

IUCN/SSC PRIMATE SPECIALIST GROUP NEWSLETTER

NUMBER 3

MARCH, 1983



The IUCN/SSC Primate Specialist Group Newsletter is produced and circulated courtesy of the World Wildlife Fund — US and the Dept. of Anatomical Sciences of the State University of New York, Stony Brook.





Cover Photo: The crab-eating or long-tailed macaque (*Macaca fascicularis*) is a wide-ranging southeast Asian species that is still abundant in many parts of its range. However, several subspecies have very small ranges on isolated islands, and could well be a source of concern to conservationists. Two of these, the Nicobar Island macaque (*Macaca fascicularis umbrosa*) and the Simalur macaque (*Macaca fascicularis fuscus*), are discussed in the field section of this newsletter. The animal depicted on the cover is from Bali (photo by R.A. Mittermeier).

A Word from the Editors

In this third issue of the Newsletter, we have added a new section, News from Captivity, to correspond to the new Primate Specialist Group section for captive breeding of endangered primate species. The importance of captive breeding continues to grow, and we believe that it is essential that people involved with conservation-oriented captive breeding of endangered primates be aware of and involved in efforts to save wild populations of these animals as well. At the same time, many of us studying primates in the field stand to benefit from knowledge of what is happening to captive populations of these species. Hopefully, the addition of a new section to both the Group and the Newsletter will facilitate a fruitful exchange of information between field workers and captive breeding specialists.

Since the last issue went to press, we have added 16 members to the PSG. A list of these, including members of the new PSG Captive Breeding Section, is included in Appendix 1, together with address changes for current members.

We are very pleased with the amount and quality of material that we have received for this third issue, and also that most of you found Newsletter number 2 both informative and useful. We hope that our Newsletter will soon become the major vehicle for

communication among the world's primate conservationists, and welcome future input from all of you.

Contributions to the News from the Field and News from Captivity sections should be 1-3 double-spaced, typewritten pages, although in exceptional cases we will publish longer contributions. Contributions to the Announcements section should be kept brief, but again we are willing to publish longer notes on issues of particular importance. Please try to illustrate your articles with photographs, especially of the rarer primate species, and always include a map if you are talking about a particular geographical area.

We are looking forward to hearing from you and receiving your contributions, and welcome any suggestions that you might have as to how the PSG Newsletter might be improved.

Russell A. Mittermeier
Editor, IUCN/SSC PSG Newsletter

William R. Konstant
Assistant Editor

Isabel D. Constable
Editorial Assistant

The IUCN/SSC Primate Specialist Group Newsletter is published by the WWF-US Primate Program. It appears twice a year and is sent free-of-charge to PSG members. Non-members interested in receiving the Newsletter may subscribe for \$10 per year. Checks should be sent to Bill Konstant at the Stony Brook address and should be made out to World Wildlife Fund — US.

Table of Contents

A Word from the Editors	3
ANNOUNCEMENTS	
New Primate Group Section Created for Specialists in Captive Breeding of Endangered Primates	7
First Brazilian Primatology Congress Held in Belo Horizonte, Minas Gerais	7
59th and 60th Meetings of the SSC to be Held in Zimbabwe and Czechoslovakia	8
Meeting on Research and Conservation in Madagascar Held in February at the Jersey Wildlife Preservation Trust	8
Recommendations from the Conference on the Barbary Macaque	8
Report on the United Kingdom and the International Primate Trade Produced by WWF	9
Conservation Strategy for Asian Primates	9
Preliminary Great Ape and New World Monkey Conservation Strategies for 1983-1985 Now Available — Further Input Needed from PSG Members	9
WTMU to Undertake a Survey of Farming and Ranching of Wild Animals	10
Two Symposia on Primates and Tropical Forest Held in Los Angeles and Houston	10
Primate Posters and T-Shirts Available from WWF-US Primate Program.	12
International Primatological Society (IPS) to Start a Series of Awards for Distinguished Service to Primate Conservation	14
International Primatological Society (IPS) Initiates Fund-Raising Campaign for Primate Conservation Projects	14
Availability of Volunteer Field Assistants	14
Primate Group Member to Serve as Venezuela's Ambassador to Kenya	15
NEWS FROM THE FIELD	
South and Central America	
More on the Muriqui Campaign in Southeastern Brazil	16
Primates of the Lower Rio Juruá in Brazil	18
The Effects of Trapping and Removal on Tamarin Populations in Peru	19
Current Status of the Pied Bare-Face Tamarin in Brazilian Amazonia	20
Primate Studies at the Biological Reserve "Los Tuxtlas", Veracruz, Mexico	21
Africa	
A Survey of Endangered Primates in Sierra Leone	22
Gorilla and Chimpanzee Census in Gabon	22
Birth Pains for Sapo National Park in Liberia	23
Effects of Selective Logging on Primates in the Kibale Forest, Uganda	24
Studies of the Comoro Lemurs: A Reappraisal	24
Asia	
Hamadryas Baboons in Yemen	26
Field Study of the Lion-Tailed Macaque in Southern India	27
Distribution Study of the Nicobar Crab-Eating Macaque	27

Tropical Forests and Conservation Education in Sri Lanka	28
Outlook for the Pileated Gibbon in Southeast Thailand	30
The Golden Monkey in the People's Republic of China	31
Conservation of the Simalur Island Macaque, Indonesia	32
Threatened Primates in Sabah, East Malaysia	33

NEWS FROM CAPTIVITY

The Argentine Primate Center (CAPRIM)	35
Update on the Rio de Janeiro Primate Center	36
Captive Propagation of <i>Callimico</i> at Brookfield Zoo	37
Lowland Gorillas at Lincoln Park Zoo	38
The Captive Population of Sulawesi Macaques (<i>Macaca nigra</i>)	39

APPENDIX 1

New Members of the IUCN/SSC Primate Specialist Group	40
Address Changes for Current Members	40

APPENDIX 2

The Barbary Macaque: Recommendations for the Conservation of the Species in the Wild and in Captive and Semi-Natural Environments	42
Annex 1: List of Contributors	45
Annex 2: Project Regions	45
Annex 3: Project Possibilities	46
Annex 4: List of wildlife parks and zoos keeping the Barbary macaque throughout the world	46

ANNOUNCEMENTS

New Primate Group Section Created for Specialists in Captive Breeding of Endangered Primates

A new PSG section for specialists in captive breeding of endangered species of primates was created in January, 1983, and already has 7 members (Appendix 1). The inclusion of a captive section in our group recognizes the growing importance of zoos and other conservation-oriented breeding centers (e.g., the Rio de Janeiro Primate Center, the Duke University Primate Center) in our overall primate conservation strategy.

In spite of efforts to save wild populations of all nonhuman primate species, the status of several has deteriorated to a point where survival in the wild is dubious at best. Establishment of well-managed captive breeding colonies is, in many cases, an essential safety measure that will help to prevent the extinction of a number of primate species, including some of the most exciting and unusual members of this Order.

To see the benefits of captive breeding, one need look no further than the case of Brazil's golden lion tamarin (*Leontopithecus rosalia*), a highly endangered species that has already been mentioned a number of times in past newsletters. Captive breeding efforts on behalf of this species have been so successful that the captive population (more than 300 animals) now almost certainly exceeds the remaining wild population (estimated at approx. 200). A reintroduction project aimed at returning captive bred lion tamarins to Brazil is in the planning stages and will represent the first case of an endangered primate that has been saved in captivity and then sent back to its native country. We hope that other captive breeding efforts will be as successful as this one.

We hope to increase the size of the captive section of the PSG to include most of the key people involved in conservation-oriented captive breeding of endangered primate species, and anticipate that this section will play a major role in our group in the future.

First Brazilian Primatology Congress Held in Belo Horizonte, Minas Gerais

The First Brazilian Primatology Congress was held from January 31 to February 4, 1983, in conjunction with the Tenth Brazilian Zoology Congress at the Federal University of Minas Gerais in Belo Horizonte. The Primatology Congress, which was organized by PSG member, Prof. Milton Thiago de Mello of the University of Brasilia, represents a very important step in the development of primatology within Brazil, and was attended by most of Brazil's leading primatologists and seven foreign scientists as well (including PSG members Devra G. Kleiman and Charles Snowdon, PSG Chairman Russ Mittermeier, and Newsletter Editorial Assistant Isabel Constable).

Primatology is rapidly emerging as a high national research priority in Brazil, and the turnout at this First Congress (up to 300 for some of the sessions) was indicative of the growing im-



Fig. 1: Ilmar Bastos Santos, a member of the UFMG/WWF research team in eastern Brazil, admires the muriqui posters prepared for the Tenth Brazilian Zoology Congress and the First Brazilian Primatology Congress.



Fig. 2: The muriqui booth at the Tenth Brazilian Zoology Congress. On sale are a variety of t-shirts and posters, some of them locally produced and others donated by WWF-US. All proceeds from this booth were donated to the Brazilian Conservation Foundation to further its efforts on behalf of the muriqui and its Atlantic forest habitat.

portance of this discipline in the country. An excellent study of the status of primatology in Brazil, by Doris Santos de Faria of the University of Brasilia, showed how many institutions were already involved in primatological research in Brazil, and we hope to publish an abridged version of her paper in a future issue of the PSG Newsletter. Primate conservation received major emphasis throughout the Congress, which bodes well for the future of Brazil's primate fauna, with 16 genera and approx. 50 species by far the richest and most diverse in the world.

The highly endangered muriqui (*Brachyteles arachnoides*) was chosen to be the symbol of the entire Zoology Congress (Fig. 1) and several different muriqui t-shirts were produced for the Congress as well. In addition, a special booth was opened at the Congress to sell these items and a number of posters and t-shirts donated by WWF-US (Fig. 2). Proceeds from these sales were donated to the Brazilian Conservation Foundation (FBCN) for the muriqui campaign (see News from the Field). In addition, the WWF-US produced film, "Cry of the Muriqui", was shown four times during the Congress and packed the house on each occasion.

At the end of the Congress, the Brazilian Primatological Society held its elections, choosing Prof. Thiago de Mello to be its next president and another PSG member, Dr. Celio Valle, to be vice-president.

59th and 60th Meetings of the SSC to be Held in Zimbabwe and Czechoslovakia

The 59th meeting of the SSC will be held in Harare, Zimbabwe from April 14-16, 1983, and will be followed by the Fourth Meeting of the Parties to the Convention on Trade in Endangered Species (CITES), to take place in Gabarone, Botswana from April 19-30. The 59th meeting will feature a special colloquium on "The Effects of Veterinary Fencing on Wildlife Conservation," the results of which will be published in booklet form.

The 60th meeting of SSC will probably be held in Czechoslovakia, October 4-7, 1983, in conjunction with the Congress of the International Union of Game Biologists. Further details on this and the Harare meeting can be obtained from the SSC Executive Officer, Robert F. Scott:

Robert F. Scott
IUCN
Avenue du Mont Blanc
CH-1196 Gland
Switzerland

Meeting on Research and Conservation in Madagascar Held in February at the Jersey Wildlife Preservation Trust

On February 1 and 2, 1983, 26 biologists and conservationists from six different countries gathered in Jersey (British Isles) to discuss how foreign scientists could contribute to nature conservation in Madagascar. Also present was Mme. Berthe Rakotosamimanana, Director, Department of Scientific Research in the Ministry of Higher Education and Scientific Research of the Malagasy Republic.

The wishes of the Malagasy government are that individual

scientists should *not* apply to conduct research directly to the Department of Scientific Research, but rather that applications be made through an external advisory group and that, although proposals on a wide and varied range of topics are welcome, each should be partially oriented towards nature conservation in Madagascar.

On the advice of the Malagasy authorities, the participants of the meeting produced a formal document in conjunction with the representative of World Wildlife Fund — International in Madagascar (whose on-site conservation efforts are now official governmental policy), which describes how research by foreigners should aid in nature conservation. The participants to the meeting compiled an international list of consultants with diverse fields of interest in Madagascar. From that list they elected seven biologists to form the International Advisory Group of Scientists (IAGS), whose duties (also described in the formal document) are to review and send comments on research proposals to Madagascar for final deliberation by the Department of Scientific Research.

The IAGS consists of established scientific investigators who are in a position to cooperate effectively in identifying the urgent conservation needs of Madagascar. The Group is constituted for a period of three years from March 1, 1983, the date that the Malagasy authorities signed this document. The IAGS does *not* provide financial assistance for research projects.

If you want more information about the constitution and duties of the IAGS or about how to apply to conduct your research in Madagascar, please write to a member of the IAGS from your region:

Dr. Roland Albignac, Faculté des Sciences, Laboratoire de Zoologie et Ecologie Animale, Université de Besançon, 25000 Besançon, France

Dr. Lee Durrell, Jersey Wildlife Preservation Trust, Les Augrès Manor, Trinity, Jersey, Channel Islands (via UK)

Dr. Alison Jolly, The Rockefeller University, 1230 York Avenue, New York, New York 10021, USA

Dr. Bernd-Ulrich Meyburg, ICBP Groupe Spécialiste des Rapaces, Bockumer Strasse 289, D-4000 Düsseldorf 34, West Germany

Dr. Jean-Jacques Petter, Museum National d'Histoire Naturelle, Ecologie Générale, 4 Ave du Petit Château, 91800 Brunoy (Essonne), France

Dr. Peter Raven, Director, Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166, USA

Dr. Alison Richard, Dept. of Anthropology, 2114 Yale Station, Yale University, New Haven, Connecticut 06520, USA

Dr. Lee Durrell chaired this important Jersey meeting, which is sure to become a milestone in conservation efforts on behalf of Madagascar, and will also chair the IAGS.

Recommendations from the Conference on the Barbary Macaque

The last issue of the Newsletter mentioned that a special conference on the Barbary macaque (*Macaca sylvanus* — Figs. 3 and 4) was held in Gibraltar in June, 1982, and attended by a number of PSG members. Recommendations from this conference have now been prepared, and are reproduced in Appendix II of

this issue. Our thanks to PSG member John E. Fa for his outstanding efforts in organizing this conference and in preparing this important list of recommendations, which should provide the bases for a sound conservation program for this vulnerable primate species.



Figs. 3-4: Adult and juvenile Barbary macaques (*Macaca sylvanus*) (photos by John E. Fa).

Report on the United Kingdom and the International Primate Trade Produced by WWF

A report on the United Kingdom and the International primate trade, written by PSG member Mike Kavanagh, has just been produced by WWF-UK. A complimentary copy is enclosed with this Newsletter. This report is based on a much broader study conducted as part of a joint TRAFFIC (U.S.A.)/Wildlife Trade Monitoring Unit/PSG study of the primate trade that is currently being prepared for publication. The book-length report resulting

from this study will appear later this year and will be available from TRAFFIC (U.S.A.):

TRAFFIC (U.S.A.)
1601 Connecticut Ave., NW
Washington, D.C. 20009
U.S.A.

Additional copies of the U.K. report are available from WWF-UK and cost £1.00 each. Orders should be placed with:

World Wildlife Fund — UK
Panda House
11-13 Ockford Road
Godalming, Surrey GU7 1QU
United Kingdom

Conservation Strategy for Asian Primates

A revised comprehensive strategy for the conservation of Asian primates is now being prepared for incorporation into the Global Strategy for Primate Conservation, 1983-85. A mailing has already gone out requesting projects for inclusion in the Asian section. If you did not receive such a mailing and are involved in the study and/or conservation of Asian primates, please send your suggestions regarding projects to Ardith Eudey, who is coordinating preparation of the Asian strategy. Suggested projects should be ones that you feel are critical to the conservation of threatened species of Asian primates and the habitats necessary for their survival. All correspondence should be addressed to:

Dr. Ardith Eudey
Dept. of Anthropology
University of Nevada
Reno, Nevada 89557
USA

Preliminary Great Ape and New World Monkey Conservation Strategies for 1983-1985 Now Available — Further Input Needed from PSG Members

Preliminary conservation strategies (updated versions of the original Global Strategy for Primate Conservation) have now been prepared for New World monkeys and Great Apes. The New World Monkey Strategy, which includes project abstracts and budget estimates, has already been circulated for comment to members of the South and Central American sections of the PSG, and a final version will be published later this year. However, the Great Ape Strategy still requires considerable work, especially in the form of more detailed project abstracts and budget estimates.

The success of these strategies depends on input from PSG members, so if any of you wish to provide information for either the Great Ape or the New World Monkey Strategy, please contact Russ Mittermeier or Jane Thornback at the addresses given below. Russ will be handling the final preparation of the New World Monkey Strategy, and Jane is in charge of the Great Ape Strategy.

Strategies for Asian and African monkeys and prosimians will be prepared in the near future (see following announcement).

A number of people have expressed concern that these strategies may be nothing more than a bureaucratic exercise with little ef-

fect on actual conservation. Past experience has shown that this is definitely not the case, and that these strategies serve as very useful tools in a variety of fund-raising endeavors.

Jane Thornback
Conservation Monitoring Unit
219 (c) Huntingdon Road
Cambridge CB3 0DL
U.K.

Russ Mittermeier
Dept. of Anatomical Sciences
Health Sciences Center
State University of New York
Stony Brook, N.Y. 11794
U.S.A.

WTMU to Undertake a Survey of Farming and Ranching of Wild Animals

With the support of the Secretariat of the Convention on International Trade in Endangered Species (CITES), the Wildlife Trade Monitoring Unit (WTMU) is undertaking a survey of the farming and ranching of wild mammals, birds, reptiles and amphibians. The aim of this survey is to produce a directory listing all known farms/ranches/commercial breeding operations with details of their methods of operation, a document that should be very useful to the CITES Secretariat and its national Management and Scientific Authorities.

The importance of this is that CITES allows international trade in captive-bred animals under certain conditions when commercial trade in wild-caught animals is prohibited. There are also specific resolutions referring to the trade in ranched animals. Not all farming or ranching operations, however, are in accord with the definitions accepted by the CITES Parties.

The directory will form a useful basis for decisions on which operations may legitimately trade as farms or ranches under the terms of the CITES Resolutions. However, the survey will not be restricted to operations in CITES Party states nor to those involving CITES-listed species, and it should be useful as a source of information to research workers and conservationists concerned with ranching/farming wildlife.

The information that WTMU will be trying to obtain on each operation over the next 12 months is:

1. name and location of operation
2. species involved and numbers kept
3. production and trade
4. sources of animals
5. numbers and form in which taken from wild and other sources
6. numbers and generations bred
7. how animals are kept
8. source of finances
9. financial success
10. research carried out
11. published results

Much of this, however, will not be easy to discover.

WTMU will be including such operations as ranching of crocodiles for skins, farming wild cats and dogs for furs, breeding primates for medical experiments, and ranching antelopes for meat and trophies. However, they will not be considering in detail

animals that have been intensively reared and domesticated, such as mink, nor will they consider the killing of free-living wild animals.

WTMU's methods of finding the required information will be limited largely to literature searches and correspondence, and the success of this important project depends in large part on the response of SSC members. We would therefore be most grateful if any PSG members with information on primate ranching or farming operations (or farming/ranching operations involving any other species) could contact Jonathan Barzdo at WTMU. Suggestions for other contacts and for relevant literature would also be welcome.

Jonathan Barzdo
Wildlife Trade Monitoring Unit
Conservation Monitoring Unit
219 (c) Huntingdon Rd.
Cambridge CB3 0DL
United Kingdom

Two Symposia on Primates and Tropical Forest Held in Los Angeles and Houston

Two symposia on conservation of primates and their tropical forest habitats were held in Los Angeles (September 21) and Houston (November 5) at the end of 1982, and were highlighted by presentations by H.R.H. The Prince Philip, President of WWF-International (Figs. 5, 6, 8). Other speakers included PSG chairman Russ Mittermeier ("The world's endangered primate species — an introduction and a case study on the monkeys of Brazil's Atlantic forests"), PSG member Alison Richard ("The world's endangered primate species — a case study on the lemur fauna of Madagascar"), Shirley Strum ("Living primates as a key to human behavior"), Thomas E. Lovejoy ("The world's disappearing tropical forests: the current situation") and Mark J. Plotkin ("Ethnobotany, conservation, and the future of the tropical forest"). Mittermeier, Lovejoy and Plotkin spoke again in Houston, and were joined there by PSG member Randall Susman ("Tropical forest and primate conservation — the pygmy chimpanzee of Zaire"), Elwyn Simons ("Tropical forest and primate conservation — the endangered lemur fauna of Madagascar"), Sarah Blaffer Hrdy ("The importance of non-human primates for understanding human evolution and behavior") and Roger Tory Peterson ("Tropical forests and the conservation of avian diversity").

