

# LABORATORY PRIMATE NEWSLETTER

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## 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 in *Mammal Species of The World: A Taxonomic and Geographic Reference* (J. H. Honacki, K. E. Kinman, & J. W. Koepl (Eds.). Lawrence, KA: Allen Press and the Association of Systematics Collections, 1982). For an introduction to and review of primate nomenclature see the chapter by Maryeva Terry in A. M. Schrier (Ed.), *Behavioral Primatology: Advances in Research and Theory* (Vol. 1). Hillsdale, NJ: Lawrence Erlbaum Associates, 1977.

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# Primateology: Another View

J. Erwin  
Chicago Zoological Park

With reluctance I am responding to the recent *Laboratory Primate Newsletter*, editorial, "On Primateology Journals and Primateologists." An earlier version of the editorial appeared as a review of the *American Journal of Primateology*, the primateology journal that I edit. I think it is seldom worthwhile responding to reviews; but since the offense has been compounded by reprinting the review as an editorial, I have agreed to respond.

In the editorial a personal view of primateology and primateologists has been stated that I do not share. Serious regrets regarding growth of scientific literature were expressed, and a criticism of the establishment of the *American Journal of Primateology* (as well as the *International Journal of Primateology*) was included. I believe the review and the editorial were poorly thought out in terms of their potential effect on the journals and the field of primateology. At the very best, the review (based on the first issue of AJP) was premature, and it is now clear that most of the guesses about the journal were wrong.

The *American Journal of Primateology* was established specifically to solve some of the problems raised in the editorial, including the following: (1) the *cost* of information; (2) the *quality* of information; and (3) the *interdisciplinary integration* of primateological information. Each of these points is addressed below.

## Cost

It is very expensive indeed to subscribe to many journals and read very few articles from each. It is also very expensive to subscribe to journals that are of topical interest but are not selective in screening articles for publication. The *American Journal of Primateology* is designed to provide an array of high quality information of interest to those who work with primates. By focusing much of the best primateological literature in one journal, subscription to some other journals can be eliminated at a substantial savings to the scientist on a restricted budget.

The annual subscription rate for the *American Journal of Primateology* has doubled, but only because the number of issues (and pages) has doubled. In fact, for those subscribing at the reduced rate available to members of the American Society of Primateologists, the cost per page has actually decreased. For \$48 per year the subscriber receives eight 100-page issues during 1983. That comes to \$.06 per printed page and about \$.025 per manuscript page. The journal is a bargain!

## Quality

The *American Journal of Primateology* is dedicated to scientific excellence and efficiency. Each manuscript is sent to four highly qualified reviewers to assure that editorial decisions can always be based on at least two expert and timely reviews. Editorial decisions are usually made within four or five weeks of receipt of manuscripts. We are very selective. More than 60% of the manuscripts submitted are rejected. While maintaining stringent standards, there has been an extraordinary increase in both the quantity and the quality of manuscripts submitted. By the second year of operation it was necessary to add an entire volume to publish accepted manuscripts in a timely fashion and to avoid delays due to development of a backlog.

Timeliness is, of course, an important aspect of *quality*. Current information is especially valuable to readers, and it is often important to the scientist that his/her work be published as early as possible. During 1982 all issues of AJP were published ahead of schedule, with the issue that had been planned for December coming out in July. By December, an entire additional volume had been produced. This accomplishment stands in stark contrast to the records of other primateology journals. Latency to publication will be further reduced during 1983 with the publication of eight issues.

## Interdisciplinary Integration

Primatology is not a narrowly specialized field composed of a few scientists who study nonhuman primates for their own sake to the exclusion of all else. Those who view the field as such are simply wrong.

Primatology is certainly multidisciplinary in the sense that primatologists are drawn from a variety of traditional arts and sciences. One need not repudiate his/her role as an anthropologist, veterinarian, psychologist or endocrinologist in order to be a primatologist. Primatology offers a unique and vital perspective on each of the disciplines with which it is associated.

At its best, primatology is truly interdisciplinary. Primatology is developing a marvelous tradition of cooperative team research. Research programs in which scientists from various disciplines merge their efforts to solve specific problems of health or conservation are becoming the state of the art in primatology. Smaller scale projects often require individual scientists to gain expertise in a variety of fields other than those in which they received specific training. A primatology journal with broad scope offers the range of reference material that is critical to such operations. Small laboratories have contributed much to the field and will continue to do so, especially as they maintain close ties of communication with larger programs. More and more programs are developing in which field and laboratory projects are coordinated. Interdisciplinary primatology is more than wishful thinking. There are exemplary programs that demonstrate the possibilities. By publishing a broad range of research reports and reviews in the *American Journal of Primatology*, we hope to help the primatologist see how relevant research on topics outside his/her traditional discipline can be.

## Summary and Conclusions

In summary, I have tried to focus on the substantive issues of the Schrier review/editorial. That was not an easy task. In my opinion, the view of primatology and primatologists presented was very pessimistic. I believe the review in *Quarterly Review of Biology* could have been very destructive to primatology and to primatology journals. I hope no one paid any attention to the review when it came time to order journals for academic libraries. This was a funny way of "doing all I can to support [the journals]." The truth is that no other primatology journal has had a workable combination of quality control and publisher's commitment, and it was necessary for the job to be done right. The *American Journal of Primatology* is committed to publication of the best work in all aspects of primatology.

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## Letters: Replies to Editorial

### *Letter from Bernstein*

I should like to make two points regarding the editorial, "On Primatology Journals and Primatologists" (October, 1982 issue of the *Laboratory Primate Newsletter*).

First, the primatologist does exist. Earnest Hooten laid claim to that title in the 1930s. A few of us, in the years between and today, do so as well. I am a Primatologist. Surely I am more a Primatologist than a Psychologist. One can check my departmental affiliations, course teachings, publications and professional memberships to prove that to oneself. I am not using monkeys as surrogate humans and do have an interest in Primate Systematics, Anatomy, Physiology, Husbandry, Genetics, Paleontology, Ecology, Sociology, and Behavior.

Second, as a Psychologist, does the Editor claim an interest in *all* of Psychology? Does he "turn with avid interest from" articles on Learning Theory to Operant and Classical Conditioning to Counseling to Personality Theory to Social to Developmental to Abnormal to Psychophysics to Industrial to Testing? And on top of that, from studies dealing with anything from earthworms to humans? I think most primatologists will have less trouble with that sort of question than will the Editor as a Psychologist, that mythical creature who only studies the psyche.

It is easy to get carried away in one's view of sciences adjacent to one's interests and in response to the plethora of publications. I suspect the Editor described his own interest in primates very accurately, but he also described me, the

mythical primatologist, equally accurately. I do exist. I do read more articles in the Primatology journals than ever I did in any Psychology journal, and the Editor knows I attend a great variety of papers at primatology meetings, running from session to session in pursuit of my interests. I can no longer find enough papers of any interest to me to even warrant a trip to the American Psychological Association meetings. It is not that the meetings or papers are bad, it is only that I belong to another interest group, Primatology.—Irwin S. Bernstein, University of Georgia, Department of Psychology, Athens, GA 30602.

*Regarding Bernstein's second point, the Editor agrees that the Psychologist described is a mythical creature, as mythical as the Primatologist that the new journals in question are apparently addressing. There is no refereed, respected experimental psychology journal, dealing either with human or animal behavior or its physiological basis, that comes even close to covering the range of psychological topics mentioned in Bernstein's third paragraph, nor should there be for all the reasons originally indicated.—Ed.*

#### *Letter from Doyle*

Regarding the recent editorial, "On Primatology Journals and Primatologists," I agree with many of the points the Editor made, disagree mildly with some, and disagree strongly with very few, but then, like anyone else reading such reviews, I have my own opinions and it would be odd indeed if they coincided with his.

I was rather unhappy with one point in particular, the Editor's inability to recommend either of "the journals very highly to the scientific community" (my emphasis). I'll confine myself to the *International Journal of Primatology*. I don't think there can be any doubt in either of our minds that *IJP* is far superior to the two primate journals in existence before we began. Could the Editor not have taken a more positive line and recommended the *IJP* to the scientific community, or recommended it highly, since he wasn't prepared to recommend it very highly?

The Editor is probably at least partly right in his conviction that scientists will prefer to publish in the journals of the professional disciplines in which they were trained, but a glance through that pile of journals on the little table near his desk will reveal that he is by no means completely right. Quite definitely many "primatologists" regard the *IJP* as their first choice. We're trying to make the *IJP* the kind of journal "that grant reviewers and departmental chairmen are going to look for when they make the kind of decisions that they are always making."

I, too, am dismayed when new journals land on my desk, particularly if they're good, since I feel constrained to get them and costs are leaping. The Editor is right, of course, that we need more good research, but more good research is being turned out, as well as more and more research that might be categorized simply as useful (I'll come back to that point). The point is that more research requires either that existing journals expand or that more journals appear. The situation is going to get worse and I can see only two possible solutions, one of which is the long-term technical solution which will see on-line Microfiche Readers on all our desks. The other is for journals to set much higher standards and publicize articles that can be categorized as very good, highly original, exciting, etc.

