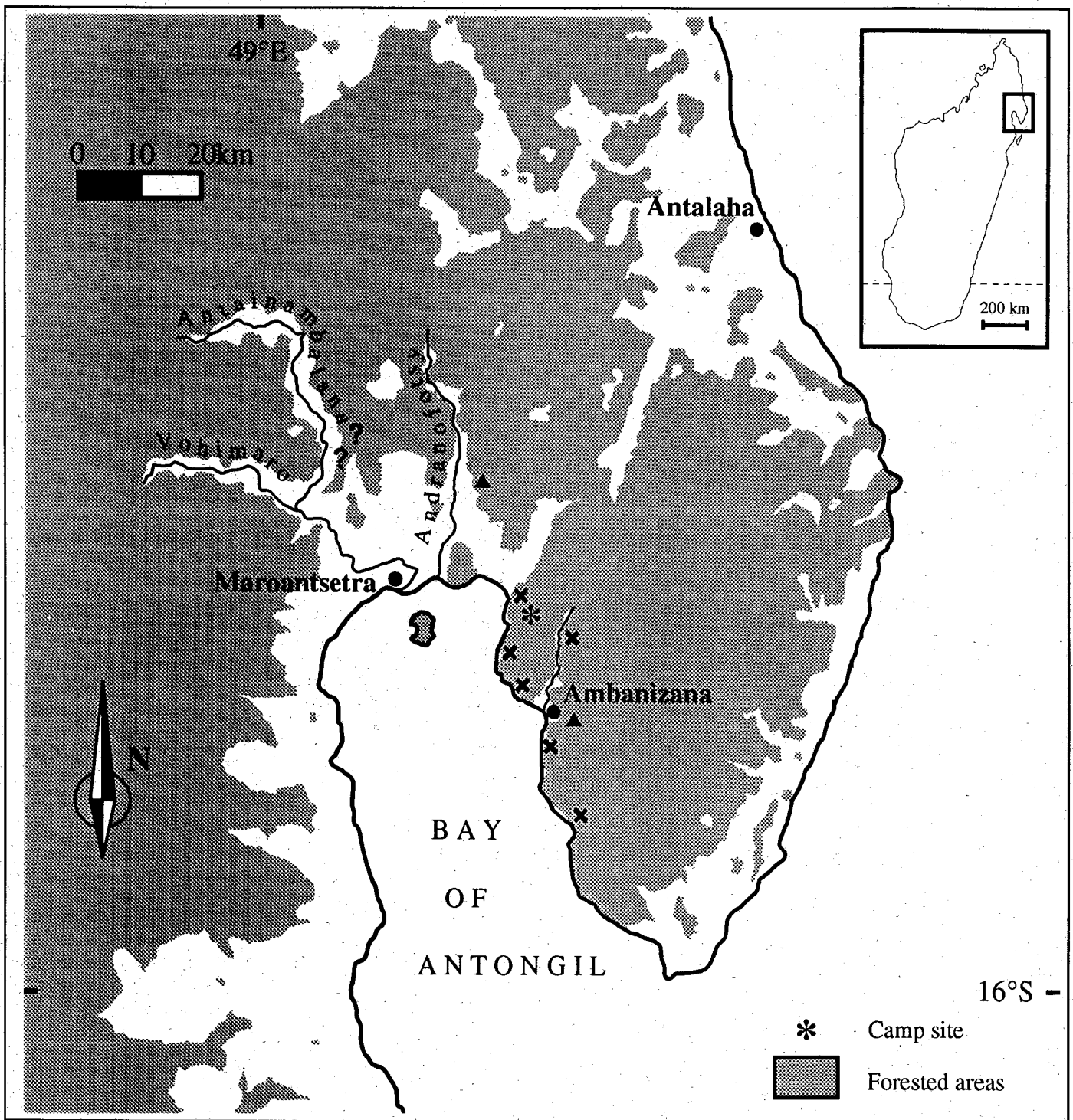
rain forest of the Ambatonakolahy mountain, the sacred rock, that had as its objective the determination of red ruffed lemur home range size, habitat use, and diet. Two groups of these lemurs were followed, and 704 hours of systematic observation were collected. The first group, composed of five individuals, covered a home range of 23.25 ha, the second group of six occupied a home range of 25.75 ha. The population density of red ruffed lemurs calculated from these home range sizes was 46 animals per square kilometer. This is an overestimate since large portions of forest were uninhabited by any group. I have calculated that a realistic estimation of their density in the Ambatonakolahy forest would vary from 20 to 25 individuals per square kilometer. Between the Antainambalana and Andranofotsy



The red ruffed lemur (*Varecia variegata rubra*) from the Masoala Peninsula. Photo by Marco Rigainonti.

local people refer to the presence of red ruffed lemurs. In 1986, Simons and Lindsay spent six days in two localities on the eastern bank of Antainambalana river (see map, page 10) but "could not confirm their presence". If living in this area they probably occur at very low densities (Simons and Lindsay, 1990). In the same year, I inspected the left bank of Antainambalana river but I did not hear a single red ruffed lemur call. I observed these lemurs in six sites all along the western side of the Masoala peninsula, but if 15-20 years ago they were common in the forest near the sea, as local villagers say, today it is necessary to search for them inland. I visited some of these places in 1986 and again in 1991 when I noticed everywhere a growth in human activity and an increased number of tavy plots (slash and burn agriculture). This situation is particularly evident North of Ambanizana. From the top of the Ambatonakolahy mountain on a clear day of December, I counted eleven smoke columns rising from new tavy scattered along the coast. In 1986, in the forest east of the Andranofotsy river valley groups of *V.v.rubra* were seen and heard by Simons and Lindsay. These observations confirm that red ruffed lemurs are still found quite uniformly on the western side of the peninsula. The situation, however, has not been documented for the interior.

For ruffed lemurs habitat destruction, trapping and hunting are the main dangers. The tavy technique, the traditional and difficult way to scrape a living from this inhospitable land, was sustainable when human density was low and families could rotate a dozen tavy plots with a very slow turnover, causing minimal damage to the forest. Today, however, human density is growing very fast. Centers like Maroantsetra, Ambanizana expand with exponential speed and human impact is becoming too intense to be supported by the forest which is rapidly being overcome, especially in river valleys and on the coast. Generally, where new isolated tavy plots are cleared far from villages, the surrounding forest is not heavily damaged as in the case of selective logging. Tavy agriculturists normally cut down *Vontro* sp. and *Ravinala* (*Ravenala madagascariensis*) for shed construction, or *Bilahy* (sp.) for *betsabetsa* preparation, but large trees are not felled outside the tavy plot. This may account for the information reported by Simons and Lindsay, and also remarked on by local people, that red ruffed lemurs normally come to the borders of tavy plots. Where they are not habitually hunted these



Map of Masoala Peninsula showing the remaining forested areas and the sites inspected by the Simons-Morland and Lindsay and by the author between 1986 and 1991. Map by Marco Rigamonti.

lemurs are not particularly afraid of man, and this makes them very vulnerable. On the other hand, when compared to other species, *Varecia* is reported to be very sensitive to habitat disturbance which occurs when large trees are selectively logged (Wright and White, 1990). This is in accordance with the high dependence on large trees recorded in the Ambatanakolahy forest where these lemurs preferred large feeding trees (mean dbh = 59.8 cm). The first step in the process of habitat disappearance is forest fragmentation, with primary forest persisting in patches only on the steepest slopes. In such a situation, the species is threatened by the absence of genetic exchange between isolated populations. In this process, rivers, especially when navigable by pirogues, play a key role as the best means of forest penetration by humans.

Another major threat to red ruffed lemurs is trapping. In three sites out of the six that I visited on Masoala I found traps. Traps are very efficient at catching

Eulemur fulvus albifrons. In the Ambatanakolahy forest this species was often active on the ground and in the lower layer of the forest. During the study period, red ruffed lemurs spent nearly 50% of their time between forest canopy (over 20 meters) and emergents (over 30 meters). I never saw them on the ground. On two occasions, however, they were observed coming down to 8 meters from the ground to reach small fruiting trees. Attracted by the food placed in the traps, red ruffed lemurs may leave the upper layers of the forest for a rendezvous with death. The capture of lemurs is practiced mainly with traps, but the trend of going to the peninsula for a hunting weekend has spread disturbingly among high class rifle owners from surrounding towns. In my opinion, an education program in coordination with a wider multidisciplinary project would be the only possible approach to rectify this habit.

My field assistant Pallote, wrote me in 1993 about a trek he made in the study

area. He could not find Luna, Chossette, Oro or any of the other lemurs of the study groups because, as he discovered, they had been killed by poachers. A protected area to preserve red ruffed lemurs is badly needed, and should include tracts of forest with abundant tree species which have been found to be particularly important in their diet, or as sleeping trees, like the high Ramy (*Canarium madagascariensis*). Two Moraceae, Amotana (*Ficus lutea*) and Nononsay (*Ficus reflexa*), seemed to be particularly important at Ambatonakolahy, as they accounted for 58.3% of all observations of fruit eating (Rigamonti, 1993).

The demarcation of the borders of a new national park on the Masoala peninsula has been the objective of a three-year project (1993-1996) conducted by Claire Kremen and Vincent Razafimhatratra. Sponsored by Wildlife Conservation International and Care International, Kremen and Razafimhatratra have been carrying out biological monitoring while also taking an inventory of the peninsula's flora and fauna. Within the context of this project Adina Merenlender has been working to better understand the impact that people are having on *Varecia variegata rubra* and has been examining the effects of selective harvesting. All prerequisites have been met for the National Park of Masoala, where *V.v.rubra* and many other species will be free to live, and we hope that the initial approval of the project will be passed into law soon.

Marco M. Rigamonti
Centro di Primatologia HSR
Via olgettina, 60
20132 Milano
Italy
phone (2) 26433651, fax (2) 26415202

References

- Donque, G., 1972. The climatology of Madagascar, in: Battistini, R. and Richard Vindard, G., Biogeography and Ecology in Madagascar. Junk ed. The Hague. 87-143.
- Simons, H.J., Lindsay, N.B.D., 1987. Survey work on ruffed lemurs (*Varecia variegata*) and other Primates in the northeastern rain forest of Madagascar, *Primate Conserv.* 8:88-91.
- Green, G.M., and R.W. Sussman, 1990. Deforestation history of the eastern rain forests of Madagascar from satellite images. *Science*, 248:212-215.
- Rigamonti, M.M., 1993. Home range and diet in red ruffed lemurs (*Varecia variegata rubra*) on the Masoala peninsula, in Lemur Social Systems and Their Ecological Basis, Ed. Peter M. Kappeler and Jorg Ganzhorn, *Plenum Press*, New York.
- Wright, P.C., and White, F.J., 1990. The rare and the specialized: conservation needs of rain forest primates in Madagascar, *Am J. Phys Anthropol.* 81(2): 320. (Abstract).

Projects at Ivoloina and Betampona in Eastern Madagascar

On Madagascar's east coast near the port city of Tamatave, an old botanical garden holding facility for confiscated lemurs and tortoises has been rehabilitated into a regional conservation center. The Ivoloina Zoological Park is administered by Madagascar's Water and Forests Department (DEF), and since 1987 has been the focus of a collaborative effort between DEF, the Madagascar Fauna Group (MFG) and the Duke University Primate Center (DUPC). As representatives of the MFG and the DUPC and with support also from Wildlife Preservation Trust international and private donors, Andrea Katz and Charles Welch have spent most of the last eight years working at Ivoloina with DEF personnel to develop a center with sustainable programs of captive breeding and research on endangered eastern forest fauna, conservation education for zoo visitors and local school groups, training for Malagasy staff and students, studies leading to the reintroduction of captive-bred lemurs to protected areas.

What was once nothing more than a collection of a few cages in disrepair and closed to the public, has been transformed into a proper zoological park that is very capably run by its hard-working Water and Forests staff. New construction and renovations have been completed with lemur and reptile enclosures, a zoo kitchen, veterinary building, office, education pavilion and concession stand. The zoo borders a rehabilitated lake that surrounds a peninsula on which groups of free-ranging lemurs have been released. Priority lemur species now housed at Ivoloina include the aye-aye (*Daubentonia madagascariensis*), ruffed lemurs (*Varecia variegata*), blue-eyed lemurs (*Eulemur macaco flavifrons*) and red-bellied lemurs (*Eulemur rubriventer*). In addition to other lemur species, radiated tortoises (*Geochelone radiata*) and tree boas (*Sanzinia madagascariensis*) are now exhibited at Ivoloina. The zoo has been open to the public since 1989. It is open daily and modest entrance fees are charged. T-shirts, posters, and local crafts are sold, and profits are deposited into a zoo maintenance fund.

As an extension of Project Ivoloina, activities are also underway at the nearby Natural Reserve of Betampona which has been identified as a potential site for the experimental restocking of the black and white ruffed lemur (*Varecia variegata variegata*). Surveys of lemur populations in Betampona suggest that a maximum of 35 ruffed lemurs inhabit this small (2,228 hectares), isolated reserve. In 1993-95, work in the reserve was done to determine ruffed lemur resource and habitat utilization and availability, to monitor the resident population, and to identify suitable sites for release of captive-bred individuals. Additionally, health and genetic analyses of the resident ruffed lemur population are underway.

In June of 1996, Ivoloina staff were highly honored to receive a Sunday afternoon visit from the President of Madagascar, Zafy Albert, his wife, and a group of other dignitaries. The delegation was given a tour of Parc Ivoloina, and samples of the Parc's gift items and educational materials.

Charles Welch
Technical Advisor, The Madagascar Fauna Group
Service Provin. des Eaux et Forets
B.P. 416
Toamasina 501
Madagascar

The significance of Infectious Diseases on Reintroduced Populations — Medical Evaluation Procedures of *Varecia* to be Released at Betampona

The significance of infectious diseases for reintroduced populations of endangered species has become a major focal point in recent years. Veterinarians involved with reintroduction programs are attempting to determine what health parameters are significant, and what impact they will have on reintroduction programs.

There are many factors that must be taken into consideration. The health status of both the resident wild populations and the captive, to be released populations, must be evaluated. Surveys of disease incidence in the wild population must be done to determine what the "normal" population is exposed to. A similar survey must be accomplished in the captive population to determine if the potential deleterious effects of the disease are more significant than the benefit of the reintroduction of the animals. Such an evaluation was designed and carried out by Randall Junge, DVM, Staff veterinarian St. Louis Zoological Park, and veterinary advisor to the Prosimian TAG, for the release project for *Varecia* at Betampona Nature Reserve. This evaluation was carried out in November 1993. The evaluation consisted of collection of blood, stool specimens, and cultures from the captive *Varecia* at Parc Ivoloina in Tamatave, and was to include samples from wild *Varecia* resident at Betampona and a second population on the Masoala Peninsula. Both of these wild populations were subjects of field research projects, and medical samples were to be collected opportunistically as animals were captured for other purposes. Screening included viral and bacterial diseases and parasites, as well as general health status. As with other reintroduction programs, the goal was to detect any potentially catastrophic diseases that the captive population may carry into the wild when released. Of equal importance is to determine the normal disease exposure of wild animals, so that the released animals can be appropriately conditioned.

The results of this study will be published in an upcoming issue of *Primate Conservation*. Briefly, neither population (captive or wild) exhibited evidence of significant disease problems, although the captive *Varecia* appeared to be in a suboptimal plane of nutrition. Unfortunately, no wild *Varecia* were captured at Betampona; the four samples from the wild were all collected in the Masoala area.

Randall E. Junge
Staff Veterinarian
St. Louis Zoological Park
Forest Park
Saint Louis, Missouri 63110
phone (314) 647-7969, fax (314) 647-7969

Translocation and Introduction of Prosimians in Madagascar

Active conservation refers to many different methods of arresting forest loss and degradation, protecting wildlife, developing agricultural schemes, creating educational programmes and instituting new legislation, but in the field of the management of wild animal populations one often regards introduction, rehabili-

tation, reintroduction, restocking and translocation as active conservation techniques. In this paper only translocation is discussed, although in Madagascar this form of management has a short history. There has been only one translocation planned for conservation purposes, that of *Daubentonia madagascariensis* in 1966. There have been other translocations for the purposes of behavioral studies, and accidental translocations have occurred when pets have escaped. The need for active management is obvious given that all of Madagascar's primates are endemic and the majority are endangered, but there are some problems to be considered.

Translocation as a mechanism for wildlife conservation is a complex issue. As it has been reviewed by previous authors, including IUCN (1968), Brambell (1977), Anonymous (1979), Campbell (1980), and Caldecott and Kavanagh (1983), only a summary of its use in Madagascar is presented here. When species or subspecies are in danger of local extinction because of intense hunting and habitat loss, movement of this population to another area may help its survival. Such was the case for the translocation of *Daubentonia* in 1966. If there are surplus stocks in captivity or if a species is bred in captivity for the specific purpose of reintroduction, then active management in its native habitat is called for. If a suitable empty niche is found for a new population, then translocation may be feasible. Further, when a local population is threatened with inbreeding because of its isolation and low numbers, new individuals could be introduced to add genetic variability and relieve immediate pressures on the population. Other reasons for translocation stem from education, economics, science (behavioral studies), compassion, religion or natural heritage (Caldecott and Kavanagh 1983). In 1984, a translocation of *Eulemur macaco* and *Eulemur fulvus* was carried out; several individuals were released into a small forest on Nosy Be, an island off the northwest coast of Madagascar (Albignac and Koenders, pers. comm.). This was followed by a short behavioral study and the eventual escape and loss of some of the individuals. In the south of Madagascar, several *Eulemur fulvus collaris* were translocated for reasons of compassion from their eastern rain forest habitat, via local markets, to the deciduous forest at Berenty Reserve (80 km distant) in an effort to save some individuals from harassment and death (de Heaulme pers. comm.). In addition, in 1994, a family group of *Lemur catta* was translocated 7 km from one forest block at Berenty Reserve to another at Bealoka, to restock the population in the latter (Crowley, pers. comm.)

In Madagascar, although there are certainly lemur populations threatened with local extinction, little effort has been put into translocation, aside from those occasions mentioned above. This is partly a result of the continual presence of local pressures, i.e., habitat loss and hunting, in most forested areas. There have been other obstacles as well, not the least of which were financial and, for several years between 1975-1982, the lack of international conservation attention. Other problems include the risk of moving diseased populations (either captive or wild) into "clean" areas, and the risk of hybridization if two subspecies come into contact. Berenty provides an example of hybridization resulting from a translocation where two subspecies of *Eulemur fulvus* (*Eulemur fulvus rufus* and *Eulemur fulvus collaris*), neither of which naturally occur there, have been brought together (O'Connor 1987). Feasibility studies, including genetic, behavioral and demographic aspects, to determine the need for active management of a lemur population and the suitability of an area for translocation, will help ensure the success of such projects, although some have been completed without these studies. This is true for the translocation of *Eulemur fulvus albifrons* and *Varecia variegata variegata* onto the island of Nosy Mangabe in the 1930's (J. J. Petter pers. comm.; Petter and Peyrieras 1970). These movements were arranged by a French regional administrator and both species reacted very favorably and now occur in high density on the island.

Why, then, has there been little active management in Madagascar? As mentioned earlier, one problem is that habitat degradation and destruction continue at an alarming rate and hunting is still prevalent, although there are protected areas available (five National Parks, eleven Reserves Naturelles Integrales and twenty-three Reserves Speciales, totaling approximately 1,100,000 ha (ANGAP, in litt.). Many of these are inadequately staffed, lack funds and, in certain cases, lack the interest of administration, guards and the local people. Some of these areas are protected by their inaccessibility, but this factor makes feasibility studies and the practical aspects of conservation management very difficult. Nevertheless, certain areas are being considered as potential sites for introduction and translocations. These sites include Bealoka forest (for the translocation of *Lemur catta* and *Propithecus verreauxi verreauxi*), Lokobe Reserve (for the translocation of *Daubentonia madagascariensis*) and an unnamed island off the coast of Antsiranana (for the translocation of *Propithecus diadema perrieri*) (Albignac, Petter and Visage, pers. comm.; O'Connor 1987). This last translocation is being considered in order to "save" the subspecies. Another principle reason for the lack of reintroduction/translocation schemes in Madagascar is that stocks from captive breeding are not available for many species. Endangered species and subspecies include: *Daubentonia madagascariensis*, *Propithecus diadema* (all subspecies), *Allocebus trichotis*, *Haplemur simus*, *Haplemur aureus*, certain *Propithecus*

verreauxi subspecies, *Eulemur rubriventer* (unknown status), *Varecia variegata rubra* and *Indri indri*. Of all these species or subspecies, only *Varecia* has a recognizable captive population and few of the others are kept in captivity except for *Propithecus verreauxi* var. *majori*, *Propithecus verreauxi coquereli*, *Daubentonia madagascariensis*, *Haplemur aureus*, and *Eulemur rubriventer*.

None of these species are represented in captivity in large numbers. Therefore, for all except *Varecia* there are not large enough captive stocks from which to reintroduce or translocate animals. These species may be at such critically low numbers in the wild that translocation itself could be dangerous if the entire population were not moved or if the population incurred any losses due to accidents. These species typically have very limited ranges so that finding suitable habitat may be difficult. Nevertheless, one can take the translocation of *Daubentonia madagascariensis* as an example.



Aye-aye (*Daubentonia madagascariensis*). Photo by Mark Pidgeon.