The Houston symposium was also attended by Admiral Ibsen de Gusmão Câmara, President of the Brazilian Conservation Foundation (FBCN) and another PSG member, and by Dr. Voara Randriansolo from Madagascar (Fig. 9) — representatives of two of the most important countries in the world for primate conservation. One of the highlights of the meeting came when Admiral Ibsen presented a painting of the muriqui, South America's largest and most endangered monkey and a Brazilian endemic, to Prince Philip (Fig. 8). This painting was done by the English wildlife artist Stephen Nash (Fig. 7) and has subsequently been donated to WWF-US for auctioning, the proceeds to be used to further the conservation of the species in Brazil.

Both symposia were followed by major fund-raising dinners, the proceeds of which will go to tropical forest and primate conservation. Proceedings of the Los Angeles Symposium, which was jointly organized with the L.S.B. Leakey Foundation, are being published and should be available shortly.



Fig. 5: Prince Philip addressing the audience in Houston.



Fig. 6: Russell E. Train, president of WWF-US, H.R.H. Prince Philip, president of WWF-International, and Walter Cronkite, host of the Houston fund-raising dinner.



Fig. 7: PSG Chairman Russ Mittermeier, Admiral Ibsen de Gusmão Câmara, president of the Brazilian Conservation Foundation (FBCN), and wildlife artist Stephen Nash with the muriqui painting in Houston.



Fig. 9: Representatives of two of the most important countries in the world for primate conservation, Admiral Ibsen from Brazil and Dr. Voara Randrianasolo from Madagascar, at the Houston symposium.



Fig. 8: Prince Philip (on left) receiving the muriqui painting from Admiral Ibsen de Gusmão Câmara (center).

Photos by Andy Young

Primate Posters and T-Shirts Available from WWF-US Primate Program

Several new posters, t-shirts and note cards are available from the WWF-US Primate Program. In addition to the mureiqui t-shirt mentioned in the last newsletter (Fig. 10), there is now also a shirt for the pygmy chimpanzee from Zaire (Fig. 11), five posters depicting various Brazilian primates (Figs. 13-17), and note cards depicting the mureiqui at Fazenda Montes Claros (Fig. 12), one of the last documented homes of this highly endangered monkey.

As part of our program in eastern Brazil, t-shirts and posters are being distributed free to guards working in parks and reserves in which the species depicted actually live, and also to local people living in the vicinity of these protected areas. Sales of these items in the U.S. are channeled directly back into the project and help to ensure further distribution in the areas critical to the survival of these species.

T-shirts are available in yellow, light blue and beige and in small, medium, large and extra-large sizes. Sizes of posters and prices for all items are given in the figure captions. Anyone interested in these items should contact Bill Konstant at the Stony Brook address:

Bill Konstant
Dept. of Anatomical Sciences
Health Sciences Center
State University of New York
Stony Brook, New York 11794

Checks should be made out to World Wildlife Fund — US.



Fig. 10: **THE MURIQUI**. This t-shirt depicts the mureiqui, largest South American monkey and the largest mammal endemic to Brazil, inside a map of Brazil. The text on the t-shirt is in Portuguese and reads as follows; "E NOSSO" = "IT'S OURS"; "O MAIOR DAS AMERICAS" = "THE LARGEST OF THE AMERICAS"; and on the back: "ESPECIE BRASILEIRA AMEACADA DE EXTINCAO" = "BRAZILIAN SPECIES ENDANGERED WITH EXTINCTION"; and "O MONO OU MURIQUI" = "THE MONO OR MURIQUI" (the two Brazilian names for this monkey). Price: \$10.00



Fig. 12: **THE MURIQUI**. These cards depict the mureiqui in its Atlantic forest habitat in southeastern Brazil. On the back they include a message about the mureiqui and the importance of Fazenda Montes Claros in the Brazilian state of Minas Gerais to its survival. Actual size of card: 4 1/4" x 5 1/4". Price: \$5.00 per dozen (with envelopes)

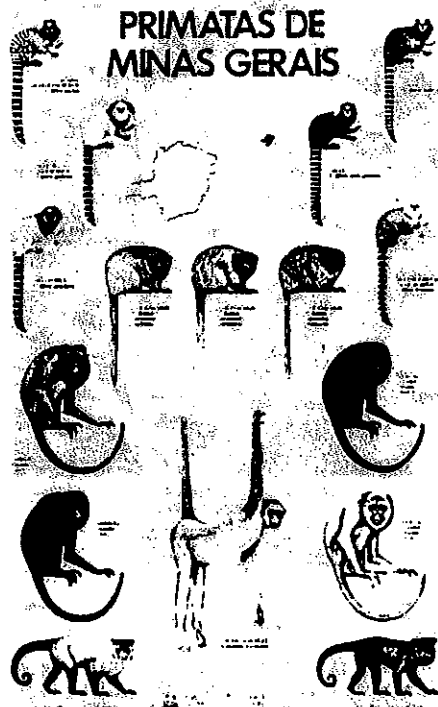


Fig. 13: **PRIMATAS DE MINAS GERAIS/ PRIMATES OF MINAS GERAIS**. This poster depicts the 14 primate species and subspecies occurring in the Brazilian state of Minas Gerais; one of the main areas of concentration in the WWF-US Primate Program's Conservation Project in the Atlantic Forest Region of Eastern Brazil. Actual size of poster: 22" x 35". Price: \$5.00



MURIQUI
(*Brachyteles arachnoides*)

Fig. 14: **THE MURIQUI (*Brachyteles arachnoides*)**. This poster is based on a painting of the mureiqui by the renowned wildlife artist, Stephen Nash. This painting was presented to H.R.H. The Prince Phillip, President of World Wildlife Fund — International, at a symposium on Tropical Forest and Primates in Houston, Texas (November 5, 1982). The mureiqui is the largest and most endangered South American primate, and is found only in the Atlantic forest region of eastern Brazil. It is a major focus of the WWF-US Primate Conservation Project in the Atlantic Forest Region. Actual size of poster: 18" x 24". Price: \$5.00

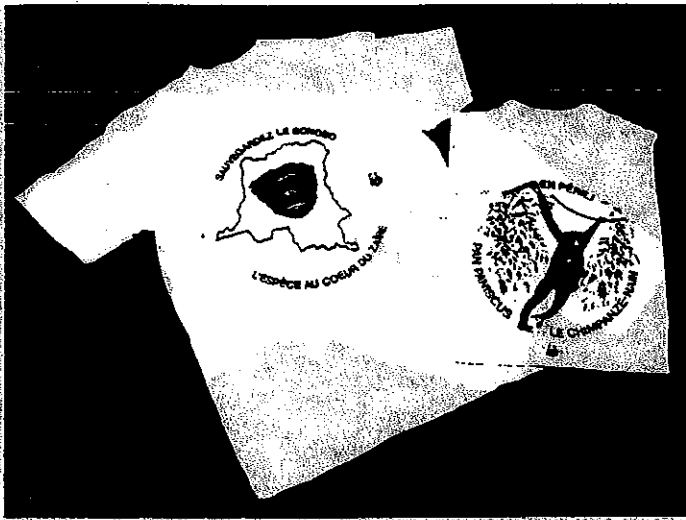


Fig. 11: **THE PYGMY CHIMPANZEE.** This t-shirt depicts the pygmy chimpanzee, one of the world's most interesting and important primate species and an animal found only in Zaire. It is also the only great ape not yet protected in any park or reserve. The text on the t-shirt is in French and reads as follows: "SAUVEGARDEZ LE BONOBO" = "SAVE THE BONOBO" (one of the names for the pygmy chimpanzee); "L'ESPÈCE AU CŒUR DU ZAIRE" = "SPECIES AT THE HEART OF ZAIRE"; and on the back: "EN PERIL" = "IN PERIL"; and "PAN PANISCUS, LE CHIMPANZÉ-NAIN" = "PAN PANISCUS, THE PYGMY CHIMPANZEE". Price: \$10.00

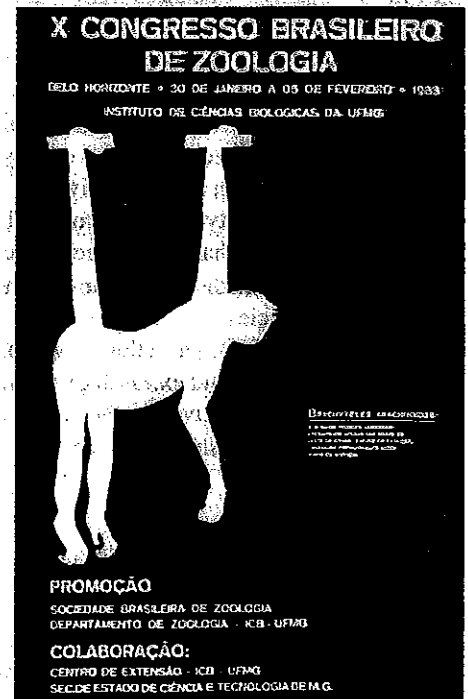


Fig. 17: **X CONGRESSO BRASILEIRO DE ZOOLOGIA/ TENTH BRAZILIAN ZOOLOGY CONGRESS.** This poster, produced in Brazil, was used in the Tenth Brazilian Zoology Congress, held in Belo Horizonte, Minas Gerais from January 30 to February 5, 1983. The murtiqui was adopted as the symbol of this Congress, which also featured the First Brazilian Primatology Congress as one of its symposia. Actual size of poster: 15 1/4" x 24 1/4". Price: \$5.00



Fig. 15: **PRIMATAS DO RIO DE JANEIRO/ PRIMATES OF RIO DE JANEIRO.** This poster depicts the seven species and subspecies of monkeys found in the Brazilian state of Rio de Janeiro. The text discusses the importance of these monkeys and also mentions the important role of the Brazilian Conservation Foundation (FBCN) and the Rio de Janeiro Primate Center (CPRJ) in conservation activities in Rio. Actual size of poster: 22" x 35". Price: \$5.00

PRIMATAS DA REGIÃO SUDESTE MUITO AMEAÇADAS DE EXTINÇÃO



ESTAMOS SENDO EXTERMINADOS!
DEFENDA NOSSO HABITAT

O mundo de hoje precisa de um equilíbrio entre o homem e a natureza. A preservação das espécies é fundamental para a manutenção da vida na Terra. A extinção de uma espécie representa a perda de um patrimônio irrecuperável. Vamos juntos lutar pela conservação da natureza e da vida.

Fig. 16: **PRIMATAS DA REGIÃO SUDESTE MUITO AMEAÇADAS DE EXTINÇÃO/ HIGHLY ENDANGERED SOUTHEASTERN BRAZILIAN PRIMATES.** This poster, which was produced jointly with the Rare Animal Relief Effort (RARE), depicts five of the most endangered Atlantic forest primates: the muriqui, the golden-lion tamarin, the golden-headed lion tamarin, the golden-rumped lion tamarin, and the buff-headed marmoset. Actual size of poster: 16" x 23". Price: \$5.00



International Primatological Society (IPS) to Start a Series of Awards for Distinguished Service to Primate Conservation

The Executive Committee of the International Primatological Society has proposed that the Society make a series of awards for distinguished service to primate conservation in the wild. The awards, up to three per year, may be made annually at the discretion of the Executive Committee, one for each major primate habitat area: Africa (including Madagascar), Asia, and South and Central America. They will be made by decision of the Executive Committee upon recommendation of the Conservation Committee of the Society, which will also advise on the monetary value of each award. The award will be commemorated by the presentation of an engraved plaque to the individuals so honored.

The intention behind the awards is to further the cause of primate conservation in the wild and they are intended primarily for nationals of the countries in the geographic areas listed above. They will recognize the successful achievement of a specific project and are intended to further similar work. A report on the use of funds will be required. The awards must be used in the country mentioned in the award citation for furtherance of primate conservation in that country.

If convenient, awards will be presented personally by an officer of the International Primatological Society. Otherwise they will be mailed.

Nominations, which should include a description of the achievements and conservation plans of the nominee and should not exceed two typewritten pages in length, should be sent together with a curriculum vita of the nominee to:

Dr. Kenneth Green
Remote Sensing Systems Laboratory
Dept. of Civil Engineering
University of Maryland
College Park, Maryland 20742
U.S.A.

International Primatological Society (IPS) Initiates Fund-Raising Campaign for Primate Conservation Projects

In response to a growing concern on the part of many of its members that the IPS was not doing enough to ensure the conservation of the world's endangered primate species, the Society has started a special fund-raising campaign to further worthy projects identified by the IPS Conservation Committee. These projects include:

1. The Korup National Park in Cameroun
2. The Mountain Gorilla Project in Rwanda and Zaire
3. The Muriqui Campaign in Brazil
4. The Primate Conservation Training Program at the University of Florida, Gainesville

A brochure providing more details on this campaign is enclosed with this Newsletter.

Availability of Volunteer Field Assistants

As in past newsletters, we are continuing to list people interested in participating in primate field projects on a volunteer basis. We hope that PSG members with ongoing field projects will be able to place some of these people, and if any of you have requests for assistants with specific skills, please feel free to advertise here.

Volunteer field assistants:

Judith Bernstein
Winthrop House B-41
Harvard University
Cambridge, Mass. 02138

Ms. Bernstein is a sophomore majoring in Biological Anthropology at Harvard University. She speaks Spanish fluently and is primarily interested in working on primate nutrition and development.

Kevin T. Grace
P.O. Box 6159
S.R.S.U.
Alpine, Texas 79832

Mr. Grace is specifically interested in tropical forest management and its relation to wildlife conservation. He holds a Master of Science Degree in Range Animal Science from Sul Ross State University, Alpine, Texas (1983) and a B.S. in Forestry from Stephen F. Austin State University, Nacogdoches, Texas (1980). He has done field work in Guatemala and speaks Spanish fluently.

Laura J. Lodwick
126 — B.S. Belmont Street
Glendale, Calif. 91205

Ms. Lodwick has earned a B.S. in Psychobiology from the University of California at Riverside, working primarily on primate social behavior. In addition to spending 6 months in 1981 studying baboons in Botswana, she has also worked for the past three years as a primate keeper at the Los Angeles Zoo. She expects to have her pilot's license shortly.

Elizabeth Losos
933 Lay Road
St. Louis, Missouri 63124

Ms. Losos is an undergraduate at Harvard University seeking work as a field assistant for the summer, 1983. Her experience as a lab technician in the Anthropology Dept. has led to her interest in primate behavioral ecology and evolutionary biology. She speaks Spanish.

Timothy R. Williams
Crosstrees Hill Road
Essex, Connecticut 06426

Mr. Williams is currently enrolled in an M.S. program in Environmental Studies at the Yale School of Forestry and Environmental Studies. He has conducted independent research in Kenya (1983) and has traveled extensively throughout Africa and Asia. He has completed the National Outdoor Leadership School (NOLS) and the Intercultural Action Learning Program (INTER-LAP) while living in Kenya, and he is seeking to volunteer for field work for the summer of 1983. Mr. Williams speaks both Spanish and Swahili.

Primate Group Member to Serve as Venezuela's Ambassador to Kenya

PSG member, Edgardo Mondolfi, one of our two representatives from Venezuela, was recently appointed to serve as Venezuela's ambassador to Kenya. Dr. Mondolfi takes up his new position in March, 1983, and his address will be:

Embassy of Venezuela
International House
Mama Ngima Street
Nairobi
KENYA

We wish him the best in his new position, and look forward to his continuing involvement in PSG matters.

South and Central America



Fig. 18: Mother and infant miqui in the forest at Fazenda Montes Claros (photo by Andy Young).

More on the Miqui Campaign in Southeastern Brazil

As mentioned in the last PSG Newsletter, the miqui (*Brachyteles arachnoides* — Fig. 18) of Brazil's Atlantic forest region is on the verge of extinction. However, the campaign to save this animal, which is the largest South American primate and the largest mammal endemic to Brazil, is now in full swing, with the result that the miqui is rapidly becoming a symbol for the Brazilian conservation movement. The species has received considerable press and television coverage in Brazil, it has been the subject of many lectures, both in cities and in the interior, (especially in the state of Minas Gerais which is one of the two most important states for its survival), and efforts to save Fazenda Montes Claros, one of its most important remaining habitats, are bearing fruit.

Lecture tours have been especially effective in the past year. Approximately 50 lectures were given in Brazil, mainly by Brazilian members of the joint WWF-US/UFGM/CPRJ/FBCN Project on Primates of the Atlantic Forest Region, and audiences included teachers, high school and college students, employees of the Brazilian Forestry Development Institute, and people liv-

ing in the vicinity of parks and reserves in the state of Minas Gerais. The WWF-US produced film, "Cry of the Miqui", was a major feature at all of these presentations, with a live Portuguese commentary given in conjunction with the English narration (a Portuguese version of the film will be produced next year).

Roughly 60 more presentations on the miqui and other Atlantic forest primates were given in the U.S. in 1982 and early 1983 by personnel of the WWF-US Primate Program — both for fund-raising purposes and to increase awareness of the critical situation of the Atlantic forest. The miqui was also featured as the key species in two major Tropical Forest and Primates Symposia/Fund-raising events held in Los Angeles and Houston, and attended by H.R.H. Prince Philip, President of WWF-International (see Announcements section).

Four new posters have been produced as part of the campaign, two of them depicting the primates of the states of Minas Gerais and Rio Janeiro (including the miqui), one dealing only with the miqui, and a fourth (produced jointly by the WWF-US Primate Program and the Rare Animal Relief Effort) showing five of the most endangered southeastern Brazilian monkeys (Figs. 13-16). Two additional posters produced in Brazil also depicted



Fig. 19: Poster of the murreti used as the symbol of a journalism contest in the state of Minas Gerais, Brazil.

the murreti, one for the Brazilian Zoology Congress (Fig. 17) and another for a journalism contest (Fig. 19). These materials have been used together with the murreti t-shirts and stickers produced in early 1982, and have become quite popular.

A WWF-US-funded Mobile Education Unit is now being organized in the state of Minas Gerais, and it will visit a minimum



Figs. 20-21: Carlos Alberto Machado Pinto, a member of the WWF/UFMG/CPRJ/FBCN project team, distributing posters in the state of Minas Gerais (photo by R.A. Mittermeier).

of 50 towns and villages in the vicinity of parks and reserves in this state over the next year. Slide shows, lectures and film presentations will be given, mainly by project members Ilmar Bastos Santos and Carlos Alberto Machado Pinto, and the above-mentioned posters and stickers and a variety of other educational materials will be distributed in conjunction with these talks (Figs. 20-21). Similar efforts during 1982 were very well-received by local people, and we believe that this program will do a great deal to help convince these people of the importance of wildlife, parks and reserves to their own future and thus help to improve local attitudes towards conservation in general.

A major zoo exhibit depicting endangered Brazilian species will also be developed in the Rio de Janeiro Zoo during 1983. This zoo has over a million visitors per year, and the educational potential of such an exhibit is enormous.

Finally, efforts to save the privately-owned forest at Fazenda Montes Claros in Minas Gerais continue. WWF-US approved a grant of \$50,000 for purchase of part of the forest on the fazenda, and the owner of the land, Sr. Feliciano Miguel Abdala, recently donated one hectare of land for us to build a modest research building to house visiting researchers (Fig. 22). The Montes Claros forest will be the site of a number of primate field



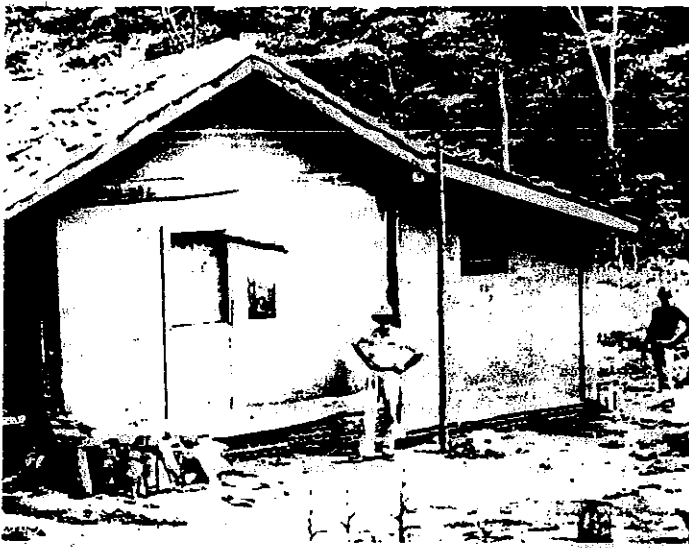


Fig. 22: Senhor Feliciano Miguel Abdala standing beside the research building under construction at the edge of the Fazenda Montes Claros forest (photo by R.A. Mittermeier).

studies this coming year, and an important field training course, organized by the University of Florida at Gainesville, the University of Brasília and the University of Minas Gerais, will be held there in late 1983. Thus, Fazenda Montes Claros is rapidly growing in importance, not just as a conservation area for the murequi and the other three primate species found there, but also as a training center to further field primatology within Brazil.