As an editor this is where the dilemma comes in. We're already running ahead of schedule and the rate of acceptance of articles is such that *IJP* should go into six numbers a year instead of four but where do we stop? For some time now, I've been asking reviewers to classify acceptable articles into two categories, high priority and low priority, the latter category containing those articles that can be classified as good and useful but no more. The point is that even though they may not be groundbreaking, highly innovative and exciting, does not the scientific community want to know about them? Should the scientific community not be deluged by articles that contain only useful information and no more but which they will not find anywhere else?—Gerald A. Doyle, Primate Behaviour Research Group, University of the Witwatersrand, 1 Jan Smuts Avenue, Johannesburg, 2001, South Africa.

\* \* \*

# Rehabilitation of Chimpanzees: Captive Population Crises

Jo Fritz  
Primate Foundation of Arizona

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O. Soave's recent article (1982) regarding the rehabilitation of chimpanzees and other apes was, for the most part, accurate; however, he barely scratched the surface of the very critical and urgent situation of the captive chimpanzee and he did not mention a major disease problem which exacerbates the current predicament. This problem is being brought about by the extensive use of chimpanzees in biomedical research, which Soave cited (1982). Also, Soave's solution, involving multiple compounds and stable populations, appears to be based upon earlier field observations of wild chimpanzees, which are now known to be inadequate characterizations of their social organization. (Note: these comments apply only to the common chimpanzee, *Pan troglodytes*.)

## Comments on Social Behavior

Soave discusses the social organization and ranging patterns of wild chimpanzees in relation to the needs in 'rehabilitation/breeding' programs in captive, semi-, or free-ranging situations. He seems to imply that chimpanzees live in large communities and though he says, "some animals...leave and join groups at will" (p. 3), the reader might still think that these groups are relatively cohesive. Studies of wild chimpanzees more recent than the ones he cites (only one of which is post-1970) indicate that this is not the case. More recent information on wild chimpanzees emphasizes the differences between the sexes in ranging patterns and in social associations. The concept of 'community' may not be equally applicable to both sexes (Bygott, 1979; Goodall *et al.*, 1979; McGinnis, 1979; Nishida, 1979; Pusey, 1979; Wrangham, 1979).

The emerging pattern of chimpanzee social organization is one in which ranges of anestrus females are much smaller than those of males. Anestrus females, especially if pregnant and/or with dependent young, tend to travel apart from other adults. Males travel in groups of males and may cooperatively repulse or displace neighboring groups of males. Females are not necessarily closely tied to these males. Females may 'stay put' when one group of males displaces another. However, females, especially young adults, may join another male community. Only estrous females (especially nulliparous or sterile ones) travel frequently and extensively with males on the rather wide-ranging excursions made while apparently 'patrolling' boundaries. Females may react aggressively to strange females, and intrasexual competition for food may be more important between females than between males (Wrangham, 1979). Males, however, have been known to protect "new" females from the aggression of "resident" females.

In terms of sexual relationships, Tutin (1979) has noted three different settings for copulations: (1) 'promiscuous' matings of an estrous female in company with several males, (2) 'possessiveness' of the most dominant male in a group of males with an estrous female, and (3) consortships ('safaris') of a pair while they seem to avoid contact with other adults. This last seems to be instituted by the male, sometimes coercively, but does not succeed without the female's cooperation. Although copulations are relatively rare during consortships, as many as 50% of conceptions may occur in this situation. Some mechanism of female choice may be involved; can, for example, the female control, to a degree, with whom she conceives? It is notable, however, that both in formation of consortships and when females change groups, males may behave aggressively toward the female. The female is rarely seriously hurt, but if she is from another group and if she has an infant (which was likely fathered by another male), the infant may be killed (Bygott, 1972; Goodall, 1977). The male's age (and consequently dominance status) seems to influence which mating situation he prefers. Even in captivity males may have a favorite partner in stable groups and yet temporarily prefer newly (re-)introduced females (Allen, 1981).

## Comments on Captive Rehabilitation

Rehabilitation and captive breeding programs must keep these wild behavior patterns in mind when designing animal management schemes. It may be difficult to introduce males to each other if they have been in association with other groups of males and formed group bonds. When females are introduced to males, the males may behave aggressively toward the females, which, in turn, requires an appropriate response from the females, such as presenting for copulation and/or defending herself. The physical space and/or caging design must allow areas where females can temporarily escape from or avoid the male. If males often prefer strange females (and perhaps vice versa), stable "family groups" (whatever Soave means by that) may result in less breeding. Individual preferences may mean that some females accept one male but not another and some males may refuse to copulate with other than their specific favorites. Finally, if conceptions are higher in consortships, some degree of temporary privacy may be beneficial to a mating pair.

All of these situations indicate that the facility for rehabilitation and/or breeding must be designed to allow fluctuating group associations and ease of shifting individuals between groups in a controlled manner. Careful attention must be paid to behavior of each individual and its preference for or dislike of companions of both sexes. It is not quite as simple to habituate or rehabilitate chimpanzees as is intimated by Soave. It is a lengthy process based upon in-depth observations of the individuals' behavior and accurate insight into both wild and captive chimpanzee behavior (Fritz, 1979). Compatible groups are formed only by being able to easily maneuver individuals in and out of the group. It would not be wise to simply "release...10 to 15 animals" into a compound to let them fight it out, at least not if rehabilitation is the goal.

## Biomedical Use and Population Crisis

Soave is correct in stating that there is a trend toward using fewer chimpanzees in biomedical research, but the trend is not necessarily due *only* to high maintenance costs, difficulties in housing, and growing sentiment. The fact is that fewer chimpanzees are available at any cost. Biomedical research is using all that are being produced and made available and, at least for the next few years, would use more if more were produced. High purchase prices and maintenance costs are a by-product of the economy and the demand for infants. In order to maximize the benefits of the expenditure and to underwrite some of the maintenance costs, multiple use programs are sought. This means, in turn, that animals are held for long periods in facilities which, in many cases, were not designed to house larger animals. It also means, for the most part, that animals are maintained in single cages past the time of youth and comparatively easy and successful rehabilitation. The vast majority of the "surplus" population are older, "used" animals.

No one can dispute the immense contribution that the chimpanzee has made toward resolution of human physical and mental health problems. However, now those very contributions may be rapidly leading to the decline and eventual disappearance of the captive population. A general overview of the captive population of 1,400 would appear to show it to be in good shape for continued population growth and genetic diversity. However, this may not be true for many reasons: (1) Many of the 1,100 animals presently in research have been living in single cages for perhaps too long a time. They may socialize to the point of group living, but not to the extent of breeding or showing parental behaviors (Fritz, 1979). (2) Many of the research animals were captive born and removed from their mothers at birth. A few of these animals are just now reaching puberty and it is not yet known to what extent (if any) social and reproductive behaviors will emerge, even under the best of conditions. (3) There is little or no room, for various reasons (one of the major being lack of funding), in any of the long-term housing institutions such as the Primate Foundation of Arizona, the Primate Research Institute (New Mexico), and the University of Texas, Bastrop, Texas. (4) Perhaps the most critical of the problems is the extensive use of the chimpanzee in hepatitis research, in particular non-A, non-B hepatitis (NANB), which appears to produce persistent chronic disease in an extremely high percentage of animals (Bradley *et al.*, 1981).

The issue of the NANB hepatitis research has further complicated the problem by the fact that there is, at present, no reliable test for the disease. There is evidence that even though a chimpanzee's enzyme levels return to the "normal" range following the acute phase of disease after experimental exposure, it can continue to be chronically infected (that is, a "carrier"). Therefore, serum from this animal, when no indications of disease are seen, i.e., general appearance or clinical tests, can be capable of transmitting disease to another unexposed animal (J. W. Ebert, personal communication, 1982). Also, because it appears that there are two or more different types of NANB viruses, the use of a single test of an animal's serum may only indicate that the animal is or is not immune to one particular NANB virus. Facilities which have relied upon enzyme elevation or tests of immunity may have integrated carrier animals into "clean" groups. This may



have already compromised the integrity of the chimpanzee population within those colonies as well as future NANB research, which is dependent upon the utilization of "clean" animals. It is not known if the offspring of experimentally exposed NANB animals will be useful for NANB research or if carriers will produce carriers.

Those facilities that have kept NANB animals separated are facing the horrendous housing problems of a very large sub-population of animals that may never add to the genetic pool. Pressures upon housing space, both suitable and unsuitable, and both long-term and short-term, are rapidly building to an explosion point. We are operating under conditions of crisis management. It would seem both logical and humane to attempt to move animals out of the research community to wherever good care and long-term commitment can be assured. However, surely we must consider the ethical implications of moving these animals outside the research community and exposing the human population to the risk of disease, and surely we also have a responsibility to zoos and their exotic animal collections to avoid the possible transfer of disease from one species to another. As a matter of fact, there may also be ethical considerations which should be given to transporting them on any public conveyance that requires a health certificate stating the animal is "free of infectious disease."

