

# LABORATORY PRIMATE NEWSLETTER

Volume 21, Number 1

January, 1982



*Stew Coitko*

**ALLAN M. SCHRIER, EDITOR**

**MORRIS L. POVAR, CONSULTING EDITOR**

Published Quarterly by the Primate Behavior Laboratory  
Psychology Department, Brown University  
Providence, Rhode Island

ISSN 0023-6861

## POLICY STATEMENT

The purpose of the *Newsletter* is to provide a central source of information about nonhuman primates and related matters, which will be of use both to the community of scientists who use these animals in their research and to those persons whose work supports such research. Accordingly, the *Newsletter* (1) provides information on care, breeding, and procurement of nonhuman primates for laboratory research, (2) disseminates general information and news about the world of primate research (such as announcements of meetings, research projects, sources of information, nomenclature changes), (3) helps meet the special research needs of individual investigators by publishing requests for research material or for information related to specific research problems, and (4) serves the cause of conservation of nonhuman primates by publishing information on that topic. As a rule, the only research articles or summaries that will be accepted for the *Newsletter* are those that have some practical implications or that provide general information likely to be of interest to investigators in a variety of areas of primate research. However, special consideration will be given to articles containing data on primates not conveniently publishable elsewhere. General descriptions of current research projects on primates will also be welcome.

The *Newsletter* appears quarterly and is intended primarily for persons doing research with nonhuman primates. Back issues may be purchased for \$2.00 each. (Please make checks payable to Brown University.)

The publication lag is typically no longer than the 3 months between issues and can be as short as a few weeks. The deadline for inclusion of a note or article in any given issue of the *Newsletter* has in practice been somewhat flexible, but is technically the fifteenth of December, March, June, or September, depending on which issue is scheduled to appear next. Reprints will not be supplied under any circumstances.

PREPARATION OF ARTICLES FOR THE *NEWSLETTER*.--Articles, notes, and announcements should be submitted in duplicate and all copy should be double spaced. Articles in the References section should be referred to in the text by author(s) and date of publication, as for example: Smith (1960) or (Smith & Jones, 1962). Names of journals should be spelled out completely in the References section. Technical names of monkeys should be indicated at least once in each note and article. In general, to avoid inconsistencies within the *Newsletter* (see Editor's Notes, July, 1966 issue), the scientific names used will be those of Napier and Napier [*A Handbook of Living Primates*. New York: Academic Press, 1967]. For an introduction to and review of primate nomenclature see the chapter by Maryeva Terry in A. M. Schrier (Ed.), *Behavioral Primatology: Advances in Research and Theory* (Vol. 1). Hillsdale, NJ: Lawrence Erlbaum Associates, 1977.

All correspondence concerning the *Newsletter* should be addressed to:  
Allan M. Schrier, Psychology Department, Brown University  
Providence, Rhode Island 02912. (Phone: 401-863-2511)

## ACKNOWLEDGMENTS

The *Newsletter* is supported by U. S. Public Health Service  
Grant RR-00419 from the Animal Resources Branch,  
Division of Research Resources, N.I.H.

We are grateful to Linda Straw Coelho for providing the cover drawing  
of an emperor tamarin (*Saguinus imperator*).

---

Managing Editor: Helen Janis Shuman

## CONTENTS

### ARTICLES AND NOTES

- The Forests and Primates of Ghana: Prospects for Protection  
and Proposals for Assistance, by J. Stephen Gartlan..... 1
- Study of Feral Vervet Monkeys In Barbados, by Julia  
Horrocks.....15

### NEWS, INFORMATION, AND ANNOUNCEMENTS

#### News Briefs:

- Harry F. Harlow Dead.....17
- New Director of Oregon Center Announced.....17
- Scientist Convicted of Cruelty to Monkeys.....17
- Pre-Doctoral Fellowships Available.....18
- Primateology in China.....19
- Colony-Bred Baboons Available.....20
- Upcoming Primate Meetings.....20
- Second Generation Black Howler Monkey Born.....21
- Saguinus oedipus geoffroyi*: Moved to Appendix I of CITES.....21
- Postdoctoral or Senior Technician Position.....21
- Traineeship at the National Zoological Park.....22
- Comparative Pathology Continuing Education Course.....22

### DEPARTMENTS

- Recent Books and Articles.....23
- Address Changes.....29

# THE FORESTS AND PRIMATES OF GHANA: PROSPECTS FOR PROTECTION AND PROPOSALS FOR ASSISTANCE

J. Stephen Gartlan

University of Wisconsin

## Aim

The purpose of this visit was to examine the current status of Ghana's forests and of its primate population, with a view to determining in what ways the International Primatological Society as well as other interested organizations could most effectively assist in the protection of these resources.

## Introduction

Ghana lies on the west coast of Africa between approximately 5°N and 11°N and 1°E and 3°W. To the east it is bounded by Togo, to the north by Upper Volta, to the west by the Ivory Coast and to the south by the Atlantic Ocean. The area of the country is 238,539 sq. km (92,200 sq miles) (*New York Times Atlas of the World*, 1978).

Topographically, the country is low and relatively flat; much of it lies below 200 meters in elevation. Either side of the mouth of the Volta River, not far from the capital of Accra, two ranges of hills rise and extend into the interior. The first of these, on the east bank of the Volta, runs due north along the Togo border; the second, on the west bank, runs northwest towards the Ivory Coast. Between these ranges lies Lake Volta, formed by the damming of the Volta River about 100 km from the mouth. This is the largest of Africa's artificial lakes with an area of 8,500 sq km (Beadle, 1974).

The former British colony of the Gold Coast achieved independence on March 6, 1957 under President Kwame Nkrumah. Nine years of peace and relative stability were interrupted by a military coup in 1966 and this

---

Author's address: Regional Primate Research Center, University of Wisconsin, 1223 Capitol Court, Madison, WI 53706.

The visit to Ghana that forms the basis of this report was undertaken on behalf of the International Primatological Society for whom this report is principally intended.

While I was in Ghana, I benefited from the assistance and hospitality of the Chief Wildlife Officer, Department of Game and Wildlife, Dr. Emmanuel A.O. Asibey and of the Officer in Charge, Research Division, Dr. Yaa Ntiamo-Baidu.

The conclusions presented here are my own and no endorsement by either the International Primatological Society or by the Ghana Department of Game and Wildlife is implied.



pattern has continued to the present, with the last coup occurring in January 1982. The leader of this coup and Chairman of the Armed Forces Revolutionary Council, Jerry J. Rawlings, again took over control of government from the civilian administration of Dr. Hilla Liman, to whom he had ceded power in late 1979.

The population of Ghana is approximately 11 million and the growth rate is approximately 3% (E.O.A. Asibey, personal communication, 1981), which will lead to a doubling of the human population in 33 years. The population density is approximately 50 persons per square kilometer, but is higher in the moist forest zone in the southern part of the country where most of the people are engaged in agricultural pursuits. Techniques of shifting agriculture have changed considerably in the past few decades. At the end of the second World War the fallow period between successive cultivations averaged 20 years; by the early 70's it had declined to 10 years or less and now to as little as 3 years in certain locations (Myers, 1980). The destruction of forest by shifting cultivators has been a persistent problem in Ghana and estimates of the amount of forest removed each year by them has been as high as 5,000 sq. km (Persson, 1974). The severity of this problem was apparent as early as 1959 when the Protected Timber Lands Act was passed to try and alleviate the problem (Paxton, 1976).

Hunting and trapping is widespread in the forest zone; all species of mammal are eaten, including primates. The favorite is probably the grasscutter, *Thryonomys swinderianus*, a hystricomorph rodent, relative of the porcupine. The meat of this animal is the most expensive and most sought-after in Ghana. The current price of a 4 kg animal in Accra is 200 cedis (\$75 at the official rate of exchange). Primates of all species are also much sought-after. They are also hunted as agricultural pests, particularly in the savanna zone.