Celso Valle
Dept. of Zoology
Federal University of Minas Gerais (UFMG)
Belo Horizonte, Minas Gerais
Brazil

Admiral Ibsen de Gusmão Câmara
President, Brazilian Conservation Foundation
Botafogo, Rio de Janeiro
Brazil

Russell A. Mittermeier
World Wildlife Fund — US
Washington, D.C.
U.S.A.

Primates of the Lower Rio Juruá in Brazil

The Rio Juruá is a southern tributary of the Solimões (Amazon) River and one of its longest. Arising in low-lying hills in Loreto Department, Peru, it enters Brazil in the state of Acre and then runs northeast through Amazonas, emptying into the Solimões below the town of Fonte Boa (Fig. 23). Flowing parallel to the Juruá are the rivers Tefé, Coari and Purus on the east side; to the west lie the Jutaf, Jandiatuba and Javari. Primary tropical rainforest covers almost the entire region of the lower Juruá basin. Bordering the river is seasonally flooded *várzea* forest, generally with a more open canopy and a greater proportion of palm species than the *terra firme* vegetation.

The region has a rich primate fauna that is little known. Our expedition visited the lower part of the west bank of the Juruá during August and September, 1981, spending six weeks in the field. Partly funded by the Fauna and Flora Preservation Socie-

ty, the Royal Geographic Society and the University of London, the authors made a brief survey of primates in a small area near the town of Carauari, 600 km upriver.

One species believed to inhabit this area is the endangered red uakari (*Cacajao calvus rubicundus*). Its distribution is poorly known, but it probably extends east from the Rio Ucayali in Peru and south from the Içá-Putamayo (perhaps extending into Colombia), where it has been seen in swamp forest. The Rio Juruá is thought to be the eastern limit for the red uakari, although it might range as far as the Rio Purus. Within the time available, searches for this elusive animal were unsuccessful. However, local people reported seeing uakaris in the area and described the coat color as completely white, rather like that of the white uakari (*Cacajao calvus calvus*), which has a very restricted range north of the Rio Solimões. On the upper Juruá red uakaris have been described as having whitish backs, but it will be interesting to discover whether on the lower Juruá there is in fact a distinct white form. On a short visit to the east bank of the Juruá opposite Carauari, uakaris were also reported. Although not confirmed by sightings, this adds weight to the suggestion that *Cacajao* may occur further east than the Juruá.

Other endangered species occurring in the region are the woolly monkey (*Lagothrix lagothricha*) and the black spider monkey (*Ateles paniscus chamek*). Neither were seen in the wild and were reported by locals to be absent near the town of Carauari. A woolly monkey shot by a hunter 30 km north-west of Carauari had the coat color of the subspecies *L. lagothricha cana*, even though the west bank of the Juruá is thought to be occupied by *L. lagothricha poeppigii*.

The only callitrichid sighted was the moustached tamarin (*Saguinus mystax*), which appeared to be common. Hunters also spoke of a white tamarin, not known from the immediate area. The range of Spix's saddleback tamarin (*Saguinus fuscicollis fuscicollis*) is thought to extend into the lower Juruá on the west side (although there are no documented records of its occurrence there). Data on the distributions of the various races of saddleback tamarins are still lacking for both sides of the Rio Juruá. Pygmy marmosets (*Cebuella pygmaea*) have previously been recorded in the survey area, inhabiting secondary forest belts beside man-made trails.

Other primates seen were the owl monkey (*Aotus trivirgatus*), squirrel monkey (*Saimiri sciureus*), tufted and white-fronted capuchins (*Cebus apella* and *C. albifrons*), monk sakis (*Pithecia monachus*) and red howler monkeys (*Alouatta seniculus*), which appeared abundant. Information from local people confirmed the existence of titi monkeys (*Callicebus torquatus* and *C. moloch*) in the area. In all, eight of the fourteen species occurring in the

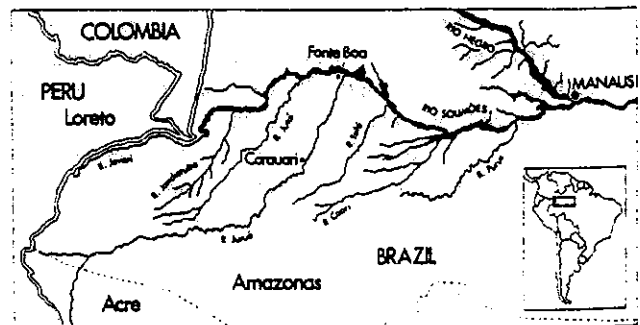


Fig. 23: Map showing the location of the Rio Juruá in Amazonian Brazil, together with other localities mentioned in the text.

region were observed during our brief survey. A more thorough investigation may reveal the presence of two forms of *Pithecia*, assuming that Hershkovitz's revision of the taxonomy of this genus proves correct. All the species recorded, except the callitrichids and the owl monkeys, are hunted for food, and for some people monkey meat forms an important part of their diet. Preferences for species vary between individuals; some locals avoid hunting the uakaris and white-fronted capuchins. Spider and woolly monkeys are especially favored and populations of these two species have probably been wiped out for several kilometers around the town.

Since the early part of the nineteenth century, rubber has been tapped on the Juruá from wild-growing rubber trees. During the 1880-1912 rubber boom it was the second most productive river. Rubber workers roamed through the riverside forests to collect latex and cut trees on the varzea for fuel and building material. Overall, however, there has been very little clearing of forest in the lower Juruá area. The human population is now very small and mostly confined to the river banks. Away from the main river and its tributaries the primate populations are quite undisturbed.

Recent developments may change this picture. In 1978, natural gas was discovered near Carauari, the largest find thus far in Brazil. Five of the wells that have been drilled have commercial potential. Further exploration is now taking place, involving the cutting of a network of trails between the lower Juruá and Jutaí rivers, and thus facilitating entry for hunters into the terra firme forests. The population is presently too small to have a serious effect on local wildlife and access to the Juruá remains difficult except by air. So, unless roads are built to connect this region with other parts of Amazonia, increases in population will be slow. Another development could have a more drastic effect, however. Several forestry projects are planned for this region, one covering 8.8 million hectares on the east bank of the lower Juruá.

Luckily, the current situation is far removed from the precarious state of the rain forest in other parts of Brazil; and it may actually be some time before development projects planned for this region are implemented. Nonetheless, the region harbors primates that are rare and threatened with extinction in other, less isolated areas, so it is urgent that further studies be undertaken in this region to determine the status of the primate fauna. Wildlife in the upper Juruá is also inadequately studied. Goeldi's monkey (*Callimico goeldii*) and the emperor tamarin (*Saguinas imperator*), species with restricted or scattered distributions, are found upstream of Eirunepé, where the terra firme forest is more open and there are large tracts of bamboo forest. Records of distribution and status for these and other primates there are few.

The Brazilian Forestry Institute (IBDF) is fortunately planning some field work along the Juruá just north of Eirunepé, where an area has been identified as having high priority for conservation. A national park to protect 605,000 hectares between the upper Rio Juruá and the Brazilian-Peruvian border has already been proposed. An area on the lower Juruá must also be set aside to safeguard the valuable primate populations and other wildlife. Hopefully the present impetus for establishing reserves in the Amazon will continue.

Richard Ranft
Jeremy L. John
Woodbridge, Suffolk
U.K.

The Effects of Trapping and Removal on Tamarin Populations in Peru

In 1972, Peru recognized the need for increased conservation of its natural resources and instituted a ban on the export of non-human primates. This led to a working agreement between the Peruvian Ministry of Health and the Pan American Health Organization (PAHO). The principal objective of this agreement was to develop a breeding and management program that would provide the nonhuman primates required for biomedical research, while at the same time developing programs that would gather basic ecological and behavioral data on as many primate species as possible. These programs also would evaluate factors which affect populations. One of these factors is the trapping and removal of animals to stock breeding colonies and/or for biomedical research.

During the summer of 1982 PAHO and the Peruvian government contracted a two-month census of the moustached tamarin (*Saguinas mystax*) and the brown-headed tamarin (*S. fuscicollis*) in order to determine the impact that previous trapping and removal efforts had on the resident populations of these two species at Fundo Los Angeles (trapped in 1976-77) and at Casserio Santa Cecilia (trapped in 1980). Additional objectives were to compare the population densities of *S. mystax* and *S. fuscicollis* at the time of trapping with the present population densities and to compare the recovery capabilities of *S. mystax* in those areas where entire groups were removed with areas where only juveniles were removed.

A total of 4.9 km² was censused and the results indicated the following:

- 1) The trapping and removal of substantial numbers of animals at both sites (Los Angeles — 213 and Santa Cecilia — 551) had little impact on the present populations of *S. mystax*, which have returned to pre-trapping levels.
- 2) The post-trapping population densities of *S. mystax* and *S. fuscicollis* are very similar to those of pre-trapping densities at both sites.
- 3) The type of trapping, i.e., taking all members of a social group or releasing the alpha pair and taking only the juveniles, has made no difference in the recovery capabilities of either species.
- 4) The five year and two year post-trapping relationship between *S. mystax* and *S. fuscicollis* groups is very similar to that before trapping, regardless of whether only *S. mystax* or both *S. mystax* and *S. fuscicollis* were removed. In fact, there may be a slight increase of the number of *S. mystax* present after trapping has occurred in an area.

Hunting, however, has removed all of the larger primate species (*Alouatta*, *Ateles*, *Cebus*) from the two censused areas. Groups of *Pithecia* and *Callicebus* were seen at Los Angeles and *Saimiri* and *Aotus* at Santa Cecilia. Hunting pressure on *S. mystax* and *S. fuscicollis* populations is apparently light due to the small size of these animals.

Based on this census it appears that *S. mystax* (an important species for biomedical research) can be cropped on a regular basis (every three years) without affecting the population size or the interspecific relationships between *S. mystax* and *S. fuscicollis*. Controlled trapping may, in fact, result in a more vigorous population. However, the trapping sites should probably be censused

every 5 to 10 years to insure the continued recovery capabilities of the resident populations.

It was also clear from this census that hunting pressure has eliminated the larger primate species from the censused areas but has not affected the smaller species. It may be possible to help the larger species by exploiting the unexpected recovery capabilities of the smaller species. This might be done by providing the hunters a financial return for participating in controlled cropping of the smaller species so that they can obtain other meat.

Kenneth E. Glander
 Duke University Primate Center
 Durham, North Carolina
 U.S.A.

Current Status of the Pied Bare-Face Tamarin in Brazilian Amazonia

The pied bare-face tamarin (*Saguinus bicolor bicolor* — Fig. 25) is found only in the vicinity of the city of Manaus in Brazilian Amazonia, extending as far east as Itacoatiara and as far north as km 40 on the Manaus-Boa Vista highway (Ayres, et al., 1982; Fig. 24). The rapid growth of Manaus over the past decade and the development of this region as a whole have resulted in considerable habitat destruction within the restricted range of this species, and it must now be considered one of the most endangered Amazonian primates.

The National Amazon Research Institute (INPA), located in Manaus, has been conducting studies of the distribution, ecology and biology of this monkey for the past few years, and the institute also has two forest reserves that provide protection for *S. b. bicolor*: the 10,000 ha Adolpho Ducke Reserve (km 26 on the Torquato-Tapajos highway) and the 10,432 ha Alberto Egler Reserve (km. 64 on the same highway). In addition to *S. b. bicolor*, these two reserves also harbor populations of *Pithecia pithecia*, *Alouatta seniculus*, *Ateles paniscus* and *Cebus apella*. Plans are underway to have both of these reserves incorporated into the Brazilian Secretary of the Environment's (SEMA — Ministry of the Interior) system of Ecological Stations, and SEMA also has a smaller Ecological Reserve, Sauim-castanheira (15 km



Fig. 25: Adult pied bare-face tamarin (*Saguinus bicolor bicolor*) (photo by Roberto da Rocha e Silva).

from the center of Manaus) that protects a population of *S. b. bicolor* within the city limits of Manaus.

Although *S. b. bicolor* is often found in secondary formations, it requires primary forest habitat for its survival. In addition to suffering as a result of habitat destruction, it may also be adversely affected by competition from another tamarin (*Saguinus midas midas*) that has a much larger range and appears to be far more adaptable (Ayres, et al., 1982). The interesting relationship between these two species will be studied in future phases of the research project now underway.

Silvia G. Egler
 Instituto Nacional de Pesquisas
 da Amazonia (INPA)
 Manaus, Amazonas
 Brazil

Literature Cited

Ayres, J.M., R.A. Mittermeier and I.D. Constable 1982. Brazilian tamarins on the way to extinction? *Oryx* 16 (4): 329-333.

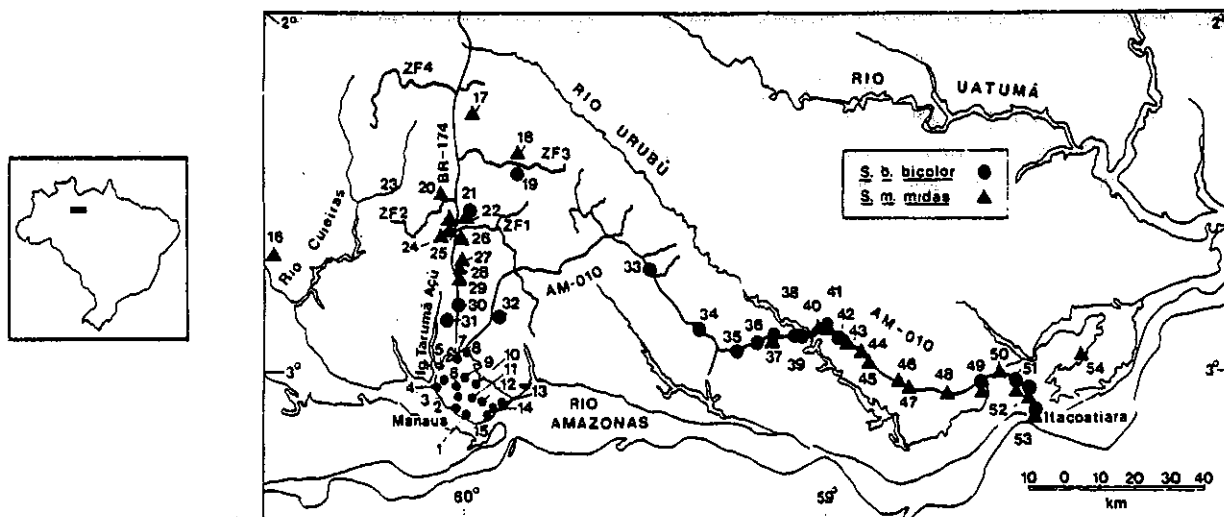


Fig. 24: Map showing the total distribution of the pied bare-face tamarin (*Saguinus b. bicolor*), together with populations of the wide-

ranging golden-handed tamarin (*Saguinus m. midas*) that occur within the range of *S. b. bicolor* (from Ayres, et al. 1982).

Primate Studies at the Biological Reserve "Los Tuxtlas", Veracruz, Mexico

According to a National Forest inventory conducted in 1977, tropical and temperate forests account for approximately 400,000 km² (22%) of Mexico's 1,963,133 km² of land area. Forest cover is associated with topography, and moist forests, estimated to cover 110,000 km², are found mainly in the southern part of the country in the states of Veracruz, Tabasco, Campeche and Chiapas.

In the last few decades, Mexico's humid tropical forests have been disappearing at an alarmingly rapid rate. This is the result of very rapid human population growth and of the intensive use of tropical land for farming and cattle ranching. The only remaining substantial tropical evergreen forest in Mexico is the Lacandon Forest near the country's southern border. Lacandon also represents one of the three large remaining lowland rainforests in all of Central America, still covering 13,000 km² despite having been extensively disturbed by shifting cultivation, timber harvesting and cattle ranching. Two smaller patches of tropical moist forest are found in Mexico on the Isthmus of Tehuantepec and at Los Tuxtlas in Veracruz state, totalling approximately 2,000-3,000 km².

Howler monkeys (*Alouatta*) and spider monkeys (*Ateles*) are the only primates which inhabit southern Mexican forest and these populations represent the northernmost distribution for these two genera in the Neotropics. Both are in danger of extinction in this region as a result of illegal hunting and the above-mentioned habitat destruction. Prior to recent studies at Los Tuxtlas, neither *Alouatta* nor *Ateles* had been studied systematically in Mexico and little information was available concerning their behavior, ecology and conservation status.

Primate field studies were initiated at the *Estación de Biología, Los Tuxtlas* in 1977. This field station is operated by the Instituto de Biología, Universidad Nacional Autónoma de México and is located in the southern portion of the state of Veracruz. The principle focus of primate studies at Los Tuxtlas thus far has been on interactions with the local ecology, specifically examining feeding ecology, time and energy budgets, chemical and phenological factors affecting feeding selectivity, seed dispersal, and resource partitioning between primates and other arboreal mammals. Other research programs currently in progress at the Los Tuxtlas Reserve cover diverse areas in tropical biology and ecology, such as plant and animal taxonomy, plant demography, plant phenology, reptile ecology, community structure of birds and mammals, etc., and they contribute important contextual information on the primates' environment. Taken collectively, the

resulting data provide the bases for intelligent design and development of biological reserves.

The Research Station at Los Tuxtlas has a number of facilities (e.g., dormitories, offices, etc.) which allow researchers to spend considerable amounts of time living and working in the field. A library, well-equipped laboratories, diverse field equipment and facilities with modern conveniences such as electricity, running water and even air conditioning, accommodate visiting researchers along with resident academic and administrative staff.

Visits to the Station can be arranged by writing to the Director at either of the following addresses: Apartado Postal 94, San Andrés Tuxtla, Veracruz, México, or Director, Instituto de Biología, Apartado Postal 70-223, México 20, D.F. Certain restrictions do exist regarding visitation procedures.

Research program proposals are welcomed at Los Tuxtlas and are evaluated on the basis of their relevance to the Station's Master Research Plan. Proposals must be submitted in writing to the Director of the Institute and should include the following:

- 1) General and specific aims of the project, methods and procedures to be employed, research schedule, and a list of participants accompanied by curriculum vitae. Information must also be provided concerning the specific nature of any collecting which may be necessary and on the type of assistance and/or equipment required from the Station.
- 2) Letters of support from high academic officials of the institution with which the principal investigator is associated.
- 3) Other relevant proposals (e.g., NSF application for support).

Research teams are expected to adhere to all plans presented in the proposal and to restrictions which are outlined by the Station.

Graduate students wishing to conduct research at Los Tuxtlas aimed at developing theses or dissertations are required to meet the requirements listed above, and in addition should provide a detailed description of the ways in which supervision of their research will be carried out by the adviser.

The existence of the Research Station "Los Tuxtlas" since 1967 and its history of research in tropical biology and ecology provide fine examples of programs and efforts necessary for tropical forest and wildlife conservation. Significant amounts of quantitative data being gathered on Mexican primates and their habitat will hopefully provide for rational use of tropical forest species and their ultimate preservation.

Alejandro Estrada
Institute of Biology
University of Mexico
San Andrés Tuxtla, Veracruz
Mexico

A Survey of Endangered Primates in Sierra Leone

With assistance from the WWF-US Primate Program, my wife, myself and a research associate traveled to the Kilimi region of northwest Sierra Leone, West Africa, in October, 1981, to conduct a census of the primates and other large mammals of the area. We concluded our work in June, 1982.

About 250 km² in size, Kilimi is one of the two areas selected by the government of Sierra Leone for incorporation into that country's first national park. When we arrived there, final arrangements for the park had not yet been completed, and as a result, a few Susu villages were still in place, their inhabitants continuing to practice traditional slash-and-burn agriculture. These villages were relatively few, however, and we were able to ascertain that healthy animal populations still remained. Nevertheless, the destruction that even a few people were able to wreak convinced us that the decision to set aside the Kilimi area had come none too soon.