If, because of disease, we must remove these "used" animals from the total breeding population, we will begin to see a decline in captive infant production in the next five to six years. We have been dependent upon the wild-born breeding stock, many of which are reaching advanced age, and we are not producing captive-born breeders fast enough to save the population. A recent survey of the U. S. chimpanzee population determined that between 1926 (when the first captive birth occurred) and 1973, 411 chimpanzees were born in captivity, and would, therefore, be eligible to breed by 1982 (International Species Inventory System, personal communication, 1982). Of these, only 17 males and 41 females, or approximately 14%, reproduced. The situation is even more critical when we consider the high losses to first year mortality. In chimpanzees, it is 20% of *all* births (International Species Inventory System, personal communication, 1982). We are faced with a multifaceted problem of surplus "used" animals with no place to live (many of which may never socialize to the point of reproduction), "used" animals which should not be housed with "clean" animals, and current management practices which may or may not produce future breeders.

Even the discussion of the "best" resocialization facilities and the most productive methods may be moot. Soave has stated, "Rehabilitation of animals, especially apes, receives much attention, publicity and national interest. Hence, any proposed program would undoubtedly receive both public and scientific support" (p. 6). If he means verbal support, he is correct; however, if by 'support' he means dollars (or even pennies), we can assure you there are not enough dollars to support the existing facilities, let alone 20 to 30 new compounds across the nation. Zoos historically struggle for funds and it would not seem likely that many urban areas would provide enough visitors to totally support the animals. Research funds for the study of behavior of captive animals have always been miniscule and are now almost non-existent. Soave has taken the idealistic approach, one that we would all wish to see achieve fruition, but it is not realistic, nor practical, nor likely to happen. Who would oversee these compounds? Who will give assurances that the quality of care and management is adequate? Where will the funds come from to build these compounds (which, if properly designed, could cost as much as one million dollars each)? From where will a staff knowledgeable in chimpanzee behavior and resocialization procedures come, and not for just one facility, but 20 or 30? It must also be considered that small stable populations may never produce enough infants to assure the existence of chimpanzees in the United States 100 years from now.

No, it is not a feasible solution. But what is the solution, and, even if we, by some miracle, come up with the optimal solution, again, who will fund it? The group of older "used" animals are the immediate problem. Shall we euthanize them or assign them to terminal research projects to relieve some of the crowding and housing problems? Shall we leave some infants with their mothers in groups and hope by this method to produce future breeders? This would mean that production would be slowed, and thus, fewer animals would be used in biomedical research. And it *must* be faced that it is the use of the animals in research which is supporting the rest of the population. Shall we set aside a young group (thus increasing resocialization probabilities) of NANB animals and hope they will produce infants that could be tested as soon as a reliable test is available? If we do this, who will support them while we are waiting for a test? We cannot depend upon the public for support. During the controversy over the permanent home for Nim, when, due to lack of financial support, the Institute for Primate Studies in Oklahoma had to decrease its population, the Primate Foundation of Arizona received over 200 telephone calls about the animal. We attempted to educate the public that funds were needed to expand, so that more chimpanzees could be housed, and that the problem was not just Nim's, it was the problem of



hundreds of chimpanzees. As a result, the Primate Foundation received one \$10.00 donation! The outraged howl over one chimpanzee continued, but it was never backed up with funds to achieve something constructive for all.

However, now is not the time to point fingers, nor to find fault. It is the time for constructive, realistic solutions. Sadly, for many chimpanzees the problem will not be solved overnight, but the process must get started. The Interagency Primate Steering Committee's (National Institutes of Health) *ad hoc* Committee on a National Chimpanzee Plan has agonized over the problem and the possible solutions. There must be financial support for a group of breeders that are allowed to produce the breeders of the future; in other words, that are reared as naturally as is possible in captivity. The problem of the NANB carriers must be openly wrestled with. Perhaps one facility can be set aside to house these animals in social groups, at least until there is a test, or heaven help us, a cure. This, too, must have stable funding. Zoos and sanctuaries must be educated to hepatitis and to NANB hepatitis in particular and the ex-research subjects should be identified in a manner that will prevent them from "slipping" into other collections. Perhaps, it is time for the formation of a formal group that can assist in the management of the population and solicit funds on behalf of *all* captive chimpanzees.

These possible solutions must also have the verbal support of the research community, if not monetary support. The problem of animal management and over-population in captive groups, as well as populations that may not be viable, are the problems of everyone who uses or studies the animals. While most of us resent attempts to humanize our primate relatives, we must remember that it is their close likeness that got them into this predicament. We use them for that very reason and it is our use and their service that may prove to be their destruction. What *are* we going to do about it?

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"ESCAPE? HECK, NO!  
IT'S A JUNGLE OUT  
THERE!"

# Cayo Santiago, Home of the Rhesus Monkey: An Annotated Song<sup>1,2</sup>

Matt J. Kessler  
Caribbean Primate Research Center

Cayo, Cayo Santiago, home of the rhesus mon-key

Trapped in the wilderness of India  
Assembled on the loading docks of Calcutta  
After sailing 14 K with Carpenter  
They arrived in San Juan bay in De-cem-ber<sup>3</sup>

Cayo, Cayo Santiago, home of the rhesus mon-key

Consumption was the scourge of humanity  
So the monkeys were tested with P P D  
Some succumbed during the long jour-ney  
And many more died in cap-ti-vi-ty<sup>4</sup>

Cayo, Cayo Santiago, home of the rhesus mon-key

Four hundred and nine finally made it to "freedom"  
A lush little island and Tomilin to feed 'um<sup>5</sup>  
Although there were problems of disease and socialization  
The colony survived thanks to the Markle Foundation<sup>6</sup>

Cayo, Cayo Santiago, home of the rhesus mon-key

The war years were lean and so were the "chavos"<sup>7</sup>  
German U-boats sank the S S Coamo  
With severe food shortages and gasoline rationing  
Donations from the townspeople was what was happening.

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Author's address: Caribbean Primate Research Center, Box 297, Sabana Seca, Puerto Rico 00749.

<sup>1</sup> Sung to the tune of "Davy Crockett", copyright Walt Disney Productions.

<sup>2</sup> Dedicated to Richard G. Rawlins, Scientist-in-Charge, Cayo Santiago, 1976-81.

<sup>3</sup> Over 500 rhesus monkeys were trapped in the mountains near Lucknow, India, in 1937-38 by the late Dr. C. R. Carpenter. After transshipment by rail 400 miles to Calcutta, they were loaded on a steamer in September, 1938, for the 14,000 mile voyage around the Cape of Good Hope to Boston and New York City. The monkeys eventually arrived in San Juan in December, 1938, on the S. S. Coamo. They were released onto Cayo Santiago in late 1938 and January, 1939.

<sup>4</sup> Tuberculosis was an early health problem with the monkeys destined for Cayo Santiago. A number tested positive using Purified Protein Derivative (PPD) and were destroyed. Some also died of TB in the first couple of years on the island.

<sup>5</sup> M. I. Tomilin, a Russian immigrant and the subject of many tales, was hired by Carpenter from the Philadelphia Zoological Park to become the first (and only) resident caretaker on the island.

<sup>6</sup> Carpenter, through collaboration with Dr. George Bachman of the School of Tropical Medicine in San Juan (predecessor of the University of Puerto Rico, School of Medicine) and Drs. E. Engle and P. Smith of the College of Physicians and Surgeons, Columbia University, were able to secure a grant from the John and Mary Markle Foundation to fund the expedition to India and the early years at Cayo Santiago. Bachman and Carpenter had begun laying plans for the establishment of the colony as early as 1936.

<sup>7</sup> "chavos" is Spanish (slang) for money.

Cayo, Cayo Santiago, home of the rhesus mon-key

The monkeys bred so well that some had to be sold  
To universities and the army we are told  
But all wasn't good and in 1947  
They were offered free in *Science* to anyone who would have them<sup>8</sup>

Cayo, Cayo Santiago, home of the rhesus mon-key

But no one wanted Cayo's monkeys then, not even for free  
(Isn't it ironic how foolish some people can be?)  
So now after 42 years of breeding and observations  
Let's not forget to thank all of the monkeys, people and organizations<sup>9</sup>

\* \* \*

## Tool Use by a Captive Orangutan

Bokar, an adult male orangutan at the Denver Zoo, exhibited some interesting instances of tool use recently (September, 1982) when he acquired a hard-rubber toy from an adjacent enclosure. The object was hollow, shaped like and about the size of the ice cream in a large two-scoop cone. For a while Bokar walked around with it on his index finger. Then he removed it and sniffed at it while turning it around and squeezing it. After a while he sat on the floor and banged it on the concrete, open end down, so that it made a sucking noise. Later he moved to the automatic water dispenser, where he repeatedly filled it with water and drank from it. Finally, he sat down, leaned forward, and with a quick sweep of his arms gathered together in a pile some of the unshelled sunflower seeds which had been scattered over the floor of his enclosure earlier that morning. He smashed the pile with the object, then carefully picked out the shelled meats and ate them. He repeated this performance for most of the rest of the morning. The toy, somewhat damaged, has remained in his enclosure, but Bokar has not since been observed using it for either drinking or shelling seeds.—Lois Miller and Duane Quiatt, Dept. of Anthropology, University of Colorado, Denver, 1100 14th St., Denver, CO 80202.