Ghana has a basically agricultural economy. The principal export commodity is cocoa, followed in importance by timber, gold, diamonds, manganese, and bauxite. With the single exception of timber, the production of which has increased annually since 1972, the production of all other export commodities has declined over the same period. Cocoa production has declined annually by an average of 7.1% and the production for 1978 amounted to only 61% of that for 1972 (*U.N. Statistical Yearbook*, 1979), at which time Ghana was producing 29.5% of the world's supply (Asibey, 1978). At the same time, in the four years between 1972 and 1976, the cost of Ghana's imports increased by almost 300%. Most of this can be attributed to the escalating cost of petroleum which has increased by 825% since 1973. In 1980, income received from cocoa exports was less than the cost of petroleum imports (*I.U.C.N. Bulletin*, 1980). Timber production has increased by an average of 5.4% per year since 1970 and 1977's production was 28% greater than that of 1972.

There is little doubt that attempts by the new military regime to

restore Ghana to economic stability will involve, among other measures, attempts to increase the country's exports. This will involve both the prevention of cocoa smuggling to the Ivory Coast, where it may be sold for hard currency, and also in further increasing timber production (E.O.A. Asibey, personal communication, 1981). Roughly half of Ghana's forests have been eliminated in the past 25 years (Myers, 1980). The trend has been to increase the number of species exported, from only one before the second World War to over 40 today. Forests used to be felled on a 25-year cycle; currently the interval has been reduced to 15 years (Asibey, 1978). There are currently few potentially exploitable forests outside of the Forest Reserves which protect some 17,000 sq. km of moist forest. There seems to be very little doubt that any effort towards establishing a sound economy must result in further erosion of the moist forest zone.

### Climate and Ecology of Ghana

The principal ecological factor determining vegetation in Ghana is precipitation. This follows a gradient within the country, with the lowest rainfall in the northeast and the highest in the southwest. In the extreme southwest of the country, annual precipitation may approach 3,000 mm (120 in.).

The main vegetational zones follow the precipitation gradient. There is a small area of Sudan savanna in the far northeast of the country. Guinea savanna covers the rest of the northern sector of the country and extends into the Lake Volta basin as far as the southernmost tip of the lake, less than 100 km from the coast. The hills that define this basin are covered with moist deciduous forest and this vegetation type extends to the southwest of the country where it is replaced by evergreen tropical rain forest. This latter type represents the furthest extension eastwards of the Upper Guinea forest block. These two forest types, the moist deciduous and the evergreen, together constitute a zone originally covering approximately 80,000 sq. km or about one-third of the total area of the country. Today, possibly as little as one-fifth of this area now remains intact.

Booth (1958) emphasized the importance of rivers as zoogeographical barriers. The Volta River in eastern Ghana is an important distribution block. The Tano River, in the western part of the country, divides the evergreen forest zone, but this boundary appears to be of little importance to primates.

There are 15 species of primates in Ghana and the majority of these are restricted to the moist forest zone. Analysis by family, species and habitat is given in Table 1. It is apparent from Table 1 that both moist deciduous and evergreen forests possess largely similar primate faunas.

Table 1

## The Primates of Ghana by Family, Species and Habitat

Family and Species	Common Name	Habitat
<b>Lorisidae</b>		
<i>Perodicticus potto</i>	Bosman's potto	EF DF GF
<b>Galagidae</b>		
<i>Galago senegalensis</i>	Senegal galago	GS SS
<i>Galagoides demidovii</i>	Demidoff's galago	EF DF GF
<b>Colobidae</b>		
<i>Procolobus verus</i>	Olive Colobus	EF DF
<i>Colobus badius</i>	Western red Colobus	EF DF
<i>Colobus polykomos</i>	Western b-&-w Colobus	EF DF GF
<b>Cercopithecidae</b>		
<i>Cercopithecus campbelli</i>	Campbell's guenon	EF DF
<i>Cercopithecus mona</i>	Mona guenon	EF DF GF
<i>Cercopithecus petaurista</i>	Lesser spot-nosed guenon	EF DF GF
<i>Cercopithecus diana</i>	Diana guenon	EF ?DF
<i>Cercopithecus aethiops</i>	Green monkey	GF SS GS
<i>Erythrocebus patas</i>	Patas monkey	GS SS
<i>Papio anubis</i>	Anubis baboon	GF GS SS
<i>Cercocebus atys lunulatus</i>	White-collared mangabey	EF DF
<b>Pongidae</b>		
<i>Pan troglodytes verus</i>	Western Chimpanzee	EF DF

Note: EF = Evergreen forest. DF = Deciduous forest. GF = Gallery forest. GS = Guinea savanna. SS = Sudan savanna

## Classification and Protection of Conserved Areas

There are four different types of conservation areas in Ghana, all under the jurisdiction of the Game and Wildlife Department; some 4.5% of the area of the country is under some kind of protection from this source (E.O.A. Asibey, personal communication, 1981). There are also Forest Reserves in Ghana under the jurisdiction of the Forestry Department. Traditional hunting rights within these Forest Reserves have not been abrogated and they offer little or no protection to the native fauna.

The four different types of conservation areas are National Parks, Game Production Reserves, Strict Nature Reserves and Wildlife Sanctuaries. The last two categories cover relatively little area; Kogyae Strict Nature Reserve protects 280 sq km in the transitional zone between moist deciduous forest and Guinea savanna. It is protected from human incursions and is not open to the public. The two Wildlife Sanctuaries, Bomfobiri and Owasi, are equivalent to National Parks in terms of protection provided but are of small size.

The great majority of the protected areas of Ghana are either National Parks or Game Production Reserves. The National Parks are classified in Category II of the United Nations List of National Parks and Equivalent Reserves (1980). Criteria for inclusion in this category require that the areas be relatively large, be provided with adequate protection from human settlement, farming, hunting or other exploitation and that they provide access to visitors.

The category of Game Production Reserves is specific to Ghana. These are areas in which wildlife is protected but in which compatible forms of land-use may be permitted. "Compatible" is defined as "not deleterious to the primary function of the Reserves", that is, to the production of wildlife. Logging is considered a compatible form of land-use by this definition. In Game Production Reserves animals may be captured for educational use, research or for sale (Wildlife Conservation Policy of the Republic of Ghana, 1974). Currently, no systematic harvesting of wildlife within the Game Production Reserves has been carried out and none is contemplated (E.O.A. Asibey, personal communication, 1981). It is into Game Production Reserves that wild animals, indigenous or exotic, may be introduced "primarily to provide a yield of meat and secondarily for sport" (Wildlife Conservation Policy of the Republic of Ghana, 1974). Research has demonstrated (Rucks, 1976) that many of the economically valuable tree species occurring in the moist forest zone are important food species for forest primates and in particular for *Colobus badius*. This would suggest that even with strict control of hunting and trapping within the Game Production Reserves, populations of endangered primates are likely to be adversely affected by logging. It is clear that the most desirable category in terms of protection provided for the indigenous flora and fauna is that of the National Park in which logging is not permitted and in which the fauna is integrally protected.

#### Protection of Biogeographic Zones

*Sudan savanna.*--There are no National Parks or Game Production Reserves in the tiny Sudan savanna area of the northeast part of the country and probably none is necessary as this biotype is not endangered and the Ghana sample does not differ florally or faunally from other areas of such savanna which are well protected.



*Guinea savanna.*--The Guinea savanna area is well protected by three National Parks; Mole (492,100 hectares; 1,922 sq miles), Digya (312,354 ha; 1220 sq. miles), and Bui (207,200 ha; 809 sq. miles). All primate species occurring in gallery forest, Guinea savanna and Sudan savanna, none of which is endangered, are protected within the boundaries of these National Parks and if protection is maintained, their survival is assured. The area comprising the National Parks in this zone is sufficiently large to protect an adequate sample of this type of habitat.

*Moist deciduous forest.*--Protection of the fauna of the moist deciduous forest zone is provided by the Bia National Park (7,700 hectares; 30 sq. miles) and by the contiguous Bia Game Production Reserve (22,500 ha; 88 sq. miles), the latter grading into the evergreen forest zone.

Timber extraction is currently taking place in the Bia Game Production Reserve. Currently, this activity is being supervised by the Department of Game and Wildlife to ensure that government logging regulations are being adhered to in terms of permitted species and size-classes of trees felled. Hunting and trapping of animals is also being strictly controlled.

Primates that occur in Bia include *Cercopithecus diana*, *C. campbelli*, *C. petaurista*, *Cercocebus atys lunulatus*, *Colobus badius*, *C. polykomos*, *Procolobus verus*, and *Pan troglodytes* (Asibey, 1978).