The information concerning the translocation of *Daubentonia* comes from Andriampiana (1978) (in Constable et al. 1985), Petter (1968) and Petter and Peyrieras (1970). *Daubentonia* was not recorded in Madagascar between 1933 and 1957 and it was considered extinct due to habitat loss by slash-and-burn agriculture and because of the *fady* (bad omen) with which the local people associate it. *Daubentonia* is viewed as a herald of evil in some parts of the island, and may be killed as a result. After its rediscovery in 1957 by Petter and Petter-Rousseau, the Madagascar Government, with the aid of the World Wildlife Fund, created a special reserve at Mahambo where the species was known to have occurred. *Daubentonia* continued to suffer even in this reserve because of the latter's proximity to the main road to Toamasina, the principal port. In 1964, a new program to protect *Daubentonia* began, including a search for animals near villages in the eastern coastal rain forest and the translocation of nine individuals to a new reserve on the uninhabited island of Nosy Mangabe. Four females and five males were released in 1966. Although this translocation lacked intensive

feasibility and follow-up studies, the immediate necessity of moving animals in view of their imminent extinction took precedence. More recently, animals have been seen on Nosy Mangabe, although it is likely that the same individuals (two or three) were observed each time (Bloxam, Nicoll and Richard pers. comm.; Bomford, 1981; Kemp, 1983; Constable *et al.* 1985). There are more signs of *Daubentonia* on other parts of the island (Bemandine, pers. comm.), and the total population on the island is believed to be around 30 individuals (Sterling, 1993). Recently, signs indicate that the species also occurs on the mainland more widely than formerly believed (Bemandine, Ganzhorn, Lanting, Randriansolo, Ratsirason and Visage, pers. comm., Sterling and Feistner, 1995). Fortunately, *Daubentonia* is known to be adapted to living in such varied habitats as primary lowland rain forest, secondary forest, coconut, mango or lychee plantation as well as in captivity (Petter 1977; Tattersall 1982). On the other hand, if the area is being degraded or if hunting still occurs, the habitat is probably not suitable. The lack of a long history of active conservation management in Madagascar should not affect the future of such programmes providing they are well-researched before and after their execution. My own study (O'Connor, 1987) involves the possible translocation of *Lemur catta* and *Propithecus verreauxi verreauxi*. In the Mandrare river valley the population of each species has decreased drastically during the past fifty years with the onset of sisal plantations and increased local demands on riverine forests. Malaza forest (part of Berenty Reserve) and Bealoka forest (the site being reviewed) are the last sizeable tracts of riverine forests in the Mandrare valley (200 ha and 100 ha, respectively). Both of these forests are now protected by fences and guards. Although Bealoka forest has been degraded by the grazing of domestic livestock, it is likely that its future will be secure from this pressure and that the translocation of a small group of *Lemur catta* and *Propithecus verreauxi* will increase the genetic variability of the existing population and help counteract the pressures leading to the local extinction of these two species. In 1994, this proposed transfer of a whole family group of *Lemur catta* was undertaken.

Translocation can be a useful active management technique even though many problems must be overcome before its implementation. On the other hand, the priority for active management in Madagascar is the conservation of forests: entire ecosystems. If uncertainty and questions remain concerning the future of these forests, then translocation of a few species is not the answer.

I would like to thank the Government of Madagascar for permission to work in their country and specifically the Ministère de l'Enseignement Supérieur for their support of this project. I am grateful to the de Heaulme family for their hospitality and for the opportunity to work in Berenty and Bealoka. Further, this project would not have been possible without the financial commitment of Wildlife Preservation Trust International (WPTI) and the National Geographic Society.

Sheila O'Connor
WWF-Madagascar
BP 738
Antananarivo 101
Madagascar
phone and fax, (2612) 34888

References

- Andriampianana, J. 1978. La protection des lemuriens. Paper presented at Colloque Scientifique International Sur Les Lemuriens, Antananarivo. September 4-14, 1978.
- Anonymous. 1979. Reintroduction hazards. *Oryx* 15:80. Bomford, E. 1981. On the road to Nosy Mangabe. *International Wildlife* 11(1):20-24.
- Brambell, M. 1977. Reintroduction. *Int. Zoo Yearbook* 17:112-116. Caldecott, J. and M. Kavanagh. 1983. Guidelines for the use of translocation in the management of wild primate populations. *Primate Eye* 20-26.
- Campbell, S. 1980. Is reintroduction a realistic goal. *Conservation Biology* 263-269.
- Constable, I, R.A. Mittermeier, J. Pollock, J. Ratsirason and H. Simons. 1985. Sightings of aye-aye and red ruffed lemur on Nosy Mangabe and the Masoala Peninsula. *Primate Conservation* 5:59-62.
- IUCN. 1968. Problems in species introduction. *IUCN Bulletin* 2(7):70-71.
- IUCN. 1985. An Environmental Profile of Madagascar.
- Kemp, E. 1983. Baby aye-aye discovered in the wild. *WWF News*, March-April 22:8.
- O'Connor, S. 1987. The Effect of Herbivory by Domestic Stock on Vegetation and the Consequences to the Diurnal Primates of Bealoka Forest, Madagascar. Ph.D. Dissertation. University of Cambridge, Cambridge.
- Petter, J. J. 1968. Aye-Aye emergency programme. Madagascar-establishment and stocking of special reserve on Nosy Mangabe Island. In: *The Ark Under Way. Second Report of the World Wildlife Fund, 1965-1967*. Nos. 127 and 259:102-104.

- Petter, J. J. 1977. The aye-aye. In: *Primate Conservation*, H. S. H. Prince Rainer of Monaco and G. H. Bourme (eds.), pp.37-57. Academic Press, New York.
- Petter J. J. and A. Peyrieras. 1970. Nouvelle contribution à l'étude d'un lemurien Malgache, *Daubentonia madagascariensis*, I. Geoffroy. *Mammalia* 34(2):167-193.
- Sterling E.J. 1993. Behavioral Ecology of the Aye-aye (*Daubentonia madagascariensis*) on Nosy Mangabe. Ph.D. Dissertation. Yale University, New Haven.
- Feistner A.T.C. and E.J. Sterling (eds.) 1994. The Aye-aye: Madagascar's Most Puzzling Primate. *Folia Primatologica* 62:63, pg. 180.
- Tattersall, I. 1982. *The Primates of Madagascar*. Columbia University Press, New York.

Update on the Endangered Sifaka of the North

The extreme north of Madagascar contains two sifaka which are in the IUCN highest priority category for endangered primates: the golden-crowned sifaka (*Propithecus tattersalli*) and the Perrier's Sifaka (*Propithecus diadema perrieri*). Perrier's sifaka, also called the black sifaka, Perrier's simpona, or ankomba joby, has a total population estimated at about 2,000 individuals (Meyers and Ratsirason, 1989). During 1994 and 1995, while working for WWF at the Amber Mountain Project, I was able to gather more information on the current status of the Perrier's sifaka. Since 1988, there have been no significant changes in forest cover and hunting pressure, nor any indication of declining population numbers for the Perrier's Sifaka. This subspecies is still found throughout the Analamera Special Reserve and has recently been seen in the eastern part of the Ankarana Special Reserve. The total population estimate still remains valid at 2,000 individuals. The major threats remain brush fires, which enter and destroy forests, clear cutting in valleys, and low level hunting in the southern portion of the range.

The golden-crowned sifaka, also called Tattersall's sifaka or ankomba malandy, can be considered the most endangered of the Malagasy lemurs. Total numbers for the species are estimated at about 8,000 individuals (Meyers, 1993), but all populations are found in isolated forest patches and fragments. The largest estimated contiguous population totals about 2,500 individuals. With only one female and one male reproducing per year in each group (average size of 5 individuals), effective population size of this largest population is under 1000. Though these numbers appear "safe" for the moment, when they are considered together with the current conservation threats, the extremely endangered situation of this species is more obvious.



CI and SUNY at Stony Brook have produced a T-shirt with the images of the two endangered sifakas of northern Madagascar. Shirts were distributed from 1993 through 1995 and were very well received. The messages in local Malagasy dialect read: *Ankomba Joby Ala fongana fonenanay foana*, meaning "When the forest is gone, our home is empty"; and on the reverse, *Malandy Ambila zehe ho velogno*, meaning "Let us live!" Artwork by Stephen Nash.

The golden-crowned sifaka is not found in any protected area. Several attempts to create protected areas for the remaining transitional forests which contain this sifaka have been denied since they were perceived as a threat to uncontrolled gold mining in the area. Although hunting by the immigrant gold miners has been reported, respect for the existing *fady* (taboo) against hunting appears to predominate. Visits by the author in 1993 and by Russ Mittermeier and Fred Boltz in 1995 have found forest destruction and hunting by miners to be limited in extent. However, the potential for the rapid extinction of *P. tattersalli* remains since: 1) isolated populations are small, 2) continued immigration by various ethnic groups challenges the existing taboo, 3) no protected areas exist, 4) logging threats persist, and 5) to date, captive breeding has been unsuccessful.

The creation of one or several related protected areas or classified forests in the area can be negotiated among government, ANGAP and conservation NGOs in such a way that a compromise is found for forest conservation and gold exploitation. In a developing country such as Madagascar, balances are needed that satisfy the country's and the world's short and long-term needs. It is hoped that rapid exploitation for gold does not ultimately cause the extinction of one of the most recently discovered primate species.

David Meyers

Institute for the Conservation of Tropical Environments
SBS Bldg., 5th Floor
State University of New York
Stony Brook, NY 11794-4364
phone (516) 632-7813, fax (516) 632-7692
email dmeyers@datalab2.sbs.sunysb.edu

References

- Meyers, D.M. and J. Ratsirason, 1989. Distribution and conservation of two endangered sifaka in northern Madagascar: *Propithecus diadema perrieri*, Lavauden, 1931 and *Propithecus tattersalli*, Simons, 1988. *Primate Conservation* 10:81-86.
- Meyers, D.M., 1993. The effects of resource seasonality on the behavior and reproduction of the golden-crowned sifaka (*Propithecus tattersalli*, Simons 1988) in three Malagasy forests. Ph.D. Dissertation, Duke University, University Microfilms, Ann Arbor, Mich.

Pilot Study to Determine the Status of *Allocebus trichotis* in Madagascar

The Malagasy primate *Allocebus trichotis*, the hairy-eared dwarf lemur (see photo), is undoubtedly the least studied and possibly the rarest of all living primates. Since it was originally described by Gunther (1875), only a few museum specimens have been collected, and the majority of these before the turn of this century. Gunther described it originally as a new species of the genus *Cheirogaleus* but it was elevated to the rank of genus by Petter-Rousseaux and Petter (1967) to reflect the many features of the dentition and cranium that distinguish it from other cheirogaleids. Of the four museum specimens of *Allocebus* that are known to exist, only the one collected by A. Peyrieras in the forests near Mananara in 1966 is associated with precise locality data. The locality data for Gunther's type specimen is extremely vague stating only that the specimen was collected "between Tamatave and Morondava". There are no locality data for the two specimens collected by Humblot. Consequently, very little is known about the geographic distribution of *Allocebus* other than that it has occurred in the lowland-rain forests between Mananara and Tamatave.

Prior to 1989, it was thought very likely that this animal was extinct. Thus, my original field objectives were to determine whether *Allocebus* was still extant in Madagascar, to estimate the approximate densities and distribution of *Allocebus* populations, and to investigate its ecological requirements. In early spring of 1989, however, a research team led by Bernard Meier discovered two living specimens in the Biosphere Reserve located south of the Mananara river, thereby confirming the continued existence of *Allocebus* in Madagascar. Despite this significant discovery, the behavior and ecology of this animal still remain a mystery.

In September of 1989, I conducted surveys in the Mananara region in an effort to further understand the distribution and ecological requirements of this rare primate. My primary approach in researching the distribution, behavior, and ecology of *Allocebus* was to travel to villages that are located near large tracts of

primary forest (see map, page 15) and interview the president, governing council, and other residents of each village. In order to be assured that the villagers knew precisely which animal I was interested in, I circulated an illustration of *Allocebus*. Of the eight villages to which I traveled, only one had no residents with knowledge of *Allocebus* (Andapararibe). In each of the other seven villages, the men (particularly the older men) were familiar with *Allocebus* and were cooperative in giving me the Malagasy names for the animal and any other information that they possessed.

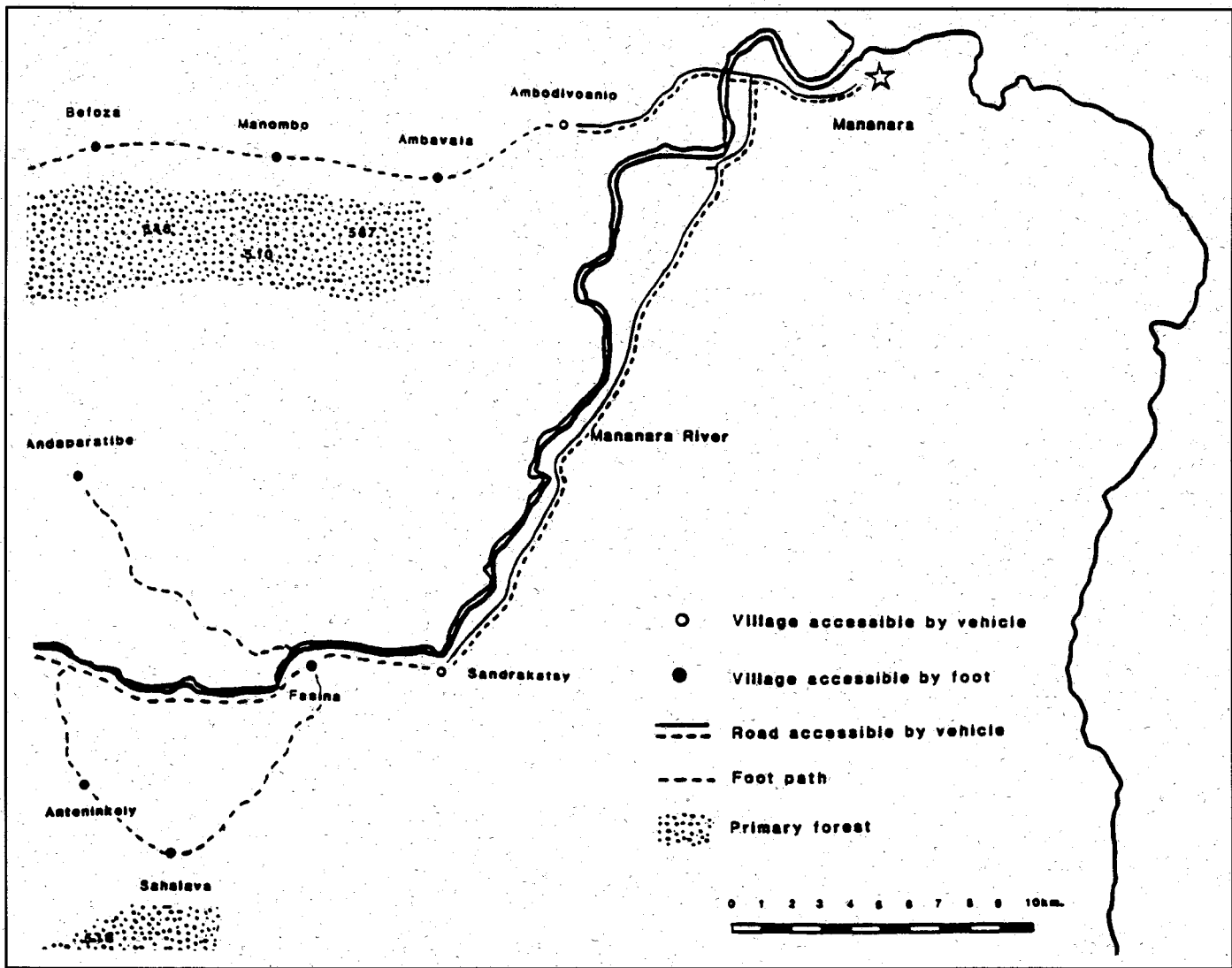
Sources from each village confirmed previous observations (Peyrieras, pers. comm.; Meier, pers. comm.) that *Allocebus* nests in tree holes. Indeed, in almost all cases, the villagers only encounter the animal in their practice of slash and burn agriculture (*tavy*) during the months of October through March, at which time they cut down the animals' nest trees. Consequently, my secondary approach was to conduct day-time surveys of the local forests by searching for and investigating any observed tree holes. In each village, I hired up to four guides to assist with these surveys so that we were able to comprise two teams. The surveys were conducted from approximately 0800 to 1800 hours for 25 days. Day-time surveys were augmented by occasional night-time surveys. The surveys were unsuccessful in locating *Allocebus*, however, which lends support to the universal opinion of the villagers that *Allocebus* hibernates for the entire "cold" season (early-May through mid-October).



The hairy-eared dwarf lemur (*Allocebus trichotis*) is undoubtedly the least studied and possibly the rarest of all living primates. Photo by Bernhard Meier.

Despite the fact that *Allocebus* was never observed in its natural habitat during the period of this preliminary survey, information was gathered in the context of interviews with the native Mananara people. Although any such information should be regarded with caution, most of it was verified by multiple independent sources. The Malagasy name for *Allocebus* was universally the same - *Tsidiala*, which means the *Tsidy* (= *Microcebus*) of the forest. This name reflects the similarity between *Allocebus* and *Microcebus* while at the same time recognizing their distinctions. Also, it seems to indicate that *Allocebus* is found only in primary forest.

The behavioral information that was collected indicates that *Allocebus* is a monogamous species. The animals are always found in single pairs (one male and one female) or in pairs with a single infant. The mated pair nests in small tree holes in either living or dead trees. The tree holes are usually three to five meters above the ground and nesting material of fresh leaves is associated with occupied tree holes. It is probable that *Allocebus* occurs in very low densities; the animals are encountered only on rare occasions, usually during the months from November to April. Although the teeth and nails of *Allocebus* suggest a gum-eating diet, the natives report a diet that consists of new leaves, small fruits and dirt. This information was communicated by several different sources, one of whom was a



Map of the Mananara region showing the villages and forests surveyed during this study. Elevations are given for the forests in which *Allocebus* is reported to exist.

guide who had examined the stomach contents of an *Allocebus* before eating the animal. The ubiquitous reports that *Allocebus*, like *Cheirogaleus*, hibernates for six months each year are intriguing. Even more surprising was the information that both of these animals hibernate under ground as well as deep within trees. Apparently, accounts of under-ground hibernation are common in Malagasy lore and may indeed be factual (Jolly et al., 1984).

The most discouraging aspect of the study was the discovery that *Allocebus* (as well as all of the other local species of primates) is being eaten by the natives. The forests are riddled with lemur traps of various descriptions. Each time a story of an *Allocebus* capture was recounted, it ended with the animal having been eaten. This combined with the rapid and progressive deforestation of the Mananara region, makes the long-term survival of *Allocebus* doubtful. There is clearly something unique and fascinating about the habits of *Allocebus*. We now know that the animal still exists in Madagascar yet it went undetected by western scientists for twenty years prior to 1989 and for the eighty years before 1966. This makes it remarkable scientifically and potentially fragile ecologically. That *Allocebus* occurs in such low densities and in such a restricted geographic area suggests that there is a limiting resource that is fundamental for its survival. Further steps must be taken to collect the ecological and behavioral data that are necessary to formulate a preliminary conservation strategy for the protection of this primate. In 1989, there were several *Allocebus* being held in captivity in Madagascar by Roland Albignac and some of his Biosphere colleagues. At that time, the animals appeared to be thriving, suggesting that captive breeding may be one alternative in the formulation of a conservation strategy for *Allocebus*.

This project would not have been possible without the cooperation and assistance of B. Andriamihaja and B. Rakotosamimanana of the Ministère de l'Enseignement Supérieur - Madagascar and P. Randrianarijaona of the Ministère de la Production Animale et des Eaux et Forêts — Madagascar. I would particularly like to thank F. Fanony and his family for their support and Josef Rasidy for his guidance and friendship. The help of P. Daniels, D. Meyers, and P. Wright was invaluable. J. Ryan furnished some essential field equipment and guidance. R. Mast provided me with useful advice during the formative stages of this project. Funds were provided by WWF-US and the Dououcouli Foundation.

Anne D. Yoder
 Department of Cell and Molecular Biology
 Northwestern University Medical School
 Chicago, IL
 ayoder@worms.cmb.nwu.edu

References

- Gunther, A. 1875. Notes on some mammals from Madagascar. *Proc. Zool. Soc. Lond.*, pp. 78-80.
- Jolly, A., R. Albignac, and J.J. Petter. 1984. The lemurs. In: *Key Environments: Madagascar*, A. Jolly, P. Oberle, and R. Albignac, eds. Pergamon Press, Oxford, pp. 183-203.
- Petter-Rousseaux, A. and J.J. Petter. 1967. Contribution a la systematique des Cheirogaleinae lemuriens malagache: *Allocebus* gen. nov. pour *Cheirogaleus trichotis* Gunther 1875.

Ankarana: Window to Madagascar's Past

Relatively little is known about the chronology of the extinctions of giant subfossil lemurs or about recent changes in the geographic ranges of extant lemur species. Whereas thousands of bones of extinct and extant lemurs have been found at Holocene cave, marsh, and streambank sites from the southern to the northern tips of Madagascar, many were excavated during the first third of the 20th century and distributed to museums in Europe and Madagascar. Their associations and contexts were often lost.