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<sup>8</sup> *Science*, 1947, 106, 32-33.

<sup>9</sup> The population of rhesus monkeys on Cayo Santiago was 1028 on 1 July, 1982. Many hundreds of monkeys have been systematically removed from the colony over the years to supply research animals for many institutions and to serve as breeding stock for other island colonies in Puerto Rico. Scientists from around the world have collected data on this colony and contributed to our knowledge of rhesus monkey sociobiology. The Center has been blessed with a devoted technical staff who have assisted countless students of primatology over the years.

Cayo Santiago has been funded by a number of organizations: The John and Mary Markle Foundation of Columbia University as the Santiago Island Primate Colony; the Commonwealth of Puerto Rico; the former National Institute of Neurological Diseases and Blindness, National Institutes of Health, as the Primate Ecology Section of the Laboratory of Perinatal Physiology, San Juan; and presently as the Cayo Santiago station of the Caribbean Primate Research Center, University of Puerto Rico, School of Medicine under a grant (RR01293) from the Division of Research Resources, Animal Resources Branch, NIH, Bethesda, MD.

# Fyssen Foundation Fellowships and International Prize

The Fyssen Foundation's general aim is "to encourage all forms of scientific enquiry into cognitive mechanisms, including thought and reasoning, underlying animal and human behavior, into their biological and cultural bases, and into their phylogenetic and ontogenetic development".

## Fellowships

The Fyssen Foundation will award a certain number of fellowships. These fellowships are meant for the training and support of research scientists working in disciplines relevant to the aims of the Foundation such as ethology, paleontology, archaeology, anthropology, psychology, logic, and the neurosciences.

The Foundation wishes to support, more particularly, research in such fields as: *Ethology and Psychology*: Nature and development of the cognitive processes in man and animals; *Neurobiology*: Neurobiological bases of cognitive processes and of their embryonic and post-natal development, as well as the elementary mechanisms they involve; *Anthropology - Ethnology*: Study of cognitive foundations (a) of the representations of the natural and cultural development, (b) of the technical systems developed in the various forms of social organization. *Human Paleontology*: Origin and evolution of the human brain and human artifacts.

Priority will be given to French scientists wishing to work abroad and to foreign scientists wishing to work in French laboratories. Study grants will normally be granted for one year but may be extended up to three. Applications should be established according to a form to be obtained from the Foundation which will include a curriculum vitae, a list of publications of the applicant, and the names of two senior scientists whom the applicant has asked to send testimonials to the Secretariat of the Foundation by the date indicated below. Applications must be sent in 15 copies to the Secretariat of the Foundation, 194, rue de Rivoli, 75001 Paris, without fail by *April 1st, 1983*, delivery date at the Foundation.

## International Prize

A substantial International Scientific Prize (awarded in 1980 to Professor Andre Leroi-Gourhan, in 1981 to Professor William H. Thorpe, and in 1982 to Professor Vernon B. Mountcastle) shall be given for a major contribution to the progress of knowledge in the fields of research supported by the Foundation. The nominations should include a curriculum vitae of the nominee, a list of his publications, and a summary (four pages maximum) of the research work upon which the nomination is based. Nominations for the 1983 Prize of the Fyssen Foundation must be sent in 15 copies to the Secretariat of the Foundation, 194, rue de Rivoli, 75001 Paris, before *September 1st, 1983*.

\* \* \*

## New Publication Series in Animal Behavior

The State University of New York Press has initiated a new series of books and monographs dealing with animal behavior. Under the editorship of Jerram Brown, SUNY Press is soliciting book-length manuscripts, which evidence high quality scholarship. Manuscripts should represent original work of the author (or authors), not published elsewhere, and can deal with any facet of animal behavior or behavioral ecology. Manuscripts may be based upon empirical research, new interpretations of pre-existing data bases, or proceedings of conferences of topical interest. No particular themes, approaches, or viewpoints about animal behavior are prerequisites to publication. Selection of publishable manuscripts will be based on the quality of underlying scholarship, the significance of the issues addressed, and the clarity and style of the written text. All books selected for this series will be published simultaneously in hardcover and paperback. SUNY Press is a member of the Columbia University Press Sales Consortium. SUNY Press offers rapid decision-making regarding manuscript acceptance and rapid publication. All inquiries about the series and all manuscripts and book proposals should be submitted to Susan D. Suarez, Ph.D., the Editor of SUNY Press, State University Plaza, Albany, NY 12246.

## Symposium on Comparative Pathobiology of Major Age-Related Diseases

A Symposium on "Comparative Pathobiology of Major Age-Related Diseases: Current Status and Research Frontiers" will be held in Building 31, Conference Room 10, National Institutes of Health, Bethesda, MD on April 25 and 26, 1983. The Symposium is sponsored by the Registry of Comparative Pathology, Armed Forces Institute of Pathology, Washington, DC and the Universities Associated for Research and Education in Pathology, Inc., Bethesda, MD. The purpose of this Symposium is to consider basic pathobiological aspects of selected major age-related diseases as these are reflected in animals including man. These presentations will emphasize the utility of comparative pathology as an approach towards understanding diseases of aging in humans. Over 25 papers will be presented in discussing the three major topics of the Symposium: 1) Basic Aspects of Aging, 2) The Mesenchyme and Aging, and 3) The Aging Brain.

The Symposium will be open and places will be reserved for at least 100 participants. Invitations will be given on a "first come" basis. Anyone interested in attending or desiring further information should contact George Migaki, DVM, Registry of Comparative Pathology, Armed Forces Institute of Pathology, Washington, DC 20306 (202-576-2452).

\* \* \*

### 1983 Primate Pathology Workshop

The 1983 Primate Pathology Workshop will be held Sunday, February 27, 1983 at the Atlanta Hilton Hotel, Atlanta, Georgia. This is the day before the meeting of the International Academy of Pathology, scheduled for February 28 to March 4, also at the Atlanta Hilton.

A set of slides and case histories will be sent prior to the Workshop to each registrant. The registration fee of \$10 (check or money order payable to UAREP) should be sent to: George Migaki, DVM, Registry of Comparative Pathology, Washington, DC 20306 (202-576-2452). Chairman of local arrangements is Dr. Harold McClure, Yerkes Primate Research Center, Emory University, Atlanta, Georgia 30322 (404-329-7742).

\* \* \*

### IPS Conservation Awards to be Given

The Executive Committee of the International Primatological Society has proposed that the Society make a series of awards for distinguished services 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 Malagasy), Asia, South and Central America. They will be made by decision of the Executive Committee upon recommendation of the Conservation Committee of the Society, who 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 for the furtherance of similar work. A report on the use of the funds will be required. The awards must be used in the country mentioned in the award citation for the 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 of no more than two typewritten pages in length, together with a curriculum vita of the nominee may be sent to Dr. Kenneth Green, Remote Sensing Systems Laboratory, Department of Civil Engineering, University of Maryland, College Park, Maryland 20742, United States of America.



## Post-Doctoral Position in Behavioral Medicine

The Department of Comparative Medicine announces a postdoctoral position in behavioral medicine. The occupant of this position will participate in studies investigating the association between psychosocial variables and atherosclerosis in nonhuman primates. The position is sponsored through a National Research Service Award (NRSA) from NIH and annual stipends follow the NIH schedule (starting at \$13,380) and increase with years of service). Address inquiries to: Jay Kaplan, PhD, Dept. of Comparative Medicine, Bowman Gray School of Medicine, Winston-Salem, NC 27103.