Skirted on the west by the Great Scarries River, which forms Sierra Leone's border with Guinea, the region is a mosaic of different habitats. Although Kilimi consists mainly of tall-grass savannah, riverine forest lines the Great Scarries and smaller remnant forests persist along secondary stream beds and on top of several small hills. The broad river and a number of seasonally-flooded areas attract a rich variety of birds, and without devoting special attention to birds, we were able to identify over 125 species during our relatively brief time there.

Eight different species of nonhuman primates were seen. The most common of these were Guinea baboons (*Papio papio*), which roamed the area in large troops of up to 150 animals. Campbell's mona monkey (*Cercopithecus campbelli*), normally a forest monkey, was found throughout Kilimi, apparently thriving in the regenerating secondary forest and scrub that is the legacy of the traditional farmers. Green monkeys (*Cercopithecus sabaenus*) were also common in the forest fringes and at the edge of farmers' fields, while sooty mangabeys (*Cercocebus torquatus*) were found in reasonable numbers walking single-file through the riverine forests and near the seasonal streams.

We were very pleased to find a healthy population of chimpanzees (*Pan troglodytes*) for we had been told that the animal exporters of Sierra Leone had hunted these valuable animals in this area in the past. We estimate that there are about 75 chimpanzees at Kilimi, including healthy youngsters, although the population is, understandably, extremely shy of humans. Black and white colobus (*Colobus polykomos*) were restricted to the riverine forest and several inland forested areas. They were not as abundant as some of the other primates and lived in smaller groups than are usual elsewhere in Africa, testifying to the pressure that humans have placed on them in the past. Their close relatives the red colobus (*Colobus badius*) require a larger foraging area to survive, and have not adjusted to the reduced forests as well as the black and white colobus. As a result, there are fewer of them to be found. Finally, we located only one group of spotted-nosed guenons (*Cercopithecus petaurista*) in the whole Kilimi area, although we saw and heard several other groups across the river in Guinea.

Other common large mammals included hippopotamus, buffalo, waterbuck, both bushpig and warthog, and several species of duiker. Smaller carnivores, such as jackal, genet, civet and golden cat were in evidence, and the sighting of spoor led us to believe that leopard are still present, but other large carnivores were not seen.

The presence of eight species of nonhuman primate in an area to be designated as a national park is most encouraging. We hope that our report on the numbers and distributions of large mammals in the Kilimi area will assist the government in developing sound management policies for the new park.

R.S.O. Harding
University of Pennsylvania
Philadelphia, Pa.
U.S.A.

Gorilla and Chimpanzee Census in Gabon

As reported in the August, 1982 Newsletter, a survey of gorilla and chimpanzee populations in Gabon, financed by the Centre International de Recherches Médicales de Franceville (C.I.R.M.F.), has been in progress since November, 1980.

Field work was completed in February, 1983, and the results are currently being prepared for publication. In the initial phase of the survey, mean population densities for the two species in the 15 major habitat-types of Gabon were calculated from the results of extensive nest-counting transects. Information on the distribution of these habitat types in Gabon are available and, in the second phase of the project, expected populations of gorillas and chimpanzees were calculated by multiplying the area of each habitat-type by the mean density. Expected population values were then reduced to take account of the detrimental effects of human activities, especially hunting and forestry. Controls were carried out in the field throughout the country (nest-counting transects and interviews) to examine the accuracy of the predicted population levels.

Tests were also made to examine the error inherent in the transect method and in the assumption of a standard mean density by habitat-type. These tests indicated that the census results were accurate to $\pm 20\%$, a large margin of error which can only be reduced by much more extensive field work. Total populations found were $35,000 \pm 7,000$ gorillas and $64,000 \pm 13,000$ chimpanzees. Chimpanzees occur throughout the country in primary forest and in areas of gallery forest associated with savannas. Gorillas were found in primary forest at low population densities in all areas of Gabon except a forest block east of Franceville, which is almost completely surrounded by savanna. The low density typical of primary forest increased in areas where secondary forest and/or thicket were part of the habitat mosaic. Gorillas were not found in gallery forest.

The most serious threat to ape populations in Gabon is local hunting for meat. Human population density is low, but the rural population depends heavily on forest animals as a source of protein, since there is no tradition of raising domestic livestock. The

level of hunting pressure on ape populations varies, being heaviest in the north where gorilla flesh is considered a delicacy and lightest in the south-west where the major ethnic group has a taboo against killing or eating apes. The chimpanzee has had total legal protection since 1967 and the gorilla is temporarily protected by a law dating from February, 1981, which suspends "big-game" hunting in Gabon. These laws are not enforced in rural areas, but recently local authorities have confiscated several young chimpanzees which were openly offered for sale. Selective logging of forests is a lesser threat. The habitat is certainly changed, but few trees are cut (1-3 per hectare) and it appears that chimpanzee and gorilla populations can adapt to alterations of this magnitude.

The potential for gorilla and chimpanzee conservation in Gabon is tremendous as populations are still large, and many areas of undisturbed habitat exist. No national parks have yet been established, but there are several large reserves. The Ministry of Water and Forests is beginning to create an infrastructure of trained personnel in the Lopé-Okanda Reserve (5,000 km²) in central Gabon. This year they will initiate a similar program in the Moukalaba Reserve (1,000 km²) in the south-west. Both of these sites consist mainly of forest, but include areas of savanna and contain sizeable populations of gorillas and chimpanzees. However, both have been selectively logged in the past — extensively at Moukalaba, more restricted at Lopé-Okanda and until they have national park status the threat of future forestry activity is very real.

The results of the census will be communicated to the Gabonese authorities (there are three Ministries directly involved in conservation matters: the Ministry of Water and Forests, responsible for hunting legislation and policing of reserves; the Ministry of Scientific Research, which is also responsible for the protection of nature; and the Ministry of Tourism, which is responsible for national parks), and cooperation with them will continue, with the aim of creating national parks out of existing reserves and in other areas of the country where good populations of gorillas and chimpanzees exist and there are no conflicting human interests. Research activities will continue, starting with a project to habituate social groups of chimpanzees and gorillas to the presence of human observers, the first step to establishing a long-term study of their ecology and behavior.

Caroline E.G. Tutin
Michel Fernandez
C.I.R.M.F.
Franceville
Gabon

Birth Pains for Sapo National Park in Liberia

The plant and animal resources associated with forest habitat in Liberia have suffered serious fragmentation from the encroachment of farmers, hunters, road builders and miners, producing a mosaic of noncontiguous biological communities across the country. Liberia is now at a serious environmental crossroad as there are presently no official national parks or protected wildlife. Without some management measures, the rate of habitat alterations would, in a very few years, prevent the establishment of conservation areas which would protect representative samples of the natural forest cover and associated wildlife. Based on field

surveys conducted by Dr. Jacques Verschuren (WWF/IUCN) in 1979 and Dr. Philip Robinson (Zoological Society of San Diego, U.S.A.) in 1982, working in conjunction with Liberia's Wildlife and National Parks Department, attention has been focused on the Sapo Forest in eastern Liberia.

No other forest area in Liberia has greater wildlife diversity than the forests and swamps of Sapo. In addition to a diverse mammalian fauna, which includes 10 ungulate species, pygmy hippo, forest elephant, leopard, and various carnivores, significant populations of primates are also present, as indicated by the following survey results:

FAMILY	COMMON NAME	SCIENTIFIC NAME	METHOD
Lorisidae	Galago	<i>Galago d. demidovii</i>	?
	Potto	<i>Perodicticus p. potto</i>	V
Cercopithecidae	Sooty Mangabey	<i>Cercocebus torquatus atys</i>	S,V
	Lesser Spot-Nose Monkey	<i>Cercopithecus petaurista</i>	S,V
	Spot-Nose Monkey	<i>C. nictitans stampflii</i>	?
	Campbell's Monkey (Mona)	<i>C. c. campbelli</i>	S,V
	Diana Monkey	<i>C. d. diana</i>	S,V
	Olive Colobus	<i>Procolobus verus</i>	S*
	Red Colobus	<i>Colobus b. badius</i>	S,V
Pongidae	Black Colobus	<i>C. p. polykomos</i>	S,V
	Chimpanzee	<i>Pan troglodytes verus</i>	S,V,P,T

Key: S — Sighting
T — Track or Field Signs
P — Photography (Remote)
A — Skeleton or Skin Artifacts
V — Vocalizations
* — Reported by University of Stirling team working in Sapo on a 1982 chimpanzee survey
? — Not confirmed but probably present

The Liberian Department of Wildlife and National Parks, under the direction of Alexander L. Peal, has put forward a proposal through its parent agency, the Forestry Development Authority (F.D.A.), for the establishment of Sapo Forest as a national park. The majority of the boundary for this park has been surveyed and a boundary line cut on the ground by F.D.A. staff. A preliminary wildlife survey of the area was conducted in 1982 which produced a report of current conditions in the area and recommended prompt action to declare this 505 mi² area as a national park. The majority of Sapo is largely unaltered forest habitat. It contains significant areas of hilly forest and swamps which contain no established human populations, although hunting incursions are common.

In 1982 a survey of chimpanzee populations in Sapo was undertaken by James Anderson, Elizabeth Williamson and Janis Carter, and the results of this survey have been submitted for publication. In addition, with the assistance of the African Wildlife Leadership Foundation and the World Wildlife Fund, an educational program was initiated in the vicinity of Sapo in the fall of 1982. Conducted by Janis Carter and wildlife staff members, this program established a dialogue with people in the park's perimeter zone about the significance of wildlife conservation and the importance of protecting the Sapo Forest.

The proposal to establish Sapo as a national park is now in the hands of the Liberian Government, but it has not yet been given official approval. In the interim, the Wildlife Department has continued to encourage investigators to conduct field studies in the

area to gather additional information on wildlife populations. A number of international agencies have been contacted about possible assistance which will be required for managing the area as a national park, although no tangible support has yet been secured. Nevertheless, wildlife personnel have been assigned to the Sapo area and are monitoring local activities related to wildlife and habitat conservation. The success of the Sapo proposal, both internally and externally, is likely to set a trend for wildlife management efforts throughout the country.

In Liberia primates are considered bushmeat and are widely used for food throughout the country. Bushmeat is currently a major, but rapidly declining, national resource. Most areas which can be reached by motor roads are wildlife-impooverished. This situation has placed tremendous pressure on more remote forests through market hunting to supply the demands for bushmeat. Overhunting is an international problem with commerce transcending political boundaries. The Department of Wildlife and National Parks has made attempts to develop a better dialogue with neighboring countries and reciprocal visits have been undertaken by wildlife staffs in Liberia and Sierra Leone to discuss mutual problems of wildlife conservation.

Philip T. Robinson
Zoological Society of San Diego
San Diego, California
U.S.A.

Literature Cited

- Anderson, J.R., Williamson, E.A. and J. Carter. Chimpanzees of Sapo Forest, Liberia: Density, nests, tools and meat-eating. University of Stirling; submitted for publication. 1982.
- Robinson, P.T. The proposed Sapo National Park in Liberia — a field survey of prospects and problems. Report to the Forestry Development Authority of Liberia, 43 pp. June 15, 1982.
- Verschuren, J. Conservation of tropical rain forest resources in Liberia. IUCN Publications. 1979.

Effects of Selective Logging on Primates in the Kibale Forest, Uganda

The world's tropical forests are immensely rich biological reservoirs. While they may cover only 5% of the earth's land surface, they are estimated to contain over 50% of the planet's animal and plant species. Yet tropical forests are disappearing at an unprecedented rate, estimated to have been between 20-40 hectares per minute during the 1960's and 70's. Therefore, it is not surprising that in a recent appraisal of IUCN's "World Conservation Strategy", a prominent zoologist stated that the loss of tropical rain forest currently worries biologists perhaps more than any other ecological issue in the world.

In Africa, at least one-half of the original rain forest has already been destroyed. Much of the remaining forest is within government forest reserves and is designated for timber exploitation. While the results of forest clearance *per se* (for instance to provide land for agriculture) are largely predictable, the effects of selective logging are largely unknown. The damaged and degraded forest which remains following selective timber removal is, in fact, an almost unknown entity in regard to its value as a habitat for tropical wildlife and plants. Yet, this will soon be the state of large areas of surviving rain forest since the commercial ex-

ploitation of timber in the tropics almost always takes the form of a selective harvest.

Nonhuman primate species adapted to tropical rain forest environments are particularly vulnerable to habitat conversion due to their generally small population units, slow reproductive rates, and fragmented distributions. As a result, these primates may be good indicator species for assessing the wildlife potential of selectively logged rain forests. The primary objective of a recent WWF-US Primate Program field project in the Kibale Forest, Uganda is to learn what effects selective tree felling has on population of rain forest primates.

The Kibale Forest, which occupies approximately 550 km² of western Uganda's Toro District, represents one of East Africa's last remaining tracts of predominantly primary tropical rainforest. A variety of ecological and behavioral studies have been conducted at Kibale since 1970, and it remains a productive field site for primatologists. The selective logging project is thus but one part of an integrated program of ecological studies which will provide the necessary basis for rational tropical forest management.

An extensive literature review conducted as background for the report on this project indicates the immense complexity of the problem of selective logging. The review also indicated that very little information currently exists on primate responses to forest disturbance. In fact, even general accounts of such responses (accounts that are often contradictory) exist for less than 50% of all diurnal primate species, while rigorous data which would be suitable for use by planners exist for less than 5%.

Preliminary analysis of the Kibale project data has led to an appraisal of the impact of selective timber harvesting on forest dynamics. The analysis strongly indicates that mechanical selective harvesting is not compatible with forest conservation, that is, it is not a sustainable use of the forest. However, less wasteful logging methods are feasible and compatible with conservation of tropical forests (and thus primates). This is an extremely important result, since mechanized selective timber harvesting has often been put forth as a possible multiple-use option for tropical forest conservation areas. Indeed, mechanized selective timber harvesting is already allowed in the game production reserves of Ghana, and the forest reserves of many African countries. Our analysis also suggests a general method that forest managers could employ to ensure that forest resources are sustainable.

Joseph Skorupa
University of California,
Davis, California
U.S.A.

Studies of the Comoro Lemurs: A Reappraisal

The Comoro archipelago, a group of four small islands in the northern Mozambique Channel (Fig. 26), is home to the only wild-living populations of lemurs to occur outside the mini-continent of Madagascar. The mongoose lemur (*Lemur mongoz*) (Fig. 27), native to northwestern Madagascar but gravely endangered in that area, occurs on the islands of Ndzuani (Anjouan) and Moili (Mohéli); the Mayotte brown lemur (*Lemur fulvus mayottensis*), derived from the Malagasy *L. f. fulvus*, is

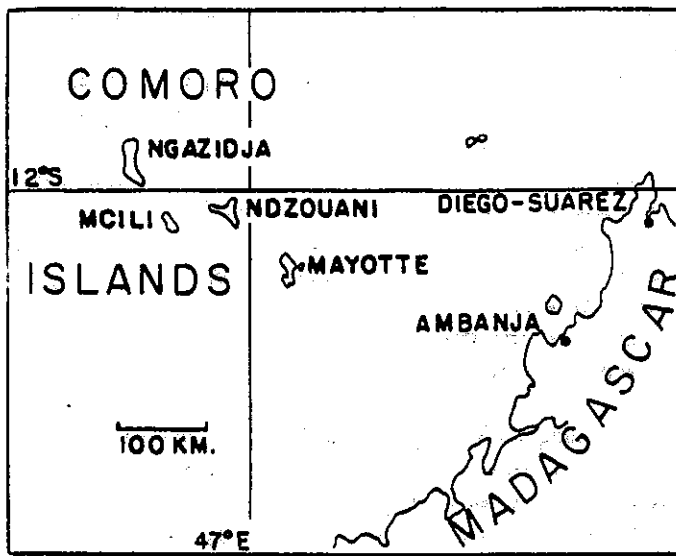


Fig. 26: Map showing the Comoro Island localities mentioned in the text.

found on Mayotte (Maore), the most southerly island of the archipelago. The fourth and largest of the islands, Ngazidja (Grande Comore), has no permanent lemur population; whether this is due to its lack of permanent water, to its dense human population, or to some other factor is unclear. Almost certainly, the lemurs were introduced to the Comores by man. On all the islands the existing vegetation is for the most part secondary; but lemurs are able to thrive in such regrowth as long as it contains sufficient numbers of large trees which provide for the bulk of their diet.

Until recently the lemur populations of Ndzouani, Moili and Mayotte all flourished. I carried out the earliest survey of these populations in 1974; subsequently I resurveyed Moili and Mayotte in 1977, Mayotte in 1980, and most recently, all three of these islands in November, 1982. The results of these surveys were progressively more dismal.

Ndzouani: In 1974 I found that while extensive forest clearance on this overpopulated island had drastically reduced the area available to the mongoose lemur (Fig. 28), the population density of these primates in the relatively undisturbed cloud forest of the central peaks was probably unmatched anywhere. By 1982 considerable encroachments had been made into the remnants of this forest and lemurs were dramatically less in evidence. Similarly, continuing clearance of the vegetation elsewhere on the island had further diminished the area of secondary habitat exploitable by lemurs. This accelerating habitat destruction is linked directly with expansion of the island's human population, up from 250/km² in 1974 to upwards of 350/km² in 1982. Of particular impact has been the arrival of several thousand refugees from Madagascar, many of whom have settled in the interior in areas adjacent to what remains of the forest.

Moili: In 1974 most of this island was covered with vegetation capable of supporting lemurs. In 1982 clear patches, covered at best with bushy scrub, were evident everywhere. Although the human population of Moili is still comparatively low, at about 60/km² (but up from 40/km² in 1974), a pattern of vegetation

destruction seems set for the future, and the abundance of lemurs has already declined and can be expected to continue to do so.

Mayotte: The secondary vegetation of this island is more tenacious than that found elsewhere in the archipelago, due largely to the presence of the rapidly-regenerating *Litsea glutinosa* which normally survives traditional methods of clearance for cultivation. Nonetheless in Mayotte, too, the vegetation has suffered considerably since the initial survey in 1974-5, and inroads into the forest have become particularly marked since 1980. Virtually the entire forest of Mavingoni, in which Mayotte lemurs were intensively studied in 1974-5, 1977 and 1980, had disappeared in 1982, despite the relocation of the village that had been adjacent; and this represents an island-wide trend. Moreover, mechanical means of terrain clearance are now being used on a much larger scale than before; and since the authorities believe, with some justice, that Mayotte's land is underexploited, one can only expect this trend to accelerate. While it would be alarmist at this point to claim that the Mayotte lemurs are threatened, these primates do face a severe curtailment of their habitat in the longer term.

In sum, the situation of the mongoose lemur is critical in Ndzouani and is becoming precarious in Moili, while the Mayotte lemur faces a long-term erosion of its habitat. In all three islands, the trend amongst lemur populations over the last decade or so has been towards accelerating decline, and this is in spite of the fact that local customs and existing legislation combine to assure a reasonable level of protection for these animals (although the influx of refugees from Madagascar, many of whom have acquired a Malagasy taste for lemurs, may soon affect this). Unfortunately, the authorities of the Republic of the Comores (Ngazidja, Moili and Ndzouani), while cognizant of the problem, do not have the resources to deal with it. In the French "territorial collectivity" of Mayotte the rapid turnover of the ad-



Fig. 27: A male mongoose lemur from Anjouan.

Hamadryas Baboons in Yemen

The hamadryas baboon (*Papio hamadryas*) is the only primate species occurring on the Arabian peninsula. Also inhabiting the Horn of Africa, its current distribution consists of two major populations effectively separated by the Red Sea. To date, the African hamadryas have received the most attention from primatologists; the Arabian baboons are only known from several expeditions through the southern portion of the peninsula and a recent study of this species in Saudi Arabia by Kummer.

This past summer the author spent one week in Yemen searching for hamadryas baboons. To find the baboons in Yemen requires travel in fairly mountainous terrain at altitudes of up to 4,000 m. Since they are occasionally hunted by the Yemenis they are wary of people and it is difficult to approach them closely, yet a little perseverance and luck will result in excellent observations.

The largest troop recorded during this informal survey was encountered on a mountain known as Jebel Al Suad ("Black Mountain") and contained approximately 30-40 animals. Jebel Al Suad is adjacent to Jebel Sabi, several kilometers south of the city of Tai'zz (Fig. 29). Other smaller troops were seen around the village of Raymah, in the Tinhana region. The range of the hamadryas baboon in this region appears to be narrow, covering only two separate mountains, and is dependent upon the local availability of figs, agricultural crops and suitable sleeping cliffs. Local inhabitants report that very large groups of baboons sometimes gather during periods of crop-raiding.