*Evergreen rain-forest.*--Protection of the evergreen forest biotype is achieved by means of the Nini-Souhien National Park (16,278 hectares; 64 sq. miles) and by the contiguous Ankasa Game Production Reserve (34,300 ha; 134 sq. miles). Unlike Bia, this area has not been logged in the recent past (E.O.A. Asibey, personal communication, 1981) and there are no immediate plans to permit logging. The primate species inhabiting Ankasa and Nini-Souhien are similar to those of Bia.

#### Summary

Protection of representative samples of the savanna biome of Ghana is satisfactory, but the same cannot be said for the moist forest zone. The National Parks of the moist forest zone together shelter three quarters of Ghana's primate species, yet their area is less than 3% of that of the three savanna National Parks and only 0.6% of the original high forest cover of Ghana (Asibey, 1979). Inclusion of the Ankasa Game Production Reserve in the National Park system would increase these percentages to a more satisfactory level. It is clearly possible that small, isolated National Parks such as Bia might be able to support viable populations of small mammals such as many primates, but "conclusions from biogeography clearly demonstrate the need for establishing parks and

reserves of several thousand square kilometers if we are to balance the rates of extinction with the rates of evolution" (Struhsaker, 1978).

A further problem affecting the conservation of Ghana's native habitats is the demand for fuel. The preferred fuel is charcoal, and this was the case even before recent price increases in kerosene (E.O.A. Asibey, personal communication, 1981). The destruction of vegetation for conversion to charcoal does not yet much affect the moist forest zone, but is seriously eroding the transitional zone between forest and savanna. Much of the area in the immediate vicinity of Accra has been completely deforested and some villages with a former history of fine woodcarving are now so far from timber that they must use the root-sticks and stems of the food crop, cassava, as fuel. The demand for charcoal can be judged from the fact that it has increased in cost by over 3,000% over the past four years (Yaa Ntiamoah-Baidu, personal communication, 1981), reflecting both the increasing scarcity of the commodity and the difficulties involved in its transportation from the transitional zone to the cities.

Prospects for the conservation of flora and fauna within the Forest Reserves administered by the Forestry Department are not good (Asibey, 1979). Hunting and trapping occur throughout them. Furthermore, Forestry Department control over commercial logging has been lax. Commercial logging companies carry out their own enumeration and extraction, often without any government supervision whatsoever. Felling, formerly based on a predetermined yield per acre, is now controlled by girth limits, so increasing the number of trees taken. It is clear that forest protection in Ghana requires a change in direction of government policy. It is equally clear that the logging of the Forest National Parks cannot meet the country's current or future needs for foreign exchange, nor even local timber needs, for more than the very short term. At current rates of timber extraction, Ghana will need to import timber within 20 years.

Conservation can only be achieved when it is part of an integrated development plan and by informed education on environmental matters. Conservation education in Ghana has been severely handicapped by a lack of facilities, buildings, films, projectors, screens, books, etc. Furthermore, there is a lack of trained staff. The Game and Wildlife Department has a single position of Education Officer. This post is currently vacant and the little education that is being carried out is undertaken by dedicated staff on a voluntary basis; admirable as this may be, it is certainly insufficient.

#### Prospects for Conservation

The conservation problems facing Ghana would seem to be overwhelming, but in fact they differ only in degree from the situation throughout most of West Africa, although they have been exacerbated by political and

economic instability. In fact, Ghana possesses some advantages that are not to be found elsewhere in West Africa and which would seem to make it an appropriate target for efforts at assistance.

The first advantage is that conservation is the responsibility of a committed, dedicated and efficient Game and Wildlife Department headed by Dr. Emmanuel Asibey. To a large extent the conceptualization and realization of this department is the personal achievement of Dr. Asibey who has modelled it closely on the Wildlife Departments of East Africa. There can be little doubt that the future of Ghana's forests and primates would be extremely bleak without the dedicated work of Dr. Asibey and his department. Conservation efforts originated by natives of a country have a much greater chance of long-term success than those originating from outside the country and carried out by expatriate "experts"; such efforts should always be supported to the greatest degree possible.

A recent government reorganization may extend the influence of Dr. Asibey and provide the change in policy noted above. A Forestry Commission was recently established in Ghana, combining four previously separate departments, Game and Wildlife, the Forestry Products Research Institute, the Timber Marketing Board and the Forestry Department. The Chief Administrator of the Commission will be Dr. Asibey.

Dr. Asibey enjoys the confidence of the highest levels of government and is thus in a position to effect substantive change of the kind outlined in this report. In a year of extreme austerity, his was one of the very few departments to be provided with any foreign exchange, with which five new Land Rovers were purchased for the National Park system. This closeness to the highest levels of government has been maintained throughout the political vicissitudes of the recent past and conservation policies have thus remained constant.

The government of Ghana has a specific conservation plan (*Wildlife Conservation Policy of the Republic of Ghana*, 1974), based on sound biological principles, whose aim is to protect representative samples of the flora and fauna occurring within the country; a plan which is well advanced and continuing. Currently, a suitable site for a Marine National Park is being sought.

The concepts of conservation which guide the government are among the most sophisticated in Africa. The impetus behind conservation has not been tourism, but rather a desire to protect the country's heritage. As Dr. Asibey has pointed out (Asibey, 1978), such moral obligations cannot be expressed in economic terms and indeed, if decisions had been made solely by international financiers and advisers, conservation in Ghana would never have been attempted. The government has long realized that the imposition of a conservation plan on an unwilling populace cannot result in success. Unless the people can see and appreciate tangible

benefits from conservation, they are unlikely to support it. If they do not support it, it will fail. In the first instance, this is a problem of education, and the problems facing conservation education in the country have been discussed above. The second aim must be to convince people that conservation is not merely a set of proscriptions restricting their ancient rights. Dr. Asibey is in the process of developing two original projects that have the aim of providing protein for a meat-hungry population. The first of these is the Grasscutter Project and the second the Shai Hills Game Ranching Project.

The grasscutter (also known as the cane rat or cutting grass) is a hystricomorph rodent and close relative of the porcupine, which it resembles in many basic ways. It inhabits woodlands and savannas and may colonize clearings and farms in the forest zone; it is generally absent from closed-canopy forest. It invades cultivated areas, feeding on maize, sugar cane, cassava and oil palm and may assume pest proportions. It is the commonest species traded as bushmeat in Ghana and also accounts for the greatest weight of meat traded (E.O.A. Asibey, personal communication, 1981).

In view of the acceptability of this rodent, Dr. Asibey reasoned that it might be worthwhile trying to raise this species domestically and he has been engaged in such a project for almost seven years. The laboratory work is now almost complete and the project is beginning to operate on a large scale.

The mature grasscutter weighs up to 4 kg (9 lbs). The mean litter size is four and there are usually two litters per year, although there is evidence that three may be obtained under optimum conditions. The young mature in from six months to a year. They are fed on grass, cassava peelings, sugar cane and vegetable refuse. They are not much prone to disease and the meat is well accepted, commanding high prices. The animals are used very efficiently; not only the meat is eaten, the coat is ground up to make a kind of seasoning and the contents of the stomach may be used to flavor soup (Asibey, 1978).

The project supplies extension services. Farmers are furnished with breeding stock and information on husbandry. The department provides further necessary information and assistance, and maintains records to try and minimize inbreeding. A Grasscutter Breeders' Association has been formed by farmers. One breeder living about 20 miles from Accra lives entirely (and fairly well) by raising these animals; the demand for meat far exceeds the supply.

The second protein-producing project is the Shai Hills Game Ranching scheme. This project is located 17 miles northeast of Accra. The intention is to fence an area of Guinea savanna and then to introduce both native Ghanaian fauna and exotic species from East Africa and to permit them to range unprovisioned and undisturbed within the



fence. When the population increases to an adequate size, systematic cropping will take place and the meat sold in the marketplace.

An area of 57 sq. km (22 sq. miles) has been acquired and is now almost three-quarters fenced. Species that will be enclosed are Kob (*Kobus kob*) and baboons (*Papio anubis*), both of Ghanaian origin, and Waterbuck (*Kobus defassa*) and Hartebeest (*Alcelaphus* sp.) from East Africa. This project is in the very early stages of development and no cropping has yet taken place.