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## News Briefs

### *Taub Loses Grant*

Edward Taub, who lost his appeal of his conviction of cruelty to laboratory animals, had the remainder of his research grant terminated by the National Institutes of Health. Taub, chief of the Behavioral Biology Center at the Institute for Behavioral Research (IBR) in Silver Spring, was arrested on September 11, 1981 and charged with 119 counts of cruelty to animals following a police raid on the laboratory where 17 monkeys were seized. He later was acquitted on all but six counts and then won acquittal on five of those convictions in this appeal. The lone conviction was for the failure to provide proper veterinary care for one monkey. The termination of the remainder of the grant by NIH cited four reasons for such action. They were: (1) Adequate veterinary care was not provided by the IBR facility. (2) The animal care committee at IBR was not properly constituted because it lacked the necessary expertise to provide the adequate oversight required by the NIH Guide for the Care and Use of Laboratory Animals. (3) The physical facilities for housing the monkeys did not meet the requirements of the PHS Animal Welfare Policy and the corresponding Guide. (4) IBR did not maintain an adequate occupational health program for IBR staff in compliance with the PHS Animal Welfare Policy and the corresponding Guide. In the termination notice NIH stated that IBR or Taub or both may be subject to additional sanctions and restrictions regarding future funding opportunities. [Information from *NSMR Bulletin*, 1982, 33[8], 4].

### Progress Report on Animal Welfare Bill

A senate counterpart of the Walgren Bill, under consideration in the House of Representatives (see *News Briefs* in the July and October, 1982, issues of this *Newsletter*), sponsored by Senator Robert Dole (R-KS), has been amended by the Senator so that it is now very similar to the House version. Attempts by Senator Dole and Representative Waxman (D-CA), whose House subcommittee will be reviewing and commenting on the House bill, to advance these bills during the lame duck session of Congress late last year were not successful, but the odds now seem high that some version of the bill in question will be passed by Congress.

\* \* \*

## Stumptailed Monkeys Available

Organon Scientific Development Group has a colony of about 80 stumptailed macaques (*Macaca arctoides*) for sale. The animals are living in an outdoor colony, are in excellent condition, and, except for a few animals, have not been used for pharmacological experiments. Institutions and investigators interested in this colony or in a number of animals, please write to: Mr. J. W. de Vries, S.D.G. Secretariat, P.O.B. 20, 5340 BH OSS, The Netherlands (Phone: 09-314120-62266)

## Summer Program: Field Work in Animal Behavior

The 1983 course, the fifth annual, will consist of 4 weeks of travel and study within the national parks and wildlife reserves of Kenya, East Africa. Students receive 6 quarter system hours of credit for completion of the course, which consists of lectures, discussions, observations, independent and group study, and tutoring in the field. Only 16 students will be admitted for the 1983 course, commencing in July. Early applications are recommended. Interested students are invited to contact the instructor at the following address: Dr. Terry L. Maple, School of Psychology, Georgia Institute of Technology, Atlanta, GA 30322.

\* \* \*

## Colony-Bred Cebus Available

A closed colony of *Cebus apella* which has been maintained for breeding purposes since the late 1960's is being dispersed because of a funding shortage. This colony consists of 6 breeder males, 6 breeder females, 3 unproven/immature breeder males, 7 unproven/immature breeder females, 6 juvenile females (1-2 years) and 2 juvenile males (3-4 months). These animals have been maintained in harem groupings and are extremely healthy.

*Prices are as follows:*

Proven adult breeders .....	\$400
Non-proven adults .....	\$300
Juveniles .....	\$225
Mother with nursing young .....	\$700

For additional information, interested parties should contact Dr. Gary N. Joiner, LARR Facility, Texas A&M University, College Station, TX 77843 (713-845-7433).

\* \* \*

## Upcoming Primate Meetings

Fifth annual meeting of the American Society of Primatologists, East Lansing, Michigan, August 7-10, 1983. Deadline for submission of abstracts is March 1, 1983. Abstract forms and other program information are available from the Program Chairman: Dr. David M. Taub, c/o Yemassee Primate Center, 414 New St., Beaufort, SC 29902.

\* \* \*

## Acquired Immune Deficiency Syndrome (AIDS): Precautions for Clinical and Laboratory Staffs

The etiology of the underlying immune deficiencies seen in AIDS cases is unknown. One hypothesis consistent with current observations is that a transmissible agent may be involved. If so, transmission of the agent would appear most commonly to require intimate, direct contact involving mucosal surfaces, such as sexual contact among homosexual males, or through parenteral spread, such as occurs among intravenous drug abusers and possibly hemophilia patients using Factor VIII products. Airborne spread and interpersonal spread through casual contact do not seem likely. These patterns resemble the distribution of disease and modes of spread of hepatitis B virus, and hepatitis B virus infections occur very frequently among AIDS cases.

Among the precautions recommended by the Centers for Disease Control, the following are advised for studies involving experimental animals inoculated with tissues or other potentially infectious materials from individuals with known or suspected AIDS. (1) Laboratory coats, gowns, or uniforms should be worn by personnel entering rooms housing inoculated animals. Certain nonhuman primates, such as chimpanzees, are prone to throw excreta and to spit at

attendants; personnel attending inoculated animals should wear molded surgical masks and goggles or other equipment sufficient to prevent potentially infective droplets from reaching the mucosal surfaces of their mouths, nares, and eyes. In addition, when handled, other animals may disturb excreta in their bedding. Therefore, the above precautions should be taken when handling them. (2) Personnel should wear gloves for all activities involving direct contact with experimental animals and their bedding and cages. Such manipulations should be performed carefully to minimize the creation of aerosols and droplets. (3) Necropsy of experimental animals should be conducted by personnel wearing gowns and gloves. If procedures generating aerosols are performed, masks and goggles should be worn. (4) Extraordinary care must be taken to avoid accidental punctures or cuts with sharp instruments contaminated with body fluids or tissues of experimental animals inoculated with material from AIDS patients. (5) Animal cages should be decontaminated, preferably by autoclaving, before they are cleaned and washed. (6) Only needle-locking syringes or one-piece needle-syringe units should be used to inject potentially infectious fluids into experimental animals.

The above precautions are intended to apply to both clinical and research laboratories. Biological safety cabinets and other safety equipment may not be generally available in clinical laboratories. Assistance should be sought from a microbiology laboratory, as needed, to assure containment facilities are adequate to permit laboratory tests to be conducted safely. [Based on a note in *CDC Morbidity and Mortality Weekly Report*, 1982, 31, 577-580.]

\* \* \*

## International Symposium on Laboratory Animal Science

The International Council for Laboratory Animal Science (ICLAS) will hold its 8th International Symposium and General Assembly in Vancouver, B.C., Canada, on July 31 - August 6, 1983, in conjunction with the 22nd annual convention of the Canadian Association for Laboratory Animal Science (CALAS). This meeting also has the support of the 8th District of the American Association for Laboratory Animal Science (AALAS). The Symposium theme is "The contribution of laboratory animal science to the welfare of man and animals: past, present, and future." There will be poster presentations on general or related topics. Posters will be on display during the entire meeting. Topics will include: 1. A geographic overview of laboratory animal science. The state of the art and science in ICLAS membership countries around the world. 2. The animal model in gerontological studies. 3. The development, status and future of international quality standards in laboratory animals. 4. New trends and future of biotechnology. General enquiries and mailing list: Mr. D. Jol, ICLAS/CALAS 1983, Box 286, 810 West Broadway, Vancouver, British Columbia, Canada V5Z 1J8. Telephone: (604) 291-4737 or 936-9885.

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# Directory of Graduate Programs in Primate and Primate Research

## ARIZONA

Arizona State University, Anthropology Department

**PROGRAM NAME AND/OR DESCRIPTION:** M. A. and Ph.D. in Anthropology. Within physical anthropology, specialization in primatology are available. Areas of concentration include primate social behavior and ecology, primate positional behavior and functional anatomy, and primate evolution. Facilities include a breeding colony of *Galago senegalensis*, extensive fossil casts, and a variety of specimens for dissection. Faculty interests are in relationships between social organization and ecology, infant socialization, parental behavior, functional anatomy and locomotion. Faculty also maintain an association with the Primate Foundation of Arizona, a private chimpanzee breeding colony. Research on chimpanzee social behavior, growth and development are underway.

**FACULTY AND THEIR SPECIALTIES:** Leanne T. Nash (social behavior of primates, socialization, baboons, galagos, experimental analysis of behavior); Mary W. Marzke (physical anthropology, primate anatomy, paleoanthropology, human evolution).

**FOR FURTHER INFORMATION:** Dr. Leanne T. Nash, Department of Anthropology, Arizona State University, Tempe, AZ 85287.

## CALIFORNIA

University of California, Davis, Psychology Department

**PROGRAM NAME AND/OR DESCRIPTION:** Comparative Psychology is a specialization within the Psychobiology program.

**FACULTY & THEIR SPECIALTIES:** Richard G. Coss (social and antipredator behavior, developmental neuropsychology, behavioral development, evolution); William A. Mason (primate social behavior, development, responses to stress, hormonal correlates of behavior); G. Mitchell (primate behavior, comparative psychology, sex differences); Robert M. Murphy (genetic correlates of behavior, bovid behavior, psychopathology); Donald H. Owings (antipredator behavior and communication by ground squirrels).