Baboons are not common around the capital city of San'a, located on a high, flat plateau. Proceeding outward from San'a either toward the coast or further inland, the terrain is drier and less hospitable to baboons.

At this time there does not appear to be any conservation prob-



Fig. 28: A typical deforested and partially cultivated hillside in Ndzouani, near Mutsamudu. Average slope is estimated at 40°; terracing is not used.

ministration makes it difficult to introduce the necessary long-term awareness of the situation. Ultimately, the establishment of adequately-policed forest reserves may be the only way of assuring the eventual survival of the lemur populations of the Comores (whose prospects nonetheless look better, at least in Moili and Mayotte, than those of the parent populations in Madagascar). But it is difficult to see how the necessary financial commitment could be generated within the archipelago itself.

Ian Tattersall
American Museum of Natural History
New York, N.Y.
U.S.A.

Postscript: Since the foregoing was written, I have learned that Moili was directly struck on January 11, 1983, by cyclone Elena. My information suggests that the vegetation of the island was ravaged terribly by the cyclone, which was apparently followed by extensive brush fires. The effects of this major disaster on Moili's lemur population remain to be ascertained.

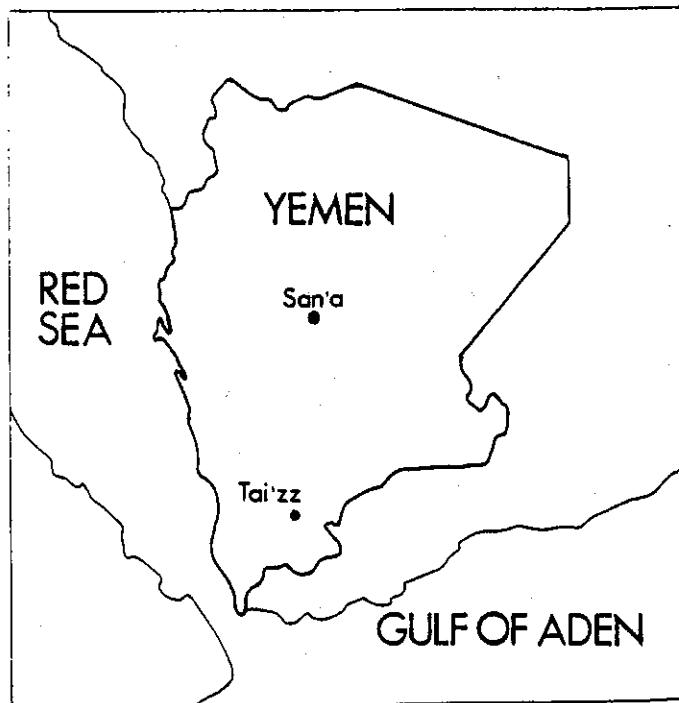


Fig. 29: Map of Yemen showing localities mentioned in text.

lem confronting the hamadryas baboon in Yemen. They are shot occasionally as crop pests, but never for food, they are not trapped commercially, and they do not seem to be popular as pets. In general, the baboons are ignored by the local people, many of whom are unaware of their existence. Others do, however, recognize a distinction between baboons, which they call *Robah* and other monkeys, which are collectively referred to as *Gruht*. It would seem that given the prevailing human attitudes toward the hamadryas and the relative ease with which these animals can be contacted and observed, the time is ripe for the first field study of this primate in Yemen.

David Rand
Encino, California
U.S.A.

Field Study of the Lion-Tailed Macaque in Southern India

In October, 1981, with funding from the World Wildlife Fund — U.S. Primate Program, a project was launched to study the ecology and distribution of the lion-tailed macaque (*Macaca silenus* — Fig. 30) in southern India. The total wild population of this endangered primate is estimated to be about 1,000 individuals restricted to the tropical rainforests of the Western Ghat mountains in peninsular India. Other non-human primates of the Western Ghats include the slender loris (*Loris tardigradus*), the hanuman langur (*Presbytis entellus*), Nilgiri langur (*P. johnii*) and the bonnet macaque (*Macaca radiata*). Of these, only the Nilgiri langur is truly sympatric with the lion-tailed macaque, the other three species being primarily residents of deciduous forests. The Malabar giant squirrel (*Ratufa indica*) is the only other arboreal mammal sympatric with *Macaca silenus*.

Human exploitation of tropical rain forest, which had a very early start in southern India compared to other Southeast Asian countries, has reduced the lion-tail's habitat to a series of small and isolated patches, most of which are still under human pressure. Though its endangered status has now been recognized, conservation measures on behalf of this monkey have been severely handicapped by the almost total lack of quantitative data on wild populations.



Fig. 30: The lion-tailed macaque (*Macaca silenus*) from south India (photo by R.A. Mittermeier).

By combining ecological and behavioral studies with population and habitat surveys, we hope to assess the conservation requirements of the lion-tailed macaque. Field studies began in June, 1982 and are now being carried out at two sites approximately 200 km apart, the Anamalai Wildlife Sanctuary in Tamil Nadu State and the Silent Valley National Park in Kerala State. The former is the largest wildlife sanctuary in southern India and is located in the Anamalai Hills. Plantations established here from the 19th century onwards have reduced suitable lion-tail habitat to a number of isolated patches, the largest of which is only about 25 km². The second study site, Silent Valley National Park, though threatened by proposals to build a dam, remains one of India's few undisturbed areas and the habitat here is largely contiguous.

Studies at each locality involve dawn to dusk observations of selected groups of lion-tailed macaques for about 7-10 days each month, during which time data are collected on all major ecological and behavioral aspects. These include activity and ranging patterns, feeding, habitat usage, interspecific relations and social behavior (with particular reference to reproductive activity), social communication and inter-group relations. Approximately one week each month is spent surveying populations and habitat. Repeated visits are being made to the various patches of habitat in an effort to make a total count of the populations and to monitor their growth during the course of the field studies. Attempts are also being made to assess the area of the habitat at both localities with the aid of LANDSAT imagery made available under the IMAGES Program of PSG member Dr. Kenneth Green of the University of Maryland. The field studies are expected to be completed by the end of March, 1984.

Comparative data from the above two field sites are expected to show differential habitat requirements of the lion-tailed macaque and how this species has adapted to isolation in disturbed patches of habitat as compared to relatively undisturbed, contiguous habitat. It is expected that a clear picture of the factors limiting population size and distribution will emerge as a result of this study, and also the extent to which these factors are reflected across the range of this species. The final assessment of conservation requirements, though particularly relevant to the two study areas, would also have relevance to other populations of lion-tailed macaques in southern India.

Ajith Kumar
Anamalai Wildlife Sanctuary
Tamil Nadu
India

Distribution Study of the Nicobar Crab-Eating Macaque

The Nicobar crab-eating macaque (*Macaca fascicularis umbrosa*) is another isolated subspecies of the wide-ranging crab-eating macaque, and is found on several islands of the Nicobar archipelago (India) in the Bay of Bengal north of Sumatra (Fig. 31). Since there had been recent reports that these macaques were rapidly disappearing, a study was initiated to determine the current status of this monkey, with support from the World Wildlife Fund — U.S. Primate Program.

The first phase of the project, ascertaining the macaque's present distribution, began in March, 1982. Nine islands of the Nico-

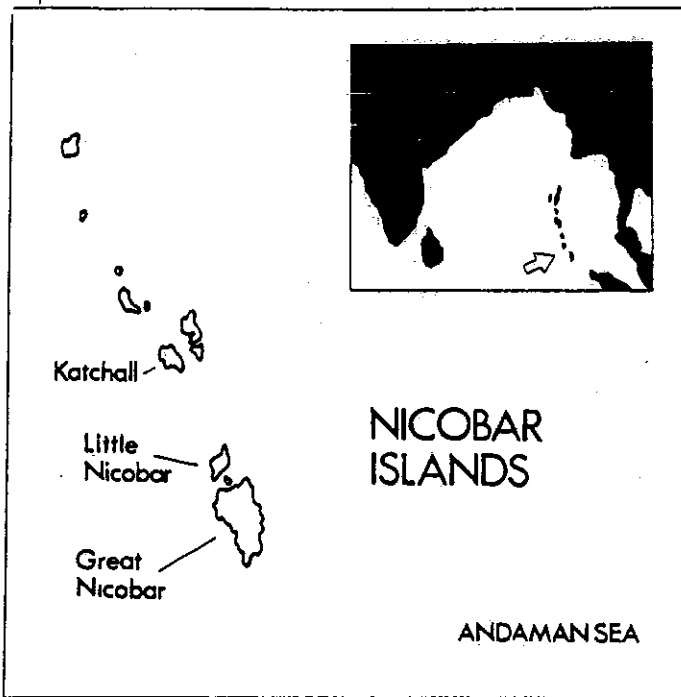


Fig. 31: Map of the Nicobar Islands, showing the localities mentioned in the text.

bar group were visited during a two-month period, in spite of a host of transportation problems, the generally inhospitable terrain, and several earthquakes. Macaques were found on only three of the islands: Great Nicobar (both near the coast and inland up to an altitude of 1,000 ft.), Little Nicobar and Katchall. A total of 136 animals were encountered and the average size of the 8 troops observed was 7 animals. Solitary animals were encountered on several occasions, both in bamboo and evergreen forests. During the course of the survey, problems posed by the macaques were discussed with administrative officials, settlers and the islanders. The importance of conserving the island environment, and the macaques in particular, was stressed during the collection of such information.

The adult Nicobar macaque is similar in size to an adult rhesus monkey (*Macaca mulatta*). Except for two animals, the color of the coat of all Nicobar macaques observed was black, with the ventrum being somewhat paler. A vertical crest of hair on each side of the face and a bright, creamy white brow ridge are characteristic of this race.

These macaques reportedly feed on tender coconuts by ripping away part of the fibrous mesocarp, biting a hole in the shell, and then consuming the liquid and soft kernel. "Fishing behavior" has also been described by the people living on Katchall. According to reports, some animals take up positions on rocks by the edge of the sea at low tide, facing the seashore, and dangle their tails in the water. When an animal feels a fish bite it immediately swings its tail up and towards the shore. The islanders say that macaques waiting on the shore feast upon these fish and that each animal takes its turn fishing until the whole troop is fed.

The islanders do not usually harm the macaques. Habitat destruction continues to be the major threat to this subspecies, though there are instances in which crop-raiding animals have been killed. Despite the risk of punishment under the local Wildlife Act, settlers, especially on Great Nicobar, feel that they must protect their crops. The macaques are also looked upon as a

menace because they are believed to carry and transmit cerebral malaria. The combination of these factors argues for the rapid development of a conservation program for the Nicobar macaques.

Efforts to prevent further habitat destruction on southern Great Nicobar Island may be an appropriate place to begin developing a conservation plan. In addition to the crab-eating macaque, the rich evergreen forest on this part of the island also harbors the Nicobar tree shrew, the salt water crocodile, the Nicobar megapode and the robber crab, the latter two perhaps occurring only on Great Nicobar within the Nicobar archipelago. In addition, on the northern part of this island there still exists an aboriginal tribe known as the Shompens, the study of which is of special importance to anthropologists. All in all, there is good reason to begin wildlife conservation efforts on this island chain as soon as possible.

B. V. Devaraj
Madras, Tamil Nadu
India

Tropical Forests and Conservation Education in Sri Lanka

During 1982 funds were provided by the World Wildlife Fund — US Primate Program and the New York Zoological Society towards ongoing support of a conservation education project in Sri Lanka. This project, initiated in 1980 by members of the March for Conservation (MFC), has as its major objective the focus of public attention on the benefits of environmental con-



Fig. 32: The grey langur (*Presbytis entellus thersites*) from Sri Lanka (photo by R.A. Mittermeier).



Fig. 33: The toque macaque (*Macaca sinica*), a Sri Lankan endemic (photo by R.A. Mittermeier).

servation. In order to achieve this objective, several activities which involved a high level of public participation were implemented throughout the year.

In January, 1982, the March for Conservation organized a one day symposium on the Sinharajah Forest, a conservation priority in Sri Lanka. Held at the Sri Lanka Foundation Institute in Colombo, the symposium focused national attention on this unique remnant of tropical rainforest on this small island nation. The symposium was preceded by a week long publicity campaign via radio broadcasts and the newspaper media. Consequently, a very large audience including leading public figures, as well as local school children attended the symposium, where speakers discussed research and conservation of the Sinharajah Forest.

In February-March, a five week lecture series for school children, "The Conservation and Management of Sri Lanka's Natural Resources", was held at the University of Colombo. Lectures were given by faculty members from several local universities and guest speakers from the Ministry of Fisheries and the Department of Wildlife Conservation were present as well. The series was attended by 225 students representing 40 different schools. At its conclusion two conservation competitions were held, with prizes being awarded both to individuals and schools.

In May, a conservation parade and rally were held again in Colombo, Sri Lanka's capital. Several hundred placard and poster-carrying conservationists marched seven miles through the

heart of the city to the Dehiwela Zoological Gardens. The colorful parade was accompanied by bands of musicians and this rather novel method of attracting public attention to conservation issues has become an important feature of the March for Conservation Program.

In June, MFC members collaborated with the Coast Conservation Division of the Ministry of Fisheries in presenting an exhibit to commemorate World Environment Day. This exhibit focused on mangrove forests as an ecosystem which has been neglected in Sri Lanka and is in need of conservation action. In November, another exhibition was held in Colombo, entitled "Sinharajah — Heritage of the Past, a Promise for the Future", which again highlighted the need for protecting the Sinharajah Forest and the human benefits derived from it. Models, charts, photographs and paintings depicted the fauna and flora of this forest, the human impacts and the major findings of an ongoing research project. Forest products such as mats, baskets, plants of economic importance, resins, etc., were also on display, in addition to designs for new Sri Lankan currency notes featuring endemic wildlife and plants of the island, many of which can be found in Sinharajah.

Throughout the course of the 1982 MFC program it was evident that a considerable number of people in Sri Lanka were coming to recognize the importance of the Sinharajah Forest and that the education activities were being particularly well-received by



Fig. 34: The purple-faced leaf monkey (*Presbytis senex*), another endemic Sri Lankan primate (photo by R.A. Mittermeier).

local schoolchildren and their teachers. Volunteer assistance was important in all aspects of the program, many of the volunteers choosing to remain as dedicated helpers. The first Annual General Meeting of volunteers was held in September to review past activities and to plan future projects, and in addition a new wildlife film was screened. The MFC program also received support from the Department of Education, the National Youth Services Council, the Department of Wildlife Conservation, the Dehiwela Zoological Gardens, the Forest Department and the Natural Resources, Energy and Science Authority.

In 1983, in addition to the above-described educational and promotional activities, MFC hopes to undertake an extensive, local fund-raising campaign. Such support is essential if tropical forest habitats such as the Sinharajah are to be preserved.

Four species of primates occur on Sri Lanka. They include the slender loris (*Loris tardigradus*), the grey langur (*Presbytis entellus* — Fig. 32), the toque macaque (*Macaca sinica*; Fig. 33) and purple-faced langur (*P. senex* — Fig. 34). The latter two are endemic to Sri Lanka.

R. Rudran
National Zoological Park
Washington, D.C.
U.S.A.

Outlook for the Pileated Gibbon in Southeast Thailand

Two new national parks created in Thailand in 1982 have virtually doubled the area of protected habitat for the pileated gibbon (*Hylobates pileatus* — Figs. 35 and 36). These are the Tab Lan National Park (2,240 km²) and Pang Sida National Park (845 km²), which together cover most of the Dong Rek Mountain Range lying between the existing Khao Yai National Park and the Cambodian border. The two new parks are contiguous and in effect constitute a single large protected area of 3,085 km².

The previous area of forest habitat in parks and wildlife sanctuaries within the pileated gibbon's range had been about 2,000 km², of which roughly 1,500 km² were estimated to be inhabited



Fig. 35: Adult male pileated gibbon (*Hylobates pileatus*) in Khao Soi Dao Wildlife Sanctuary, Thailand (photo by Warren Y. Brockelman).



Fig. 36: Juvenile pileated gibbon (*Hylobates pileatus*) in Khao Soi Dhao Wildlife Sanctuary, Thailand (photo by Warren Y. Brockelman).

by gibbons. It is not known what part of the additional 3,085 km² contains gibbons, but it is clear from satellite images that most of the area represents forests remote from human settlements. Slash-and-burn agriculture does threaten the parks from all sides, however, and there is currently little manpower to ensure protection. Poachers doubtless occur throughout most of the area as well, and insurgents are also reported, which may prevent wildlife surveys in the near future. The threats imposed by the insurgents and disgruntled villagers have also prevented the Forest Department from patrolling the eastern half of Khao Yai National Park where the pileated gibbon is known to occur. The vast, rugged area of Tab Lan National Park is not likely to be patrolled in the foreseeable future.

Khan Soi Dao Wildlife Sanctuary, with an area of over 1,000 km², remains the largest reserved area known to harbor a large pileated gibbon population (in the thousands). Many parts of this area have been surveyed for these primates, and it has been the site of intensive ecological and behavioral studies on the pileated gibbon. Although the sanctuary (established in 1972) is largely protected against deforestation, little of it is patrolled on foot or protected from poaching.

Foot patrols of parks and wildlife sanctuaries in Thailand are potentially dangerous and have resulted in the shootings and deaths of both villagers and Forest Department personnel. The manpower needed to "consolidate" protected areas currently does not exist and does not seem likely to be budgeted by the Thai government. Although few, if any, people depend exclusively on the forest for meat (with the exception of hill tribesmen in northern and western Thailand), some rural Thai villagers regard it as their natural right to enter the forest to hunt and collect products in season. They feel that they receive no benefits — only

losses — from the creation of parks and sanctuaries.

Although Forest Department personnel are generally sympathetic to locals, the mission of the Royal Forest Department is to protect reserved areas if possible and not to provide any special benefits to local villagers. If gibbons and other wildlife are to be protected in Thailand, basic management objectives may have to be reviewed and altered to overcome the present problems. At the present time, the National Park Division of the Forest Department is promoting a project that will increase benefits to local villagers through selective tourism and trekking in Khao Yai National Park. This represents a first step toward gaining local acceptance of these protected areas. However, future efforts must be directed toward adequate protection of these parks and sanctuaries.

Warren Y. Brockelman
Dept. of Biology
Mahidol University
Bangkok
Thailand

The Golden Monkey in the People's Republic of China

The golden monkey, or snub-nosed monkey (*Rhinopithecus roxellanae* — Fig. 37), is poorly known outside its home in the People's Republic of China. Numbers of this endangered colobine have declined significantly in recent years due to habitat destruction and hunting, and remaining populations are largely restricted to high mountain areas and forest reserves. Listed as a first priority endangered species by the Chinese government in 1975, the golden monkey is now protected from hunting and trapping. In addition, forest destruction within its range has been curtailed somewhat, and it is evident that continued enforcement of these policies is critical to the survival of *Rhinopithecus roxellanae*.

Three subspecies of *R. roxellanae* inhabit China. The white-shoulder-haired snub-nosed monkey (*R. r. brelichi*) is found only in the Fan Jing Mountains, Kweichow Province. The black snub-



Fig. 37: The golden monkey (*Rhinopithecus roxellanae roxellanae*) (photo by Frank E. Poirier).

nosed monkey (*R. r. bieti*) inhabits only Yunnan Province. The most abundant and widely distributed subspecies, the golden monkey (*R. r. roxellanae*) inhabits Gansu, Hubei, Shaanxi, and Szechwan Provinces. Subspecies designations are based on hair color differences and tail and body lengths. The most distinctive physical trait for this genus is the very flat, up-turned nose which is pointed at the tip. The nostril configuration leads to the common name of snub-nosed monkey.

Rhinopithecus inhabits the Mountain Subregion of the Central China zoogeographical region in evergreen subtropical forests with temperatures of 10°C or above for between 225-280 days per year. The genus is also found in the South-west Subregion of the South-west China zoogeographical region in subtropical mountain forests with temperate conifers. Here summer lasts for less than 90 days.