Recent paleontological and paleoecological research in Madagascar has begun to remedy this situation. One region in particular may allow documentation of changes in the local habitat as well as the composition of the fauna (Jungers et al., 1995). That region is the Ankarana Massif. Ankarana is a 300m high outcrop of Jurassic limestone which lies about 100 km south of the northern tip of Madagascar. The outcrop is literally riddled with caves, some of which are highly fossiliferous. Radiocarbon dates on specimens from different cave sites at Ankarana show that the subfossils sample diverse time periods (Simons, Burney et al., 1995). Some of these dates are older than any previously recorded for Malagasy subfossil lemurs.

Caves, in general, yield more complete skeletons than do swamps or open sites, and the remarkably complete extinct lemur skeletons found at Ankarana have been a boon to lemur paleontological research (Simons et al., 1990). Between 1986 and 1993, many hundreds of bones belonging to 15 or 16 species of lemurs (6 extinct and 8 or 9 extant) were recovered from the deposits of the caves of Ankarana. Ankarana rivals Ampasambazimba (a swamp site in the Itasy Basin to the west of Antananarivo that was excavated in the early 1900's) in paleontological richness. But unlike Ampasambazimba, which is today devoid of lemurs, Ankarana's forests have remained sufficiently intact for at least ten lemur species to survive until the present day (Wilson et al., 1989, Hawkins et al., 1990).

By far the most common subfossils in the caves of Ankarana are *Hapalemur simus*, which survives today only in the eastern rainforest (Godfrey and Vuillaume-Randriamanantena, 1986), and the giant extinct lemur, *Archaeolemur* sp. (cf.

edwardsi), whose closest relatives ranged throughout central Madagascar ca. 1000 years ago. Specimens of *Indri indri* and perhaps *Propithecus tattersalli* have been found in the cave deposits, expanding northward these species' known ranges (Jungers et al., 1995). There are specimens of *Daubentonia madagascariensis* and *Propithecus diadema* (species that survive in this region today but are highly threatened), as well as several of the locally more common lemur taxa.

In addition to *Archaeolemur* sp. (cf. *edwardsi*), the roster of extinct lemurs at Ankarana includes the first entirely new genus and species of extinct lemur to be found in Madagascar since 1908, *Babakotia radofilai* (Godfrey et al., 1990; Jungers et al., 1991; Simons et al., 1992), and a new species of *Mesopropithecus* (an extremely rare and poorly documented palaeopropithecid; see Simons, Godfrey et al., 1996). Also found here are excellent specimens of the northern variant of the genus *Megaladapis* (see Vuillaume-Randriamanantena et al., 1992; Wunderlich et al., 1996). Specimens of *Palaeopropithecus* sp. (cf. *ingens*), the most specialized of the sloth lemurs, and *Pachylemur* sp., a large *Varecia*-like lemurid, occur in lesser abundance at Ankarana.

In a recent article, we document the history of ecological and paleontological research at Ankarana, and discuss the conservation status of the lemur species that remain in this region (Wilson et al., 1996). The table below summarizes the results of our combined ecological and paleontological research.

Laurie R. Godfrey, Jane M. Wilson, Elwyn L. Simons,
Paul D. Stewart, and Martine Vuillaume-Randriamanantena
Department of Anthropology
University of Massachusetts
Amherst, Massachusetts 01003-4805
phone (413) 5452064, fax (413) 545-9494
E-mail: l.godfrey@anthro.umass.edu

References

Godfrey, L.R., E.L. Simons, P.S. Chatrath, and B. Rakotosamimanana. 1990. A new fossil lemur (*Babakotia*, Primates) from Northern Madagascar. *Comptes Rendus de l'Académie des Sciences* (Série II) 310:81-87.

LEMURS AT ANKARANA: SUBFOSSILS AND LIVING SPECIES

<u>Species</u>	<u>Current Status at Ankarana</u>	<u>Conservation Status</u>	<u>Represented as Subfossils</u>
<i>Pachylemur</i> sp.	---	extinct	yes
<i>Megaladapis</i> sp. (cf. <i>madagascariensis/grandidieri</i>)	---	extinct	yes
<i>Mesopropithecus dolichobrachion</i>	---	extinct	yes
<i>Palaeopropithecus</i> sp. (cf. <i>ingens</i>)	---	extinct	yes
<i>Archaeolemur</i> sp. (cf. <i>edwardsi</i>)	---	extinct	yes
<i>Babakotia radofilai</i>	---	extinct	yes
<i>Indri indri</i>	locally extinct	endangered	yes
<i>Hapalemur simus</i>	locally extinct	endangered	yes
<i>Propithecus tattersalli?</i>	locally extinct	endangered	yes?
<i>Hapalemur griseus</i> (maybe <i>occidentalis</i>)	scarce	vulnerable	yes
<i>Propithecus diadema</i>	scarce	endangered	yes
<i>Avahi laniger</i>	scarce	vulnerable	yes
<i>Daubentonia madagascariensis</i>	scarce	endangered	yes
<i>Eulemur fulvus sanfordi</i>	common	vulnerable	yes
<i>Eulemur coronatus</i>	common	endangered	yes
<i>Lepilemur septentrionalis</i>	common	vulnerable	yes
<i>Microcebus</i> sp. (maybe <i>rufus</i>)	common	abundant	no
<i>Cheirogaleus</i> sp. (maybe <i>medius</i>)	scarce	abundant	no
<i>Phaner furcifer</i>	scarce	rare	no

IUCN assigns conservation status as follows: extinct; endangered (in danger of extinction); vulnerable (likely to become endangered in the near future); rare (small global population but not yet vulnerable or endangered); abundant (not presently threatened) (See Harcourt and Thornback, 1990).

Godfrey, L.R. and M. Vuillaume-Randriamanantena. 1986. *Hapalemur simus*: Endangered lemur once widespread. *Primate Conservation* 7:92-96.

Harcourt, C. and J. Thornback. 1990. Lemurs of Madagascar and the Comoros. The IUCN Red Data Book. Gland, Switzerland: IUCN - The World Conservation Union.

Hawkins, A.F.A., P. Chapman, J.U. Ganzhorn, Q.M.C. Bloxam, S.C. Barlow, and S.J. Tonge. 1990. Vertebrate conservation in Ankarana Special Reserve, Northern Madagascar. *Biological Conservation* 54:83-110.

Jungers, W.L., L.R. Godfrey, E.L. Simons, and P.S. Chatrath. 1995. Subfossil *Indri* from the Ankarana Massif of northern Madagascar. *American Journal of Physical Anthropology* 97:357-366.

Jungers, W.L., L.R. Godfrey, E.L. Simons, P.S. Chatrath, and B. Rakotosamimanana. 1991. Phylogenetic and functional affinities of *Babakotia radofilai*, a new fossil lemur from Madagascar. *Proceedings of the National Academy of Sciences, USA* 88:9082-9086.

Simons, E.L., D.A. Burney, P.S. Chatrath, L.R. Godfrey, W.L. Jungers, and B. Rakotosamimanana. 1995. AMS¹⁴ dates on extinct lemurs from caves in the Ankarana Massif of northern Madagascar. *Quaternary Research* 43:249-254.

Simons, E.L., L.R. Godfrey, W.L. Jungers, P.S. Chatrath, and B. Rakotosamimanana. 1992. A new giant subfossil lemur, *Babakotia*, and the evolution of the sloth lemurs. *Folia Primatologica* 58:197-203.

Simons, E.L., L.R. Godfrey, W.L. Jungers, P.S. Chatrath, and J. Ravaoarisoa. 1995. A new species of *Mesopropithecus* (Primates, Palaeopropithecidae) from Northern Madagascar. *International Journal of Primatology* 16:653-682.

Simons, E.L., L.R. Godfrey, M. Vuillaume-Randriamanantena, P.S. Chatrath, and M. Gagnon. 1990. Discovery of new giant subfossil lemurs in the Ankarana Mountains of Northern Madagascar. *Journal of Human Evolution* 19(3): 311-319.

Vuillaume-Randriamanantena, M., L.R. Godfrey, W.L. Jungers, and E.L. Simons. 1992. Morphology, taxonomy and distribution of *Megaladapis* — giant subfossil lemur from Madagascar. *Comptes Rendus de l'Académie des Sciences, Paris* 315 (Série II):1835-1842.

Wilson, J.M., P.D. Stewart, G.-S. Ramangason, A.M. Denning, and M.S. Hutchings. 1989. Ecology and conservation of the crowned lemur, *Lemur coronatus* at Ankarana, Madagascar with notes of Sanford's lemur, other sympatric and subfossil lemurs. *Folia Primatologica* 52:1-26.

Wilson, J.M., L.R. Godfrey, E.L. Simons, P.D. Stewart, and M. Vuillaume-Randriamanantena. 1995. Past and present lemur fauna at Ankarana, North Madagascar. *Primate Conservation* 16:47-52.

Wunderlich, R.E., E.L. Simons, and W.L. Jungers. In press. New pedal remains of *Megaladapis* and their functional significance. *American Journal of Physical Anthropology* 100:115-138.

Malagasy Primate Origins

The primates of Madagascar exemplify the phenomenon of biological diversity. One consequence of the bewildering array of morphologies and behaviors displayed by these primates is that virtually every lemur biologist, at one time or another, confronts the question: "How did this diversity arise?" In other words, we want to know if there have been multiple colonizations of primates to Madagascar or was there a single ancestral population that subsequently radiated into the variety of lineages that we observe today? One clue in our search to answer this question lies in the geographic distribution of lemurs and their closest relatives, the lorises. All five families of lemurs are restricted to the island of Madagascar whereas the two families of lorises are distributed throughout Africa and parts of Asia. Geological evidence indicates that Madagascar separated from the African mainland at least 150 million years ago, approximately 90 million years before the first true primates appear in the fossil record. Because Madagascar is now separated from Africa by 300 miles of ocean, it is difficult to imagine how primates could have dispersed between the two land masses even once. Consequently, primate systematists have traditionally regarded the entire Malagasy primate fauna as the result of a single adaptive radiation, despite the fact that there are no uniquely shared morphological characteristics to support this hypothesis.

With the advent of Hennigian systematics, this traditional classification of lemurs and lorises was challenged. Several definitive studies of lemur and loris cranial morphology concluded that one family of Malagasy primates, the cheirogaleids, share with lorises a suite of unique basicranial characteristics which indicate a shared evolutionary history between the two taxa. This hypothesis of cheirogaleid-loris affinities, however, requires that Malagasy primates dispersed at least twice across the Mozambique channel during primate evolutionary history.

The result of this conflict between zoogeography and morphology has been uncertainty as to whether cheirogaleids are best considered lemurs or lorises. It also suggests the possibility that migrations between Madagascar and Africa may have been easier than previously suspected, and consequently, additional migrations might also have occurred.

Unfortunately, there are virtually no early strepsirrhine fossils to help resolve this dilemma and therefore we must rely exclusively on the techniques of phylogenetic systematics as they are applied to extant data. I have integrated data from adult morphology, the mitochondrial genome, and ontogeny in an effort to resolve the questions of cheirogaleid affinities and Malagasy primate monophyly. My studies have also included the aye-aye (*Daubentonia madagascariensis*), which is undoubtedly the most unusual of the Malagasy primates, and thus represents the extreme of Malagasy primate diversity. The outcome of this research has been strong support for the traditional recognition of the Malagasy primate fauna as a single adaptive radiation (Yoder, 1994; Yoder, 1996). Furthermore, a molecular clock analysis of the cytochrome b gene indicates that the founding lemurs must have reached Madagascar by the early Eocene, at the latest (Yoder, 1996).

This demonstration of Malagasy primate monophyly and antiquity is thus a starting point for a more thorough understanding of lemur diversity. Modern scientific methods have confirmed the traditional view that a single population of primates migrated to Madagascar (probably from Africa) to give rise to a unique example of adaptive radiation within the primates. Moreover, we can now surmise what this ancestral primate might have looked like and how it might have behaved. The detailed similarities between cheirogaleids and lorises (e.g., small body size, nocturnality, insectivory) are probably retentions from this remote ancestor. If this is indeed the case, the diverse array of modern Malagasy primates is truly an astonishing example of the power of natural selection.

Anne D. Yoder

Department of Cell and Molecular Biology
Northwestern University Medical School
Chicago, IL
ayoder@worms.cmb.nwu.edu

References

- Yoder, A. D. 1994. Relative position of the Cheirogaleidae in strepsirrhine phylogeny: a comparison of morphological and molecular methods and results. *Amer. J. Phy. Anthr.* 94:25-46.
- Yoder, A. D., M. Cartmill, M. Ruvolo, K. Smith, and R. Vilgalys. 1996. Ancient single origin of Malagasy primates. *Proceedings of the National Academy of Sciences* 93:5122-5126.

Formation en Anthropologie Biologique à l'Université d'Antananarivo/Faculté des Sciences

A la Faculté des Sciences de l'Université d'Antananarivo existe depuis l'année 1977, une formation post-universitaire (à partir de D.E.A. c'est-à-dire du Baccalauréat + 5 ans) ou il est délivré:

- 1) Le Diplôme d'Etudes Approfondies (D.E.A.) d'Anthropologie;
- 2) Le Doctorat de 3ème Cycle d'Anthropologie qui est un Doctorat de Spécialité;
- 3) Le Doctorat d'Etat en Sciences Naturelles, mais en Anthropologie Biologique comme spécialité.

Depuis 1979, 12 promotions d'étudiants ont suivi cette filière, et 44% des étudiants ont réussi à avoir le D.E.A. et ils sont tous, en cours de préparation du Doctorat de 3ème cycle. Certains d'entre eux sont naturellement enseignants-chercheurs à la Faculté des Sciences, d'autres travaillent dans les projets qui concernent l'Environnement, et tous ont reçu une formation en Paléontologie des Vertébrés, en Primatologie, et notamment la connaissance très approfondie des Prosimiens de Madagascar, en Anthropologie physique et en Anthropologie nutritionnelle.

A la Faculté des Sciences, ils sont regroupés dans le Département d'Anthropologie biologique et se rattachent à l'un des 3 laboratoires suivants de ce Département:

- 1) Laboratoire de Primatologie et de Paléontologie des Vertébrés;
- 2) Laboratoire d'Anthropologie Physique;
- 3) Laboratoire d'Anthropologie Nutritionnelle

Cette formation post-universitaire reçoit l'aide, au niveau de l'encadrement des étudiants sur le terrain:

1) de laboratoires américains, tels que: Duke Primate Center (Duke University), Field Museum of Natural History, et Stony Brook University de New York;

2) de laboratoires français, tels que: Institut d'Embryologie de la Faculté de Médecine-Université Louis Pasteur de Strasbourg, et Institut de Paléontologie du Muséum d'Histoire Naturelle de Paris;

3) d'une université allemande: Universität Tubingen Verhaltenphysiologie.

Ces laboratoires ont contracté des protocoles d'accord avec le Département d'Anthropologie biologique. C'est ainsi que les sujets sur les Primates non-humains ont été traités dans les Mémoires et les thèses de ces étudiants dont 11 sont axés sur les lémuriens de Madagascar subfossiles ou actuels au cours de recherches bibliographiques ou sur le terrain ou en laboratoire.

On peut citer notamment comme groupes étudiés:

1) Parmi les groupes subfossiles:

* Les vertébrés et l'appareil masticateur du genre *Pachylemur*;

* Les dents des genres *Megaladapis* et *Archaeolemur*;

* La mise sur catalogue des os récoltés dans la grotte d'Anjohibe;

2) Parmi les formes naturelles:

* L'éco-éthologie de quelques lémuriens du Parc National de RANOMAFANA (*Lemur rubriventer*, *Eulemur fulvus rufus*, *Hapalemur aureus*, *Propithecus diademata edwardsi*)

* La spermatogénèse du lémurien nocturne *Avahi langer* du Parc National de Ranomafana et de *Avahi occidentalis* de la Station d'Ampijjora

* Les coussinets et dermatoglyphes des Lémuriens et notamment de *Lemur macaco flavifrons* de la région du Nord-Ouest qui est une nouvelle variété de *Lemur macaco*.

N'oubliez pas que la découverte de l'Indriide *Babakotia*, nouvelle espèce de Lémurien subfossile dans l'Ankarana, au Nord de l'île, s'est faite dans le cadre du Protocole d'Accord entre le Département d'Anthropologie Biologique et Duke Primate Center.

Berthe Rakotosamimanana

Département de Anthropologie et de Paléontologie

Faculté des Sciences : Université d'Antananarivo

Antananarivo, Madagascar

Suivi Ecologique des Lémuriens Diurnes

Au sein du Projet de Conservation et de Développement Intégré de Masoala, le rôle du suivi-évaluation (y compris le suivi écologique) est de suivre l'évolution des pressions humaines et leurs impacts sur les écosystèmes et/ou la biodiversité, et de déterminer si le programme d'activités de développement dans la zone périphérique tend effectivement à diminuer ces pressions humaines sur l'aire protégée. Le suivi écologique en fait partie et s'avère indispensable pour la gestion quotidienne et la gestion à long et à moyen terme en tant qu'outil du Projet.

Deux espèces de lémuriens diurnes, *Varecia variegata rubra* et *Eulemur fulvus albifrons*, sont des espèces clés qui présentent un intérêt spécial pour le projet, pour les touristes et pour le pays. En outre, comme ces espèces jouent un rôle très important du point de vue écologique, nous les classons parmi les espèces biologiques indicatrices qui sont justement l'objet du travail de suivi parmi les espèces particulières de Masoala.

La méthode d'observation adoptée depuis 1993, considérant les besoins du projet, a été développée pour faciliter la collecte des données démographiques d'un grand nombre de groupes sociaux de ces deux espèces en même temps. Elle requiert le suivi de la composition démographique des groupes dans le temps par des observations rapprochées et répétées.

Initialement, la méthode est conçue pour comprendre les impacts de la perturbation humaine de l'habitat sur la population de lémuriens. On travaille dans six sites au versant ouest de la presqu'île depuis 1993. On a utilisé des pistes préexistantes dans les sites perturbés qui suivent, dans la plupart du temps, des lignes de crête, et des pistes nouvellement créées dans les sites non-perturbés. Cette méthode augmente la possibilité de voir et d'entendre les animaux sur une plus grande surface. Cela nous a fourni des données provenant des sites de forêt primaire intacte (non-perturbée) et des sites de forêt primaire perturbée. Tandis qu'au versant est, ces sites sont seulement établis après que les limites des différentes zones d'action du parc national aient été proposées. Ce qui fait que le travail d'observation avait commencé le mois de Janvier de cette année dans six sites de forêt primaire à l'intérieur ou à l'extérieur du parc, avec ou sans gestion rationnelle des ressources naturelles. Ces derniers sites sont établis en respectant certaines similarités telles que (1) gradient d'altitude (=Åm), et (2) type de végétation à peu près identique.

Au niveau de ces sites, des observations se font d'une façon visuelle directe en marchant lentement suivant des pistes de suivi établies dans les différents sites, à partir de 6h30 du matin. Les pistes sont seulement visitées pendant le beau temps (sans pluie).

Chaque fois qu'un groupe de lémuriens est rencontré, les caractéristiques suivantes sont notées: (1) le point de piste le plus proche, (2) l'espèce, (3) le nombre total d'individus, (4) le nombre d'individus dans chaque classe d'ages (adultes, juvéniles, enfants), (5) le nombre de mâles et de femelles de chaque classe d'age, (6) le comportement durant l'observation, (7) si les animaux ont été vus ou entendus avant qu'ils soient observés, (8) le temps d'observation et (9) la direction indiquée par la boussole. Si les animaux ont été entendus et si la distance est estimée à moins de 100m, les observateurs s'écartent de la piste pour les examiner.

Des collectes de données supervisées par Adina Merenlender, Claire Kremen et Vincent Razafimahatratra sont assurées par des agents de conservation sur terrain. Ces agents sont bien formés sur la méthode de collecte des données, ainsi qu'ils s'identifient des groupes spécifiques de lémuriens dans chaque site.

Comme résultat, on devrait avoir une liste des groupes de lémuriens rencontrés par espèce à chaque site. Cette liste sera mise à jour annuellement en tenant compte de leur composition respective (Adultes/Jeunes/enfants - Mâles/Femelles). Autrement dit, une fois que tous les groupes sont identifiés, l'échantillonnage est répété (avec une unité d'échantillonnage à chaque site) une fois par an suivant le protocole décrit ci-dessus, durant la période de reproduction soit d'Octobre à Décembre, juste après la naissance des petits. C'est une période favorable quant aux observations de lémuriens.

L'échantillonnage de ces sites devrait se poursuivre pour permettre l'achèvement d'une longue série d'observations, et l'évaluation des impacts de la gestion du Parc sur les lémuriens telle que la foresterie soutenable ou bien le tourisme car certains sites recevront de plus en plus de touristes alors que d'autres n'en recevront pas du tout.

La collecte des données basées sur les paramètres démographiques telles que le sexe ratio, la distribution des classes d'ages, la fécondité, etc..., fournirait un ensemble plus riche des données qu'ainsi permettrait la comparaison et la compréhension des effets fonctionnels des différents types de gestion.

Cette méthode permet à la fois l'obtention des estimations de la densité et des données démographiques raisonnablement fiables à partir du nombre des groupes suivis, si les méthodes d'étude classiques ciblent une limite d'individus pour l'étude d'abondance/densité ou l'étude intensive de comportements sur quelques groupes définis.