**FOR FURTHER INFORMATION:** Graduate Admissions, Department of Psychology, University of California, Davis, CA 95616.

University of California, Riverside, Psychology Department

**PROGRAM NAME AND/OR DESCRIPTION:** Comparative Psychology

**FACULTY AND THEIR SPECIALTIES:** L. Petrinovich (social behavior, birdsong); R. Riesen (early experience, primate neuroanatomy); R. Rhine (socioecology, primate development); P. Wilson (visual system in several mammals).

**FOR FURTHER INFORMATION:** R.J. Rhine, Psychology Department, University of California, Riverside, CA 92521.

## FLORIDA

University of Florida, Psychology Dept.

**FACULTY AND THEIR SPECIALTIES:** Marc N. Branch (behavioral pharmacology); E. F. Malagodi (experimental analysis of behavior).

**FOR FURTHER INFORMATION:** Dr. Marc N. Branch, Psychology Department, University of Florida, Gainesville, FL 32611.

## GEORGIA

Georgia Institute of Technology, School of Psychology

**PROGRAM NAME AND/OR DESCRIPTION:** Program in Experimental Psychology.

**FACULTY & THEIR SPECIALTIES:** Terry L. Maple (social and emotional development of primates; environmental psychology, aggression and conflict); J. N. Bohannon III (cognitive development; psycholinguistics); M. Jackson Marr (operant conditioning; behavioral pharmacology); Anderson D. Smith (cognitive psychology; aging and memory; primate models of memory); Larry D. Byrd (operant conditioning; behavioral pharmacology; primate behavior).

**FOR FURTHER INFORMATION:** Dr. Terry L. Maple, School of Psychology, Georgia Institute of Technology, Atlanta, GA 30332.

University of Georgia, Athens, Anthropology Department

**PROGRAM NAME AND/OR DESCRIPTION:** Graduate program in anthropology, specialty in primate behavior and evolution. M. A. program current; Ph.D. program September, 1983.

**FACULTY AND THEIR SPECIALTIES:** Dr. Carolyn L. Ehardt (primate social organization, socialization); Dr. Ben G. Blount (primate communication, socialization); Dr. Charles R. Peters (primate ecology, paleoecology).

**ADDRESS FOR FURTHER INFORMATION:** Department of Anthropology, University of Georgia, Athens, GA 30602 (404) 542-3922.

University of Georgia, Athens, Psychology Department

**PROGRAM NAME AND/OR DESCRIPTION:** Biopsychology, specialty area in primatology.

**FACULTY AND THEIR SPECIALTIES:** Irwin S. Bernstein (primate social organization).

**FOR FURTHER INFORMATION:** Dr. I. S. Bernstein, Department of Psychology, University of Georgia, Athens, GA 30602.

## ILLINOIS

University of Chicago, Depts. of Anthropology & Biology

**PROGRAM NAME AND/OR DESCRIPTION:** Doctoral programs, Committee on Evolutionary Biology, Department of Anthropology, Department of Biology.

**FACULTY AND THEIR SPECIALTIES:** Stuart Altmann (biology, evolutionary biology: behavioral ecology of primates, especially foraging); Jeanne Altmann (biology: social behavior, especially maternal behavior and infant development); Martha McClintock (evolutionary biology, human development: menstrual synchrony, pheromonal communication); Leonard Radinsky (evolutionary biology, anatomy: mammalian brain evolution); Russell Tuttle (anthropology, evolutionary biology: primate morphology, locomotion, and behavior). Russell S. Lande (evolutionary biology, biophysics & theoretical biology: population biology and evolutionary theory); Leigh Van Valen (biology, evolutionary biology: population biology and evolutionary theory); Michael J. Wade (biology, evolutionary biology: population biology and evolutionary theory).

**FOR FURTHER INFORMATION:** Any of the above at Committee on Evolutionary Biology, University of Chicago, 1103 E. 57th St., Chicago, IL 60637.

## MASSACHUSETTS

Boston University School of Medicine, Dept. of Anatomy

**PROGRAM NAME AND/OR DESCRIPTION:** Doctoral and post-doctoral training in anatomy. The Department of Anatomy offers a Ph.D. in anatomy. In addition there is an active post-doctoral training program. While a variety of species are utilized in the different anatomical research projects conducted within the department, three members of the faculty (Drs. Pandya, Raviola, and Rosene) focus their research programs almost exclusively on research problems in the primate, principally the rhesus monkey. Two other faculty members (Drs. Peters and Vogt) also have significant research interests in the primate. Other members of the department occasionally take advantage of the availability of rhesus monkeys to extend their investigations into the primate.

**FACULTY AND THEIR SPECIALTIES:** D. N. Pandya (the organization and thalamocortical relationships of the cerebral cortex of the rhesus monkey); G. Raviola (the morphology of the primate eye, including the structural basis for maintenance of the normal values of intraocular pressure); D. L. Rosene (the organization of the limbic system in the rhesus monkey, particularly the connections and histochemistry of the hippocampus and amygdala); A. Peters (the intrinsic and ultrastructural organization of area 17 of the monkey visual cortex); B. A. Vogt (the connections and receptor binding characteristics of the monkey cingulate cortex).

FOR FURTHER INFORMATION: Dr. Alan Peters, Chairman, Department of Anatomy, Boston Univ. Sch. of Med., Boston, MA 02118.

## NEW YORK

City University of New York, Anthropology Department

PROGRAM NAME AND/OR DESCRIPTION: Evolutionary primatology and biological anthropology.

FACULTY AND THEIR SPECIALTIES: Eric Delson (paleoanthropology, catarrhine primate evolution and systematics); Warren Kinzey (primate anatomy, ecology, and behavior; field studies in South America); John Oates (behavioral, ecological and evolutionary studies of tropical rainforest primates); Sara Stinson (growth and development; human ecological adaptations); Frederick S. Szalay (primate evolutionary history, with an emphasis on the fossil record); Robert DiBennardo (biometrics and human variation).

FOR FURTHER INFORMATION: Executive Officer, Ph.D. Program in Anthropology, Graduate Center, CUNY, 33 West 42 St., New York, NY 10036. 212-790-4617.

Cornell University, Ecology and Systematics Section in the Division of Biological Sciences

PROGRAM NAME AND/OR DESCRIPTION: Human Biology Program: Primate studies appear in two Sections of Cornell University's Division of Biological Sciences: (1) Section of Ecology and Systematics; (2) Section of Neurobiology and Behavior. The person who is presently in NB&B is Dr. Glenn Hausfater, and he should be asked for a description of his program. Dr. Dian Fossey was for a period of time associated with this Section as well. Both Hausfater and Fossey have conducted classes and seminars on primate behavior and have active field stations in Africa. In E & S the primate studies are in both the Human Biology Program for undergraduates and in the graduate program. There are courses and labs in comparative primate anatomy and primate evolution.

FACULTY AND THEIR SPECIALTIES: Glenn Hausfater (primate behavior, African monkeys); Dian Fossey (primate behavior, gorillas); Kenneth A. R. Kennedy (primate comparative anatomy and paleontology/evolution). We curate teaching collections and research collections of primate skeletons. There are faculty members in the Department of Psychology at Cornell University who have had research programs and teaching programs in primate studies. (The person to contact for further information is: Dr. Barbara Finlay, Dept. of Psychology, Uris Hall, Cornell University).

FOR FURTHER INFORMATION: Dr. Kenneth A. R. Kennedy, Ecology and Systematics, Division of Biological Sciences, Corson Hall, Cornell University, Ithaca, NY 14853 (607) 256-5070, Ext. 214.

## OHIO

Kent State University, Psychology Department

PROGRAM NAME AND/OR DESCRIPTION: Experimental psychology

FACULTY AND THEIR SPECIALTIES: F. Robert Treichler (primate learning and retention mechanisms; retention of concurrently learned tasks; interference effects in complex retention).

FOR FURTHER INFORMATION: Dept. of Psychology, Kent State Univ., Kent, OH 44242.

The Ohio State University, Anthropology Department

PROGRAM NAME AND/OR DESCRIPTION: Graduate work in primatology is part of the specialization of the Ph.D. program in physical anthropology. Students are expected to receive training in primate ethology, primate anatomy, primate evolution and primate conservation.

FACULTY AND THEIR SPECIALTIES: Frank E. Poirier (primate ethology, particularly socialization; conservation of endangered species; primate evolution); Paul Sciulli (primate dentition; primate evolution; primate genetics). Additionally, students are advised to take courses in the departments of psychology and zoology, both of which have faculty interested in primatology. Students have an opportunity for an internship at the Columbia Zoo, which is famous for its gorilla collection.

FOR FURTHER INFORMATION: Dr. Frank E. Poirier, Dept. of Anthropology, Lord Hall, The Ohio State Univ., Columbus, OH 43210



## PENNSYLVANIA

Bucknell Univ., Psychology Dept., Program in Animal Behavior

PROGRAM NAME AND/OR DESCRIPTION: M.A. or M.S. in Animal Behavior; M.A. or M.S. in Psychology.