To summarize the prospects for forest primate conservation in Ghana, the animals and their habitats still exist and are capable of being conserved. The government is amenable to conservation, which it sees as preserving a national heritage and not strictly in economic terms. Conservation is seen as an aspect of balanced economic development and this idea pervades the Department of Game and Wildlife under the direction of Dr. Asibey. Dr. Asibey has proved to be an effective conservationist who has almost singlehandedly achieved substantial progress in the protection of representative samples of Ghana's natural resources. He has the ear of the highest levels of government. The creation of a Forestry Commission, to be headed by Dr. Asibey, will assist in the rationalization of the need to exploit the forests and at the same time to conserve areas of them for posterity. There is little doubt that practical and material assistance given to him would bear substantial fruit in the twin goals of forest and primate conservation.

#### Recommendations

My recommendations, I should once again re-emphasize, are purely personal. Although I have discussed most of them with Dr. Asibey and have revised this report in the light of his comments, the responsibility for the final version is my own.

The recommendations fall into two groups. The first concerns action which the government of Ghana could take to increase the protection of the evergreen forest zone and its primates. The final three concern potential assistance which the Society and its members could render to Ghana to assist in the achievement of these goals.

#### Government

*Nini-Souhien and Ankasa.*--I believe that it would be appropriate to combine the Nini-Souhien National Park and the contiguous Ankasa Game Production Reserve into a single National Park. There are several reasons for this. Unlike Bia, neither of these two areas has been logged in the recent past. The new National Park would be located in the evergreen rain-forest zone proper rather than in the moist semi-deciduous zone of Bia. Nini-Souhien is rather small as an individual forest park, but combined with Ankasa it would make a park of 50,578 ha (198 sq. miles).

Furthermore, forest primates are more abundant at Nini-Souhien Ankasa than they are at Bia (Martin, 1976).

I realize that there may be economic obstacles to the achievement of this goal, but the protection afforded by the Status of Game Production Reserve may not be sufficiently robust in the long term.

#### International Primatological Society

*Bia National Park.*--The Bia National Park possesses a rich primate fauna of seven anthropoid and two prosimian species. The research facilities and opportunities presented by this forest have not been adequately utilized by the international community. Dr. Asibey is anxious to encourage primate and other research within this park.

At the Park Headquarters, Kumkumso, at the northern top of the park is housing for the warden, rangers and technical assistants. There is also a three-bedroom Rest House which is fully furnished, with running water, two bathrooms, a sitting cum dining room and an external kitchen.

The fauna of the park is well protected by rangers and, in addition, technical staff carry out census work on a regular basis. There is therefore a considerable body of information available on primate populations, their movements, feeding, and demography. An approved research project could expect technical assistance from the Department of Game and Wildlife staff.

In view of the fact that research by foreign nationals in many developing countries is being made more and more difficult, the opportunity being offered here can be seen to be exceptional.

Interested persons may obtain further information from the author of this report, or may contact Dr. Asibey directly at the Department of Game and Wildlife, P.O. Box M. 239, Ministry Post Office, Accra, Ghana, West Africa.

*Camp 5 Facility at the Bia Game Production Reserve.*--This facility is a former logging camp that has been donated to the Department of Game and Wildlife and which has been proposed as a potential research, study and educational facility (E.O.A. Asibey, personal communication, 1981).

The facility is located at the extreme southeastern tip of the Bia Game Production Reserve. It is some 25 km (15 miles) from the Bia National Park Headquarters at Kumkumso, and 16 km (10 miles) south of the boundary between the Bia National Park and the Bia Game Production Reserve. The facility comprises five wooden buildings that were previously the field headquarters of a logging company when it was felling this part of the then Bia Forest Reserve. Two of the buildings have concrete floors, two have wooden floors and the last has an earth floor.

The construction is of sawn hardwood with corrugated, painted zinc sheet roof. All have verandahs. There is a fresh water source within easy walking distance. The buildings are unfurnished and without electricity. The facility stands in a cleared area on the perimeter road of the Game Production Reserve. The total area of the compound is about 1 acre; it is bounded on one side by native farms, on another by a plantation of various economic tree species and on the third by the logged portion of the Bia Game Production Reserve.

The proximity of this facility to the logged forest, to other forms of land-use, as well as to the primary forest of the Bia National Park make it appropriate for several different uses: (a) As a dormitory and teaching facility for school children and students who would be brought in from towns and villages for short courses (1-2 days) in conservation and the problems of land use. (b) As a base for socio-economic studies of the farmers who are opening up the new land, the extent to which they depend on forest products (animal and vegetable) for their survival, etc. (c) As a base for studies of the regeneration of the logged area and in particular of the use and re-invasion of the former logged area by primates. The use of secondary and regenerating forest by primates has not been well studied and needs to be understood much better.

The facility therefore needs furnishing, suitable educational and library materials, as well as a simple kitchen and toilet. Appropriate ways of doing this are currently being explored.

*Conservation education.*--Conservation education is crucial to the long-term protection of the forests and primates of Ghana. Facilities and equipment for it are currently in very short supply in Ghana, and it is in this area that the International Primatological Society can most fruitfully contribute.

There is a need for a Conservation Education Officer with the Department of Game and Wildlife, the post being currently vacant. There seems little possibility that the I.P.S. could provide the funds necessary to finance this post and essential equipment such as a vehicle, but the possibility of obtaining such funding from other sources is currently being explored.

It has been found by experience that films on conservation can have a dramatic impact on local populations. If appropriate films are made available, they can be used in a conservation education program. They could also be shown on national television and could be introduced and discussed by Dr. Asibey in order to ensure that the maximum impact is derived from them.

One of the main aims of any conservation education program must

be to try and influence school children. Dr. Asibey is currently preparing, at my request, a pamphlet on the primates and forests of Ghana and the need for the conservation, to be used in the classroom and distributed to children and villagers. Versions will be produced in both Ashanti and English, and will be printed and donated to the Department of Game and Wildlife by the International Primatological Society. Technical assistance by the Conservation Education Department of the Twycross Zoo, England has also been promised. As Dr. Asibey is a senior civil servant, no problems with government permission to import and use the pamphlets is anticipated.

Apart from schools, there is also a need for conservation textbooks to be used in courses at the country's three universities. Courses in conservation are given in the Zoology, Botany and Agriculture Departments of all these institutions. Although not primarily geared towards the training of professional conservationists, it is useful to expose these students to conservation issues relevant to their disciplines. A course leading to an undergraduate diploma, graduate and postgraduate courses in forestry, wildlife and fisheries will be undertaken by the Institute of Renewable Natural Resources at the University of Science and Technology at Kumasi, and materials are needed for this, as for the Wildlife School at Mole.

The possibility of providing limited scholarships to promising students to permit them to study primates and the problems facing them during school vacations is also being explored.

Equipment for the facility at Bia is also required, as noted above, and the possibility of providing some of this material is being explored.

Comments on the above report will be welcomed by the author. Textbooks and other materials may be sent to Dr. Asibey directly at the above address. Packets and parcels should be marked "Donated Educational Materials".

#### References

- Asibey, E.O.A. Primate conservation in Ghana. In D.J. Chivers & W. Lane-Petter (Eds.), *Recent Advances in Primatology*. Vol. 2. *Conservation*. London: Academic Press, 1978.
- Asibey, E.O.A. *The Case for High Forest National Parks in Ghana*. Unpublished report, Department of Game and Wildlife, Accra, 1979.
- Beadle, L.C. *The Inland Waters of Tropical Africa*. London: Longman, 1974.