Marius Rakotondratsima

Junior Researcher, Wildlife Conservation Society

Projet de Conservation et de Développement Intégré de Masoala
Madagascar

References

- Merenlender, A. 1993. Planning for National Parks: Humans and their Relatives the Lemurs. Report for the Masoala Project.
- Merenlender, A., Kremen C., Rakotondratsima M. 1994. Population Monitoring of *Eulemur fulvus albifrons* and *Varecia variegata rubra* on the Masoala Peninsula, Madagascar. Report for the Masoala Project.
- Rakotondratsima, M. 1995. Contribution à l'Etude des Impacts de la Perturbation humaine sur les Populations de *Eulemur fulvus albifrons* and *Varecia variegata rubra* dans la Péninsule de Masoala, Madagascar. Mémoire de DEA en Sciences Biologiques Appliquées. Université d'Antananarivo.
- Volet Suivi-Evaluation, PCDI Masoala, 1996. Plan de mise en oeuvre du système de suivi-évaluation du Projet de conservation et de développement intégré de Masoala. Un projet de DEF- ANGAP- CARE- WCS- TPF, Financement SAVEM.

Is *Lemur Catta* Endangered ?

Lemur catta is usually considered among the commonest of diurnal lemurs (see photo, page 19). It is certainly the commonest advertisement for Madagascar. Its ringed tail adorns billboards and brochures and school childrens' notebooks. Every television program on Madagascar has its parade of ringtails usually filmed at Berenty, a reserve smaller than Central Park. The ringtail is in a sense the flagship species for the whole country, but it may now live in only relict populations.

L. catta is often seen on the ground, at forest edges or on open rocks. However at Berenty and Beza Mahafaly it does not range far from standing water or evergreen riverside vegetation. It may depend on such vegetation in at least part of each troop's range. If so, it is indeed endangered, since this is also the habitat that humans prefer for agriculture.



The ring-tailed lemur (*Lemur catta*), once considered one of the commonest of diurnal lemurs in the wild, may live in only relict populations. Photo by Russell Mittermeier.

We do not know *L. catta*'s population in the wild to an order of magnitude beyond the 400 at Berenty and the 250 at Beza Mahafaly. They certainly exist in other places, such as the Isalo massif, but there is presently no accurate tally.

I would be grateful if readers of Lemur News could let me know of any noteworthy sightings of *L. catta*. Please write the month and year you saw them, the geographical site as exactly as possible, the vegetation type, and finally your estimate of distance to the nearest water or evergreen vegetation. Thank you.

Alison Jolly
Department of Ecology
Princeton University
Princeton, NJ USA 08544-1003
fax (609) 258-1334

Conservation Priority Setting Workshop Drives A Changing Paradigm for Biodiversity Conservation in Madagascar

In 1989, the Government of Madagascar completed its National Environmental Action Plan (French acronym: PAE). The PAE targeted a small number of high priority reserves for immediate attention, and subsequently many became the focus of integrated conservation and development projects (ICDPs) to reduce habitat destruction. The progress made under the initial PAE effort is noteworthy, yet since 1989 many new priority areas have been identified as part of a second phase of the PAE that was undertaken with the backing of the Global Environment Facility (GEF), an important component of which was a Madagascar priority-setting workshop.

The conservation priority-setting workshop for Madagascar was convened in April of 1995, with 143 of the foremost Malagasy and international experts on the island's biodiversity in attendance. The workshop was organized by Conservation International (CI) as part of a Malagasy government and multi-donor effort to better refine conservation priorities using the best available planning technology and human resources.

The Madagascar workshop was modeled on *Workshop '90*, a nine-country initiative designed by CI to define conservation priorities for South America's Amazon Basin. Over the past six years since *Workshop '90*, CI has refined its conservation priority setting and regional analysis methodology through similar workshops in Papua New Guinea, the Atlantic Forest of Brazil, the Andes Cordillera, and other critical areas for conservation. Planning for the Madagascar workshop began in mid-1994 with the selection of specialists, definition of thematic and regional criteria to be considered, and preparation of an exhaustive series of base maps and data sets for inclusion in the analysis.

The specialists participating in the workshop were divided into eight thematic groups, which began work four months prior to the workshop itself (socio-economy, paleobiology, botany, mammals, birds, reptiles and amphibians, fish and aquatic invertebrates). The groups were managed by an international coordination team and a data management unit based at ANGAP. Data collection was done concurrently by working group leaders in Madagascar and in a variety of international institutions, as well as at CI in Washington. Reference data including hydrology, major roads, protected areas, forest cover, major cities, fivondronana limits, geology, soils, vegetation, and elevation were compiled on a series of 1:1,000,000 scale maps prepared by CI, and a full set was provided to each working group, thus serving as a common starting point for discussions at the workshop.

At the workshop, the specialists first defined priority conservation zones within each thematic group (i.e., birds, mammals, etc.), documenting these on their base maps and on a series of tabular forms. The full group then defined biogeographic regions (5 were defined), and new multi-specialist groups were created to define priorities within each of these five regions; the multi-specialist groups then characterized and ranked the regions. The regional integrative groups brought together the findings of the thematic groups into a unified conservation priority assessment based on overall biodiversity and socioeconomic criteria. The final results were mapped, presented, and discussed by the entire workshop during the final plenary session. These country and regional priorities included biological priorities, research priorities, priorities based on degree of destructive pressure and priorities for conservation action.

The biological priorities map (see page 20) showed that while most of the priority areas as defined in the early phase of the PAE are indeed ranked *Very High Priority* for both research and biodiversity, few are in the highest priority category (*Exceptional*). This means that many of the highest biological priority areas fall outside of the areas where existing ICDPs are being implemented, particularly in the South and the North. This may result from the fact that the criteria for originally selecting these ICDP sites considered numerous factors in addition to biodiversity importance, including watershed importance, tourism potential and donor interest.

In the case of priority areas for research, ICDPs have gradually generated biodiversity survey information which has subsequently shifted research needs to other areas. The aforementioned observations are likely the inevitable result of the ICDP approach to conservation, given the limited geographic impact of these efforts, suggesting that alternative or complementary approaches need to be developed for conservation and research in high priority areas outside the ICDP network.


Additional major conclusions from the workshop are:

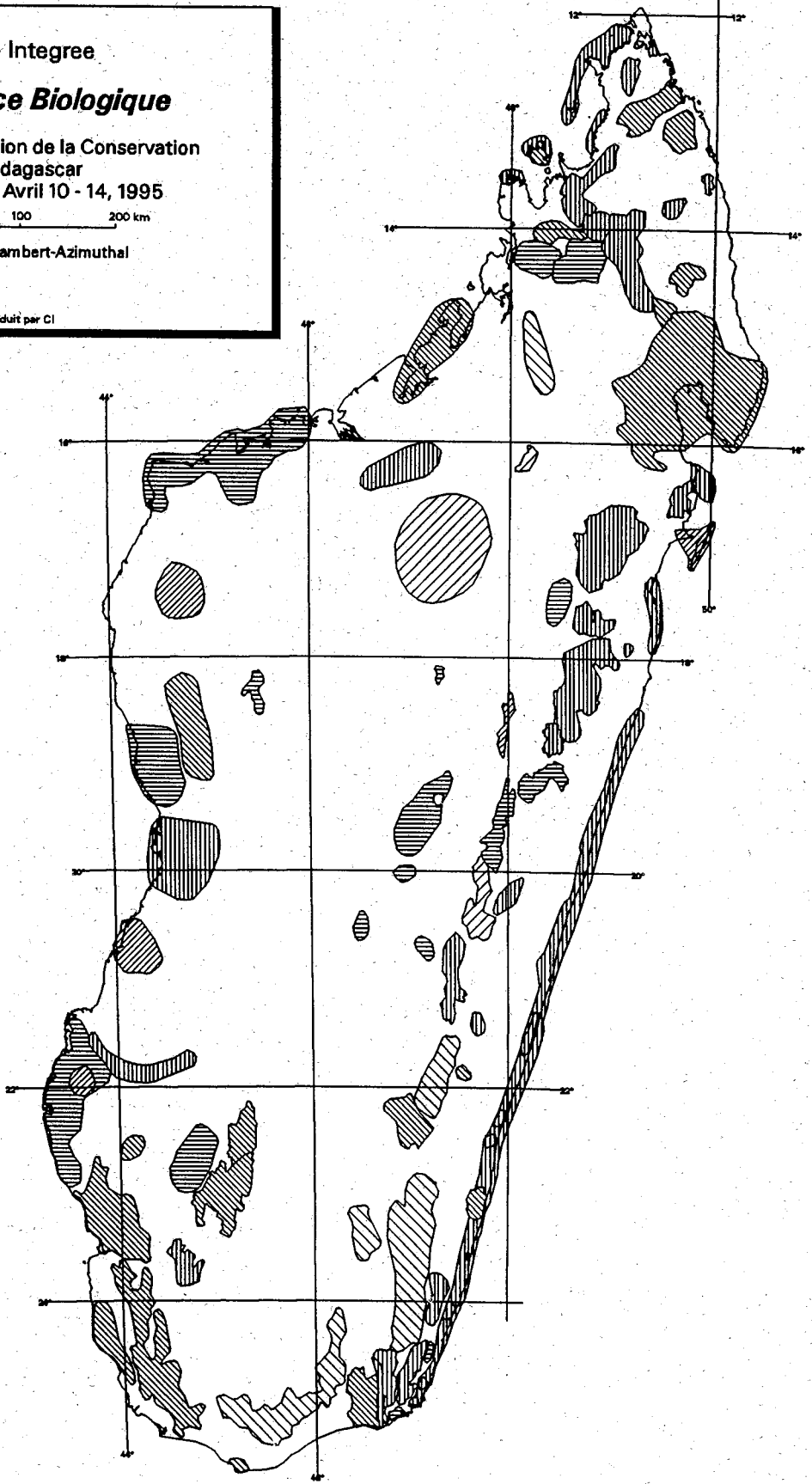
- Overlay of the different priority areas with a map of the existing protected areas shows that many of the priority areas are not located within protected areas. Important gaps are found in the South and Southwest of Madagascar almost all the way from Morombe to Tolanaro. The dry forests of Northern Madagascar are also exceptionally important in all respects, but have very limited protection. The situation is similar in many other parts of Madagascar.
- Littoral forests in the east represent a unique ecosystem which is highly threatened and not protected. Other unique habitats not included in the present system of protected areas are dunes and inselbergs.
- Any remaining lowland rain forest needs immediate protection.
- The Northeast (Mananara-Marosetsra), as well as the eastern rain forest as a whole, is threatened by fragmentation. Though these ecosystems are covered by several protected areas, the forests between them are not.
- The installation of several regional museums and one national museum of natural history has been recommended.

Now, just a year after the workshop, the impacts of its results are being felt. Efforts to increase protection of biodiversity outside of parks will be strengthened by both the GEF that has recently approved a \$20.8 million investment program for the environment in Madagascar, and the PE2 (the second phase of the PAE),

Carte Integree
Importance Biologique
 Atelier de Priorization de la Conservation
 à Madagascar
 Antananarivo, Avril 10 - 14, 1995
 0 100 200 km
 Projection: Lambert-Azimuthal
 Produit par CI

Legende

-  Exceptionnelle
-  Tres Important
-  Important
-  Moyen
-  Faible
-  Tres faible
-  Inconnu
-  Pas d'information



This map of key areas of biological importance in Madagascar is one of several that were produced by a conservation priority-setting workshop for Madagascar that was convened in April of 1995, organized by CI as a part of a Malagasy government and multi-donor effort to better refine conservation priorities using the best available planning technology and human resources. Map by Lata.

that will receive a high level of support from a multi-donor group over the coming years. The GEF initiative is expected to get underway in late 1996, with PE2 becoming effective in early 1997.

Perhaps the most dramatic impact of the workshop was the paradigm shift that its results have fomented away from the ICDP/protected area focus that has been used by the government and donors to date, to a broader approach that addresses the roots of environmental degradation. This new thinking has manifested itself in the plans of the government and the donors (GEF and PE2), that will usher in the next millennia of biodiversity conservation in Madagascar. Results of the workshop, a poster-map and CD-ROM database, are expected to be released soon, and will be available through Lee Hannah at CI.

Lee Hannah, Berthe Rakotosamimanana, Jorg Ganzhorn, Silvio Olivieri, John Hough, Russell A. Mittermeier, Roderic Mast, Serge Rajaobelina
Conservation International
1015 18th Street, NW Suite 1000
Washington, DC 20037 USA
phone (202) 973-2218, fax (202) 887-0192,
email L.Hannah@Conservation.org

References

Olivieri, S., I. Bowles, R. Cavalcanti, G. Fonseca, R. Mittermeier and C. Rodstrom 1995. A Participatory Approach to Biodiversity Conservation: The Regional Priority-Setting Workshop. Washington, D.C, Conservation International.

MEETINGS

Workshop on Primate Conservation Methods

A Workshop on Methods of Primate Conservation, will be held 9-11 August 1996 at the Chicago Zoological Society (Brookfield Zoo) for primatologists from developing countries who are attending the XVIth IPS/ASP International Congress of Primatology, in Madison, Wisconsin. Contact: Dr. Jeanne Altmann, Vice President for Conservation, IPS, Chicago Zoological Society, Brookfield Zoo, Chicago, Illinois 60513, USA, Fax: 708 485 3532, e-mail: bzconbio@ix.netcom.com, or Dr. Alison Jolly, President, International Primatological Society, Department of Ecology and Evolutionary Biology, Princeton University, Princeton, NJ 08544, USA, Fax: 609-258-5381, e-mail: ajolly@arachne.princeton.edu.

XVIth Congress of the International Primatological Society & 19th Conference of the American Society of Primatologists

The 16th Congress of the IPS and the 19th Conference of the ASP, will be held 1-16 August 1996, on the campus of the University of Wisconsin, Madison, hosted by the Wisconsin Regional Primate Research Center (WRPRC). For information, contact Edith Chan, WRPRC, 1220 Capitol Court, Madison, Wisconsin 53715, USA. Phone: (608) 263-3500, Fax: (608) 263-4031, e-mail: ipsasp-info@primate.wisc.edu.

IUDZG and CBSG Annual Meetings Held Jointly

The 1996 Annual Meeting of the Conservation Breeding Specialist Group of the IUCN Species Survival Commission (CBSG), will take place on 22-25 August, 1996, in Denver, Colorado, USA. Hosted by the Denver Zoological Garden, the meeting will immediately precede the Annual Meeting of the World Zoo Organization (IUDZG). For further information and registration materials, contact Angela Baier, Marketing Director, Denver Zoological Foundation, City Park, 2300 Steele Street, Denver, Colorado 80205-4899, USA. Tel: 1-303-331-5805; Fax: 1-303-331-4125.

Conservation in a Changing World

A Conference entitled Conservation in a Changing World: Integrating Processes into Priorities, will be held 24-25 September, 1996, at the Zoological Society of London, Regent's Park, London. For further information: Assistant Editor, Zoological Society of London, Regent's Park, London NW1 4RY, UK. Tel: +44(0)171 448 6272, Fax: +44 (0)171 586 5321.

Primate Society of Great Britain Winter Meeting

The Primate Society of Great Britain Winter Meeting for 1996, focusing on the theme "Social Learning among Mammals," will be held 29-30 November 1996 in the Meeting Rooms of the London Zoological Society, London.

Meeting of the Association of Primate Veterinarians

A meeting of the Association of Primate Veterinarians, will be convened on 16-17 August 1996, at the University of Wisconsin, Madison. Contact: Edith Chan, WRPRC, 1220 Capitol Court, Madison, Wisconsin 53715-1299, USA. Tel: (608) 263-3500, Fax: (608)263 4031, e-mail: ipsasp-info@primate.wisc.edu.

First Congress of the Asociación Primatológica Española (APE) and European Workshop on Primate Research

The First Congress of the Asociación Primatológica Española (APE) will be held jointly with the European Workshop on Primate Research on 16-19 October 1996, Hotel Escuela, Madrid, Spain. The European Workshop on Primate Research, consisting of a panel of invited speakers and free poster contributions, will take up the last two days of the meeting. The objective of the Congress is to provide a forum to assess the current situation and perspectives on primate research in Spain and the rest of Europe to facilitate the exchange of information among European primatologists and to promote the establishment of co-operative links between European institutions and research groups working in primatology. For further information, contact Dr. Fernando Colmenares, Departamento de Psicobiología, Universidad Complutense de Madrid, Campus de Somosaguas, 28223 Madrid, Spain. Tel: +34 1 3943073, Fax: +34 1 3943189, e-mail: ppspc06@sis.ucm.es.

6th International Behavioural Ecology Congress

The 6th International Behavioural Ecology Congress, will be held 29 September - 4 October 1996 in Canberra, Australia. Details are available through Andrew Cockburn, Division of Botany and Zoology, Australian National University, Canberra ACT 02000, Australia. Fax: 61 6249 5773, e-mail: andrew.cockburn@anu.edu.au.

Full Meeting of the Species Survival Commission of the IUCN

The 68th Full Meeting of the World Conservation Union (IUCN) Species Survival Commission will take place 11-12 October 1996 in Montreal, Canada. The theme of this meeting will

be Communicating the value of the SSC - its worldwide presence, scientific knowledge, expert advice, and ongoing work, and its relevance to the conservation of biodiversity. For more information, contact the World Conservation Congress Coordinator, IUCN, Rue Mauverney 28, 1196 Gland, Switzerland, Fax: + 41 22 999 0020.

IUCN World Conservation Congress

The IUCN World Conservation Congress will be held 13-23 October 1996, at the Montreal Conference Centre, Montreal, Canada, in four distinct parts: Special Members' Session (13-14 October) to consider revised statutes - for accredited delegates of IUCN and voting members; Members' Business Session (15-16, 22-23 October) to discuss and approve IUCN's future strategy, programme and budget, elect the officers and Council of the Union, and debate and adopt resolutions and recommendations - also for delegates and voting members, though invited observers may also attend; Open Session of Workshops (17-18, 20-21 October) under the overall theme of "Caring for the Earth" - open to the public; A major environmental exhibition - open to the public. 19 October is set aside for excursions. For further details, contact John Burke, Director of Communications, IUCN The World Conservation Union, 28 rue Mauverney, 1196 Gland Switzerland. Tel: +41 22 999 0123.

Australian Primate Society Annual Meeting

The Australian Primate Society's Annual Meeting will be held 6-8 December 1996, at the Wellington Zoo, Wellington, New Zealand. Contact: Graeme Crook, CSIRO Division of Human Nutrition, Animal Services, Majors Road, O'Halloran Hill, South Australia 5158. Tel: +61 82980336, Fax: +61 83770004, e-mail: graemec@dhn.csiro.au.

1997 Meeting of the American Society of Primatologists

The 1997 Meeting of the American Society of Primatologists will be held 27 June - 1 July, 1997 at the Bahia Hotel, San Diego, California. For more information, contact Nancy Caine, Psychology Department, California State University, San Marcos, California 92096, USA. Tel: (619) 752-4145, Fax: (619) 752-4111, e-mail: nancy_caine@csusm.edu.

Ecological Summit 96

The Ecological Summit 96, will be held 19-23 August 1996, in Copenhagen, Denmark. The summit is organized by Elsevier Science. For information contact: Ecological Summit 96, Conference Secretariat, Elsevier Science Ltd., The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK. Tel: +44 (0)1865843643, Fax: +44 (0)1856 843958, e-mail: g.spear@elsevier.co.uk.

Measuring Behavior '96

An International Workshop on Methods and Techniques in Behavioral Research entitled Measuring Behavior '96, will be held 16-18 October 1996 in Utrecht, The Netherlands. For program booklet and registration/abstract forms, write to Measuring Behavior '96 Workshop Secretariat, Attn: Rosan Nikkelen, P.O. Box 268, 6700 AG Wageningen, The Netherlands. Tel: +31 (0)317-497677, Fax: +31 (0)317-424496, e-mail: mb96@noldus.nl. (Information on the workshop is also available on the World Wide Web: <http://www.diva.nl/noldus/mb96.html>).

BOOK REVIEWS AND NEW PUBLICATIONS

Review of *The Aye-aye and I* (I being the author, Gerald Durrell himself)

Today's books on conservation and nature are so replete with earnestness, appropriate gloom and daunting challenges, that it is a delight to find Gerald Durrell in his last book as much the master naturalist and author as ever. Literary acumen of the highest order is combined with a naturalist's eye and leavened with humor and a sense of the absurd.

This time Durrell, one of Europe's best selling authors, takes us on a quest to the great red island of Madagascar. Separated by the deep Mozambique Channel for tens of millions of years it has developed its own, often very peculiar, flora and fauna including the lemurs—sufficient reason for any naturalist to visit. But in the last centuries the natural work of Madagascar has been in retreat, prompting the need for the kind of attention Durrell's Wildlife Preservation Trust provides, captive propagation and reintroduction.

The adventures, and adventures they are, take the Durrells, their crew and the reader to vanishing Lake Alaotra in search of gentle lemurs, to visit a Ploughshare tortoise (Anonoka) breeding project, to Morandava in search of jumping rats and the flat-tailed tortoises of Kapidolo. These experiences and those which ensue are developed with skill of description like no other. Who else would have the imagination to describe baobab trees (all species but two of which live on Madagascar) as "an army of Chianti bottles eighty feet or more high.." and "Their ridiculous little twisty branches made them look like someone who has washed their hair and can't do a thing with it."