The entire *R. r. brelichi* population is restricted to the Fan Jing Mountains, Kweichow Province, at altitudes of 1,400-1,800 meters. A 1980 survey estimated that only 500 individuals survive. *R. r. bieti* inhabits N.W. Yunnan Province in the Yun Ling Mountains within the coordinates 98° 40'-100° 00' E and 26° 30-31' N in the Chinese counties of Qin, Weixi, Lijang, Jian Chuan and Lan Ping, and also in Mangkan County of the Tibet Autonomous Region. *R. r. bieti* resides in dark conifer forests at altitudes of 3,350-4,000 meters. Their main food is from the China fir (*Cunninghamia lanceolata*). In 1980 it was estimated that only 200 of this subspecies survived in Yunnan.

R. r. roxellanae is the most abundant and widely distributed golden monkey subspecies. In Hubei Province they are restricted to Shen Nong Jia, where it is estimated in 1975 that 1,000-3,000 individuals survived. Troop sizes appeared to vary tremendously, from 30-600 animals, the smaller troops being found in disturbed habitats. *R. r. roxellanae* also inhabits the Bai Shui Tan Reserve located in the Qin Ling Mountains, Gansu Province. This reserve was established to save the giant panda (*Ailuropoda melanoleuca*). Eleven troops of golden monkeys, over 1,000 animals, are believed to live here, and the local birth rate appears to be on the increase. In Szechwan Province *R. r. roxellanae* is found only in the Wolong Reserve, encompassing an area of 770 mi². This is also a giant panda reserve, and in 1979 an estimated 1,700+ golden monkeys in six troops were reported. The birth rate here is also said to be increasing.

Prior to the 1975 listing as a first priority endangered species, golden monkeys in Shen Nong Jia were under extreme pressure. Between 1964 and 1980, 332 animals were either captured or killed. This represents anywhere from a tenth to a third of the current population in this region. As a result of hunting pressure and habitat destruction, golden monkeys in Shen Nong Jia have moved south into Ba Dung County, where 3-5 troops currently reside. Migration is, however, restricted by large open areas because the monkeys are reluctant to come to the ground. In areas of considerable forest destruction, group sizes and total population numbers appear to have dropped drastically.

The most recent estimates put the total *R. r. roxellanae* population at somewhere between 3,700 and 5,700 animals, the greatest uncertainty being the actual number of monkeys in Shen Nong Jia. This subspecies constitutes over 75% of the existing Chinese *Rhinopithecus* population (*R. avunculus* inhabits Vietnam) and has at present the best chances for survival.

For almost 1,000 years *Rhinopithecus* has held an esteemed position in China's faunal array. In texts from the Northern Sung

Dynasty (1017 A.D.), the law states that, besides the ranking Provincial Governor, other officials using this species' hair for decoration should be above the fifth rank (e.g., a Prefectural Governor). Live monkeys were sold as pets and dead animals were sold to local medicinal shops. The flesh was considered a valuable source of strength. The bones were soaked in wine and considered useful for arthritis and heart trouble, or they could be boiled and sold in jellied form as medicine for other ailments. Portions of the gastrointestinal tract were believed to cure stomach problems.

Since its 1975 listing as an endangered species by the Chinese government, hunting and habitat destruction have declined within the range of the golden monkey. The most extensive efforts to establish preserves have occurred in Szechwan Province, although preserves also exist in Shaanxi, Gansu, Hubei and Kweichow Provinces. All but the Fan Jan Shan Reserve in Kweichow protects *R. r. roxellanae*, this being established instead to protect *R. r. brelichii*. The oldest and largest reserve is Bai Shui Tan in Gansu Province. It was established in 1963 and encompasses 182,431 ha (1 km² = 100 ha). The newest reserve is Shen Nong Jia, in Hubei Province, which should open sometime in 1983.

Another method of ensuring the survival of the golden monkey and its habitat is through conservation education efforts. Recently, postage stamps have been issued in honor of the golden monkey. Should the establishment of reserves and attempts at education fail to stop hunting, violators may be fined as much as \$555.55 (US) and jailed for one year.

Clearly, more ecological studies on *Rhinopithecus* are needed in China, and population and density estimates should be updated. It is imperative that the large population of *R. r. roxellanae* in Shen Nong Jia be given full protection and that efforts begin immediately on behalf of the less numerous subspecies, *R. r. brelichii* and *R. r. bieti*. It appears that birth rates have increased significantly where golden monkeys have been protected in the past. Whether or not foreign scientists will be invited to participate in preservation efforts is unknown. Chinese scientists appear very qualified to do the studies, provided they are given the necessary financial support.

Frank E. Poirier
Dept. of Anthropology
Ohio State University
Columbus, Ohio
U.S.A.

Conservation of the Simalur Island Macaque, Indonesia

Simalur, known in Indonesia as Simelue, is the northern-most island in the archipelago along the west coast of Sumatra (Fig. 38). Lying about 100 km into the Indian Ocean, Simalur is a deep-water island long isolated from mainland Sumatra. It is unlikely that Simalur was ever connected to Sumatra by a Pleistocene land-bridge, as was the case with all other western Sumatra islands with the exception of Enggano far to the south.

Simalur has an area of about 1,800 km², a length of about 100 km and a width that varies from 15 to 30 km. Much of the interior of the island is rugged and forested, while the coast is fringed with mangroves, coconut and clove groves. Cloves form the largest export from the islands and provide income for the majority of the population, which increased from about 4,000

in 1944 to over 52,000 in 1981. The vast majority of the population, however, resides in the south-east, leaving the north and west only sparsely populated with small settlements confined to the coast.

Rainfall is abundant without much seasonal variation and maintains a dense forest cover. Dipterocarps, particularly *Shorea*, are common in the interior and may reach 50-60 meters in height; average canopy height is 30-35 meters. Since there has been no historic connection linking Simalur with Sumatra, there has never been a free interchange of plants and animals. Those that did float, swim, fly or get blown to the island evolved in isolation, resulting in plants and animals that show many distinctions from those found on Sumatra. Twenty endemic subspecies and one species of bird occur on Simalur, and at least three endemic species of snakes. The terrestrial mammalian fauna, however, is extremely impoverished, as would be expected on a deep-water island with no past land connection: three species of rat, a civet, a pig and a macaque.

The Simalur macaque (*Macaca fascicularis fuscus* Miller, 1903 — Fig. 39) is of particular interest. This macaque is quite distinct from *M. fascicularis* found on the mainland and it may have split from the mainland stock at a very early date. Its color is uniformly coal to dusky-black, somewhat like that of the Nicobar Islands macaque (*M. fascicularis umbrosa*). Brief surveys indicate that its social structure and ecology may be somewhat different from the race found on Sumatra. It is believed that densities of the Simalur macaque are highest in coastal secondary forest, often near human settlements, and the monkey is seen by local people as an agricultural pest to cloves, bananas and fruit trees. In spite of trapping, shooting and poisoning of macaques in recent years, they appear to be abundant. Mangrove/inland forest transition zones and riparian forests also have good macaque populations, but the animals apparently occur in very low densities in dipterocarp forests, where fruit trees are relatively scarce and insect abundances lower.

Surveys made on the island in 1981 by WWF and PPA (Indonesian Directorate of Nature Conservation) resulted in submis-

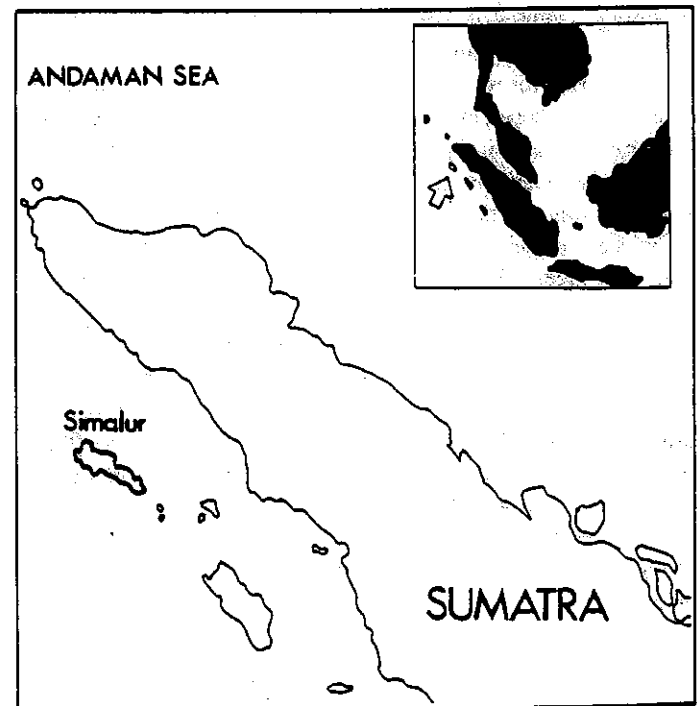


Fig. 38: Map showing the location of Simalur in relation to Sumatra.

Threatened Primates in Sabah, East Malaysia

In July, 1979, the Wildlife Section of the Sabah Forest Department initiated a systematic census of the larger mammals of Sabah. Funding for two principal investigators for two years was provided by World Wildlife Fund — Malaysia. During the project, surveys were conducted by Wildlife Section personnel in over 20 different areas of the State, while Sabah National Park personnel surveyed designated conservation areas.

All of Sabah's ten primate species were seen during the surveys; five of these are endemic to Borneo. The small, nocturnal tarsier (*Tarsius bancanus*) and loris (*Nycticebus coucang*) were seldom seen and relatively little is known about them. The diurnal primates can be divided into two distinct communities. In the coastal mangroves and along edges of large rivers (up to 100 km inland), there is a distinct group of species that includes the proboscis monkey (*Nasalis larvatus*, Fig. 40), the silvered leaf monkey (*Presbytis cristata*) and the long-tailed macaque (*Macaca fascicularis*). The other community, which occurs in the inland forests throughout the state, includes the red and grey leaf monkeys (*P. rubicundus* and *P. hosei*), the pig-tailed macaque (*Macaca nemestrina*), Mueller's gibbon (*Hylobates muelleri*) and the orangutan (*Pongo pygmaeus*).

The distribution of these species is not uniform throughout available habitats, although the red and grey leaf monkeys, the macaques and gibbon were abundant in many areas and probably do not require any immediate conservation measures. The orangutan is common only in the lowlands of eastern Sabah and an estimated population of at least 3,500 individuals may still exist in unlogged areas of the state. The populations of silvered leaf monkeys and proboscis monkeys are much lower. In fact, very few of the former were encountered and proboscis monkeys were only recorded in the mangrove swamps of Sabah's east coast. It was apparent that this species no longer occurs in some areas in which it had been previously sighted, but where there are now larger human populations.

The main threats to the orangutan and the proboscis monkey are hunting, timber exploitation and agricultural development. Although primate hunting is not widespread in Sabah, it is clear that orangutans have been eliminated from some western regions where indigenous hunters, who eat this species, are common. The loss of proboscis monkeys from some areas may be due to



Fig. 39: A juvenile Simalur macaque (*Macaca fascicularis fuscus*) (photo by Art Mitchell).

sion of a proposal to the Forest Department for a 270 km² reserve to be established in the north-west interior of the island. Much of the proposed reserve is rugged terrain forming the upper watershed of many rivers leading to the coast. If the reserve could be managed and zoned to allow for areas of traditional utilization (providing a source of wood for local non-commercial use) as well as areas of undisturbed wilderness, much of Simalur's important interior forests supporting a fragile ecosystem could be conserved. It is hoped that adequate populations of macaques exist in a variety of habitat types within the reserve, particularly the riparian and secondary forests, but the reserve should not be viewed as vital to the survival of this rare macaque. What is needed is a solution or a lessening of the problem of crop-raiding by the macaques. With increasing affluence, guns and poisons will become more common. Since the macaques appear to prefer coastal forests (those areas in greatest demand for clove cultivation) conflicts between man and monkey will only increase. PPA will need to have staff on the island with the goal of initiating wildlife law enforcement throughout the island and not just within the forest reserve. The importance of protecting and monitoring the macaque outside the reserve extends off the island as well. *M. fascicularis* is exported legally from Indonesia, but the Simalur macaque, as a rare subspecies, should be excluded from such commerce.

Art Mitchell
Yale University
New Haven, Connecticut
U.S.A.



Fig. 40: Proboscis monkeys (*Nasalis larvatus*) (photo by R.A. Mittermeier).

similar practices. Habitat degradation through extraction of commercial timber is the major threat to the orangutan, since it seems unable to adapt to logged forests. Furthermore, the development of agriculture over much of the lowlands has resulted in severe habitat loss. Clearance of mangroves is a threat to populations of proboscis monkeys, although the rarer silvered leaf monkeys appear capable of adapting to other habitats.

Conservation of both orangutans and proboscis monkeys requires that areas of primary forest be preserved and protected from hunters. These areas must be large enough to maintain viable populations. Although further surveys are required to investigate

all potential conservation areas, two have been identified as being particularly important. Proboscis monkeys are abundant in some areas of the Kinabatangan estuary and preliminary surveys indicate that the Danum Valley area has a dense population of orangutans.

The positive attitude towards primate conservation shown by the Sabah Forest Department and Sabah National Parks has resulted in policies being developed to investigate the above-mentioned problems and take action in light of current information. If these policies continue to be put into effect, then the survival of all of Sabah's primate species can be assured.

Glyn Davies

NEWS FROM CAPTIVITY

The Argentine Primate Center (CAPRIM)

The Argentine Primate Center (CAPRIM) was founded in 1972 under the initiative of the Institute of Neurobiology Foundation (FIDNEU) and with support from the National Research Council of Argentina (CONICET). Dr. Orestes Colillas has been the Center's director since its foundation, and is assisted by a Scientific Committee that contributes to ensure the achievement of CAPRIM's basic objectives and to evaluate and control the use of monkeys as experimental models in projects conducted under the sponsorship of CONICET. The following are the members of the Committee:

Dr. A. Gutinsky, CONICET researcher, Center of Natural Resources

Dra. M.A.F. de Mantecón, Head of Mastozoology, Buenos Aires Zoo

Dr. J.H. Tramezzani, President, Institute of Neurobiology Foundation

Field studies on the distribution of primate species in northern Argentina were carried out in the course of the first few years after the Center's foundation and while awaiting the availability of suitable facilities. Since 1976, several building projects have been undertaken and completed, including laboratories, libraries, staff and visitor housing, workshops, animal facilities and a power generating center (Figs. 41, 42). The Center is distributed over an area of 85 hectares in San Cayetano, Province of Corrientes.

In pursuit of its basic objectives, CAPRIM has attached great importance to the training of specialist personnel in the fields of primate medicine, reproductive physiology, nutrition, behavior and ecology. CAPRIM's facilities have been designed to cover these working requirements and they include laboratories for histopathology, hemochemistry, hematology, microbiology, plant chemical analysis, surgery, radiology, photography, plant taxonomy and biological rhythms. The Center currently publishes



Fig. 41: Personnel and facilities of CAPRIM at San Cayetano, Corrientes Province.



Fig. 42: Lics. S. Chalukian and C. Gallari and Drs. O. Colillas and J. Ruiz in CAPRIM's library.

the "Argentine Primatological Bulletin", with support from the Argentine Programme for Primatological Resources. The bulletin contains technical and scientific information on different aspects of primate biology.

Beginning in 1978, a 30-day period is devoted each year to offering intensive courses on ecology, biostatistics, primatological medicine and the care and handling of monkeys in research activities.

CAPRIM's activities are organized as follows:

Primatological Medicine:

Veterinary — B. Travi, G. Arroyo and M. Monge
Histopathology — J. Claver

Reproductive Physiology:

Spermatogenesis — G. Arroyo
Biological Rhythms — M. Monge
Sexual Behavior — M. Monge and J. Ruiz

Physical and Behavioral Maturation:

C. Gallari and J. Ruiz

Cytotaxonomy:

Dra. Mudry

Ecology: Coordinator — J. Ruiz

Alouatta caraya

Population Dynamics — D. Rumiz
Energy Balance — G. Zunino
Feeding Behavior — Obregozo

Cebus apella

Habitat Studies — A. Brown
Feeding Behavior — S. Chalukian

Aotus trivirgatus

Census and Social Organization — C. Gallari and J. Ruiz

Ecological studies are carried out in the Provinces of Salta, Jujuy, Formosa and Chaco, while in the Province of Corrientes work is performed in areas close to CAPRIM's facilities. The Ecology Group is only now beginning to work in the Province of Misiones, where it is trying to obtain and update information on different subspecies of *C. apella*. This task is urgent because of intensive pressure that man is exerting on this primate's habitat, and information must be obtained without delay to ensure its survival in this region. Currently, the Ecology Group, in cooperation with the National Park Authority, is attempting to evaluate the effectiveness of national parks as sanctuaries for monkey species in Argentina. In addition, because of plans for major hydroelectric projects on the River Paraná, the group is also undertaking studies aimed at establishing methods for successful translocation of threatened primates to protected areas.

The "mirinquinha" (*Aotus trivirgatus*) is probably the most threatened primate in Argentina at this time, and CAPRIM has planned two simultaneous projects in its behalf; a captive breeding colony will be established while field primatologists gather data on its ecology and attempt to establish conservation areas. A number of projects have also been designed for the 1983-88 period to acquire a better understanding of *Cebus* and *Alouatta* biology.

Update on the Rio de Janeiro Primate Center

The Rio de Janeiro Primate Center (CPRJ — Figs. 43-46), a branch of Rio de Janeiro's State Foundation for Environmental Engineering (FEEMA), was briefly described in the first issue of our Newsletter. This Center, which is dedicated to the conservation of highly endangered Brazilian primates (and especially primates of eastern Brazil's Atlantic forest region), has the only captive colonies or individuals of several species that are literally on the verge of extinction, among them the golden-headed lion tamarin (*Leontopithecus chrysomelas* — Fig. 43), the golden-rumped lion tamarin (*Leontopithecus chrysopygus*), the buffy-



Fig. 43: The golden-headed lion tamarin (*Leontopithecus chrysomelas*) at the Rio de Janeiro Primate Center (photo by R.A. Mittermeier).



Fig. 44: The white-faced marmoset (*Callithrix geoffroyi*) at the Rio de Janeiro Primate Center (photo by R.A. Mittermeier).

tufted-ear marmoset (*Callithrix aurita*), the buff-headed marmoset (*Callithrix flaviceps*), Wied's marmoset (*Callithrix kuhlii*), and the buff-headed tufted capuchin (*Cebus apella xanthosternus*). The colonies of the golden lion tamarin (*Leontopithecus rosalia*)



Fig. 45: Aerial view of the Rio Primate Center showing the large area of forest surrounding the Center's buildings. Plans are underway to have this forest declared a special protected area.

and the white-faced marmoset (*Callithrix geoffroyi*) are also of international significance.

The Center is ideally situated about 100 km from the city of Rio de Janeiro, right at the foot of the Serra dos Orgãos mountain range and only about 20 km from the Serra dos Orgãos National Park. These mountains include some of the largest tracts of Atlantic forest habitat left in the state of Rio de Janeiro, and the Rio Center hopes to turn 260 ha under its jurisdiction into a biological reserve. Brown howler monkeys (*Alouatta fusca*) still



Fig. 46: Some of the cages at the Rio Primate Center. In the background are the forested foothills of the Serra dos Orgãos mountain range (photo by R.A. Mittermeier).

exist in forests surrounding the Center, and it is possible that a tiny remnant population of the muriqui may survive there as well (although this remains to be confirmed).

Over the past few years, the Rio Center has been assisted by the Wildlife Preservation Trust International, World Wildlife Fund — US, the Souza Cruz Brazilian Tobacco Co., and the Brazilian Forestry Department Institute (IBDF), in addition to the basic support provided by FEEMA. With this help, the Center

Species	Sex	Total
<i>Callithrix aurita</i>	1.2	3
<i>Callithrix flaviceps</i>	0.1	1
<i>Callithrix geoffroyi</i>	7.9.5	21
<i>Callithrix kuhlii</i>	1.0	1
<i>Callithrix penicillata</i>	1.3	4
Misc. <i>Callithrix</i> hybrids	9.8.2	19
<i>Saguinus midas niger</i>	4.0	4
<i>Saguinus b. bicolor</i>	0.1	1
<i>Leontopithecus rosalia</i>	9.5.3	17
<i>Leontopithecus chrysomelas</i>	12.9	21
<i>Leontopithecus chrysopygus</i>	11.10.2	23
<i>Cebus apella xanthosternos</i>	2.0	2
<i>Cebus apella robustus</i>	0.1	1
TOTALS	57.49.12	118

continues to grow and now has a total of 118 animals of 12 different species and subspecies.