- Booth, A.H. The zoogeography of West African primates: A review.  
*Bulletin de l'I.F.A.N.*, 1958, 20, ser A, [2], 587-622.
- I.U.C.N. Bulletin*, 1980, 11 [12], 105.
- I.U.C.N. Commission on National Parks and Protected Areas. *United Nations list of national parks and equivalent reserves*. Gland, Switzerland: I.U.C.N., 1980.
- I.U.C.N. Commission on National Parks and Protected Areas. *Conserving Africa's natural heritage*. Gland, Switzerland: I.U.C.N., 1981.
- Martin, C. *Report on a survey of the Ankasa River Forest Reserve*. Unpublished report, Department of Game and Wildlife, Accra, 1976.
- Myers, N. *Conversion of moist tropical forests*. Washington, DC: National Academy of Sciences, 1980.
- Paxton, J. (Ed.) *The statesman's yearbook*. New York: St. Martin's Press, 1976.
- Persson, R. *World forest resources: Review of the world's forest resources in the early 1970s*. Research Notes No. 17, Department of Forest Survey. Stockholm: Royal College of Forestry, 1974.
- The New York Times Atlas of the World*. New York: The New York Times, 1978.
- The New York Times Cumulative Quarterly Index*. New York: The New York Times, 1978-1981.
- Rucks, M. *Notes on the problems of primate conservation in Bia National Park*. Unpublished report, Department of Game and Wildlife, Accra, 1976.
- Struhsaker, T. T. Bioeconomic reasons for conserving tropical rain forest. In D.J. Chivers & W. Lane-Petter (Eds.), *Recent Advances in Primatology*. Vol. 2. Conservation. London: Academic Press, 1978.
- United Nations Statistical Yearbook*. New York: United Nations, 1979.
- Wildlife Conservation Policy of the Republic of Ghana*. (Approved by Executive Council.) Accra-Tema: Ghana Publishing Corporation, 1974.

\*

\*

\*

# STUDY OF FERAL VERVET MONKEYS IN BARBADOS

Julia Horrocks

The University of the West Indies, Barbados

The Department of Biology of the University of the West Indies has initiated behavioral/ecological research on *Cercopithecus aethiops Sabaeus* in Barbados. This old world species, which has been called by the common name of grivet, vervet or green monkey depending on taxonomic inclinations (e.g., see Napier & Napier, 1967; Poirier, 1972; Dunbar, 1974; Kavanagh, 1980), originated in Africa and colonized Barbados, St. Kitts and Nevis some 300 years ago. The exact time of its establishment is not clear from historical records (Denham, 1981). I will follow Dunbar (1974) in considering all members of the superspecies *C. aethiops* as vervets.

*Cercopithecus* species are extremely adaptable and successful as indicated by their abundance and distribution in Africa. In Barbados, an island of 430 km<sup>2</sup>, with a human population of 250,000, the monkeys inhabit the deciduous (mesophytic) woodlands of the numerous gullies and forested regions, as well as the cultivated and ornamental gardens of the sugar-cane estates. Their behavioral flexibility allows them to inhabit areas densely populated by man, including the outskirts of the capital city, Bridgetown.

Encouraged by the high ratio of cultivated to uncultivated land, they forage primarily on cultivated crops, supplementing their diet with naturally growing leaves, fruits, insects, lizards' and birds' eggs. They have no local predators other than man, and since the monkey population has reached pest proportions, Barbadians are encouraged by a bounty to shoot and trap them. A program led by Mr. Jean Baulu, set up in 1979 by a regional organization, Caribbean Agricultural Research and Development Institute (C.A.R.D.I.), is presently operating to reduce the numbers to "acceptable" levels using humane trapping techniques.

The Department of Biology first became involved in research on the monkeys through a cooperative assessment of monkey crop damage with C.A.R.D.I., out of which came a general appreciation of their abundance and distribution on the island. I selected four troops for a study of phenotypic flexibility of troop structure, behavior, and vocalization in response to differing levels of harassment by man. In addition, the vocal repertoire of the Barbadian vervet is being compared with that of its African counterpart (Struhsaker, 1967) with special emphasis on alarm calling.

Two troops have been chosen for investigations of the effects of rank and kinship on intra-troop organization and behavior. In both troops the home range includes areas of open grassland which greatly facilitates observations.

---

Author's address: Department of Biology, University of the West Indies, Cave Hill, Barbados.

After an initial two-month period of habituation one troop could be approached to within less than 1 m. This troop was particularly easy to habituate since it had been the focus of general observations for three years previously, as a consequence of which its birth history is now known for four continuous years. Individuals in the second troop could be approached to within about 4.5 m after three months habituation period. This troop had not been under previous study and its birth history is only known for two seasons.

We intend to continue observations on these troops indefinitely in order to record long-term changes in social organization and population dynamics. However, we are also attempting to habituate other troops, since the existence of the bounty makes long-term studies somewhat unpredictable. In spite of this, I feel that Barbadian vervets offer considerable potential for primate studies in the future, particularly since we will be endeavoring to get certain troops protected from hunters by legislation.

#### References

- Denham, W. W. History of green monkeys in the West Indies. Part 1. Migration from Africa. *Journal of the Barbados Museum and Historical Society*, 1981, 36, 211-228.
- Dunbar, R. I. M. Observations on the ecology and social organisation of the green monkey, *Cercopithecus sabaeus*, in Senegal. *Primates*, 1974, 15, 341-350.
- Kavanagh, M. Invasion of the forest by an African savannah monkey: Behavioural adaptations. *Behaviour*, 1980, 73, 238-260.
- Napier, J. R., & Napier, P. H. *A handbook of living primates*. London: Academic Press, 1967.
- Poirier, F. E. The St. Kitts green monkey (*Cercopithecus aethiops sabaeus*): Ecology, population dynamics and selected behavioural traits. *Folia Primatologica*, 1972, 17, 20-55.
- Struhsaker, T. T. Auditory communication among vervet monkeys (*Cercopithecus aethiops*). In S. A. Altmann (Ed.), *Social communication among primates*. Chicago: Chicago University Press, 1967.

\*

\*

\*

## NEWS BRIEFS

### *Harry F. Harlow Dead*

We learned of Harry F. Harlow's death on December 6, 1981 with great personal as well as professional sorrow. He was a good friend and a magnificent teacher. He was one of the pioneers in the field of primate research. He was truly a scientific innovator, whose work has directly generated several broad, major lines of behavioral research that are being actively pursued in very many laboratories today and, without doubt, will be for many years to come. Science has lost a great man.

### *New Director of Oregon Center Announced*

Dr. B. Vaughan Critchlow, professor and chairman of the Department of Anatomy at the Oregon Health Sciences University in Portland since 1972, has been named director of the Oregon Regional Primate Research Center. Dr. Critchlow will replace Dr. William Montagna, who has been director since 1963, by May 1, 1982. The major emphasis of the Oregon Primate Research Center is on basic studies in reproductive biology.

Dr. Critchlow received his bachelor's degree from Occidental College in Los Angeles and doctorate from the University of California at Los Angeles. He then joined Baylor University College of Medicine in Houston where he rose to the rank of professor and acting chairman of the Department of Anatomy.

Research conducted by Dr. Critchlow, which will continue at the Primate Center, concerns how the brain controls the secretion of growth hormone. He is working with the brain hormone somatostatin, which is synthesized in the hypothalamus and acts directly on the pituitary gland, where growth hormone is made and sent into the circulatory system. He is also interested in how stress affects the secretion of hormones in the body. To accomplish this, he investigates the brain structures that influence the pituitary, or "master" gland at the base of the brain which releases numerous hormones which stimulate specific organs in the body involved in the stress reaction.

### *Scientist Convicted of Cruelty to Monkeys*

Dr. Edward Taub, chief researcher of the Institute for Behavioral Research, Silver Spring, Maryland, was convicted November 23, 1981 of cruelty to animals for failing to provide veterinary care for six monkeys at his research laboratory.

District Court Judge Stanley Klavan, of Montgomery County Maryland, fined Taub a total of \$3,015--\$500 for each of six counts of animal cruelty and \$15 in court costs--ending a trial that has received considerable national publicity. The background of the trial was described in the News Briefs section of the October, 1981 issue of this *Newsletter*. Taub's assistant, John



Frederic Kinz was acquitted of all charges

Judge Klavan, delivering his ruling to a courtroom filled with almost 100 people, including a large number of reporters and animal welfare advocates, said that Taub did not provide care to six monkeys that were found to be suffering from lesions and scar tissue on their arms and hands. At the same time, Klavan threw out 11 other cruelty charges, saying that the 11 monkeys cited in those charges were not shown to have suffered any pain or cruelty

Taub plans to appeal the ruling.

After the verdict, the group, People for the Ethical Treatment of Animals whose head, Alex Pacheco, had served as a volunteer worker in Taub's laboratory issued a prepared statement that called the convictions "a landmark victory in the struggle for animal rights and the ethical treatment of animals; the first time in the history of the U.S. that an animal research facility has been penetrated, internal conditions exposed, and a successful prosecution accomplished." [Based in part on information contained in an article by K. B. Richburg in *The Washington Post*, November 24, 1981.]