The main object of the adventure is the bizarre aye-aye and it keeps the reader waiting, ever more impatiently for its appearance. A field camp is set up and the wait continues. In the mean time Durrell turns his observant "naturalists eye" to the camp, its residents, himself and the nearby village. While the true meaning of the "Battle of the Thunder box" had best be left to those who read this charming volume, Malagasy fowl and ducklings march through camp and the pages, along with zebu and the young lady christened "Girl with the Bucket". Indeed the reader shares with Durrell his sadness when the time comes to leave this camp and its fauna, human and otherwise. Finally the aye-aye do appear and we learn of the vagaries of adapting them to captivity and seeing them safely back to Jersey.

One of the first books on which I cut my naturalist's teeth was Durrell's *The Bafut Beagles* published in 1954 in the United States. In that and subsequent volumes one concludes that things happened differently in Durrell's life: the serious combines with the comic and improbable in bold relief. On opening the latest book I was delighted to find that this visionary conservationist is as delicious and idiosyncratic as ever.

On visiting Gerry in the hospital a few months before he died, I found him undiminished in his zest for nature and conservation. He even insisted on discussing a possible visit to my camp in the Amazon. Gerry was alive in a way that few people are, and the world of his readers (past, present and future), of zoos (for which he played a major transforming role) and of nature, all are the better for it. Like the jester who gets closer to the truth through humor, Gerry made us love animals more by making us laugh and showing us how to do great things by having fun at the same time.

Thomas E. Lovejoy

Assistant Secretary for External Affairs
Smithsonian Institution
1000 Jefferson Dr., SW
Room 320
Washington D.C. 20560
Phone (202)786-2263, Fax (202)786-2304

New Publication Available: *Lemurs of the Lost World*, by Jane Wilson

Lemurs of the Lost World is a fascinating account of expeditions to the crocodile caves at the Ankarana Massif in the late 1980's, the difficulties confronted by the expedition members, the remarkable paleontological discoveries, and the observations of the fauna, especially the lemurs in the sunken forests there. Besides the crocodiles that live in a complex of more than 60 miles of caves, six subfossil lemurs have been found there, including the remarkable sloth lemur, (*Babakotia radofilai*), the giant *Megaladapis*, *Pachylemur*, *Mesopropithecus*, *Palaeopropithecus*, and *Archaeolemur*. Ten living lemur species occur there also today, and a further two occurred there in the recent past. This book is illustrated with beautiful color photographs and provides an insight to the social, economic, and conservation problems of Madagascar. An excellent read, and highly recommended. *Lemurs of the Lost World*, by Jane Wilson, 1995, 2nd edition, 216pp. Impact books, London. Paperback. ISBN 1 87468743 9. Price £5.00 or US\$11.00. In the UK, write to Impact Books, 22 Glen Dale, Rowlands Castle, Hants, PO9 6EP, or Impact Books, 70 Newcomen Street, London SE1 1YT, and in the USA it is available from Impact Books, P. O. Box 287, Great Falls, VA 22066, USA.

Anthony Rylands

(Conservation International-Brazil)
Depto. De Zoologia
UFMG/ICB
Caixa Postal 2486
Pampulha
31.270 Belo Horizonte MG
BRAZIL
Phone [55](31)448-1199, Fax [55](31)441-1412

Fanamby — A New Video From Conservation International

Fanamby tells the story of the conservation challenge that Madagascar cannot postpone. A storyteller, using traditional Malagasy proverbs,

takes the viewer to the world of lemurs, chameleons, and baobabs. Malagasy music punctuates the images and highlights their rich cultural heritage. Lyrics are woven into the story, making *Fanamby* a true musical testimony to Madagascar's new ecological awareness.

Fanamby was produced in 1994 by Conservation International (CI), in an effort to highlight Madagascar's biological riches and to enhance Malagasy policy makers' awareness of the country's critical conservation challenges and opportunities. The documentary addresses the fact that Madagascar's ecological problems are a direct result of a lack of information about economically and environmentally prosperous alternatives to today's destructive resource use trends. Three versions of *Fanamby* were produced in English, French, and Malagasy (see figure, page 23) in order to reach all the stakeholders in Madagascar's environmental future. Each version was individually tailored not only in terms of language, but with themes and characters most appropriate communicating with the targeted audiences. The English version was designed to attract international organizations and financing prospects. The French version called for the national officials and institutions to create and implement long-term conservation solutions for Madagascar, and the

FANAMBY NY NOSY MENA HO NOSY MAITSO

FANAMBY

NY NOSY
MENA
HO NOSY
MAITSO

FANAMBY

NY NOSY MENA
HO NOSY MAITSO

Atolotry ny ONE sy ANGAP ary Conservation International

Nisy nanome anaram-bositra hoe "Nosy Mena" i Madagasikara noho ireo tanimena voakaoka, mivarina manara-driandrano na koo ho any an-dranomasia mihitay aza. Ny tany sy ny tany voakaoka vokatra izany no isan'ny fositra manimba ny tontolo iainana eto Madagasikara ary mety hamandrika syhanimba ny lampandrosoana. Manan-karena voajanahary manokana ho azy i Madagasikara nefa ankehitriny miatrika FANAMBY iray lehibe, izao dia izao, mba ho tonga "Nosy Maitso".



Hitefy ny nosy onentan'ny antoanala sy ny zava-boahary miavaka tokoa isika ary hifaneshy sy hifanojo amin'izany ny sary mampiseho ny hasoan'ny tazy-maso, singastinganin'ny valiha, dobo-dobohan'ny anjanga, haren'ny riba malagasy ary ankalazain'ny tonon-kira mampiseho la tonga saina amin'ny fitipihana ny tontolo iainana ho amin'ny lampandrosoana ny Malagasy.

FANAMBY... mba hitotro ny ho avin'ny toe-karena mamiratra ny tontolo iainana.

FANAMBY... mba ho vatsoan'izao tontolo izao hatrany i Madagasikara, hatrany ho avin'ny ankizy malagasy sy ny ankizy rehetra eran-tany.

Maharitra: 14 minitra

Mpanolotra: Conservation International

Tale sy Mpanatontosa: Haroldo Castro, Mpanoratra: Flavia Castro

Mpanolo-isaina manokana: Jocelyn Rafidinarivo, Serge Rajaobelina

Mozika: Tanka, Tsanga, Ihanbi, Milly Clement, Babata, Garry Jean Emilien

© 1994 Conservation International. Tous droits réservés.

Distribue par Conservation International, 1015 18th Street, NW, Washington, DC 20036

USA et CI-MADAGASCAR, Boite Postale 3178, Antananarivo 101

Photos: Baobabs par Haroldo Castro, Indri par Russell Mittermeier

Mpitantara: Jocelyn Rafidinarivo
(Jean-Louis Rafidy)

ONE - Office National de l'Environnement

ANGAP - Association Nationale
pour la Création des Aires Protégées



VHS NTSC PAL SECAM



Cover to Malagasy version of award-winning CI video, *Fanamby*. Three versions of *Fanamby* were produced in English, French, and Malagasy in order to reach all the stakeholders in Madagascar's environmental future. Video Produced by Haroldo and Flavia Castro.

Malagasy version was designed to work within the traditional structure of local villages to create awareness of, and protection for the country's unique biodiversity.

The documentary was launched as the centerpiece of a CI information campaign targeting government ministries and institutions, conservation organizations, international agencies, and the local media. *Fanamby* first aired on Malagasy television on December 17, 1994, and subsequently was distributed extensively throughout the country in video format. It has won several awards including "Most Resourceful Production" from the prestigious Jackson Hole Wildlife Film Festival in 1995, and it inspired the creation of a new Malagasy Conservation Organization, also called *Fanamby*, now headed by the video's Scientific Director, Mr. Serge Rajaobelina (see figure, page 25).

The documentary can be ordered in any of the three formats by sending a check for \$30.00 drawn from a U.S. bank to CI.

Gary Dodge
Conservation International
1015 18th St. NW, Suite 1000
Washington, DC 20036
Phone (202) 429-5660, fax (202) 887-0193
email g.dodge@conservation.org



Madagascar wildlife T-shirts available — panther, chameleon and tomato frog are depicted in full color on this shirt designed and created by CI artist, Stephen Nash. Available for \$15 from Danielle Mihalko, CI, 1015 18th St., NW, Washington, DC 20036, or call (202) 973-2214.

New Publication Available: *Ecology and Economy of a Tropical Dry Forest in Madagascar*, edited by Jörg Ganzhorn and Jean-Pierre Sorg

Sustainable development has been the rallying cry for international conservation efforts in developing countries. There are few places on earth where this kind of activity would be more welcome than in the dry deciduous forest of Madagascar. First, Madagascar is one of the "megadiversity" countries of highest conservation priority with extremely high endemism of plants and animals, and habitats are being irreversibly lost at an alarming rate. Second, tropical dry forests represent one of the most threatened biomes on earth whose demise has gone largely unnoticed because most of it happened before public awareness of conservation issues.

In view of this situation, the Swiss Aid Agency in collaboration with the Malagasy Ministry of Waters and Forests, started a pilot project to study potential ways of sustainable forest utilization via selective logging on the west coast of Madagascar in 1978. The project was joined in 1987 by an international group of biologists who started studying various aspects of this dry forest ecosystem and the consequences of selective logging on some of its plants and animals. Some of the results of this multidisciplinary project are summarized in a special volume of *Primate Report*.

After setting the scene by describing the general ethnological, geological and botanical situation, the book goes on to review traditional ways of using forest products as well as the process of deforestation for opening new farmland. It then summarizes 15 years of silvicultural experience in forest exploitation, tree propagation and reforestation. The applied portion closes with a review about the problems associated with projects aiming for sustainable use of forest resources through selective logging imposed upon the project by traditions and political boundary conditions.

The second part of the book describes some effects of selective logging on different groups of animals, ranging from invertebrates to lemurs. It then closes with selected case studies on zoological themes and animal-plant interactions in this dry forest ecosystem.

After a number of books describing the consequences of selective logging in tropical wet forest, the book is the first of its kind that deals with a tropical dry forest. It has been written by 45 contributors from 9 different countries. One of the strongest points of this book is the substantial participation of Malagasy foresters, students and researchers. It demonstrates that despite all problems, the capacity and enthusiasm is right there and available in the country.

The book will be of value for basic researchers, conservationist, applied foresters, politicians, conservation and aid agencies, as well as for the interested layman. Books can be ordered through Dr. Jörg Ganzhorn at a Price of DM 22.00 to be transferred to the account of DPZ-Förderkreis N 680 680 500 at the Volksbank Gottingen (BLZ 260 900 50), keyword: PRSONDER; or US\$ 16.00 to be transferred to the account of J. Ganzhorn (N 2377-367774) at Wachovia Bank & Trust Company, N.A. Durham, NC 27702-2252; keyword: PRSONDER. U.S. banks checks welcome.

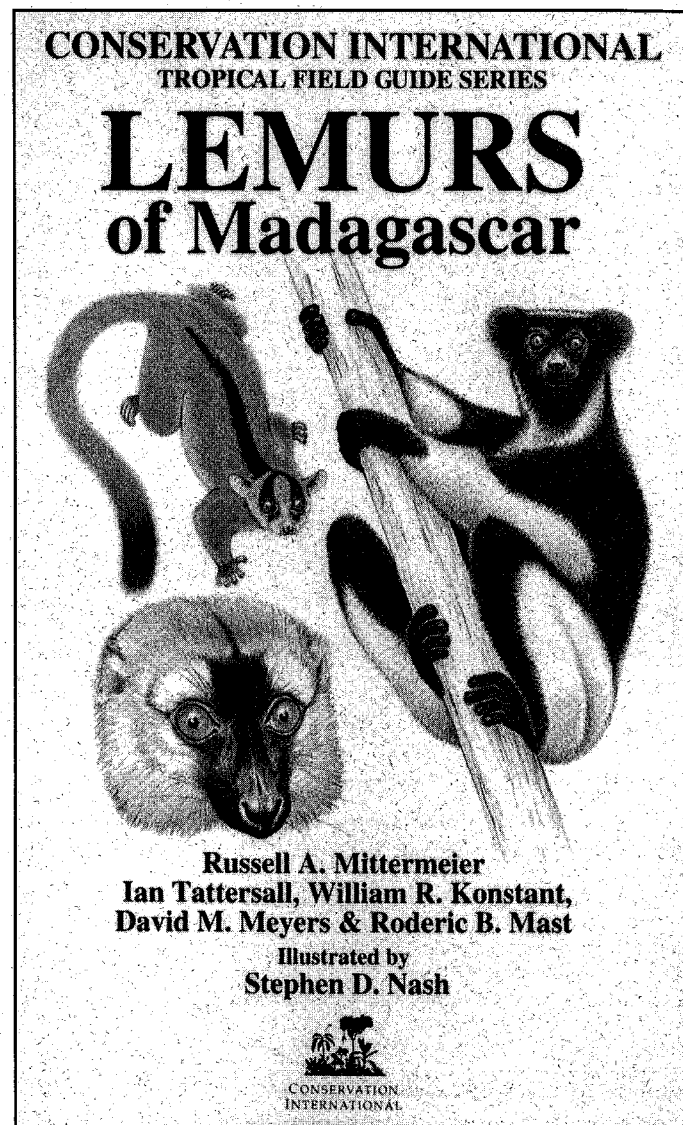
Jörg Ganzhorn
Deutsches Primatenzentrum
Kellnerweg 4
37077 Gottingen
Germany
fax 49 (551) 3851 228
email: jganzho@gwdg.de

New Publication Available: *Madagascar, The Red Island*, by Arlette P. Kouwenhoven with photographs by Toussaint Raharison

In this book, the authors have tried to show the reader some of the many sides of this remarkable island (History, the Red Highlands, The Asia of Madagascar, The Spiny Desert, The Rich East Coast, The Last Rain Forests, and the Land of the Sakalava). This beautiful coffee table style book is available at Rainbow Gardens, Nursery & Bookshop, 1444 E. Taylor Street, Vista, CA 92084 (tel. 619-758-4290, fax. 619-945-8934) or at the publisher, WINCO Publishing, P.O. Box 2212, 2301 CE Leiden, The Netherlands. Fax. 31-71-5142851 and above e-mail address) Price is \$39.95, excluding postage. If ordered at publisher, payment can be done by Visa, Mastercard or Amex.

How to See Lemurs — A Review of *Lemurs of Madagascar*, Conservation International Tropical Field Guide Series, by Russell A. Mittermeier, Ian Tattersall, William R. Konstant, David M. Meyers, and Roderic B. Mast; illustrated by Stephen D. Nash

This book, even more than most, should be judged on two separate criteria: first, what is in it, as a contribution to knowledge in general and second, what is its effect on its intended audience. It succeeds brilliantly in both respects.



What is in it? It is a field guide, with picture and descriptions of all 50 currently recognized species and subspecies of living Malagasy lemurs. There is also a plate of Stephen Nash's reconstructions of extinct giant lemurs which is rapidly becoming one of the most pirated single book illustration on the primate lecture-slide circuit. Gorilla-sized, extinct, *Archeoindris* is in the guide, one shambling hand upraised. The smallest of all primates, *Microcebus myoxinus*, is there as well, even though its description was published only last year (Schmid and Kapeler, 1994). The species and subspecies are succinctly presented, with a paragraph each of identification, geographic range, natural history, and where to see it. Naturally, this is inadequate treatment for any one lemur - it does not satisfy a desire to know every behavioral study of the ringtail, for instance. However, given the expertise of the authors, the facts that are stated are the best we have available, and in the

most accessible format. For rare and recently discovered forms such as the golden-crowned sifaka the information is even better than you can find in published literature. The series of variant *Variagatus* is an object lesson in the difficulty of defining subspecies. Besides, Stephen Nash's drawings are a delight, both the carefully colored diagnostic plates and the action sketches scattered through the text. I am not sure if my favorite is the *Eulemur* inching its way over a branch gap, or the hairy-eared dwarf lemur yearning upward bipedally, the ultimate essence of cute.

In short, everyone who deals professionally with prosimians needs a Lemur Guide in easy reach of the desk. However, the real audience is not the few dozen specialists. It is every ecotourist in Madagascar. Even more ambitious, the Guide aims to change the nature of primate ecotourism.

Madagascar has just, reluctantly, discovered that ecotourism is its biggest foreign exchange earner, outranking coffee and vanilla and sisal and gems. As the Guide points out, Madagascar ranks 123rd out of 153 countries on the UN Human Development Index, largely because of its material poverty. Foreign exchange is an urgent need. But serious ecotourists come in two varieties. There are people who arrive because the landscape and people are exotic and the lemurs indeed enchanting. Then there are twitchers, with their checklists of birds, orchids, succulent plants, and even fungi (One enthused to me, "I added a species to my life list right at the airport"). The point about twitchers is that they may even return again, or stay a long time and visit many different sites, bringing a little tourist cash to each province. Many of the general or cute-lemur tourists are ambitious to know more and see more than they do - but until now they had no guidebook to tell them what exactly it is they could be seeing.

The insidious page in the Guide is the next to last: the lemur checklist. I am going to boast that I've seen 30 of the 50 listed forms in the wild. It's not as many as some authors of this book-but you can bet that I shall plan the next trip to reach a forest that ups my total. That of course makes me think of whole regions I have not seen, and their particular attractions. The reason that Madagascar is speciose is that it is an island of islands, where each forest offers a new landscape, new people, new plants and animals. Madagascar's reserves are what Bernard Meier (codiscoverer of the golden bamboo lemur and rediscoverer of the hairy-eared dwarf lemur) has called a "necklace of pearls"

The pearls of the reserves are threatened, by fire and charcoal burning, by slash-and-burn, and by the relentless economic pressure. The hard-hitting introduction to the Guide shows the galloping lavaka, or gully erosion of the plateau, and names names about failed World Bank and other aid projects. This Guide, however, should do its part to help, if well marketed through travel agents. Simply realizing that there is so much richness out there, so many different creatures and regions to see, should boost tourist presence, and also the pleasure that tourists gain in their visit. The Guide claims to be first of a series. Perhaps it will indeed create a class of primate watchers who travel to find new species in Madagascar and throughout the primate world.

Finally, there is yet another audience among Malagasy scientists themselves. At the conclusion of the April 1995 Workshop on Conservation Priorities, sponsored by the University of Madagascar, Conservation International, and the Global Environment Fund of UNDP, Dr. Mittemeier donated some 50 copies of the Guide to the assembled biologists and anthropologist of Madagascar. And those scientists are the most significant and most appreciative readers of all, for this deceptively straightforward, very important, book.

Lemurs of Madagascar is available by mail from Conservation International (CI) for \$35; please send check payable to CI to Russell A. Mittermeier, CI, 1015 18th Street, NW, Washington, DC 20037 USA.

Alison Jolly

Dept. Of Ecology and Evolutionary Biology
Princeton University

References

Schmid, J; Kappeler, PM 1994. Sympatric mouse lemurs (*Microcebus* spp) in Western Madagascar. *Folia Primatologica* 63: 162-170.

Putting Primates in the Classroom: Instructional Materials for Grades 6-12 from the Wisconsin Regional Primate Research Center

"The Primates" is composed of three colorful slide sets that take full advantage of children's interest in monkeys, apes and the environment.

These slide sets are available on loan for teachers to use in their classrooms. Drawing on the library and resources of the Wisconsin Regional Primate Research

Center, these sets introduce the topics of primate behavior, primate conservation and primate taxonomy. Accurate and accessible, each set contains 72 slides with accompanying annotated script, suggestions for classroom activities, bibliographies and other supporting materials. All three sets have been tested in schools and revised at the suggestion of middle and high school teachers.

"Behavior of Social Animals" examines the social lives of primates (including humans). Topics covered include the interactions of infants with their mothers; the kinds of social groups in which primates live; how primates communicate; friendly and unfriendly behavior; and how infants become part of a social group. Examples are drawn from more than 20 species of primates.

"Conservation of Endangered Species" explores how primates use their habitat, and how threats to the habitat have caused most primate species to become threatened or endangered. Two conservation projects which successfully incorporate education, benefits for the local population, and habitat preservation, are examined in detail.

"Taxonomic Classification" introduces the common features that characterize the Order Primates. Included in the set are photos of members of each major group of primates: Prosimians (8 species), New World monkeys (12 species), Old World monkeys (14 species), and Apes (6 species). Maps and graphics illustrate the geographic distribution and classification of each group.

A fourth slide set, "Conservation and Research — Making the Connection," is in production. It focuses on selected topics in conservation biology, illustrating the ways in which primatologists integrate their research and conservation. This slide set is expected to be available in the winter of 1996.

These slide sets are available as part of the Wisconsin Regional Primate Research Center library's audiovisual collection and can be borrowed for 14 days at no cost for teachers who pick them up in person. They can also be mailed for a \$10 service fee for each set. For more information, or to request these materials, contact Ray Hamel, Special Collections Librarian, at the WRPRC.

Ray Hamel

Wisconsin Regional Primate Research Center
Madison, WI 53715-1299

FANAMBY

UNE OBSESSION :

Conscient de la lente dégradation des ressources humaines et naturelles de notre "Grande Ile" sous la pression du "survivre aujourd'hui",

Fort de l'idée que cette situation ne peut être inéluctable et que l'amélioration des modes de gestion débouchera nécessairement sur un développement économique et l'amélioration des conditions de vie des acteurs,

Et en réponse à la politique de décentralisation en cours de mise en oeuvre qui vise à responsabiliser les gestionnaires dans la valorisation de la part du patrimoine national qui leur revient,

Nous, jeunes malgaches, avons décidé de nous engager pour relever un défi. "FANAMBY" est née. Notre ONG se propose d'assister les collectivités décentralisées dans l'identification et la mise en oeuvre de programmes de développement humain durables.