FACULTY AND THEIR SPECIALTIES: Nancy G. Caine (development of social behavior and peer relationships); Douglas K. Candland (perceptual organization and kinship selection (Species: *Macaca fuscata*, *Papio hamadryas*, *Saimiri sciureus* and *Saguinus labiatus*)).

FOR FURTHER INFORMATION: Program in Animal Behavior, Bucknell University, Lewisburg, PA 17837.

University of Pennsylvania, Department of Anthropology

PROGRAM NAME AND/OR DESCRIPTION: Students may enroll for a Ph.D. in Anthropology with a specialty in Primatology. They will have an opportunity to familiarize themselves with theory and methods in Anthropology during their first year, and thereafter may specialize in the aspect of primatology that interests them. Courses in primate behavior, ecology, and anatomy are given within the Department, but students are encouraged to make use of the extensive resources available elsewhere in the University, in the Departments of Biology and Psychology, the Veterinary School, and the Medical School, as well as in the Philadelphia Academy of Natural Sciences and the Philadelphia Zoo.

FACULTY AND THEIR SPECIALTIES: Robert S. O. Harding (primate ecology and behavior, primate conservation, human evolution); Alan Mann (primate anatomy, primate paleontology, human paleontology and human evolution).

FOR FURTHER INFORMATION: Dr. Robert S. O. Harding, Department of Anthropology, University Museum F-1, University of Pennsylvania, Philadelphia, PA 19104.

## RHODE ISLAND

Brown University, Department of Psychology

PROGRAM NAME AND/OR DESCRIPTION: The Psychology Department offers a Ph.D. program in experimental psychology with the option of specializing in research with nonhuman primates, especially research on complex learning and visual information processing. There are related courses in the Linguistics and Anthropology Departments and the Division of Biology and Medicine.

FACULTY AND THEIR SPECIALTIES: Psychology Dept.: Allan M. Schrier (complex discrimination learning and visual information processing, comparative behavior).

FOR FURTHER INFORMATION: For a brochure describing the graduate program in experimental psychology write to: Mrs. Patricia Devine, Psychology Department, Brown University, Providence, RI 02912. For application forms write to the Graduate School, Brown University, Providence, RI 02912. For additional information about research programs write to Professor Schrier.

## TENNESSEE

Vanderbilt University, Depts. of Psychology & Anatomy

PROGRAM NAME AND/OR DESCRIPTION: Neurobiology and behavior program. As part of the regular Ph.D. program in psychology or anatomy, it is possible to concentrate research activities on the behavioral, anatomical, or physiological studies of the visual or somatosensory systems in tree shrews, prosimians, New World monkeys, or Old World monkeys.

FACULTY AND THEIR SPECIALTIES: V. A. Casagrande (behavior, neuroanatomy, and neurophysiology); R. Fox (behavior); J. H. Kaas (neuroanatomy, neurophysiology, and behavior); J. A. McKanna (anatomy).

FOR FURTHER INFORMATION: Jon H. Kaas, Ph.D., Dept. of Psychology, Vanderbilt University, 134 Wesley Hall, Nashville, TN 37240.

## TEXAS

University of Texas, Austin, Anthropology Dept.

PROGRAM NAME AND/OR DESCRIPTION: M. A. and Ph.D. degrees are offered in anthropology, with specialization in physical anthropology, including primate anatomy, evolution, and behavior.

**FACULTY AND THEIR SPECIALTIES:** Claud A. Bramblett (physical anthropology, primate behavior, osteology); Ellen R. Brennan (physical anthropology, demography, population genetics); Kenneth H. Jacobs (primate and hominid evolution, archeology and ethnology of gather-hunters, European prehistory, skeletal biology); Robert M. Malina (physical anthropology, child growth, human adaptability).

**FOR FURTHER INFORMATION:** Dept. of Anthropology, University of Texas, Austin, TX 78712.

## WASHINGTON

University of Washington, Department of Psychology

**PROGRAM NAME AND/OR DESCRIPTION:** The Animal Behavior Program at the University of Washington is dedicated to providing the best possible graduate training in scholarly knowledge, research techniques, theory and actual investigative work with animals both in the laboratory and in their natural habitat or zoos. The program leads to the Ph.D. in Psychology, with special training in animal behavior (including primate social behavior). It is administered by the core faculty in animal behavior, listed below. One of the great assets of the Animal Behavior Program is the interest and competence of faculty in departments other than Psychology. Cordial and cooperative relationships exist with behavior-oriented colleagues in Zoology, Sociology, Anthropology, Wildlife Science (College of Fisheries and Forest Resources), the Institute for Environmental Studies (Gordon Orians, Director) and the Regional Primate Research Center (Orville Smith, Director). Excellent relations and research potential also exist with the Woodland Park Zoo in Seattle.

**FACULTY AND THEIR SPECIALTIES:** Joan S. Lockarda (primate social behavior, human ethology, animal behavior, circadian rhythms, neurobehavior); Michael D. Beecher, (animal communication, avian sociobiology and ecology, behavior of zoo animals); Gene P. Sackett (primate development and behavior); David P. Barash (sociobiology, behavioral ecology, animal behavior and evolution); Robert C. Bolles (animal behavior, learning, and motivation); Eric A. Fischer (ethology and sociobiology, evolutionary models, ecology and behavior (particularly of marine animals)).

**FOR FURTHER INFORMATION:** Joan S. Lockard, Ph.D., Dept. of Psychology NI-25, University of Washington, Seattle, WA 98195.

Washington State University, Primate Research Center

**PROGRAM NAME AND/OR DESCRIPTION:** Primate Behavior; M.S. and Ph.D. in Psychology with an emphasis on Primate Behavior including sensory (all aspects), learning and memory, social behavior, comparative and physiological characteristics, drug aspects, sexual behavior, handling and care of primates. Courses and research opportunities in these areas.

**FACULTY AND THEIR SPECIALTIES:** Roger T. Davis (learning memory, social and aging); Joseph W. Harding (peptides and neurochemistry); George A. Leary (vision and refractive characteristics); C. W. Leathers (microbiology and pathology); John W. Wright (peptides and behavior); Francis A. Young (vision, audition, sexual behavior, breeding and care, aging, sensory effects and drug effects).

**ADDRESS FOR FURTHER INFORMATION:** Francis A. Young, Ph.D., Director, Primate Research Center, Washington State University, Pullman, WA 99164.

## WISCONSIN

University of Wisconsin, Madison, Psychology Department

**PROGRAM NAME AND/OR DESCRIPTION:** Animal Behavior Area Group. The department has an extensive program of research and training in animal behavior. The Primate Laboratory carries out research with rhesus monkeys on the development of social behavior and affectional systems, classical and operant conditioning, complex learning, animal models of psychopathology, biochemical correlates of stress and learning, psychopharmacology, hormone function, mental retardation and environmental behavioral toxicology. Additional research in these areas is conducted at the Wisconsin Regional Primate Research Center adjacent to the Primate Laboratory. The Primate Center offers an opportunity for students in Psychology to interact with scientists in other disciplines: anthropology, ecology, biochemistry, endocrinology. Facilities for research with two species of New World Primates are available in the Psychology Building. Seminars on animal learning, animal behavior, and comparative psychology including such areas as ethology, sociobiology, animal models of psychopathology, and social development are offered by the staff.

**FACULTY AND THEIR SPECIALTIES:** Robert Bowman (behavioral toxicology, biochemical bases of behavior); John Davenport (hormones and behavior, psychological stress); Robert Goy (neuroendocrinology, social and sexual development); Susan Mineka (animal models of psychopathology, phobias); Charles Snowdon (animal communication social and reproductive behavior of endangered primates); Stephen J. Suomi (primate biobehavioral development: psychophysiological, cognitive, biochemical and affective development).

**FOR FURTHER INFORMATION:** Charles Snowdon or Stephen Suomi (for program information), Jane Fox-Anderson (for applications and admissions materials), Dept. of Psychology, Charter at Johnson St., University of Wisconsin, Madison, WI 53706.

University of Wisconsin, Milwaukee, Dept. of Anthropology

**PROGRAM NAME AND/OR DESCRIPTION:** Ecology, population genetics, anatomy, and aging in primates, especially African monkeys. Electrophoretic analysis of local populations of *Cercopithecus aethiops*, *cercopithecus mitis*, and *Macaca silenus*. More than 500 embalmed and skeletonized specimens of *Cercopithecus aethiops*, *Cercopithecus ascanius*, *Cercocebus albigena*, *Papio cynocephalus*, *Saimiri sciureus*, *Cebus albifrons*, and *Saguinus nigricollis*. The Department of Anthropology has graduate programs leading to M.S. and Ph.D. degrees.

**FACULTY AND THEIR SPECIALTIES:** Neil C. Tappen (primate anatomy, ecology and evolution, structure and function of bone and muscle); Trudy R. Turner (nonhuman primate population genetics, ecology and evolution, medical genetics).