\*

\*

\*

#### PRE-DOCTORAL FELLOWSHIPS AVAILABLE

The Primate Foundation of Arizona in association with Arizona State University has available pre-doctoral fellowships for the study of chimpanzee behavior. The fellowship term is one year beginning January and August of each year; the award amount for 12 months is \$6,000. Behavior observation experience is desirable and a Master's degree or equivalent is preferred. Applications must be received no later than 90 days prior to starting date. Applications are now being received for the period beginning August 1982. Send letter of inquiry to: Jo Fritz, Executive Secretary, Primate Foundation of Arizona, PO Box 86, Tempe, AZ 85281.

\*

\*

\*

## PRIMATOLOGY IN CHINA

On January 1, 1982 the New China News Agency (Xinhua) reported that the First Symposium on Primates had been convened during December 1981 in Kunming, Yunnan Province, People's Republic of China by the Chinese Society of Zoology.

The conference called for the establishment of a national primate research and preservation center in the Province. The 75 representatives, drawn from all over China, called for international cooperation and training of personnel to care for rare Chinese primates, such as the golden-haired and Taiwan monkeys and the white-headed langurs. The 99 papers presented at the Symposium detailed research on primate classification, anatomical structure, behavior, evolution, breeding, domestication and medical biology. The participants called for further studies into the classification, distribution and population of primates, and on measures to be taken to protect those in danger of extinction. More reserves for apes and monkeys, and more natural parks were also called for. About 19 provinces and autonomous regions contain 16 ape and monkey species.

In addition, it should be mentioned that in April 1981 Chen Yufeng, Lo Lihwa, Can Siangmian and Cao Yiumei published *The Karyotypes of all the primate species in China* (English translation of Chinese title), Science Publications, Beijing. The book has 208 pages and contains photo illustrations of the karyotypes of both male and female species of *Tupaia belangeri chinensis* Anderson, *Nycticebus coucang bengalensis* Fischer, *Macaca mulatta* Zimmermann, *M. assamensis* McClelland, *M. nemestrina leoninus* Blyth, *M. cyclopis* Swinhoe, *M. speciosa speciosa* F. Cuvier, *M. s. tibetanus* Milne-Edwards, *M. s. melli* Matschie, *M. s.* subsp., *Rhinopithecus roxellanae* Milne-Edwards, *Presbytis francoisi francoisi* Pousargues, *P. f. leucocephalus* Tan, *P. phayrei crepusculus* Elliot, *Hylobates concolor concolor* Harlan, *H. lar* Linnaeus and *H. hoolock* Harlan. The penultimate chapter deals with karyotyping methods and the final chapter provides a glossary of terms used in cytology and chromosomal studies. At the end there is a list of 107 references. [Reported by Professor F. P. Lisowski, Dept. of Anatomy, University of Hong Kong, Li shu Fan Building, 5 Sassoon Road, Hong Kong.]

\*

\*

\*

## COLONY-BRED BABOONS AVAILABLE

A national baboon breeding program, funded by a grant from NIH, is in its third year of operation at the Southwest Foundation for Research and Education, San Antonio, Texas. Three species of juvenile baboons 6-30 months old are available for sale. The three species are *Papio cynocephalus*, *Papio anubis* and *Papio hamadryas*. A limited number of culled breeders are also available.

Preference will be given to requests from investigators with current NIH grant and contract support. Researchers from other non-profit institutions are also eligible to purchase these primates. All requests are reviewed by the Colony Review Committee following the NIH-approved guidelines.

Investigators wishing to obtain baboons for use in biomedical and behavioral research are invited to submit requests. The letter of request should indicate the source of support including title, number, and principal investigator of the grant or contract. Information regarding species, age, sex, number and special characteristics should be included.

The price of the juvenile baboons are: 6-12 months, \$500; 12-24 months, \$650; 24-36 months, \$800. The price of the adult baboons is negotiable.

All requests should be addressed to: Dr. William J. Goodwin, Director, Department of Laboratory Animal Medicine, Southwest Foundation for Research and Education, PO Box 28147, San Antonio, TX 78284 (Phone: 512-674-1410).

\*

\*

\*

## UPCOMING PRIMATE MEETINGS

The IXth Congress of the International Primatological Society, August 8-13, 1982, Atlanta, GA USA. This will be a joint meeting of the International Primatological Society, American Society of Primatologists, and the International Society for Human Ethology. The Congress is being coordinated by the Yerkes Regional Primate Research Center. The Congress Chairman is Dr. Frederick A. King. Write to the Congress Office, Yerkes Regional Primate Research Center, Emory University, Atlanta, GA 30322 USA for a booklet containing the following information and forms: (1) Outline of the general organization of the Congress; (2) Forms for proposals for symposia, workshops, oral or poster presentations, and film or videotape presentations; (3) Forms for registration and hotel reservations; (4) Information about side trips, post-Congress trips, the meeting site, and so on. The deadline for proposals is February 1, 1982. At the time of this writing there was a possibility that this deadline would be extended.

## SECOND GENERATION BLACK HOWLER MONKEY BORN

On November 10, 1981, a second generation Black howler monkey, *Alouatta caraya*, was born at Riverbanks Zoological Park, Columbia, SC. Both parents were also born in Columbia and have been housed off-exhibit with another female for several years. This infant was the 22nd howler born here, of which 10 (5 male, 3 female, 2 undetermined) have survived, and is thought to be the first fully second generation howler birth in captivity.

The mother of the infant was born on June 5, 1978 and was nearly 3 1/2 years old (1,253 days) at the time of birth. The father was born on February 20, 1978 and was 3 3/4 years old (1,358 days) at the time of birth. Gestation in howler monkeys, based on observations of captive animals, is approximately 180 days, making this female somewhat less than 3 years old (1,173 days) at the time of conception. No observations are available to indicate whether this was her first estrus cycle, although in the wild female howlers are not thought to reproduce at this early age. The young is being raised by the mother in the presence of the other pair of adult monkeys and appears to be developing normally. Anyone having information on second generation howler monkeys is requested to contact: Alan H. Shoemaker, Riverbanks Zoological Park, 500 Wildlife Parkway, Columbia, SC 29210 USA.

\*

\*

\*

### *SAGUINUS OEDIPUS GEOFFROYI*: MOVED TO APPENDIX I OF CITES

The parties to the Convention on International Trade in Endangered Species (CITES) have approved a resolution to change the listing of *Saguinus oedipus* to include the subspecies *geoffroyi*. This moves this subspecies from Appendix II to Appendix I of the convention.

\*

\*

\*

### POSTDOCTORAL OR SENIOR TECHNICIAN POSITION

Postdoctoral or Senior Technician for employment as Primate Research Assistant. Must have experience in maintenance of primates or other small mammals, in order to supervise, conduct research on, maintain and propagate animals in major section of a large prosimian colony. Starting date early in 1982 desired. Send applications with vitae to: Dr. Elwyn L. Simons, Director, Duke Primate Center, 3705 Erwin Rd., Durham, North Carolina 27705.

\*

\*

\*

## TRAINEESHIPS AT THE NATIONAL ZOOLOGICAL PARK

The National Zoological Park, with funding and assistance by the Friends of the National Zoo, is offering a limited number of Research Traineeships for the summer and academic year of 1982-83. The purpose of the traineeship is to allow a student to become familiar with and practice research and clinical methods in one of several program areas of the Zoo. Each student will participate in ongoing projects directed by the National Zoo staff. Each will receive appropriate guidance on methodology and the use of materials. Thereafter, working alone or in small teams the student will be responsible for routine research or preceptorship duties. Weekly progress meetings will be arranged by the staff supervisor. A brief summary report is required at the end of the trainee period. The General Program Areas are: A. Behavioral, animal husbandry, nutritional, and ecological research. B. Preceptorships in clinical zoological medicine or pathology. C. Education. D. Design methodology and analysis. E. Records management and ADP systems. The deadline for applications is March 1, 1982.

For additional information and application forms write to: Mary Sawyer Hollander, Coordinator, Research Traineeship Program, Friends of the National Zoo, c/o The National Zoo, Washington, DC 20008.