Plans are now underway to establish satellite colonies in other conservation-oriented institutions to ensure that the most endangered taxa will survive in captivity even if efforts to save them in the wild are unsuccessful. *Callithrix geoffroyi* will probably be the first species sent out to satellite colonies, followed by golden-headed and golden-rumped lion tamarins.

Education is also a priority at the Rio Center, which now has what is probably the best primatological library in South America, and part of the first-ever primatological training course will be held there later this year.

A list of the primates represented at the Rio Primate Center as of January, 1983, is given in the accompanying table.

Adelmar F. Coimbra-Filho
 Director, Rio de Janeiro Primate Center (CPRJ)
 FEEMA
 Rio de Janeiro
 BRAZIL

Russell A. Mittermeier
 World Wildlife Fund — US
 Washington, D.C.
 U.S.A.

Captive Propagation of *Callimico* at Brookfield Zoo

The Brookfield Zoo has recently been awarded a gold propagation certificate (for 50 captive births) from the American Association of Zoological Parks and Aquariums for captive propagation of Goeldi's monkey (*Callimico goeldii*). Goeldi's monkey (Fig. 47) is currently listed as "rare" in the IUCN RED DATA BOOK and is found in low densities in a widespread area of the upper Amazon region in Bolivia, Peru, Brazil, Colombia and probably Ecuador.

Because these primates are dispersed at low densities, they may be especially susceptible to the effects of habitat destruction and genetic isolation. The Brookfield Zoo has developed an exten-



Fig. 47: Family group of Goeldi's monkey (*Callimico goeldii*) (photo by R.A. Mittermeier at the Frankfurt Zoo).

siye captive propagation program based upon a few *Callimico* confiscated by the U.S. Fish and Wildlife Service. Brookfield cooperates with a number of other zoos in fostering captive propagation and management of Goeldi's monkeys, and is interested in developing an extended conservation program for this species, in cooperation with the World Wildlife Fund and other organizations. An off-exhibit breeding facility is currently under construction at the Brookfield Zoo that will eventually house about 150 callimicos, tamarins, marmosets, or other small primate species that require captive propagation for their long-term conservation.

The distribution of Brookfield's captive *Callimico* population is presented in the following table.

Callimico at Brookfield: 21.21.1		(18.20.1 captive born)	
owned by Brookfield: 21.25.2			
on loan to Brookfield from:			
JWPT, Channel Islands		1.3	
Lincoln Park, Chicago		0.2	
Oklahoma City, Okla.		3.1	
U.S. Fish and Wildlife		3.0	
		<hr/>	
	Total	7.6	
	(Captive born)	(4.5)	
on loan from Brookfield to:			
Cincinnati		1.1	
Denver		0.2.1	
Los Angeles		1.1	
National Zoo		1.1	
San Antonio		1.3	
Stockholm		1.1	
W. Palm Beach		2.1	
		<hr/>	
	Total	7.10.1	
	(Captive born)	(7.10.1)	

Joe Erwin
Brookfield Zoo

Lowland Gorillas at Lincoln Park Zoo

One of the largest collections of lowland gorillas (*Gorilla g. gorilla*) is maintained at Lincoln Park Zoological Gardens, Chicago, Illinois, U.S.A. (Fig. 43). Now numbering 23 animals, this group represents years of management planning and a long-term commitment to captive propagation of an endangered species. Gorillas were first exhibited at Lincoln Park with the purchase of *Bushman* in the late 1920's. This male, although a fine specimen, never had the opportunity to interact with other members of his species while in captivity. Other gorillas were slowly added to the collection and one male, *Sinbad*, acquired in 1948, is still part of the collection. Unfortunately, although several attempts were made to place him in a social situation, he is still maintained alone.

In the 1960's, a number of adolescent gorillas were purchased by Lincoln Park. These animals were to be the initial founder stock for the present day collection. The first groupings were between single males and females, with the eventual goal of forming family troops a number of years away. These initial pairings proved successful, when in 1970 the first gorilla was born at Lincoln Park. The mother, *Mumbi*, proved to be an ideal parent for

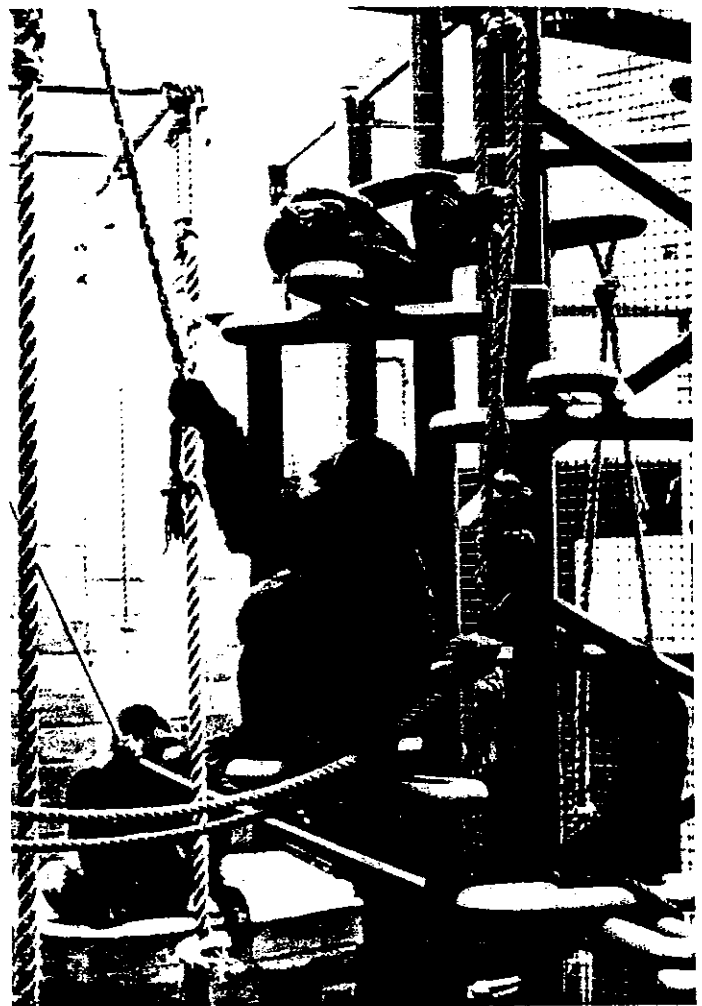


Fig. 48: Captive lowland gorillas at Lincoln Park Zoological Gardens (photo by Peter Clay).

the infant's first month, but then began to neglect it, necessitating its removal for handrearing. Another birth followed in 1971, both babies having been sired by the same male, *Kisoro*. Eventually, a new great ape facility was built to accommodate the small troops which were forming. Breeding continued and the increases in troop size were being accompanied by more positive social interactions between members. Young females, in particular, appeared to benefit from observing older females nurse and care for their infants.

In 1973, *Kisoro* was sent to Howlett's Zoo Park in England, this move being part of a long range breeding program. The move proved successful and *Kisoro* has become the most prolific breeder of all of England's zoo gorillas. In exchange for *Kisoro*, Lincoln Park received two young males, *Koundo* and *Kambula*, both of whom were successfully introduced to their new troops, providing new "blood" for Lincoln Park's collection and raising its number to 12 individuals.

In 1978, a female, *Kivu*, was born to *Benga*, a first generation captive-born gorilla. *Benga* did not nurse this particular infant, but eventually became a model gorilla mother with future offspring. *Kivu* was taken to the zoo nursery and at one year of age was introduced to another adult female who adopted her. This successful reintroduction of a young gorilla to an "aunt", and then later to a troop, was another positive step in forming and maintaining long range breeding groups.

Three gorilla troops now reside at Lincoln Park, each having an adult male as troop leader. Group sizes have varied over the years as different management strategies have been used, but the concept of the troop has been maintained. Continued cooperation with other zoological parks has been a successful part of Lincoln Park's long term gorilla management. In 1979, an older female, *Terra*, was received on breeding loan from the Milwaukee County Zoo and sometime later a young male was obtained from the Rotterdam Zoo. The capacity to form cohesive groups and to periodically add new members has given Lincoln Park's breeding program a good deal of flexibility and bodes well for the long term future of this particular collection of lowland gorillas.

Mark Rosenthal
Curator of Mammals
Lincoln Park Zoological Gardens
Chicago, Illinois U.S.A.

The Captive Population of Sulawesi Macaques (*Macaca nigra*)

Most of the Sulawesi macaques in captivity reside in zoological gardens. Arriving at a complete census of this population is problematic since there are only two sources of information, both incomplete. One of these is the International Species Inventory Service (ISIS), which lists 149 *M. nigra* in 29 institutions in 1982. The number of *M. nigra* held in zoos on a world-wide basis can be estimated by extrapolating from the ISIS holdings to those reporting births annually to the *International Zoo Yearbook* (IZY). Records for the most recent five-year period (1975-79) reveal that an additional 27 institutions have held *M. nigra* in their collections. Assuming these colonies still exist, and assuming equivalence to ISIS in mean collection size, there may be another 150 or so *M. nigra* in these institutions. These figures are probably conservative, since an institution appears in the IZY listings only if reproduction has occurred. It is noteworthy that 41% of those reporting to ISIS at the end of 1982 had had no reproduction in the previous five years.

Births reported to IZY, 1975-1979			
Year	# zoos reporting births	# live births	# surviving 30 days or less *
1975	19	37	28
1976	25	50	32
1977	23	38	38
1978	31	40	30
1979	22	35	28
	Total	200	146

* IZY Editor's note: "Because zoos differ in their methods of record, it is not at this stage possible to standardize the criterion of 'survival'; in many major zoos, however, it has now been established as '30 days or more'."

Apparently, *M. nigra* is not widely used as a research animal. The Oregon Regional Primate Research Center (USA) uses *M. nigra* in studies of diabetes. As of 1982, this colony numbered 50 animals [*Primate News*, Vol. 20(2), Dec. 1982]. There are undoubtedly other research holdings, but the number of animals held is clearly small. It seems reasonable to conclude, then, that at least 300 or so *M. nigra* are to be found in research facilities and non-ISIS zoos.

While total numbers of captive *M. nigra* cannot be precisely established, productivity figures may be somewhat firmer. The IZY reports indicate an average of 40 births per year for the five year period ending in 1979 (Table below). Mortality within the first 30 days has averaged 10.8 individuals annually. It is not clear if reproduction is sufficient to make the captive *M. nigra* population self-sustaining. However, the ISIS figures do indicate a growth in mean size of collections from 4.6 to 5.1 animals between 1978-1983.

Donald G. Lindburg
San Diego Zoological Society
San Diego, California
U.S.A.

APPENDIX 1

New Members of the IUCN/SSC Primate Specialist Group

The following members have been added to the group since the appearance of the last issue of the Newsletter.

Asian Section

Dr. John Payne
Jabatan Kehutanan
P.O. Box 311
Sandakan, Sabah
EAST MALAYSIA

Dr. H.D. Rijksen
School of Environmental Conservation
Management
P.O. Box 109
Bogor
INDONESIA

African Section

Dr. Janis Carter
Chimpanzee Research Project
Wildlife Conservation Department
Ministry of Water Resources and Environment
Banjul
THE GAMBIA

Dr. Shirley Strum
c/o African Wildlife Foundation
Box 48177
Nairobi
KENYA

South and Central American Section

Dr. Carlos Alves, Jr.
Departamento de Parques Nacionais e
Reservas Equivalentes/ IBDF — SBN
Ed. Palacio do Desenvolvimento, 12° andar
70.057 Brasília, D.F.
BRAZIL

Prof. Milton Thiago de Mello
Departamento de Biologia Celular
Instituto de Ciências Biológicas
Universidade de Brasília
70.910 Brasília, D.F.
BRAZIL

Dr. Bráulio Magalhães-Castro
Departamento de Biologia Animal
Instituto de Ciências Biológicas
Universidade de Brasília
70.910 Brasília, D.F.
BRAZIL

Dr. Patricia C. Wright
Duke University Primate Center
3705 Erwin Road
Durham, North Carolina 27705
U.S.A.

Captive Section

Dr. Joe Erwin
Curator of Primates
Brookfield Zoo
Chicago Zoological Park
Brookfield, Illinois 60513
U.S.A.

Mr. Jon Jensen
Wildlife Preservation Trust International
34th St. and Girard Ave.
Philadelphia, Pennsylvania 19104
U.S.A.

Dr. Devra G. Kleiman
National Zoological Park
Smithsonian Institution
Washington, D.C. 20008
U.S.A.

Dr. Donald G. Lindburg
Zoological Society of San Diego
P.O. Box 551
San Diego, California 92112
U.S.A.

Dr. Dennis Meritt
Assistant Director
Lincoln Park Zoological Gardens
2200 N. Cannon Drive
Chicago, Illinois 60614
U.S.A.

Dr. Hartmut Rothe
Institut für Anthropologie
der Universität Göttingen
Bürgerstrasse 50
D-3400 Göttingen
WEST GERMANY

Dr. Charles Snowdon
Dept. of Psychology
The University of Wisconsin
Madison, Wisconsin 53706
U.S.A.

Dr. Jürgen Wolters
Department of Ethology
University of Bielefeld
P.O. Box 8640
D-48 Bielefeld 1
WEST GERMANY

Address Changes for Current Members

The following members have changed addresses since the appearance of the last issue of the Newsletter.

Dr. José Marcio Ayres
Instituto Nacional de Pesquisas da Amazonia
Caixa Postal, 478
69.000 Manaus, Amazonas
BRAZIL

Dr. Ferdinand Baal
c/o ISEDS
Colorado State University
C 313 Clark Building
Fort Collins, Colorado 80523
U.S.A.

Dr. Michael Kavanagh
National Parks and Wildlife Office
Forest Department
Jalan Gartak
Kuching, Sarawak
EAST MALAYSIA

Mr. Ajith Kumar
Anamalai Wildlife Sanctuary
Top Slip P.O.
Coimbatore District
Tamil Nadu
INDIA

Mr. Art Mitchell
Dept. of Anthropology
Yale University
New Haven, Connecticut 06520
U.S.A.

Dr. Edgardo Mondolfi
Embassy of Venezuela
International House
Mama Ngima St.
Nairobi
KENYA

Dr. Alan Rodgers
Dept. of Zoology
University of Dar es-Salaam
P.O. Box 35064
Dar es Salaam
TANZANIA
(the address given for Dr. Rodgers in the last
Newsletter was incorrect — our apologies)

Dr. Marc. G.M. van Roosmalen
c/o Dr. J.-J. de Granville
ORSTOM
Centre de Cayenne
B.P. no.165
Code Postal 97305
FRENCH GUIANA/ GUYANE FRANCAISE
SOUTH AMERICA

Dr. Anthony B. Rylands
Instituto Nacional de Pesquisas da Amazonia
Caixa Postal, 478
69.000 Manaus, Amazonas
BRAZIL

Dr. K.K. Tiwari
Vice Chancellor
Jiwaji University
Gwalior 474011 (MP)
INDIA

Editorial Staff of the Newsletter

Dr. Russell A. Mittermeier
Chairman, IUCN/SSC Primate Specialist
Group
World Wildlife Fund — US
1601 Connecticut Ave., NW
Washington, D.C. 20009

and
Dept. of Anatomical Sciences
Health Sciences Center
State University of New York
Stony Brook, N.Y. 11794
U.S.A.

Mr. William R. Konstant
Assistant Editor, PSG Newsletter
Dept. of Anatomical Sciences
Health Sciences Center
State University of New York
Stony Brook, N.Y. 11794
U.S.A.

Ms. Isabel D. Constable
Editorial Assistant, PSG Newsletter
World Wildlife Fund — US
1601 Connecticut Ave., NW
Washington, D.C. 20009
U.S.A.

APPENDIX 2

The Barbary Macaque: Recommendations for the Conservation of the Species in the Wild and in Captive and Semi-Natural Environments

I. Introduction

The Barbary macaque (*Macaca sylvanus*) is the only one of thirteen species of the genus *Macaca* found outside Asia, and the only non-human primate indigenous to North Africa. The range of the species has declined steadily from a distribution encompassing most of North Africa to mere pockets in Morocco and Algeria. Literature records indicate that the Barbary macaque was discontinuously distributed in five general regions of Morocco and Algeria since earlier this century: High Atlas, Middle Atlas, Rif, Grande Kabylie, Petite Kabylie.

In 1973, the Barbary macaque was listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as a species which could become threatened with extinction if trade was not regulated to avoid overexploitation. Control of capture of macaques from the wild has been difficult to implement and trapping for export and for pets is still reported in some parts of its range. Loss of habitats in the wild and overall competition with man makes the species even more vulnerable.

Until now conservation action relative to the Barbary macaque and its habitat has been minimal. As with most of North Africa's disappearing fauna and flora, saving the Barbary macaque in the wild requires more information for the identification of priority areas. Once this is available these areas must be protected and managed. However, survival of the Barbary macaque will also depend on the cooperation of captive breeding projects. It is therefore essential that zoos and wild animal parks with captive populations of Barbary macaques participate in this conservation effort by developing a well-directed captive propagation program.

A strong precedent on primate conservation was set by the IUCN in October, 1982, when it launched its Tropical Forest and Primates program. The present Barbary macaque campaign can benefit from this and the general principles and objectives in the following statements are intended to be closely aligned with those set up by the Tropical Forest and Primates program.

This document is designed to summarize the recommendations developed at the conference on the Barbary macaque convened by the Primate Society of Great Britain Working Party for Conservation and held at the Rock Hotel, Gibraltar from June 16-20, 1982. The conference was sponsored by the World Wildlife Fund (WWF), the International Union for Conservation of Nature (IUCN) and the Fauna and Flora Preservation Society (FFPS). The main objectives of the recommendations are to safeguard the species and its habitats in the wild as well as supervise its situation in captivity. It should be stressed here that the program that will emerge from these recommendations is in no way intended to compete with already established research or development projects but to cooperate with these.

II. The Barbary Macaque in the Wild

1. Distribution and Current Status

The distribution of the Barbary macaque in the wild is now

confined to a few isolated areas in Morocco and Algeria. This monkey was once widespread throughout North Africa, but its distribution has been progressively checked by habitat destruction and hunting. The species survives best in the high altitude coniferous forests which have remained inaccessible to civilization (most of the destruction of the lowland forest and its fauna in North Africa is the result of timbering for building materials and fuel and then over-grazing by livestock in the resulting pastures). The effects of human factors are gradually increasing, however, causing severe losses even in these remaining forests. Legal and illegal felling of large stands of trees, especially conifers in both Morocco and Algeria, is being followed by overgrazing and erosion which prevent forest regeneration. In the Oak forest pockets that remain and which contain monkeys, tree felling is minimal, but the problem is the depression of ground primary productivity through the spread of unpalatable herb species that result from over-grazing by livestock. Because the Barbary macaque is largely dependent on herbaceous foods during most of the year, and abundant oak leaves are not suitable food items except when young, decreasing primary food resources prevent macaque populations from reaching levels attained in coniferous forests.

In Morocco, the species exists in large numbers only in the Middle Atlas where a maximum of 16,000 animals live primarily in the high, mixed Cedar (*Cedrus atlantica/Quercus ilex*) forests of the Central Zone. In the Rif Mountains numbers are lower, with a maximum of perhaps 600 animals. The main areas of distribution in the Rif are the Fir (*Abies pinsapo*) forests of Djebels Lakraa, Tissouka and Tazoute where approximately 400 macaques live. In the Rif, the monkey is also found in Oak (*Quercus faginea/Q. pyrenaica/Q. suber*) forests at Djebel Bouhassim at densities of about one animal per square kilometer (total estimated population of 70-100 animals) and in scrub habitats, but at considerably lower densities and population sizes. Reports of monkeys in Ourika in the High Atlas have also been recently substantiated, but only one group has been accounted for. In Algeria, the species is found in the two main mountain ranges of the Grande and Petite Kabylies. Both localities have been surveyed recently and about 23% (5,500 animals) of the total Barbary macaque numbers are estimated to occur there. High densities and large populations exist in the Oak (*Quercus faginea/Q. afares/Q. suber*) forests of the Djurdjura, Akgfadou and Guerrouch and in the Cedar/Fir (*Cedrus atlantica / Abies numidica*) localities of Djebel Babor. Three other small populations of macaques are found in the Chiffa Gorge, south of Algiers, at Kerrata and on the Pic des Singes in Bejaia.