UNE EQUIPE :

ONG de droit malgache, FANAMBY est orientée vers une approche régionale des problèmes environnementaux.

Quoique composée de membres de formation pluridisciplinaire, FANAMBY, ne pouvant prétendre à une connaissance exhaustive de toutes les régions où elle opère, rallie à chacune de ses interventions les autorités locales, les communautés, les opérateurs économiques, bref tous les acteurs impliqués dans un processus de développement régional pour former avec elle une équipe plus efficace.

UNE EXPERIENCE :

C'est parce qu'il nous a été donné de côtoyer des mois durant les gestionnaires/décideurs sur l'ensemble du pays - lors de l'élaboration d'un mécanisme de mise en oeuvre de l'intégration spatiale initiée par le PNUD - qu'il nous est apparu incontournable de nous mettre à leur service pour les appuyer à relever le défi qui les attend.

Cette expérience ayant permis à l'équipe d'avoir une vision nouvelle des problèmes environnementaux a raffermi sa volonté d'aller encore plus loin:

- * mettre en pratique le processus au niveau d'une région pour tester son bien-fondé,
- * promouvoir un programme plus affiné qu'elle pourra communiquer non seulement aux autres régions mais aussi à l'extérieur.

Inspired by the video *Fanamby*, a new conservation NGO of the same name has been recently founded in Madagascar by a group of young Malagasy, headed by Mr. Serge Rajaobelina. *Fanamby's* mission is stated above.



A close look at the back of Madagascar's 500 Ariari (2500 Malagasy Francs) note reveals a lemur hidden in the vegetation.

Primate Eye Field Studies Supplement

The Primate Society of Great Britain (PSGB) has published the 16th edition of the Current Primate Field Studies Supplement to the Society's newsletter, Primate Eye (supplement to No. 58, February 1996). Julia M Casperd, University of Liverpool, compiled this publication which lists all current field studies by country, and includes the name of the field site, the species studied, the research team, the starting date of the project and its duration and status (planned, current and completed), the aims, and the correspondence and field addresses of the researchers involved.

As pointed out in the introduction, surprisingly the number of field studies registered dropped by more than 50%, from 307 to 144, since the 1994 issue of the supplement. Reasons for this are partially, however, due to sampling bias. The figures from the 1994 issue were artificially inflated due to the backlog of entries received from a 1993 mailing. This is reflected in an increase in the number of current studies in the 1995 survey, 88% compared to 70% in the 1994 survey, and a reduction in completed projects from 24% of all entries in 1994 to 6% in 1995. A number of studies providing inadequate information were also left out.

The geographical distribution of the field projects was found to be fairly even. Africa, Asia and the Americas having the majority (27-31%) with the least in Madagascar (11%). Asia has the most ongoing studies (73%), followed by Africa (66%), the Americas (68%) and Madagascar (50%). Conservation and ecology were the most frequent aims (37% of all studies), and behavioural ecology accounted for 28%. The Cercopithecidae are receiving the most attention (39% of all entries which specified actual species), followed by the Cebidae (26%).

No field studies were listed for Daubentonidae, Lorisidae, and Tarsiidae. This survey also includes a breakdown of the different species currently being studied in each region in relation to their conservation status according to the IUCN Red List of Threatened Animals. Most field studies are being carried out on ubiquitous species that are not threatened, 12% deal with endangered species, 31% deal with vulnerable species. Only about one-third of all the studies focus on threatened species.

This supplement is most valuable in assessing the status of field research efforts, especially in terms of conservation and the occurrence and status of primates in protected areas. Julia Casperd is to be congratulated on this heroic job of winking out the information and organising this survey, the accuracy of which depends solely on the willingness of field researchers to dedicate ten minutes of their time to supply the necessary information. The next survey will be published in February 1998. Please send information on your field projects, using the simple one-page form available from the addresses below. The deadline for receiving forms for inclusion in the 1988 supplement is 1 December, 1997.

Copies of the 1995 edition of Current Primate Field Studies are available at the price of 5.00 each from Julia M. Casperd, Department of Psychology, University of Liverpool, Eleanor Rathbone Building, Myrtle Street, P. O. Box 147, Liverpool L69 3BX, UK, or for the Americas, Anthony B. Rylands, Conservation International do Brasil, Avenida Antonio Abrahão Caram 820/302, 31275-000 Belo Horizonte, Minas Gerais, Brazil.

Anthony Rylands
Conservation International — Brazil
Depto. de Zoologia
UFMG/ICB
Caixa Postal 2486
Pampulha
31.270 Belo Horizonte MG
BRAZIL
Phone [55](31)448-1199, Fax [55](31)441-1412

New Listserv For Users of VORTEX Population Modeling Software

Dr. Robert Lacy announces the creation of a VORTEX e-mail discussion group (listserv). The VORTEX Listserv will facilitate the exchange of ideas, questions, answers, and suggestions among the many users of the VORTEX population modeling program. To sign up for the VORTEX Listserv, send an email message to: vortex-request@bio-3.bsd.uchicago.edu. The subject of the message should be just the word SUBSCRIBE. After signing up, it is possible to send messages to the list at: vortex@bio-3.bsd.uchicago.edu (note that this address is only slightly different from the one to which the initial subscribe request is sent.). Messages will be distributed to everyone on the list.

Robert C. Lacy
Department of Conservation Biology
Brookfield Zoo
Phone (315)682-3571



New Poster Available — The Madagascar Fauna Group has produced a color poster created by CI's famed lemur artist, Stephen Nash, with a strong conservation message, "Imperiled Fauna of Madagascar." Text in Malagasy and English describes seven Malagasy endemics, their ecological significance, conservation status, and the work of the MFG to preserve them. Posters are \$10 from Lilia Teninty, San Francisco Zoo, 1 Zoo Rd., S.F., CA USA 94132, or call (415) 753-7123]

RECENT JOURNAL PUBLICATIONS

- ALBIGNAC, R. and S. PONSARD. 1995. Long-term survey of a population of sifakas (*Propithecus verreauxi coquereli*) in Ankarafantsika Forest (north-west Madagascar). *Folia Primatologica* 64(1-2): 73.
- ALBRECHT, G.H., P.D. JENKINS, and L.R. GODFREY. 1990. Ecogeographic size variation among the living and subfossil prosimians of Madagascar. *American Journal of Primatology* 22(1): 1-50.
- ALTERMAN, L., G.A. DOYLE, and M.K. IZARD, eds. 1995. *Creatures of the Dark: The Nocturnal Prosimians*. New York, Plenum Press, 1995, xiv, 571 pp. (ISBN 0-306-45183-2)
- ANDRIAMASIMANANA, M. 1994. Ecoethological study of free-ranging aye-eyes (*Daubentonia madagascariensis*) in Madagascar. *Folia Primatologica* 62(1-3): 37-45.
- ANONYMOUS. 1994. AZA mongoose lemur SSP formed. *AZA Communiqué* (Aug): 6.
- ANONYMOUS. 1995. Black lemur forest project: Education. *Primate Eye* (57): 20-23.
- ANONYMOUS. 1993. Cambridge Andasibe lemur survey, Madagascar 1993. *Cambridge Expeditions Journal* 28: 37-42.
- ANONYMOUS. 1996. Mongoose lemur SSP master plan. *AZA Communiqué* (Jan): 16 and 18.
- ANONYMOUS. 1994. Ring-tail lemur conservation status and mating behavior. *On The Edge* 48: 9.
- ASHBOURNE, C.J. and A.T.C. FEISTNER. 1994. Acquisition of foraging skills in an infant aye-aye *Daubentonia madagascariensis*. *Cong IPS* 15: 400.
- BENNETT, A.J., J.P. WARD, G.W. MILLIKEN, and D.K. STAFFORD. 1995. Analysis of lateralized components of feeding behavior in the ring-tailed lemur (*Lemur catta*). *Journal of Comparative Psychology* 109(1): 27-33.
- BERGE, C., F.K. JOUFFROY, A. CASINOS, and M. MAJORAL. 1995. Morphometric study of the limb proportions in prosimians: Allometry and locomotor adaptations. *Folia Primatologica* 64(1-2): 75.
- BONNAIRE, L. 1994. Preliminary study of taste perception as a function of diet in six species of Malagasy prosimians. *Folia Primatologica* 62(4): 189.
- BONNAIRE, L. and B. SIMMEN, 1994. Taste perception of fructose solutions and diet in *Lemuridae*. *Folia Primatologica* 63(3): 171-176.
- BONS, N., C. DOUMERGUE, N. MESTRE, and A. PETTER. 1995. Changes in hypothalamic vasopressinergic systems with aging in mouse lemurs (*Microcebus murinus*). *Folia Primatologica* 64(1-2): 75.
- BONS, N., V. JALLAGEAS, S. SILHOL, N. MESTRE-FRANCES, A. PETTER, and A. DELACOURTE. 1995. Immunocytochemical characterization of Tau proteins during cerebral aging of the lemurian primate *Microcebus murinus*. *Comptes Rendus de L'Academie des Sciences* (Ser III)318: 77-83. (French summary)
- BONS, N. and N. MESTRE. 1993. [Similarities between amyloid in a lemurian primate brain and in Alzheimer's disease patient.] *Comptes Rendus des Seances de la Societe de Biologie et de Ses Filiales* 187(4): 516-525.
- BONS, N., N. MESTRE, K. RITCHIE, A. PETER, M. PODLISNY, and D. SELKOE. 1994. Identification of amyloid beta protein in the brain of the small, short-lived lemurian primate *Microcebus murinus*. *Neurobiology of Aging* 15(2): 215-220.
- BROCKMAN, D.K. 1995. Reproduction and mating system of Verreaux's sifaka, *Ptilinopus verreauxi*, at Beza Mahafaly, Madagascar-[publ. 1994.]. *Dissertation Abstracts International* A55(7): 2032. (ordering info: Order #AAD94-30260. University Microfilms, Inc., Ann Arbor, MI 48106)
- BROCKMAN, D.K., P.L. WHITTEN, and E. RUSSELL. 1994. Hormonal correlates of reproduction and mating in free-ranging female *Propithecus verreauxi* at Beza Mahafaly, Madagascar. *American Journal of Primatology* 33(3): 198.
- BURNEY, D.A. 1993. Late Holocene environmental change in arid southwestern Madagascar. *Quaternary Research* 40:98-106.
- BUTLER, P.M., D.K. STAFFORD, and J.P. WARD. 1995. Relative efficiency of preferred and nonpreferred patterns of lateralized foraging in the gentle lemur (*Haplemur griseus*). *American Journal of Primatology* 36(1): 71-77.
- CAMPBELL, J. 1994. Golden-crowned sifaka born at Duke University Primate Center. *AZA Communiqué* (May): 18.
- CARROLL, J.B. and J.C. BEATTIE. 1993. Maintenance and breeding of the aye-aye *Daubentonia madagascariensis* at the Jersey Wildlife Preservation Trust. *DODO [Journal of Wildlife Preservation Trusts]* 29: 45-54.
- CARROLL, J.B. and D.M. HARING. 1994. Maintenance and breeding of aye-eyes (*Daubentonia madagascariensis*) in captivity: A review. *Folia Primatologica* 62(1-3): 54-62.
- CHARLES-DOMINIQUE, P. 1995. Food distribution and reproductive constraints in the evolution of social structure: Nocturnal primates and other mammals. Pp 425-438 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- COCKS, L.R. 1993. The effect of public presence on cage utilisation by vervet monkeys (*Cercopithecus aethiops*) and ringtailed lemurs (*Lemur catta*) in Perth Zoo. *Australian Primatology* 7(4): 9.
- COFFMAN, B. 1995. SSP report: Mongoose lemur (*Eulemur mongoz*). *AZA Communiqué* (Jan): 7-8.
- COFFMAN, B.S. 1994. *Cheirogaleid North American Regional Studbook: Fat-Tailed Dwarf (Cheirogaleus medius), Lesser Mouse Lemur (Microcebus murinus), Coquerel's Mouse Lemur (Mirza coquereli)*. Update, June 1994. Durham, Duke University Primate Center, 15 pp.
- COFFMAN, B.S. 1995. The nocturnal prosimian colony at the Duke University Primate Center. Pp. 527-530 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- COFFMAN, B.S., W. R. HESS, K.E. GLANDER, P.E. FEESER, and E.L. SIMMONS. 1993. Management of a breeding colony of aye-eyes (*Daubentonia madagascariensis*) at the Duke University Primate Center. *AAZPA [American Association of Zoological Parks and Aquariums] Regional Conference Proceedings* (1993). 161-167.
- COHN, J.P. 1993. Madagascar's mysterious aye-eyes. *Bioscience* 43(10): 668-671.
- COLQUHOUN, I.C. 1994. Drinking behavior and left-handed preference among *Eulemur macaco macaco* at Ambato Massif, Madagascar. *American Journal of Physical Anthropology* (Suppl. 18): 69.
- CORBIN, G.D. and J. SCHMID. 1995. Insect secretions determine habitat use patterns by a female lesser mouse lemur (*Microcebus murinus*). *American Journal of Primatology* 37(4): 317-324.
- CROMPTON, R.H. 1995. "Visual predation," habitat structure, and the ancestral primate niche. Pp. 11-30 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- CROMPTON, R.H., W.I. SELLERS, and M.M. GUENTHER. 1993. Energetic efficiency and ecology as selective factors in the saltatory adaptation of prosimian primates. *Proceedings of the Royal Society of London* B254(1339): 41-45.
- CROVELLA, S., D. MONTAGNON, and Y. RUMPLER. 1995. Highly repeated DNA sequences and systematics of Malagasy primates. *Human Evolution* 10(1): 35-44.
- CUCE, L. 1994. Changes in general activity in behaviour of *Haplemur simus* (Primates, *Lemuridae*), following an environmental change at the Paris Zoological Park. *Folia Primatologica* 62(4): 193-194.
- DAGOSTO, M. 1995. Seasonal variation in positional behavior of Malagasy lemurs. *International Journal of Primatology* 16(5): 807-833.
- DAGOSTO, M. 1994. Testing positional behavior of Malagasy lemurs: A randomization approach. *American Journal of Physical Anthropology* 94(2): 189-202.
- DASILVA, G. 1993. Primate conservation: An assessment of progress. Pp. 115-142 in *Conservation in Progress*. F.B. Goldsmith and A. Warren, eds. New York, John Wiley. (ISBN 0471936413)
- DELACOURTE, A., P.-E. SAUTIERE, A. WATTEZ, C. MOURTON-GILLES, A. PETTER, and N. BONS. Biochemical characterization of Tau proteins during cerebral aging of the lemurian primate *Microcebus murinus*. *Comptes Rendus de L'Academie des Sciences* (Ser III)318(1): 85-89. (French summary)
- DEL PERO, M.R., S. CROVELLA, P. CERVELLA, G. ARDITO, et al. 1995. Molecular phylogeny of Malagasy lemurs as revealed by mitochondrial DNA sequence analysis. *Primate Report* 42: 6-7.
- DEMES, B., W.L. JUNGERS, T.S. GROSS, and J.G. FLEAGLE. 1994. Substrate compliance and leaping kinetics in lemurs. *Journal of Morphology* 220(3): 340.
- DEMES, B., W. L. JUNGERS, T.S. GROSS, and J.G. FLEAGLE. Takeoff and landing forces of leaping sifakas and bamboo lemurs. *American Journal of Physical Anthropology*. (Suppl. 18): 79.
- DEMES, B., W.L. JUNGERS, and K. SELPIEN. 1991. Body size, locomotion, and long bone cross-sectional geometry in indriid primates. *American Journal of Physical Anthropology* 86: 537-547.
- DEW, L. and P.C. WRIGHT. 1994. Conservation implications of seed dispersal by primates in a Malagasy rainforest (Ranomafana National Park). *IPS Congress* 15: 124.
- DHENAIN, M., J.L. MICHOT, J.L. PICQ, A. VOLK, and F. BOLLER. 1995. Behaviour and magnetic resonance imaging of the brain in old mouse lemurs. *Folia Primatologica* 64(1-2): 78.
- DIXSON, A.F. 1995. Sexual selection and ejaculatory frequencies in primates. *Folia Primatologica* 64(3): 146-152.