\*

\*

\*

## COMPARATIVE PATHOLOGY CONTINUING EDUCATION COURSE

The 9th annual Comparative Pathology Course will be presented 3-5 May 1982, at the Armed Forces Institute of Pathology, Washington, DC. Military and federal service employees in the medical, veterinary and other medical fields are requested to consult respective agency regulations for appropriate application procedures. Civilian physicians, veterinarians and allied scientists are invited to apply and will be considered on a space available basis. This Course is specially designed to bring attention to disease processes in animals for which a similar entity occurs in man. Differences and similarities of pathologic lesions, as well as the biological behavior of specific entities will be compared in animals and man. Application forms to attend this Course may be obtained by contacting: The Director, Armed Forces Institute of Pathology, (AFIP-EDE), Washington, DC 20306. Completed application forms should be returned by 5 April 1982. Non-federal civilians and foreign nationals are required to submit a \$75.00 fee, payable to the "Treasurer of the United States."

\*

\*

\*

## RECENT BOOKS AND ARTICLES

### Books

*Beach Troop of the Gombe*. Timothy W. Ransom. East Brunswick, NJ: Associated Universities Press, 1981. 319 pp. [Price: \$35. Ordering Address: Associated Universities Press, 4 Cornwall Dr., East Brunswick, NJ 08816.]

This book deals with the behavior and activities of baboons that the author observed for 18 months at the Gombe National Park in Tanzania. There is a foreward by Thelma Rowell. Contents: HISTORICAL PERSPECTIVE. 1. The Gombe National Park. 2. The field study--methods of observation, recording, experimentation, and analysis. DEMOGRAPHY, ECOLOGY, AND MAINTENANCE ACTIVITIES. 1. Population variables and dynamics. 2. Patterns of range use and group movement. 3. Diet and feeding behavior. 4. Relations with other animals. 5. Discussion. COMMUNICATION. 1. Comments on communication. SEXUAL AND CONSORT BEHAVIOR. 1. Sexual behavior. 2. Consort behavior. SOCIAL ORGANIZATION AND TROOP STRUCTURE. 1. Aspects of troop social structure. 2. Special relationships between individuals. 3. The effects of social structure on patterns of spacing and movement. INTERTROOP RELATIONS. 1. Troop encounters. 2. Intertroop migration. INTERACTIONS BETWEEN BABOONS AND CHIMPANZEES. 1. Predation by chimpanzees on baboons. 2. Responses to predation. 3. Problems of primate predation.

*Handbook: Animal Models of Human Disease* (10th Fascicle). C. C. Capen, D. B. Hackel, T. C. Jones, & G. Migaki (Eds.). Washington, DC: Registry of Comparative Pathology, Armed Forces Institute of Pathology, 1981. 22 new animal model studies from *The American Journal of Pathology* and the *Comparative Pathology Bulletin* have been reprinted as this fascicle. Together with the 210 animal models already reprinted for inclusion in the *Handbook* during the past nine years, these new studies make a total of 232 illustrated studies now available. In addition, the Registry has published supplemental updates to two models published earlier, which are provided with the 10th Fascicle. This Fascicle, which includes a comprehensive cumulative index to the complete set of 232 models appearing in Fascicles 1-10, can be purchased in a three-ring vinyl binder large enough to contain five Fascicles for \$8; unbound, \$4. The first seven Fascicles are available in a separate three-ring vinyl binder Library Edition for \$25. Individual copies of Fascicles 1 through 9 are sold unbound for \$4 each. All prices include postage. Orders

---

In many cases, the original source of reference in this section has been the Current Primate References prepared by The Primate Information Center, Regional Primate Research Center SJ-50, University of Washington, Seattle, WA 98195. Because of this excellent source of references, the present section is devoted primarily to presentation of abstracts of articles of practical or of general interest. In most cases, abstracts are those of the authors.



must be prepaid, with a check or money order may payable to UAREP and sent to Registry of Comparative Pathology, Armed Forces Institute of Pathology, Washington, DC 20306.

#### Reports

*Techniques for the Study of Primate Population Ecology.* Subcommittee on Conservation of Natural Populations, Institute of Laboratory Animal Resources, National Research Council. Washington, DC: National Academy Press, 1981. 233 pp. [Price: \$14.50. Order from: National Academy Press, 2101 Constitution Ave., NW, Washington, DC 20418]

Many inconsistencies in findings concerning the status of primate populations in the wild appear to be the result of lack of standardization of procedures. This manual is an attempt to increase the accuracy and consistency of such findings. Export restrictions imposed on various primates over the past decade are in part a response to concern for conserving wild populations. Such restrictions are likely to remain in effect until reliable scientific data become available that justify changing them. Contents: Introduction. Site Selection. Habitat description and specimen collection. Census methods for estimating densities. Techniques for sexing and aging primates. Habitat use. Primate population analysis. Determinants of population density and growth. Commentary.

#### Directories

*Directory: Resources of Biomedical and Zoological Specimens.* Compiled by Registry of Comparative Pathology. Washington, DC 20306: Registry of Comparative Pathology, Armed Forces Institute of Pathology, 1981. Soft cover. 53 pp. [A single free copy may be obtained by writing to the Registry at the address indicated above.]

This is the first guide to collections relevant to the comparative aspects of disease processes. The booklet, supported in part by the Division of Research Resources, NIH, briefly describes the contents of 114 collections, located worldwide, and lists the contact point for each collection. Entries are listed according to type of collection. The contents are separated into five sections: General collections (material from many diseases/conditions and many species); specific collections (material of a specific nature or from one category of animal); museum collections (preserved specimens, skulls, skins, skeletons); miscellaneous collections; and catalogs and guides. The largest section, specific collections--containing 75 citations--includes subsections on aquatic animals, bones and teeth, laboratory animals, neuropathology, nonhuman primates, parasites, reproduction, tumors, zoo and wild animals. Subsections are cross-referenced to other pertinent citations in the booklet.

#### Disease

Intestinal parasitism in an outdoor breeding colony of *Macaca mulatta*. Eberhard, M. L. (Delta Reg. Prim. Res. Ctr., Three Rivers Rd., Covington,

LA 70433) *Laboratory Animal Science*, 1981, 31, 282-285.

A portion of a large outdoor breeding colony of rhesus monkeys was surveyed for intestinal parasites. The results of this examination were compared to data obtained at the time of arrival for this same group of animals. In addition, a small number of infants born in the colony were examined. Although most species of parasites detected during quarantine were retained in the breeding colony, the parasite population changed. The number of helminthic infections doubled while protozoan infections decreased by 20%. *Trichuris* (47%), *Strongyloides* (34%), *Entamoeba* (59%), *Endolimax* (20%), and *Iodamoeba* (20%) were the most common parasites detected in the outdoor breeding colony.

Funduscopy observations in a colony of African green monkeys (*Cercopithecus aethiops*). Johnson, P. T., & Peiffer, R. L., Jr. (P. T. Johnson, P. J. Associates, 1512 Crestwood Lane, Chapel Hill, NC 27514) *Journal of Medical Primatology*, 1981, 10, 33-37.

Funduscopy examinations were performed on 139 African green monkeys. Notable observations were made in 5% including varying degrees of retinal hypopigmentation and nerve fiber myelination. Bilateral optic nerve head colobomas were found in one monkey. This species was easily tranquilized and examined using the described methods.

#### Breeding and Rearing

Domestic breeding of patas monkeys (*Erythrocebus patas*). Kaplan, J. R., Anthony, M., & Wood, L. (Arteriosclerosis Res. Ctr., Bowman Gray Sch. of Med., Winston-Salem, NC 27103) *Laboratory Animal Science*, 1981, 31, 409-412.

Two reproductive strategies were used in the management of a patas monkey breeding colony. The first strategy involved placement of all animals into one-male harem units for breeding, parturition, and infant rearing. The second strategy involved a reduction in the number of males, movement of pregnant females to individual cages, and formation of new groups with females and neonates. The second strategy resulted in an increased percentage of females having successful births and an increased survival of neonates. The percentage of females becoming pregnant did not change.

Plasma cortisol response to different methods of weaning in rhesus monkey (*Macaca mulatta*) infants. Golub, M. S., Anderson, J. H., Goo, G. P., & Sassenrath, E. N. (Calif. Prim. Res. Ctr., Univ. of Calif., Davis, CA 95616) *Laboratory Animal Science*, 1981, 31, 400-402.