2. Objectives

It is recommended that conservation policies for North Africa should broadly follow the definition of conservation already forwarded by the World Conservation Strategy: "the management of human use of the biosphere so that it may yield the greatest substantial benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations". Within this framework the Barbary macaque in the wild should be protected in conjunction with a program of protection of the unique forest ecosystems it inhabits. The three general objectives which have been proposed for the Tropical Forest and Primates program are applicable here:

- to maintain essential ecological processes and life-support systems
- to preserve genetic diversity
- to ensure suitable utilization of species and ecosystems.

The following list of specific objectives for the conservation of the Barbary macaque in North Africa should serve as a guideline in the formulation of action plans.

2.1 Objective 1

To promote the integration of species and habitat conservation with socio-economic development.

Conservation action on North African forests must be fully integrated in the development plans and projects of the countries if they are to be long lasting. Such action must also be formulated in such a way that it demonstrates that forests can contribute to sustainable development. It should also take into account local cultural values and traditional practices.

This will require support for environmental planning and assistance in preparing conservation strategies and plans at various levels. Cooperation between development agencies which contribute to forest and wildlife conservation should discourage the undertaking of projects which are likely to be wasteful of natural resources and which would lead to an overall decrease in the human life support system of the region.

2.2 Objective 2

To support national efforts to strengthen the legal, institutional and administrative capability to conserve intact forest habitats and to promote the effectiveness of the international legal framework in assisting North African forest conservation at the national level.

The development of an adequate framework for conservation in the habitat countries is necessary. This objective aims to ensure that countries receive the required support and assistance for development and implementation of legal measures related to forest and wildlife conservation. To this end, efforts should be made to supply necessary legal reference materials to governments, to assist in drafting appropriate legislation.

2.3 Objective 3

To promote better understanding of the North African forest ecosystems and their importance to the countries where they occur, and of the consequences of appropriate exploitation; to train forest and park managers and other key personnel.

Training, or improving the capability of the North African countries to manage their own forest resources is a high priority. Environmental education programs aimed at children and adults should be fostered.

2.4 Objective 4

To collect and disseminate knowledge on the North African forest ecosystems, and to develop improved guidelines and practices for their management based on ecological principles.

Scientific research on North African forest ecology has been minimal. Impetus should be given to projects which combine the protection of representative samples of the different Mediterranean North African forest areas for their value as genetic reserves, watershed protection areas, and scientific reference sites in a way that is not incompatible with conservation of these same areas.

2.5 Objective 5

To promote the establishment, in biogeographically representative areas, of a network of effectively managed North African forests, protected areas of sufficient size to be viable ecological units and to promote the protection and sustainable utilization of their plants and animals.

Areas of critical conservation importance should be designated as protected areas. These should provide for sufficiently large forest areas to be conserved in each of the major biogeographical zones in the Mediterranean North African region, to secure the long-term survival of the plants and animals they contain.

3. Immediate Priorities and Recommendations

The development and implementation of conservation programs which incorporate the objectives set out above is crucial and should be undertaken immediately. Because differences exist between the North African countries as to the stage at which their conservation programs are in, it is necessary to define separately key priorities for Morocco and Algeria. Concern for conservation is most apparent in these two countries' conservation bureaus. Furthermore, Morocco has recently invited FAO for assistance in the setting up of national parks and Algeria has approached WWF for help in the management of already established parks.

3.1 Morocco

Most of the Barbary macaque populations and forest habitat are found in Morocco. Because these primary areas of macaque distribution are under strong and continuing pressures of degradation, highest priority should be given to:

- a) assisting the Ministère de l'Agriculture et de la Réforme Agraire through their offices in La Division des Eaux et Forêts in the development of a broad system of national parks and smaller education/tourist parks.
- b) initiating response within the Moroccan legal system to urge the country to develop and implement wildlife protection laws, especially to restrict capture, sale and exploitation of animals and plants.
- c) cooperating with universities and learned institutions to develop programs of instruction and research on Moroccan wildlife.

3.2 Algeria

Algeria has a formal National Parks program. There are some 13 national parks, three of which contain Barbary macaques and are of considerable importance as forested habitats. Utmost concern should be given to:

- a) assisting the Secretariat d'Etat aux Forêts a la Mise en Valeur des Terres in producing management plans for the relevant national parks.
- b) cooperating with universities and learned societies in the country to develop further programs of instruction and research on the Algerian forests and their wildlife.
- c) initiating response from the Algerian legal system for the country to ratify the Convention on International Trade in Endangered Species of Wild Fauna and Flora and give support to introduce new environmental laws.

III. The Barbary Macaque in Captive and Semi-Natural Environments

1. General Status

Barbary macaque colonies in captivity have varied consider-

ably in size since 1964, yet the number of collections has increased from 9 to 25 in this period of time. Breeding performance and infant mortality figures of the forty documented parks which have kept Barbary macaques during the period of 1964-1981 show that the overall numbers of young reared in these collections had been low until 1974. Since 1974, the mean number of young born per collection has increased dramatically due to the unprecedented success of three facilities, two in France (Kintzheim and Rocamadour) and one in Germany (Salem). At the end of 1981, the total number of Barbary macaques in captivity exceeded 900 animals.

2. Objectives

The present number of Barbary macaques kept in captivity represents a significant volume of potential information on the species' demography, behavior, genetic background and pathology. Because captive propagation and the safeguarding of the species in the wild should be viewed as complementary issues, the importance of having centralized, up-to-date, accessible information is paramount. Protection of the species from misuse in research and from over-exploitation are also important objectives that can be approached from within the captive sector. The general objectives of captive programs, therefore, are:

- to stop the export of wild Barbary macaques.
- to control the use of the species as a laboratory animal.
- to document and safeguard the species' status in captivity.

The specific objectives are:

2.1 Objective 1

To advise on the proper scientific management of the Barbary macaque in captive and semi-natural environments.

Consideration should be given to the introduction of a scheme of cooperation between collections keeping the Barbary macaque, so as to allow exchange of information regarding the proper maintenance of the species in captivity and in semi-natural conditions.

2.2 Objective 2

To promote the centralization of demographic data on the Barbary macaque in captivity.

There is a need to centralize demographic data on the Barbary macaque in captivity. Computer programs such as ISIS in the United States and general computer facilities available in most research institutions make the storage of large data bases, prompt analyses and access to information possible. Data from each institution keeping these macaques could be collected and collated annually and updated reports on numbers and general condition of the species could be published.

2.3 Objective 3

To help ensure the species' status in the wild by promoting the control or ban of trade in the species.

At present there is no appreciable trade of the Barbary macaque. However, exports from the wild to replenish or to start captive groups should be prohibited and recommendations made to countries containing the species to ensure a greater control of the movement of the animal across national boundaries.

2.4 Objective 4

To support action which will adequately contribute to the rational utilization of surplus animals generated in captivity.

If surplus Barbary macaques generated in captivity were

to become well established as a source of laboratory animals for research, this could become a potential threat to this species in the future. If the monkey's status in captivity were to deteriorate and demands for it remained high, the pressure to procure animals from the wild would increase. Thus it is important to control the destiny of surplus macaques as part of a complementary program to protect this species in the wild.

3. Immediate Priorities and Recommendations

To ensure the best prospects for success in safeguarding the species in captive and semi-natural environments, it is essential to channel efforts into the areas and activities set out in the objectives above. Five target areas requiring immediate attention are:

3.1 Gibraltar

Although the British Army has been successful in maintaining the stock of Barbary macaques on Gibraltar for more than 68 years, the present management system exercises constraints on the proper use (educational, scientific and commercial) of such an important population of animals. There are currently problems with overfeeding and with overall disturbance from people visiting the important tourist attraction that the monkeys represent at the Rock. The effect of this is proving detrimental to the breeding of the species and could present further problems in the future. The proper management of the Barbary macaque in Gibraltar would offer a potentially viable self-financing enterprise, which if managed as a park, would benefit not only the monkeys, but also the Gibraltar economy. It is thus recommended that the Gibraltar government give every support to the development and implementation of the proposals already submitted by Fa and Pankhurst (1982) and which have been endorsed by the Primate Society of Great Britain.

3.2 Surplus Monkeys

Since Barbary macaques are now being bred very successfully in captivity, surplus monkeys should be treated in accordance to the following priorities:

- a) Reintroduction to the wild, according to guidelines of international conservation organizations and those set out by Caldecott and Kavanagh (1983) with the cooperation of WWF/IUCN.
- b) Establishment of new parks wherever feasible, subject to the requirements of the owner of the monkeys being met, and subject to strict national guidelines.
- c) Loans to zoos for conservation purposes, according to the requirements of the owner, and subject to strict guidelines being observed.
- d) Sale of surplus animals from b) and c) to legitimate research, preference being given to non-invasive research (that could also have a conservation output), according to the requirements of C.I.T.E.S. and international conservation organizations.

3.3 Control of Research

Several international bodies (IUCN/SSC, WHO, PSGB) recently have voiced concern at the use in captive research of non-human primate species whose existence in the wild is threatened. Past examples (e.g., *Saguinus oedipus*, cottontop tamarin) show that when a species is "legitimized" as such a laboratory animal, its use in laboratories becomes self-perpetuating. Such demand can be forestalled by early

ANNEX 1: List of Contributors

action, e.g., in 1975 concerted efforts by primatologists stopped an attempt to bring the pygmy chimpanzee (*Pan paniscus*) into the laboratory. As the Barbary macaque is listed as vulnerable in the IUCN's RED DATA BOOK, it should not become a laboratory species. In this light, it is important to ask to what extent the species is now being used.

On-line computer search of references on the species shows that little research takes place on *M. sylvanus* in captivity, i.e., the species is not yet well-established in research. However, there are some worrying signs.

The studies fall into three types, the first two of which give little cause for concern. These are: (1) observational studies of the behavior of captive groups in zoological gardens and wildlife parks, e.g., parental care, social interaction; (2) non- or minimally invasive studies of other aspects of the species in the same sort of facilities, e.g., analysis of breeding records, taking of blood samples; and (3) studies done in laboratories involving invasive techniques, i.e., methods of research which cause lasting physical and/or psychical damage to the monkeys. Experimental neurophysiological research which is prolonged, injurious and painful is being done on Barbary macaques in at least one facility. This third type of research should be strongly discouraged, or it will exacerbate the problems already facing the species. It is thus recommended that:

- a) No further capture of the Barbary macaque should be made from the wild (only in exceptional circumstances where the conservation management authorities in habitat countries may decide to capture animals for strict conservation purposes).
- b) No new research should be started on this species in captivity, unless monkeys are obtained from self-sustaining captive breeding colonies (i.e., all subjects should be second generation captive born at least).
- c) Existing research on the Barbary macaque in captivity should be phased out unless the monkeys are obtained entirely from self-sustaining captive-bred populations.

3.4 Trade

Because numbers of the Barbary macaque in the wild are declining rapidly at present due to habitat destruction and overall human pressures it is crucial that the species should receive greater protection against capture and export by changing the Barbary macaque's position in the CITES appendices from Appendix II to Appendix I.

3.5 Documentation and Data Retrieval of the Demography of the Barbary Macaque in captivity and provisioned environments

In order to carry out a successful conservation program for the Barbary macaque in captivity as part of the concern expressed for this species' survival in the wild, it is essential that analysis of collection and demographic data from all zoos be undertaken immediately.

Prepared by John Fa
Primate Society of Great Britain
University of Oxford
Oxford, England

- F. Alvarez, Estacion Biologica Donana, Sevilla, Spain.
B. Asselah, Institut de Biologie, Universite d'Alger, Alger, Algeria.
W. Angst, "Affenberg Salem", Salem, W. Germany.
F. Braza, Estacion Biologica Donana, Sevilla, Spain.
F.D. Burton, Dept. of Anthropology, University of Toronto, Toronto, Canada.
J.O. Caldecott, Sub-dept. of Veterinary Anatomy, University of Cambridge, Cambridge, G.B.
D.J. Chivers, Sub-dept. of Veterinary Anatomy, University of Cambridge, Cambridge, G.B.
M.J. Coe, Dept. of Zoology, University of Oxford, Oxford, G.B.
J.M. Deag, Dept. of Zoology, University of Edinburgh, Edinburgh, G.B.
G.R. Drucker, Dept. of Anthropology, University College, London, G.B.
N. Ellerton, Chester Zoo, Chester, G.B.
J.E. Fa, Dept. of Zoology, University of Oxford, Oxford, G.B.
A. Gautier, Station Biologique de Paimpont, Universite de Rennes, France.
J.-P. Gautier, Station Biologique de Paimpont, Universite de Rennes, France.
P. Hopkins, Estacion Biologica Donana, Sevilla, Spain.
M. Kavanagh, IUCN, Conservation Monitoring Centre, Cambridge, G.B.
N. Martin, Chessington Zoo, Chessington, G.B.
P.T. Mehlan, Dept. of Anthropology, University of Toronto, Toronto, Canada.
E. Merz, "La Montagne des Singes", Kintzheim, France.
H. Meziane, Secretariat d'Etat aux Forets et a la Mise en Valeur des Terres, Alger, Algeria.
W.C. McGrew, Dept. of Psychology, University of Stirling, Stirling, G.B.
A. Paul, "Affenberg Salem", Salem, W. Germany.
D.M. Taub, Yemmassee Primate Centre, Yemmassee, U.S.A.
J. Thömbäck, IUCN, Conservation Monitoring Centre, Cambridge, G.B.
W. de Türkheim, "La Montagne des Singes", Kintzheim, France.
S. Wendland, Sub-dept. of Animal Behaviour, University of Cambridge, Cambridge, G.B.

ANNEX 2: Project Regions

The forests of the Maghreb, North-west Africa, fall within such vegetation realm. One of the major characteristics of the Mediterranean forests is undoubtedly their floristic and phytosociological heterogeneity. Over 40 major forest species and at least 50 sub-varieties make up these forests, while in the middle and northern latitudes of Europe these figures do not exceed 12 and 20 respectively. This heterogeneity is linked with the complex biogeography, history, regional climate and physical characteristics of the area. The conservation status of most, if not all Mediterranean forests, however, is alarming and their long-term survival is under severe threat. Owing primarily to human factors the land once covered by these forests has been much reduced and only a few types, in a number of restricted regions, can now be considered as viable for long-term conservation.

Most of the lowland forests in Morocco, Algeria and Tunisia have been depleted already but the higher altitude deciduous oak forests (Upper Mediterranean forest or sub-mediterranean) and the Mediterranean mountain forest (Supra-mediterranean forest), consisting mainly of Mediterranean conifers (Black Pine, Cedar, Fir) deserve consideration as species reservoir sites. The Barbary macaque, as well as other important animal and plant species are found in these areas. The following regions in Morocco and Algeria should be made protected areas if they do not already hold that status:

Morocco:

- 1) Djebel Bouhassim — Pyrenean, Portuguese (*Quercus pyrenaica*, *Q. faginea*) and Cork Oak (*Q. suber*) forests situated to the S.W. of Chaouen in the Djebala region of North Morocco.
- 2) Djebels Lakraa and Tazoute — Fir (*Abies pinsapo*) forests in the high mountain ranges S.E. of Chaouen.
- 3) Ras El Ma — High pure Cedar (*Cedrus atlantica*) forests within the Central Zone of the Middle Atlas Mountains, S. of Azrou.
- 4) Ain Kahla — High open mixed Cedar/Holly Oak (*Cedrus atlantica/Q. ilex*) forests in the southern sector of the Central Zone of the Middle Atlas Mountains.
- 5) Michliffen — Continental type high open Cedar (*Cedrus atlantica*) forests.

Algeria:

- 1) Akgfadou — Deciduous (*Quercus faginea*) and some evergreen Oak (*Q. afares*, *Q. suber*) forests between Azazga and El Kseur. Taourirt Irhill and Beni Ghorbi are included. An area of 2115 ha at Akgfadou is already a National Park.
- 2) Djurdjura — Oak (*Q. faginea*, *Q. afares*, *Q. suber*) forests in the Grande Kabylie. This area of approximately 2000 ha is a National Park.
- 3) Djebels Babor and Tababor — High Fir (*Abies numidica*) and some Cedar (*Cedrus atlantica*) relict forests on Djebels Babor National Park (1700 ha) and on the adjacent Djebel Tababor.
- 4) Guerrouch — Portuguese Oak (*Q. faginea*) and Cork Oak (*Q. suber*) forests along the coast SSW. of Dijjel. Three main forests are contained here (Guerrouch, Dar-El-Oued and Djebel Adendoun).

ANNEX 3: Project Possibilities

In addition to the priorities mentioned above for the particular regions in question, projects that conform to activities related to legislation, education, ecological research, to protected areas and to species should also receive special attention.

The proposed project possibilities set out below refer to general lines of action that should be taken towards the conservation of the North Africa forest ecosystems where the Barbary macaque is a component species of their fauna. Reference should also be made to the UNESCO Programme on Man and the Biosphere Reports 19, 36, 41 and 45 (UNESCO, 1974, 1975, 1976, 1979) for further discussions on lines of research on Mediterranean forest conservation and to the IUCN Tropical Forests and Primates Programme for criteria that should be used to identify project sites and activities.

1) Legal activities

- preparation of public awareness materials for use in the North African countries on the role of forests and on its indigenous fauna and flora.
- preparation of forest conservation handbooks for use by conservation campaigners.
- preparation of field guides on the North African flora and fauna for more general circulation.
- preparation of handbooks on the ecology, behaviour and conservation of particular species, such as the Barbary macaque.

2) Ecological research and studies

- evaluation of the critical size and optimum distribution of reserves that would promote the long-term survival of precarious ecosystems such as the high mountain coniferous forests and the also delicate oak forests of North Africa.

- evaluation of the carrying capacities of habitats for the indigenous fauna together and without domestic livestock.

- development of forest conservation and management methods that relate specifically to Mediterranean forests.

- evaluation of key habitats for the reintroduction of endangered indigenous fauna.

- field testing of conservation and management guidelines to establish their effectiveness.

3) Protected areas activities

- development of policies and guidelines on the role which protected areas can play in the *in situ* conservation of genetic resources.

- development of a system to monitor the effectiveness of protected area management.

- support for raising standards of protected area management through training and publications.

4) Species-related activities

- studies on the distribution and numerical status of the indigenous forest fauna of North Africa.

- studies on the ecology and behaviour of forest animal species, which includes the Barbary macaque.

- studies on the social and reproductive behaviour and physiology of the Barbary macaque within captive environments.

ANNEX 4: List of wildlife parks and zoos keeping the Barbary macaque throughout the world

1) Amersfoot, Netherlands	(3/2)
2) Antwerp, Belgium	(1/2)
3) Atlanta, U.S.A.	(1/1)
4) Berlin, W. Germany	(5/6)
5) Bonn, W. Germany	(1/1)
6) Bussolengo, Italy	(?)
+ 7) Chessington, G.B.	(4/3)
+ 8) Chester, G.B.	(3/6)
+ 9) Chicago, U.S.A.	(1/1/1)
10) Edinburgh, G.B.	(1/2)
11) Frejus, France	(3/4)
+ 12) Gibraltar	(16/23)
13) Gr. Witchingham, G.B.	(2/4)
+ 14) Los Angeles, U.S.A.	(3/6)
15) Madrid, Spain	(1/2)
16) Malton, G.B.	(2/2)
+ 17) New York Bronx, U.S.A.	(2/6)
18) Nice, France	(?)
19) Nuremberg, W. Germany	(3/6)
20) Paigton, G.B.	(4/3)
21) Paris, France	(2/2)
+ 22) Philadelphia, U.S.A.	(1/1)
+ 23) Pennsylvania, U.S.A.	(1/1)
24) Rabat, Morocco	(10/14)
25) Rheine, W. Germany	(41)
26) Rocamadour, France	(52/70)
27) Salem, W. Germany	(115/120)
+ 28) San Diego, U.S.A.	(3/3)

+29) San Francisco, U.S.A.	(2/1)
30) Selestat, France	(110/158)
31) Toronto, Canada	(4/5/5)
32) Tregomeür, France	(1/0)
33) Tunis, Tunisia	(2/3/1)
34) Vienna, Austria	(1/4)
35) Vielliers, France	(1/1)
+36) Washington, U.S.A.	(5/3)
37) Weyhill, G.B.	(1/1)
38) Winston-Salem, U.S.A.	(2/4)
39) Wroclaw, Poland	(0/1)

The figures given for the number of animals (M/F/?) kept in each collection refer to censuses as of 1979 taken from the Int. Zoo Ybk. Figures for collections marked with a cross (+) were taken from ISIS and refer to censuses made in 1981.