- DIXSON, A.F. 1995. Sexual selection and the evolution of copulatory behavior in nocturnal prosimians. Pp 93-118 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- DOURNARD, P., J.-P. GAUTRON, E. PATTOU, N. BONN, N. MESTRE, A. PETTER, C. KORDON, and J. EPELBAUM. 1994. Choline acetyltransferase and somatostatin levels in aged *Microcebus murinus* brain. *Neurobiology of Aging* 15(6): 727-731.
- DOWNMAN, M. 1993. Breeding behavior in the black and white ruffed lemur *Varecia v. variegata* at the Cotswold Wild Life Park. *Ratel* 20(3): 87-91.
- DOYLE, G.A. 1995. A Historical perspective. Pp. vii-ix in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- DUCKWORTH, J. W. 1993. Feeding Damage Left in Bamboos, Probably by Aye-Ayes. *International Journal of Primatology* 14(6): 926-931.
- DUCKWORTH, J.W., M.I. EVANS, A.F.A. HAWKINS, R.J. SAFFORD, and R.H. WILKINSON. 1995. The lemurs of Marojejy Strict Nature Reserve, Madagascar: A status overview with notes on ecology and threats. *International Journal of Primatology* 16(3): 545-559.
- DUTRILLAUX, W.R. and Y RUMPLER. 1995. Phylogenetic relations among *Prosimii* with special reference to Lemuriforms and Malagasy nocturnals. Pp. 141-150 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- ERICKSON, C.J. 1995. Feeding sites for extractive foraging by the aye-aye *Daubentonia madagascariensis*. *American Journal of Primatology* 35(3): 235-240.
- ERICKSON, C.J. 1995. Perspectives on percussive foraging in the aye-aye (*Daubentonia madagascariensis*). Pp 251-259 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- ERICKSON, C.J. 1994. Tap-scanning and extractive foraging in aye-eyes, *Daubentonia madagascariensis*. *Folia Primatologica* 62(1-3): 125-135.
- ERICKSON, C.J., S. NOWICKI, and L.J. DOLLAR. 1994. Percussive foraging and the detection of subsurface features by the aye-aye, *Daubentonia madagascariensis*. *American Journal of Primatology* 33(3): 206-207.
- EVANS, C. and A. SCHILLING. 1995. The accessory (vomeronasal) chemoreceptor system in some prosimians. Pp. 393-411 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- FEESER, P. 1994. Haematology and serum biochemistry values in aye-eyes (*Daubentonia madagascariensis*) at the Duke University Primate Center. *Folia Primatologica* 62(1-3): 175-178.
- FEISTNER, A.T.C. 1994. Biology and conservation of *Haplemur griseus alaotrensis* at Lac Alaotra. *IPS Congress* 15: 122.
- FEISTNER, A.T.C. and C.J. ASHBOURNE. 1994. Infant development in a captive-bred aye-aye (*Daubentonia madagascariensis*) over the first year of life. *Folia Primatologica* 62(1-3): 74-92.
- FEISTNER, A.T.C. and J.B. CARROLL. 1995. Aye-aye conservation: The role of the Jersey Wildlife Preservation Trust. Pp. 519-525 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- FEISTNER, A.T.C. and J.B. CARROLL. 1993. Breeding aye-eyes: An aid to preserving biodiversity. *Biodiversity and Conservation* 2(3): 283-289.
- FEISTNER, A.T.C., E.C. PRICE, and G.W. MILLIKEN. 1994. Preliminary observations on hand preference for tapping, digit-feeding and food-holding in captive aye-eyes (*Daubentonia madagascariensis*). *Folia Primatologica* 62(1-3): 136-141.
- FEISTNER, A.T.C. and M. RAKOTOARINOSY. 1993. Conservation of gentle lemur *Haplemur griseus alaotrensis* at Lac Alaotra, Madagascar: Local knowledge. *DODO [Journal of Wildlife Preservation Trusts]* 29:54-65.
- FEISTNER, A.T.C. and E.J. STERLING. 1994. Aye-eyes: Out of the dark and into the light? *Folia Primatologica* 62(1-3): 6-7.
- FIGUEROA, F., C. O'HUIGIN, H. TICHY, and J. KLEIN. 1994. The origin of the primate Mhc-DRB genes and allelic lineages as deduced from the study of prosimians. *Journal of Immunology* 152(9): 4454-4465.
- FITCH-SNYDER, H. 1995. The role of studbooks in conservation and captive management of nocturnal prosimians. Pp. 513-514 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- FREED, B.Z. 1994. Feeding preferences of crowned lemurs and Sanford's lemurs in northern Madagascar. *American Journal of Primatology* 33(3): 208-209.
- GANZHORN, J.U. 1994. Lemurs as indicators for habitat change. Pp. 51-56 in *Current Primatology, Vol 1: Ecology and Evolution*. B. Thierry, J.R. Anderson, J.J. Roeder, and N. Herrenschmidt, eds. Strasbourg, University of Louis Pasteur. (ISBN 2-907531-00-X)
- GANZHORN, J.U. 1995. Low-level forest disturbance effects on primary production, leaf chemistry, and lemur populations. *Ecology* 76(7): 2084-2096.
- GANZHORN, J.U., and P.M. KAPPELER. 1993. Lemuren Madagaskars: Tests zur Evolution von Primaten-gemeinschaften. *Naturwissenschaften* 80:195-208. (Translated into English as: Kappeler, P.M., and Ganzhorn, J.U. 1993. The evolution of primate communities and societies in Madagascar. *Evolutionary Anthropology* 2:159-171.)
- GAUR, L.K. and J. ANDERSON. 1994. Prosimian MHC-DQB allelic polymorphisms. *Experimental and Clinical Immunogenetics* 11(1): 45-52.
- GAUTHIER, C.-A., M. SANTINI-PALKA, and T. PAPIN. 1995. Preservation of endangered species by captive breeding: The case of the aye-aye (*Daubentonia madagascariensis*) at Paris Zoological Park. *Folia Primatologica* 64(1-2): 80.
- GHOSH, P., M. O'DELL, P.T. NARASIMHAN, S.E. FRASER, and R.E. JACOBS. 1994. Mouse lemur microscopic MRI brain atlas. *Neuroimage* 1(4): 345-349.
- GIBBONS, E.F. JR. 1995. Conservation of primates in captivity. Pp. 485-501 in *Conservation of Endangered Species in Captivity*. Gibbons, E.F., Jr., B.S. Durrant, and A.J. Demarest, eds. Albany, SUNY Press. (ISBN 0-7914-1911-8)
- GLANDER, K.E. 1994. Aye-aye weight and gestation. *American Journal of Physical Anthropology*. (Suppl. 18): 94.
- GLANDER, K.E. 1994. Morphometrics and growth in captive aye-eyes (*Daubentonia madagascariensis*). *Folia Primatologica* 62(1-3): 108-114.
- GLANDER, K.E., D. HARING, J. CAMPBELL, W. HESS, and P. FEESER. 1993. Management of an overweight prosimian. *AAZPA [American Association of Zoological Parks and Aquariums] Regional Conference Proceedings (1993)*: 205-211.
- GLASER, D., J.M. TINTI, and C. NOFRE. 1995. Evolution of the sweetness receptor in primates. I. Why does allitame taste sweet in all prosimians and simians, and aspartame only in Old World simians? *Chemical Senses* 20(5): 573-584.
- GODFREY, L.R., S.K. LYON, and M.R. SUTHERLAND. 1993. Sexual dimorphism in large-bodied mammals: The case of the subfossil lemurs. *American Journal of Physical Anthropology* 90: 315-334.
- GODFREY, L.R., E.L. SIMONS, P.S. CHATRATH, and B. RAKOTOSAMIMANANA. 1990. A new fossil lemur (*Babakotia*, Primates) from northern Madagascar. *C. R. Acad. Sci., Paris* 310 (Série II): 81-87.
- GODFREY, L.R., M.R. SUTHERLAND, R.R. PAINE, F.L. WILLIAMS, D.S. BOY, and M. VUILLAUME-RANDRIAMANANTENA. 1995. Limb joint surface areas and their ratios in Malagasy lemurs and other mammals. *American Journal of Physical Anthropology* 97(1): 11-36.
- GODFREY, L.R., M.R. SUTHERLAND, A.J. PETTO, and D.S. BOY. 1991. Size, space and adaptation in some subfossil lemurs from Madagascar. *American Journal of Physical Anthropology*. 81: 45-66.
- GOIX, E. 1993. L'utilisation de la main chez le Aye-aye en captivité (*Daubentonia madagascariensis*) (*Prosimiens, Daubentoniides*). *Mammalia* 57(2): 171-188.
- GOODMAN, S.M. 1994. The enigma of antipredator behavior in lemurs: Evidence of a large extinct eagle on Madagascar. *International Journal of Primatology* 15(1): 129-134.
- GOODMAN, S.M. 1993. A Reconnaissance of Ile Sainte Marie, Madagascar: The Status of the Forest, Avifauna, Lemurs and Fruit Bats. *Biological Conservation* 65: 205-212.
- GOODMAN, S.M., S. O'CONNOR, and O. LANGRAND. 1993. A Review of Predation on Lemurs: Implications for the Evolution of Social Behavior in Small, Nocturnal Primates. Pp 51-65 in *Lemur Social Systems and Their Ecological Basis*. Kappeler, P.M. and J. U. Ganzhorn, eds. New York, Plenum Press.
- GOULD, L. 1995. Affiliative behavior between adults males and immatures in ringtailed lemurs. *American Journal of Primatology* 36(2): 126.
- GOULD, L. 1994. Male-male affiliative behavior in naturally occurring adult male ringtailed lemurs (*Lemur catta*). *American Journal of Physical Anthropology* (Suppl 18): 96-97.
- GOULD, L. 1994. Male-female affiliative behavior in ringtailed lemurs. *American Journal of Primatology* 33(3): 212.
- GOULD, L. 1995. Patterns of affiliative behavior in adult male ringtailed lemurs (*Lemur catta*) at the Beza-Mahafaly Reserve, Madagascar. [publ. 1994]. *Dissertation Abstracts International* A55(11): 3556. (ordering info: Order #AADAA-19509913. University Microfilms, Inc., Ann Arbor, MI 48106)
- GRESSE, M., M.C. LACOUR, I. FORNASIERI, and J.J. ROEDER. 1994. Targeting aggression in Lemur fulvus albifrons. Pp. 233-239 in *Current Primatology, Vol II: Social Development, Learning and Behaviour*. J.J. Roeder, B. Thierry, J.R. Anderson, and N. Herrenschmidt, eds. Strasbourg, University of Louis Pasteur. (ISBN 2-907531-01-8)
- GUIRARD, I. and N. BONN. 1995. Influence of age and amyloid plaques on the occurrence of spontaneous atherosclerotic aortic lesions in mouse lemurs (*Microcebus murinus*). *Folia Primatologica* 64(1-2): 82.
- HAFEN, T. and E. Zimmerman. 1994. Deme-specific vocalisations in mouse lemurs (*Microcebus murinus*) evidence for dialects? *IPS Congress* 15: 114.

- HAMRICK, M.W. 1996. Functional morphology of the lemuriform wrist joints and the relationship between wrist morphology and positional behavior in arboreal primates. *American Journal of Anthropology* 99(2): 319-344.
- HARING, D. 1995. *Propithecus International Studbook*. 1st ed., Durham, Duke University Primate Center, 42pp.
- HARING, D.M., W.R. HESS, B.S. COFFMAN, E.L. SIMONS, and T.M. OWENS. 1994. Natural history and captive management of the Aye-aye at the Duke University Primate Center, Durham. *International Zoo Yearbook* 33: 201-219.
- HEARN, G.W., V. ANDERS, M. HUMAN, and C. SHEPARD. 1993. Behavioral observations on two pairs of mongoose lemurs (*Eulemur mongoz*) housed in adjacent cages at the Philadelphia Zoo. *AAZPA Annual Conference Proceedings (1993)*: 290-291. (ISBN 3925382364)
- HEMINGWAY, C.A. 1995. Feeding and reproductive strategies of the Milne-Edwards' sifaka, *Propithecus diadema edwardsi*. *Dissertation Abstracts International* B56(6): 3082. (ordering info: Order #AADAA-19533037. University Microfilms, Inc., Ann Arbor, MI 48106)
- HEMINGWAY, C.A. 1994. Spatial relations in three groups of the diademmed sifaka, *Propithecus diadema edwardsi*, in southeastern Madagascar. *American Journal of Physical Anthropology*. (Suppl 18): 105.
- HOLLESCHAU, A.M. and W.B. RATHBUN. 1994. The effects of age on glutathione peroxidase and glutathione reductase activities in lenses of Old World simians and prosimians. *Current Eye Research* 13(5): 331-336.
- HOOD, L.C. 1994. Infanticide among ringtailed lemurs (*Lemur catta*) at Berenty Reserve, Madagascar. *American Journal of Primatology* 33(1): 65-69.
- HOSEY, G.R. and M. JACQUES. 1994. Interactions between infant ring-tailed lemurs (*Lemur catta*) and their parents and older siblings. Pp. 315-319 in *Current Primatology, Vol II: Social Development, Learning and Behaviour*. J.J. Roeder, B. Thierry, J.R. Anderson, and N. Herrenschmidt, eds. Strasbourg, University of Louis Pasteur. (ISBN 2-907531-01-8)
- IZARD, K., B. EPPS, and E. SIMONS. 1995. Reproduction in the brown lemur (*Eulemur fulvus fulvus*). *American Journal of Primatology* 36(2): 129.
- IZARD, K., C. SAVAGE, and E. SIMONS. 1994. Reproduction in Sanford's lemur (*Eulemur fulvus sanfordi*). *American Journal of Primatology* 33(3): 217.
- JACOBSON, A.S. and L.T. NASH. 1995. Behavioral thermoregulation in a captive population of ring-tailed lemurs (*Lemur catta*). *American Journal of Primatology* 36(2): 130.
- JACQUES, M. 1994. Exploration and play in ring-tailed lemurs (*Lemur catta*). *IPS Congress* 15: 68.
- JALLAGEAS, V. and N. BONS. 1995. Detection of apolipoprotein E in the brain of mouse lemurs (*Microcebus murinus*). *Folia Primatologica* 64(1-2): 83.
- JENKINS, P.D. and G.H. ALBRECHT. 1991. Sexual dimorphism and sex ratios in Madagascar prosimians. *American Journal of Primatology* 24: 1-14.
- JOHANN, A. 1992. [Color observation in lemurs.] *Zoologische Garten* 62(6): 422-424. (German)
- JOHANN, A. 1994. Prosimians in European zoos -the work of the prosimian Taxon Advisory Group. *IZN [International Zoo News]* 41(7): 13-16.
- JOLLY, A. 1994. Female dominance and social structure in lemurs. 1994. *IPS Congress* 15: 285.
- JUNG, K.Y. 1994. [Confirmation of the occurrence of Robertsonian translocation during lemur evolution by localization of stromelysin II DNA sequences on lemur chromosomes via in situ hybridization.] *Hanguk Yujon Hakhoe Chil Korean Journal of Genetics* 16(1): 9-16. (Korean w/ English summary)
- JUNGERS, W.L., L.R. GODFREY, E.L. SIMONS, and P.S. CHATRATH. 1995. Subfossil *Indri* from the Ankarana Massif of northern Madagascar. *American Journal of Physical Anthropology* 97: 357-366.
- JUNGERS, W.L., L.R. GODFREY, E.L. SIMONS, P.S. CHATRATH, and B. RAKOTOSAMIMANANA. 1991. Phylogenetic and functional affinities of *Babakotia radofilai*, a new fossil lemur from Madagascar. *Proc. Natl. Acad. Sci., USA* 88: 9082-9086.
- KAPPELER, P.M. 1990a. The evolution of sexual size dimorphism in prosimian primates. *American Journal of Primatology* 21: 201-214.
- KAPPELER, P.M. 1990b. Female dominance in *Lemur catta*: More than just female feeding priority? *Folia Primatologica* 55: 92-95.
- KAPPELER, P.M. 1995. Life history variation among nocturnal prosimians. Pp. 75-92 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- KAPPELER, P.M. 1991. Patterns of sexual dimorphism in body weight among prosimian primates. *Folia Primatologica* 57: 132-146.
- KAPPELER, P.M. and J.U. GANZHORN. 1993. The evolution of primate communities and societies in Madagascar. *Evolutionary Anthropology* 2(5): 159-171.
- KAPPELER, P.M. and J.U. GANZHORN, eds. 1993. *Lemur social systems and their ecological basis*. Plenum, New York.
- KATZ, A.S. 1995. The Madagascar fauna group. Pp. 515-517 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- KAUFMAN, R. 1991. Female dominance in semifree-ranging black-and-white ruffed lemurs, *Varecia variegata variegata*. *Folia Primatologica* 57: 39-41.
- KIMURA, T. 1994. [Muscle fiber composition of the anterior tibial muscle in several species of prosimians.] *Reichurui Kenkyu/ Primate Research* 10(1): 25-31. (Japanese w/ English summary)
- KOPERA, D., H.P. SOYER, and H. KERL. 1994. Human eccrine hamartoma of the forearm-antebrachial organ of the ringtailed lemur (*Lemur catta*): A possible phylogenetic relationship? *American Journal of Dermatopathology* 16(3): 275-279.
- KOYAMA, N. 1993. [Dominance relationships of ring-tailed lemurs, at Berenty, Madagascar.] *Reichurui Kenkyu/ Primate Research* 9(3): 259.
- KOYAMA, N. 1994. [Troop division and home range take-over of ring-tailed lemurs (*Lemur catta*) at Berenty, Madagascar.] *Reichurui Kenkyu/ Primate Res* 10(2): 130.
- KRESS, W.J., G.E. SCHATZ, M. ANDRIANIFAHANANA, and H.S. MORLAND. 1994. Pollination of *Ravenala madagascariensis* (Strelitziaceae) by lemurs in Madagascar: Evidence for an archaic coevolutionary system? *American Journal of Botany* 81 (5): 542-551.
- LACOUR, M.C., M. GRESSE, and M. PAILLETTE. 1994. Demographic parameters from a 23-year breeding population of *Lemur fulvus albifrons*. Pp. 249-253 in *Current Primatology Vol III: Behavioural Neuroscience, Physiology and Reproduction*. J.R. Anderson, J.J. Roeder, B. Thierry, and N. Herrenschmidt, eds. Strasbourg, University of Louis Pasteur. (ISBN 2-907531-02-6)
- LECLERCQ, B. 1994. Changes in social behaviour in *Hapalemur griseus* (primates, *Lemuridae*) after separation from a family group at the Paris Zoological Park. *Folia Primatologica* 62(4): 202.
- LECLERCQ, B. and M. SANTINI-PALKA. 1995. Comparative study of the feeding behaviour of two folivorous lemur species (*Hapalemur simus* and *Hapalemur griseus*) at the Zoological Park of Paris. *Folia Primatologica* 64(1-2): 84.
- LESSNAU, R.G. and H.S. MORLAND. 1995. Release of free-ranging black and white ruffed lemurs (*Varecia variegata variegata*) on St. Catherine's Island. *American Journal of Primatology* 36(2): 138.
- LESSNAU, R.G., L.L. TAYLOR, and W.L. THOMPSON. 1993. Infant transfer patterns in a captive group of ringtailed lemurs (*Lemur catta*) at the Detroit Zoological Park. *AAZPA [American Association of Zoological Parks and Aquariums] Regional Conference Proceedings (1993)*: 254-259.
- LESSNAU, R.G. and L.L. TAYLOR. 1994. Infant transfer patterns in captive ringtailed lemurs (*Lemur catta*). *American Journal of Primatology* 33(3): 223-224.
- MAAS, M.C. 1994. Enamel microstructure in *Lemuridae* (Mammalia, Primates): Assessment of variability. *American Journal of Physical Anthropology* 95(2): 221-241.
- MACEDONIA, J.M. 1993. The vocal repertoire of the ringtailed lemur (*Lemur catta*). *Folia Primatologica* 61(4): 186-217.
- MACEDONIA, J.M. and STANGER, K.F. 1994. Phylogeny of the Lemuridae revisited: Evidence from communication signals. *Folia Primatologica* 63(1): 1-43.
- MANFREDI ROMANINI, M.G., E. RONCHETTI, D. FORMENTI, and C. PELLICCIARI. 1993. The role of DNA resisting C-Banding pretreatment in *Eulemur* karyotype diversification. *Istituto Lombardo Accademia di Scienze e Lettere Rendiconti Scienze Chimiche e Fisiche, Geologiche, Biologiche e Mediche* B127(1): 23-33.
- MARTIN, R.D. Prosimians: From obscurity to extinction? Pp. 535-563 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- MASON, A.M., L.D. WOLFE, and J.C. JOHNSON. 1995. Hand preference in the sifaka (*Propithecus verreauxi coquereli*) during feeding in captivity. *Primates* 36(2): 275-280.
- MASON, G. 1991. Grubs on tap for the aye-aye. *New Scientist* 130(1774): 23.
- MASTERS, J.C., R.J. RAYNER, and I. TATTERSALL. 1995. Pattern and process in strepsirrhine phylogeny. Pp. 31-44 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- MEIER, B. and Y. RUMPLER. 1992. Enzyme variability in island and mainland populations of black lemur (*Eulemur macaco*): A contribution to conservation biology. *Karger Gazette* 54: 10-12.
- MESHIK, V.A. and B. GRUZINSKAYA. 1993. Behavioral adaptation during pair formation in two species of prosimians. *Primate Report* 37: 57-67.
- MEYERS, D.M. 1995. The effects of resource seasonality on behavior and reproduction in the golden-crowned sifaka (*propithecus tattersalli*, Simons, 1988) in three Malagasy forests-[publ. 1993]. *Dissertation Abstracts International* A55(11): 3556. (ordering info: Order #AADAA-19508755. University Microfilms, Inc., Ann Arbor, MI 48106)
- MILLER, R.I. and J.H. ALLEN. 1994. Mapping the elements of biodiversity: The rare species of Madagascar. Pp. 37-51 in *Mapping the Diversity of Nature*. R.I. Miller, ed. London, Chapman and Hall. (ISBN 0-412-45510-2)