Plasma cortisol measurements were used as a means of evaluating the stress induced by two methods for weaning rhesus monkey infants. Infants weaned by removing the dam from the home-cage showed a moderately high cortisol response 1 day after weaning, and cortisol remained elevated during the first post-weaning week. Infants removed from the dam and placed in the primate nursery showed a higher initial cortisol response but a more rapid return to baseline. These data illustrate that plasma cortisol levels can provide an index of stress accompanying

colony management procedures.

Ovulatory patterns in the squirrel monkey (*Saimiri sciureus*). Dukelow, W. R., Theodoran, C. G., Howe-Baughman, J., & Magee, W. T. (Endocrine Res. Unit, Michigan State Univ., East Lansing, MI 48824) *Animal Reproduction Science*, 1981, 4, 55-63.

The results of induced ovulation regimens on 95 squirrel monkeys over a 7-year period are described. A distinct seasonal pattern of response was observed in the temperate climate. The pretreatment of squirrel monkeys with progesterone slightly suppresses the total number of follicles showing growth in response to the FSH but results in a significantly higher number of animals showing at least one ovulation. No significant differences were noted for ovarian response based on the length of time the animal had been in captivity. The effectiveness of the ovulation induction regimen over 20 or more consecutive courses of treatment was not significantly reduced, suggesting that antibodies were not formed against the gonadotropins.

#### Ecology and Field Studies

*Cercopithecus aethiops* of St. Kitts: A population estimate based on human predation. Coppinger, R. P., & Maguire, J. P. (Sch. of Natural Sci. & Math., Hampshire College, Amherst, MA 01002) *Carribean Journal of Science*, 1980, 15, 1-7.

Researchers have designed a method of estimating the minimum population of vervet monkeys on the island of St. Kitts by determining the rate of human predation on the monkeys and the minimum population required to support the mortality due to monkey hunting. The minimum population was determined to be 12,000 monkeys whereas the actual population must be two to three times this figure.

Natural regulation of rhesus monkey populations in Kathmandu, Nepal: Rhesus monkey groups near Kathmandu, Nepal, show demographic patterns of intrinsic population stability. Teas, J., Richie, T. L., Taylor, H. G., Siddiqi, M. F., & Southwick, C. H. (Interdisciplin. Progs. in Hlth., Harvard Sch. of Public Hlth., Boston, MA 02115) *Folia Primatologica*, 1981, 35, 117-123.

In Kathmandu valley, two populations of rhesus monkeys which are totally protected, have shown relatively stable numbers over a period of several years. Population stability within heterosexual troops appears to have been maintained through lower birth rates and slightly higher infant and adult mortality rates than in comparable rhesus populations in India which have been subject to trapping. Although the behavioral and physiological mechanisms by which these demographic changes occur are not known, behavioral observations on these populations suggest several possibilities. These data represent the first indication of possible mechanisms for population regulation in natural rhesus populations.

A field study of the socio-ecology of the Goeldi's Monkey (*Callimico goeldii*)

in Northern Bolivia. Pook, A. G., & Pook, G. (New York Zool. Soc., Bronx Zoo, Bronx, NY) *Folia Primatologica*, 1981, 35, 288-312.

A 5-month field study on both the distribution and ecology of *Callimico goeldii* was carried out in the seasonally dry rain forest of north-western Bolivia. The species was found to be very sparsely distributed (approximately one group per 4 km<sup>2</sup>) in isolated groups of about 6 animals throughout the study area. *Callimico* was found to associate a great deal with two species of *Saguinus* that inhabit the same region in greater densities. It appears to be a habitat specialist, preferring low-lying and damp, but well-drained, bamboo forest and spending nearly all its time within 3 m of ground level, travelling mainly by vertical clinging and leaping. It appears that this ecological specialization accounts for the species' discontinuous micro-distribution, and that this in turn is related to *Callimico*'s distinctive pattern of social organization.

Lesões produzidas pelo sagüi, *Callithrix p. pencillata* (E. Geoffroy, 1812), em árvores do cerrado (Callitrichidae, Primates). Rizzini, C. T., & Coimbra-Filho, A. F. (2nd author: CPRJ-DECAM-FEEMA, Rua Fonseca Teles, 121/142, Cx-Postal. 23011-Rio (RJ) Brazil) *Rev. Brasil. Biol.*, 1981, 41, 579-583.

The present paper discusses the peculiar aspects of feeding behavior shown by the marmosets of the genus *Callithrix*. In particular, this contribution discusses observations made during a short visit to the cerrado of Paraopeba, Minas Gerais State, when individuals of *C. p. pencillata* were seen feeding on tree exudates. *Vochysia rufa* (Vochysiaceae) and *Hancornia speciosa* (Apocynaceae) were amongst the most procured trees by the marmosets in that area. The perforations caused by the monkeys on these plant species are directly related to the quality of the exudates as well as to the "modus operandi" which they employ to obtain them.

#### Taxonomy

The uniqueness of *Daubentonia*. Oxnard, C. E. (Depts. of Biol. & Anatomy, and the Graduate Sch., Univ. of Southern Calif., Los Angeles, CA 90007) *American Journal of Physical Anthropology*, 1981, 54, 1-21.

The current assessment of the genus, *Daubentonia*, as lemuriform, and within that group as indriids, depends on which anatomical data have given the greatest weight. The present paper reports a discriminant analysis of the data of a large series of studies in which many different anatomical regions have been characterized osteometrically in a wide range of primate genera. The differences that have been found are large enough that it can be confidently asserted that in its postcranial skeleton, *Daubentonia* is more different from the primates as a whole than is any other primate genus. They are so great indeed, paralleling the enormous differences of *Daubentonia* from other primates in its dentition, skull and cheiridia, that we may prefer to keep open minds about its taxonomic placement.

## Instruments and Techniques

Device for capture and restraint of nonhuman primates. Smith, E. O. (Yerkes Regional Primate Res. Ctr. Fld. Stat., 2409 Collins Hill Rd., Lawrenceville, GA 30245) *Laboratory Animal Science*, 1981, 31, 305-306.

A device was developed which allowed the isolation, capture, and restraint of individual stumptail macaques (*Macaca arctoides*) living in a social group. Capture and restraint was accomplished with minimum stress to the animals and minimum risk to animal handlers. The use of positive reinforcement in the training regime contributed to reliable daily entrance into the capture device.

## Conservation

Mountain gorilla project: Progress Report 4. Aveling, C., & Aveling R. *Oryx*, 1981, 16, 135-137.

Since the last report on the work of the Mountain Gorilla Project (*Oryx*, August 1980), all the three main programs in Rwanda--conservation education, park protection, and park development--have made substantial progress, as outlined in the present report.

Pygmy chimpanzees in peril. Susman, R. L., Badrian, N., Badrian, A., & Handler, N. T. (Dr. Randall L. Susman, Dept. of Anatomical Sci., Hlth. Sci. Ctr., State Univ. of NY at Stony Brook, Long Island, NY 11794) *Oryx*, 1981, 16, 179-183.

So far as is known pygmy chimpanzees, or bonobos, occupy only a comparatively small area in the central basin of Zaire. A large multinational company has acquired logging rights in what is believed to be the core of their range, and the authors, who have been studying the animals, believe that this could mean the end of this major population. A reserve is urgently needed, and they suggest a particular area of undisturbed primary forest where the local people would act as guardians and also continue their traditional uses.

ADDRESS CHANGES

Robert D. Gunnels  
LASB M-13  
NMRI/NNMC  
Bethesda, MD 20814

Alison Jolly  
The Rockefeller University  
1230 York Ave.  
New York, NY 10021

Franklin M. Loew  
Sch. of Vet. Med., Tufts Univ.  
203 Harrison Ave.  
Boston, MA 02111

Amos E. Palmer  
National Cancer Inst.  
Frederick Cancer Res. Fac.  
Bldg. 538, Rm 205-E  
Frederick, MD 27101

D. Lewis Sly  
Division of Animal Care, U-2224  
Vanderbilt Univ. Med. Ctr.  
Nashville, TN 37232

Douglas W. Windle  
Apt. 503, 2901 S. King Dr.  
Chicago, IL 60616