- MILLIKEN, G.W. 1995. Right hand preference and performance biases in the foraging behavior of the aye-aye. Pp. 261-292 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- MITTERMEIER, R.A., W.R. KONSTANT, and R.B. MAST. 1994. Use of Neotropical and Malagasy primate species in biomedical research. *American Journal of Primatology* 34(1): 73-80.
- MORLAND, H.S. 1990. Parental behavior and infant development in ruffed lemurs (*Varecia variegata*) in a northeast Madagascar rain forest. *American Journal of Primatology* 20: 253-265.
- MYHER, J.J., A. KUKSIS, C. TILDEN and O.T. OFTEDAL. 1994. A cross-species comparison of neutral lipid composition of milk fat of prosimian primates. *Lipids* 29(6): 411-419.
- NASH, L.T. 1994. Behavior and habitat use of Lepilemur at Beza Mahafaly Special Reserve, Madagascar. *American Journal of Primatology* 33(3): 230.
- NEVEN, H., D. MONTAGNON, B. LUDES, and Y. RUMPLER. 1995. Genetic analysis of captive and wild populations of prosimians by the RAPD method: Implications for management in captivity. *Folia Primatologica* 64(1-2): 88.
- NIESCHALK, U. and B. DEMES. 1993. Biomechanical determinants of reduction of the second ray in Lorissinae. Pp 225-234 in *Hands of Primates*. Preuschoft, H. and D.J. Chiver, eds. New York, Springer-Verlag. (ISBN 0-387-82385-9)
- NILSSON, L.A., E. RABAKONANDRIANINA, B. PETTERSSON, and R. GRUENMEIER. 1993. Lemur pollination in the Malagasy rainforest liana *Strongylodon craveniae* (Leguminosae). *Evolutionary Trends in Plants* 7(2): 49-56.
- OXNARD, C.E., R.H. CROMPTON, and S.S. LIEBERMAN. 1990. *Animal Lifestyles and Anatomies: The Case of Prosimian Primates*. Seattle, University of Washington Press.
- OVERDORFF, D.J. 1993. Similarities, Differences, and Seasonal Patterns in the Diets of *Eulemur rubriventer* and *Eulemur fulvus rufus* in the Ranomafana National Park, Madagascar. *International Journal of Primatology* 14 (5): 721-753.
- OVERDORFF, D.J. and A.M. MERELENDER. 1994. Social organization in *Eulemur fulvus rufus* in Madagascar. *American Journal of Physical Anthropology* (Suppl 18): 156.
- OVERDORFF, D.J. and M.A. RASMUSSEN. 1995. Determinants of nighttime activity in "diurnal" lemurid primates. Pp. 61-74 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- PAIN, S. 1994. Lemur mum breeds fresh hope. *New Scientist* 141(1915): 8.
- PAOLINI, M., M.I. SERENO, R. JEO, A. DOBBINS, et al. 1994. Organization of extrastriate cortex in the primitive primates, Cheirogaleus and Lemur. *Soc Neurosci Abstracts* 20(Pt 1): 427.
- PEREIRA, M.E. 1994. Life history and social cognition in gregarious primates: Robotic monkeys and clever lemurs? *Primate Eye* (52): 28-29.
- PEREIRA, M.E., R. KAUFMAN, P.M. KAPPELER, and D.J. OVERDORFF. 1990. Female dominance does not characterize all of the *Lemuridae*. *Folia Primatologica* 55: 96-103.
- PEREIRA, M.E. and C.M. POND. 1995. Organization of white adipose tissue in *Lemuridae*. *American Journal of Primatology*. 35(1): 1-13.
- PERRET, M. 1995. Photoperiodic rhythms and longevity in the lesser mouse lemur (*Microcebus murinus*). *Folia Primatologica* 64(1-2): 88-89.
- PERRET, M. 1995. Social interactions and reproductive capacities in the lesser mouse lemur. *Folia Primatologica* 64(1-2): 89.
- PERRET, M. 1994. Social signals and their influences on reproduction in the lesser mouse lemur. Pp. 45-47 in *Current Primatology, Vol II: Social Development, Learning and Behaviour*. J.J. Roeder, B. Thierry, J.R. Anderson, and N. Herrenschmidt, eds. Strasbourg, University of Louis Pasteur. (ISBN 2-907531-01-8)
- PERRET, M. 1995. Chemocommunication in the reproductive function of mouse lemurs. Pp. 377-392 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- PETTERSSON, B. and L.A. NILSSON. 1994. [Lemurs with odd jobs.] *Fauna and Flora* 89(1): 11-14. (Swedish)
- PICQ, J.-L. 1995. Effects of aging upon recent memory of *Microcebus murinus*. *Aging (Milano)* 7(1): 17-22.
- PICQ, J.L. 1994. The mouse lemur: a new animal model for cerebral aging. *Folia Primatologica* 62(4): 207.
- PORTEOUS, I.S. 1994. Disease and inbreeding in lemur populations of *Lemur catta* and *Propithecus verreauxi* in Southern Madagascar, preliminary study. *IPS Congress* 15: 406.
- PORTON, I. 1995. Captive conservation and the role of the AZA prosimian advisory group. Pp. 511-512 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- PREUSCHOFT, H., H. WITTE, and M. FISCHER. 1995. Locomotion in nocturnal prosimians. Pp. 453-472 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- PRICE, E.C. and A.T.C. FEISTNER. 1994. Responses of captive aye-ayes (*Daubentonia madagascariensis*) to the scent of conspecifics: A preliminary investigation. *Folia Primatologica* 62 (1-3): 170-174.
- PRIVAT, N. and N. BONS. 1995. Age-related loss of Purkinje cells in the mouse lemur (*Microcebus murinus*). *Folia Primatologica* 64(1-2): 90.
- RABARIVOLA, C., B. MEIER, C. LANGER, W. SCHEFFRAHN et al. 1994. Population genetics of *Eulemur macaco* on Nosy Be, Nosy Komba and the Peninsula of Ambato, Madagascar. *IPS Congress* 15: 183.
- RAKOTOSAMIMANANA, B. and RAKOTOMALALA, M. 1994. The G.E.R.P. (Groupe d'Etude et de Recherche sur les Primates de Madagascar): Its mission and the current state of research on lemurs in Madagascar. *IPS Congress* 15: 424.
- RAMANGASON, G.S. 1993. The Mananara-Nord Biosphere Reserve. *Nature and Resources* 29(1-4): 17-23.
- RASAMIMANANA, H. 1994. Lemurs and plants. *IPS Congress* 15: 415.
- RASOLOARISON, R.M., B. P. N. RASOLONANDRASANA, J.U. GANZHORN, and S.M. GOODMAN. 1995. Predation on Vertebrates in the Kirindy Forest, Western Madagascar. *Ecotropica* 1: 59-65.
- RATHBUN, W.B. 1995. Phylogenetic studies of glutathione-metabolizing enzymes in primate lenses. Pp. 151-169 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- RATSIMBAZAFY, H.J. 1994. A comparative study of the behavioral ecology of two Malagasy prosimians, *Propithecus diadema edwardsi* and *Hapalemur aureus*. *IPS Congress* 15: 77.
- RAVELOARINORO, G.M. 1994. Food habits of three sympatric species of lemurs at Ampijoroa (integral natural reserve of Ankarafantsika, Madagascar). *Congr IPS* 15: 173.
- RAVOLOLOANARIVO, G. 1994. Vertebral column of *Pachylemur* (Lamberton 1946) and application on phylogeny of *Lemuridae*. *IPS Congress* 15: 225.
- RICHARD, A.F., P. RAKOTOMANGA, and M. SCHWARTZ. 1991. Demography of *Propithecus verreauxi* at Beza Mahafaly: Sex ratio, survival and fertility, 1984-1988. *American Journal of Physical Anthropology*. 84: 307-322.
- RIGAMONTI, M.M., G. SCARI, C. VISMARA, and V.G. LEONE. 1993. Space use, diet and activity budgets in wild red ruffed lemurs (*Varecia variegata rubra*). *Primate Rep.* 37: 9.
- ROEDER, J.-J. and I. FORNASIERI. 1995. Does agonistic dominance imply feeding priority in lemurs? A study in *Eulemur fulvus mayottensis*. *International Journal of Primatology* 16(4): 629-642.
- ROEDER, J.J., I. FORNASIERI, and J.R. ANDERSON. 1994. Yawning in ring-tailed lemurs (*Lemur catta*). Pp. 77-80 in *Current Primatology, Vol II: Social Development, Learning and Behaviour*. J.J. Roeder, B. Thierry, J.R. Anderson, and N. Herrenschmidt, eds. Strasbourg, University of Louis Pasteur. (ISBN 2-907531-01-8)
- RUMPLER, Y., S. WARTER, M. HAUWY, B. MEIER, A. PEYRIERAS, R. ALBIGNAC, J.J. PETTER, and B. DUTRILLAUX. 1995. Cytogenetic study of *Allocebus trichotis*, a Malagasy prosimian. *American Journal of Primatology* 36(3): 239-244.
- SABOR, A.A. and J.M. CALCAGNO. 1993. Reproductive behavior in captive red ruffed lemurs (*Varecia variegata rubra*). *AAZPA [American Association of Zoological Parks and Aquariums] Regional Conference Proceedings (1993)*: 292-299.
- SAITO, C. 1994. Intra-group social relations among *Propithecus verreauxi verreauxi*. *IPS Congress* 15: 286.
- SAITO, C. 1994. *Propithecus verreauxi* adaptation in seasonal environment. *Reichorui Kenkyu/ Primate Research* 10(2): 158.
- SANTINI-PALKA, M.-E. 1994. Feeding behavior and activity patterns of two Malagasy bamboo lemurs, *Hapalemur simus* and *Hapalemur griseus*, in captivity. *Folia Primatologica* 63(1): 44-49.
- SANTINI-PALKA, M.E. 1994. Feeding strategies of three species of folivorous lemur, *Hapalemur simus*, *H. griseus* (Primates, Lemuridae) and *Propithecus verreauxi* (Primates, Indriidae), at the Paris Zoological Park, *Folia Primatologica* 62(4):209.
- SAUTHER, M.L. 1994. Wild plant use by pregnant and lactating ringtailed lemurs, with implications for early hominid foraging. Pp. 240-256 in *Eating on the Wild Side*. N.L. Etkin, ed. Tuscon, University of Arizona Press. (ISBN 0-8165-1369-4)
- SCHILLING, A. 1995. Current research on the chemosensory systems in the lesser mouse lemur (*Microcebus murinus*). *Folia Primatologica* 64(1-2): 91-92.
- SCHILLING, A. and J. SERVIERE. 1995. The lesser mouse lemur. A model for the study of circadian rhythms. *Folia Primatologica* 64(1-2): 92.
- SCHMID, J. 1994. Reduction of metabolism during daily torpor in mouse lemurs (*Microcebus spp.*) in western Madagascar. *IPS Congress* 15: 221.

- SCHMID, J. and J.U. GANZHORN. 1996. Resting metabolic rates of *Lepilemur ruficaudatus*. *American Journal of Primatology* 38(2): 169-174.
- SCHMID, J. and P.M. Kappeler. 1994. Sympatric mouse lemurs (*Microcebus spp.*) in western Madagascar. *Folia Primatologica* 63(3): 162-170.
- SCHMITT, D. and S.G. LARSON. 1994. Patterns of heel-substrate contact in nonhuman primates. *American Journal of Physical Anthropology*. (Suppl. 18): 178.
- SCHOENEICH, S. 1993. Hand usage in the ring-tailed lemur (*Lemur catta* Linnaeus 1758) when solving manipulative tasks. Pp. 7-20 in *Hands of Primates*. Preuschhoff, H. and D.J. Chivers, eds. New York, Springer-Verlag, 1993. (ISBN 0-387-82385-9)
- SCHUURMAN, D. 1993. Madagascar: The world's number one conservation priority. *African Wildlife*. 47(3): 100-102.
- SCHWIND, C. and R. LESSNAU. 1995. Foraging behavior in free-ranging ringtailed lemurs on St. Catherine's Island. *American Journal of Primatology* 36(2): 154.
- SHAHAR, R., I.H. HOROWITZ, and I. AIZENBERG. 1995. Disseminated hydatidosis in a ring-tailed lemur (*Lemur catta*): A case report. *Journal of Zoo and Wildlife Medicine* 26(1): 119-122.
- SILHOL, S., V. JALLAGEAS, N. MESTRE, and N. BONS. 1995. Immunocytochemical characterization of the beta-amyloid precursor protein in the brain of mouse lemurs (*Microcebus murinus*). *Folia Primatologica* 64(1-2): 93.
- SIMONS, E.L. 1995. History, anatomy, subfossil record and management of *Daubentonia madagascariensis*. Pp 133-140 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- SIMONS, E.L. 1994. The giant aye-aye *Daubentonia robusta*. *Folia Primatologica* 62(1-3): 14-21.
- SIMONS, E.L., D.A. BURNEY, P.S. CHATRATH, L.R. GODFREY, W.L. JUNGERS, and B. RAKOTOSAMIMANANA. 1995. AMS¹⁴ dates on extinct lemurs from caves in the Ankarana Massif of northern Madagascar. *Quaternary Research* 43:249-254.
- SIMONS, E.L., L.R. GODFREY, W.L. JUNGERS, P.S. CHATRATH, and B. RAKOTOSAMIMANANA. 1992. A new giant subfossil lemur, *Babakotia*, and the evolution of the sloth lemurs. *Folia Primatologica* 58: 197-203.
- SIMONS, E.L., L.R. GODFREY, W.L. JUNGERS, P.S. CHATRATH, and J. RAVAOARISOA. 1995. A new species of Mesopropithecus (Primates, Palaeopropithecidae) from northern Madagascar. *International Journal of Primatology* 16(4): 653-682.
- SIMONS, E.L., L.R. GODFREY, M. VUILLAUME-RANDRIAMANANTENA, P.S. CHATRATH, and M. GAGNON. 1990. Discovery of new giant subfossil lemurs in the Ankarana Mountains of Northern Madagascar. *Journal of Human Evolution* 19(3): 311-319.
- STANGER, K.F. 1995. Vocalization of some cheirogaleid prosimians evaluated in a phylogenetic context. Pp. 353-376 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- STANGER, K.F., B.S. COFFMAN, and M.K. IZARD. 1995. Reproduction in Coquerel's dwarf lemur (*Mirza coquereli*). *American Journal of Primatology* 36(3): 223-237.
- STANGER, K.F. and J.M. MACEDONIA. 1994. Vocalizations of aye-ayes (*Daubentonia madagascariensis*) in captivity. *Folia Primatologica* 62(1-3): 160-169.
- STEELE, T.L., J.C. BROWN, C.K. PECK, and N.M. SPINDLER. 1993. Time management by captive ringtail lemurs exposed to a simple foraging design. *AAZPA [American Association of Zoological Parks and Aquariums] Regional Conference Proceedings (1993)*: 540-547.
- STEPHENSON, P.J., H. RANDRIAMAHAZO, N. RAKOTOARISON, and P.A. RACEY. 1994. Conservation of mammalian species diversity in Ambohitantely Special Reserve, Madagascar. *Biological Conservation* 69(2): 213-218.
- STERLING, E. 1994. Taxonomy and distribution of *Daubentonia*: A historical perspective. *Folia Primatologica* 62(1-3): 8-13.
- STERLING, E. and A.T.C. FEISTNER. 1994. Recent developments in the conservation of the aye-aye *Daubentonia madagascariensis*. *IPS Congress* 15: 134.
- STERLING, E.J. 1994. Aye-ayes: Specialists on structurally defended resources. *Folia Primatologica* 62(1-3): 142-154.
- STERLING, E.J. 1994. Evidence for nonseasonal reproduction in wild aye-ayes (*Daubentonia madagascariensis*). *Folia Primatologica* 62(1-3): 46-53.
- STERLING, E.J., E.S. DIERENFELD, C.J. ASHBOURNE, and A.T.C. FEISTNER. 1994. Dietary intake, food composition and nutrient intake in wild and captive populations of *Daubentonia madagascariensis*. *Folia Primatologica* 62(1-3): 115-124.
- STERLING, E.J. and A.F. RICHARD. 1995. Social organization in the aye-aye (*Daubentonia madagascariensis*) and the perceived distinctiveness of nocturnal primates. Pp. 439-451 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- STEVENSON, M., A. BAKER, and T.J. FOOSE, comp. 1992. Conservation Assessment and Management Plan for Primates. Apple Valley, MN, *IUCN/SSC Captive Breeding Specialist Group*, 456pp.
- STEYN, H. and A.T.C. FEISTNER. 1994. Infant development in a captive-bred Alaotran gentle lemur *Hapalemur griseus alaotrensis* over the first 26 weeks of life. *IPS Congress* 15: 413.
- STRASSER, E. and M. DAGOSTO. 1994. An allometric analysis of lemurid, anthropoid and nothartine hindlimbs. *American Journal of Physical Anthropology*. (Suppl. 18): 190.
- TAN, C.L. and P.C. Wright. 1994. Behavioral development and mother-infant relations in *Propithecus diadema edwardsi* (Milne-Edwards' sifaka), southeastern rain forest of Madagascar. *American Journal of Physical Anthropology*. (Suppl. 18): 194.
- TATTERSALL, I. 1993. Speciation and morphological differentiation in the genus *Lemur*. Pp. 163-176 in *Species, concepts, and primate evolution*. W.H. Kimbel and L.B. Martin, eds. Plenum, New York.
- TAX, C.J.H.M. 1995. [For the first time on stage in the Netherlands. Ring-tail lemurs.] *Dieren* 11(6): 186-189. (Dutch)
- THALMANN, U. and N. RAKOTOARISON. 1994. Distribution of lemurs in central western Madagascar, with a regional distribution hypothesis. *Folia Primatologica* 63(3): 156-161.
- TILDEN, C.D. 1994. Reproductive energetics of prosimian primates-[publ. 1993]. *Dissertation Abstracts International* A54(11): 4159. (ordering info: Order #AAD94-12304. University Microfilms, Inc., Ann Arbor, MI 48106)
- TILDEN, C.D. and O.T. OFTEDAL. 1995. The bioenergetics of reproduction in prosimian primates: Is it related to female dominance? Pp 119-131 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- TODER, R., G.A. RAPPOLD, K. SCHIEBEL, and W. SCHEMPP. 1995. ANT3 and STS are autosomal in prosimian lemurs: Implications for the evolution of the pseudoautosomal region. *Human Genetics* 95(1): 22-28.
- TOMIUK, J. and V. LOESCHKE. 1994. The genetic monitoring of primate populations for their conservation. *EXS* 68: 401-406.
- VASARHELYI, K. and R.D. MARTIN. 1994. Evolutionary biology, genetics and the management of endangered primate species. Pp. 118-143 in *Creative Conservation*. P.J.S. Olney, G.M. Mace, and A.T.C. Feistner, eds. London, Chapman and Hall. (ISBN 0-412-49570-8)
- VENEROSI, A., M.G. FRANCESCHI, S.M. BORGOGNINI TARLI. 1994. Taxonomic keys based on skeletal and dental traits for some Madagascar lemurs (*Lemur*, *Varecia*, *Hapalemur* and *Lepilemur*). Pp. 327-333 in *Current Primatology, Vol 1: Ecology and Evolution*. B. Thierry, J.R. Anderson, J.J. Roeder, N. Herrenschildt, eds. Strasbourg, University of Louis Pasteur. (ISBN 2-907531-00-X)
- VILLERS, L. and C. Lent. 1993. Successful introduction of two lemur species at the Indianapolis Zoo. *AAZPA [American Association of Zoological Parks and Aquariums] Regional Conference Proceedings (1993)*: 534-539.
- VUILLAUME-RANDRIAMANANTENA, M., L.R. GODFREY, W.L. JUNGERS, and E.L. SIMONS. 1992. Morphology, taxonomy and distribution of *Megaladapis* — giant subfossil lemur from Madagascar. *C. R. Acad. Sci., Paris* 315 (Série II): 1835-1842.
- WARD, J.P. 1995. Laterality in African and Malagasy prosimians. Pp. 293-309 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)
- WARREN, R. D. and R. H. CROMPTON. 1994. The locomotor ecology of two species of nocturnal lemur in Madagascar. *IPS Congress* 15: 204.
- WARTER, S., D. MONTAGNON, S. CROVELLA, B. DUTRILLAUX, and Y. RUMPLER. 1994. Complementary approaches from cytogenetic and molecular biology in determining lemur phylogeny. Pp. 393-398 in *Current Primatology, Vol 1: Ecology and Evolution*. B. Thierry, J.R. Anderson, J.J. Roeder, and N. Herrenschildt, eds. Strasbourg, University of Louis Pasteur. (ISBN 2-907531-00-X)
- WEBER, M., N. LAMBERSKI, and K. HERIOT. 1995. An idiopathic proliferative disease of bone in two subspecies of ruffed lemur (*Varecia variegata variegata* and *Varecia variegata rubra*). *AAZV [American Assoc of Zoo Vet] WDA [Wildl Dis Assoc] AAWA [American Association of Wildl Vet] Joint Conference Proceedings (1995)*: 268.
- WEIGLER, B.J., P.L. FEESER, S.M. GRANT, and C.A. NORRIS. 1994. Epidemiologic assessment of reproductive success and infant mortality in ruffed lemurs (*Varecia variegata*). *Zoo Biology* 13(6): 527-536.

- WHITE, F.J., D.J. OVERDORFF, E.A. BALKO, and P.C. WRIGHT. 1995. Distribution of ruffed lemurs (*Varecia variegata*) in Ranomafana National Park, Madagascar. *Folia Primatologica* 64(3): 124-131.
- WILSON, J.M., L.R. GODFREY, E.L. SIMONS, P.D. STEWART, and M. VUILLAUME-RANDRIAMANANTENA. 1995. Past and Present Lemur Fauna at Ankarana, North Madagascar. *Primate Conservation* 16:47
- WINN, R.M. 1994. Development of behaviour in a young aye-aye (*Daubentonia madagascariensis*) in captivity. *Folia Primatologica* 62(1-3): 93-107.
- WINN, R.M. 1994. Preliminary study of the sexual behavior of three aye-ayes (*Daubentonia madagascariensis*) in captivity. *Folia Primatologica* 62(1-3): 63-73.
- WRIGHT, P.C. 1995. Demography and life history of free-ranging *Propithecus diadema edwardsi* in Ranomafana National Park, Madagascar. *International Journal of Primatology* 16(5): 835-854.
- WRIGHT, P.C., J. JERNVALL, and G. RAKOTONARINA. 1994. Ontogeny of tooth wear of *Propithecus diadema edwardsi* in relation to seed predation. *IPS Congress* 15: 364.
- WRIGHT, P. C. and L.B. MARTIN. 1994. Predation, pollination and torpor in two nocturnal primates: *Cheirogaleus major* and *Microcebus rufus* in the rain forest of Madagascar. *American Journal of Physical Anthropology*. (Suppl. 18): 211.
- WRIGHT, P.C., C. TAN, and G. RAKOTONARINA. 1994. Comparisons of infant development and reproductive behavior in New World and Malagasy primates. *IPS Congress* 15:187.
- YAMASHITA, N. 1994. Patterns of mechanical dietary properties in two Malagasy lemur families. *American Journal of Physical Anthropology*. (Suppl. 18): 212.
- YAMASHITA, N. 1994. Seed eating among three sympatric lemur species in Madagascar. *IPS Congress* 15: 365.
- YODER, A.D. 1994. Molecular systematics of the *Lemuridae*: Is *Eulemur* necessary? *American Journal of Physical Anthropology*. (Suppl. 18): 212-213.
- YODER, A.D. 1994. Relative position of the Cheirogaleidae in strepsirhine phylogeny: A comparison of morphological and molecular methods and results. *American Journal of Physical Anthropology* 94(1): 25-46.
- YOUNG, A.L., A.F. RICHARD, and L.C. AIELLO. 1990. Female dominance and maternal investment in strepsirhine primates. *American Naturalist* 135: 473-488.
- ZIMMERMAN, E. Acoustic communication in nocturnal prosimians. Pp. 311-330 in *Creatures of the Dark: The Nocturnal Prosimians*. L. Alterman, G.A. Doyle, M.K. Izard, eds. New York, Plenum Press. (ISBN 0-306-45183-2)

Instructions for Contributors

Lemur News publishes manuscripts that deal largely or exclusively with lemurs and their habitat. The aims of *Lemur News* are: 1) to provide a forum for exchange of information about all aspects of lemur biology and conservation, and 2) to alert interested people to particular threats to lemurs as they arise. *Lemur News* is distributed free-of-charge to all interested persons. To the extent that donations are sufficient to meet the need, the policy of free distribution will continue. Manuscripts should be sent to the editor at the address on the letterhead by mail, fax or email. Manuscripts should be composed either in English or French, be legibly typewritten and double spaced (generally 1-8 pages including references and figures). The authors' name, affiliation and address must be provided; please provide fax, email and pertinent telephone numbers also. Tables and figures should include brief captions. Graphics should be clear and "camera ready" (large lettering is appreciated since most figures are reduced before printing). The Editor retains the privilege of soliciting peer comment on any manuscript submitted and

may request that the author(s) revise the article according to comments received. *Lemur News* welcomes the results of original research, field surveys, advances in field and laboratory techniques, book reviews, and informal status reports from research, conservation, and management programs with lemurs in Madagascar and from around the world. In addition, notes on changes in the legal status of lemurs, public awareness programs, the availability of new educational materials (include the name and address of distributor and cost, if applicable), job announcements (paid or volunteer), and notification of newly published scientific papers, technical reports and academic theses are all appropriate contributions. Readers are also encouraged to alert *Lemur News* to pertinent letter-writing campaigns and other activities which may need the support of the lemur research and conservation community. Finally, *Lemur News* serves as a conduit for debate and discussion and welcomes contributions on any aspect of the legal or scientific status of lemurs, or on conservation philosophy.

Roderic B. Mast
Conservation International
1015 Eighteenth Street, NW Suite 1000
Washington, DC 20036 USA

ADDRESS CORRECTION REQUESTED