**FOR FURTHER INFORMATION:** Dept. of Anthropology, University of Wisconsin-Milwaukee, Milwaukee, WI 53201.

University of Wisconsin, Wisconsin Regional Primate Research Center

**PROGRAM NAME AND/OR DESCRIPTION:** Although the Wisconsin Primate Center offers no formal graduate program, students may conduct research at the Center by enrolling in an appropriate academic department at the University of Wisconsin-Madison and by choosing a faculty advisor with Center affiliation. Appropriate departments for graduate students hoping to do research at the Center include Psychology, Zoology, Anthropology, Physiology, Pathology, Genetics, Veterinary Science, and Meat and Animal Science, as well as such interdisciplinary programs as the Endocrinology-Reproductive Physiology Program and the Neurosciences Training Program. For information about these departments and programs, potential students should write to The Graduate School, Bascom Hall, UW-Madison, Madison, WI 53706.

**FACULTY AND THEIR SPECIALTIES:** Ph.D. level staff (\* indicates joint faculty appointment at UW-Madison). Barry Bavister\* (reproductive physiology); William Bridson\* (gonadotropic physiology); Philippa Claude (neural ultrastructure); Gary Davis (neurochemistry); Donald Dierschke\* (reproductive physiology); J. Stephen Gartlan (primate ecology); David Goldfoot (behavioral endocrinology); Robert Goy\* (behavioral endocrinology); Joseph Kemnitz (feeding and energy regulation); Jerry Robinson (reproductive endocrinology); Samuel Sholl (reproductive endocrinology); Ei Terasawa (neuroendocrinology); Hideo Uno (experimental pathology); Richard Wolf\* (reproductive physiology).

**FOR FURTHER INFORMATION:** R. W. Goy, Director, Wisconsin Primate Center, 1223 Capitol Court, Madison, WI 53715.

## ALBERTA CANADA

University of Calgary, Dept. of Anthropology

**PROGRAM NAME AND/OR DESCRIPTION:** Master of Arts in Anthropology. The department gives an M. A. in Anthropology for primatology studies (in addition to more traditional fields). The orientation is towards behavioral ecology, but studies of purely behavioral intent are acceptable. The basic program requires 3 full courses in anthropology, some research work—often field work—the preparation and defense of a thesis. Students in the department have conducted field research on howler monkeys in Mexico, on a large captive group of gorillas in England, and on gorilla mothers in various zoos.

**FACULTY AND THEIR SPECIALTIES:** James D. Paterson (behavior and ecology of New World arboreal and Old World terrestrial primates; captive gorilla studies; allometry and bioenergetics; evolutionary theory; computer modelling and data acquisition systems); Philip T. Spaulding (physiology of digestion, sexual physiology, anatomy); Usher Fleising (sociobiology, methodology).

FOR FURTHER INFORMATION: Dept. of Anthropology, University of Calgary, 2500 University Drive N.W.,  
Calgary, Alberta, Canada T2N 1N4.

## ONTARIO CANADA

University of Toronto, Dept. of Anthropology

**PROGRAM NAME AND/OR DESCRIPTION:** Primate studies are part of the program of the sub-field of Physical Anthropology. Undergraduate and graduate courses are taught in primate studies including social behavior, demography, ecology and anatomy. Ph.D. dissertations have dealt with *Macaca* spp; *Cercopithecus* and *Papio*. Graduate students follow the regular M.A. program: four courses and a comprehensive exam and specialize thereafter.

**FACULTY AND THEIR SPECIALTIES:** Frances D. Burton (primate behavior, ecology, demography; *Macaca sylvanus*; *Cercopithecus* spp.). Becky Sigmon (paleoanthropology, primate anatomy).

**FOR FURTHER INFORMATION:** F. D. Burton, Dept. of Anthropology, University of Toronto, St. George St., Toronto, Ontario, M5S 1A1.

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## On Updating of Directory of Graduate Programs in Primatology and Primate Research

Single copies of the Directory of Graduate Programs will be mailed to interested undergraduates and others on request. The Directory is stored in a computer and can be readily updated, so corrections and additions that are sent to us can be made at any time and included in the mailed version.

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## Directory of Postdoctoral Programs to be Published

The Directory of Graduate Programs in Primatology and Primate Research, published in this issue of the *Newsletter*, deals with graduate programs. A number of questionnaires returned to us in connection with the preparation of that Directory described postdoctoral programs and, hence, have not been included. We have decided to publish these descriptions separately in the April issue of the *Newsletter*. Additional descriptions of postdoctoral programs are welcome. These should be typed, in the format of the graduate Programs Directory.

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## Recent Books and Articles

(Addresses are those of first authors)

### Books

*Mammal Species of the World: A Taxonomic and Geographic Reference.* James. H. Honacki, Kenneth E. Kinman, & James W. Koepl (Eds.). Lawrence, Kansas: Allen Press and The Association of Systematics Collections, 1982. 694 pp. [Price: \$55. (\$44. for members of American Society of Mammalogists)] (Order from: Mammal Species of the World, PO Box 368, Lawrence, KS 66044)

This book was compiled for the Parties to CITES as a standard reference to mammalian nomenclature with scientific advice from members of the American Society of Mammalogists and its Checklist Committee. A comprehensive listing by scientific name only of all the mammal species in the world. Each listing includes the original citation of the species in the biological literature, information on taxonomic relationships, and its distribution in the world.

*The Primates of Madagascar.* Ian Tattersall. New York: Columbia University Press, 1982. 382 pp. [Price: \$40.]

The purpose of this book is to provide a comprehensive description of the biology of lemurs. Beginning with a history of lemur studies, there is an environmental account of Madagascar and its geological evolution. The sites that have yielded subfossil lemurs, the morphology of the subfossils, and their relationships to the surviving lemur fauna are discussed. A description of the living species of lemurs includes cytogenic and biochemical data, geographical and ecological distributions, morphological characteristics, and their ecology and behavior. The book concludes with an examination of the remaining lemur population and its prospects for survival. Contents: 1. THE HISTORICAL BACKGROUND. 2. MADAGASCAR: THE ENVIRONMENTAL BACKGROUND. Geology and topography. Climate. Vegetation. 3. THE LIVING SPECIES OF MALAGASY PRIMATES. Family Lemuridae. Family Lepilemuridae. Family Indriidae. Family Daubentoniidae. Family Cheirogaleidae. 4. MORPHOLOGY AND ADAPTATION. Cranial and mandibular morphology. The dentition. The brain and cranial sensory organs. Learning and intelligence. Locomotion and the locomotor apparatus. The digestive system. Thermoregulation. Reproduction. Blood proteins and general hematology. 5. THE SUBFOSSIL LEMURS. The subfossil sites. The extinct lemurs. Extinction of the subfossil lemurs. 6. PHYLOGENY AND CLASSIFICATION. Evolutionary relationships. Classification. 7. BEHAVIOR AND ECOLOGY. Activity patterns. Social organization. Ranges and population densities. Diet and feeding behavior. Use of the vertical habitat. Social behavior. 8. RETROSPECT AND PROSPECT.

*Child Nurturance.* Vol. 3. *Studies of development in nonhuman primates.* Hiram E. Fitzgerald, John A. Mullins, & Patricia Gage (Eds.). New York: Plenum, 1982. 274 pp. [Price: \$29.50]

Contents: PART I. MALNUTRITION AND DEVELOPMENTAL OUTCOME. Protein deprivation and offspring behavior, by A. J. Riopelle. PART II. PARENTAL AND OTHER SOCIAL INFLUENCES ON PRIMATE DEVELOPMENT. Mother-infant relationships in non-human primates, by L. T. Nash & R. L. Wheeler; Paternal behavior in primates, by C. T. Snowdon & S. J. Suomi; Infant separation in monkeys: Studies on social figures other than the mother, by J. L. Vogt & M. B. Hennessy. PART III. CONTEXTUAL AND SOCIAL ASPECTS OF LANGUAGE DEVELOPMENT. A pragmatic approach to chimpanzee language studies, by S. Savage-Rumbaugh; Cultural transmission of a human language in a chimpanzee mother-infant relationship, by R. S. Fouts, A. D. Hirsch, & D. H. Fouts. PART IV: BIOSOCIAL ASPECTS OF BEHAVIORAL DEVELOPMENT. Depression and helplessness in primates, by S. Mineka; The origins of aggression, by K. E. Moyer.

*The Social Life of Monkeys and Apes* (2nd ed.). S. Zuckerman. London: Routledge & Kegan Paul, 1981. (First published in 1932.) 511 pp. [Price: \$55.]

In this second edition, the original book is reprinted, along with a number of the author's later articles on topics first

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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.



explored in the book. Contents: PART I. THE SOCIAL LIFE OF MONKEYS AND APES. I. Human sociology and the sub-human primates. II. Mammalian sociology. III. Sexual periodicity. IV. The breeding season and society. V. The physiology of the reproductive processes of mammals other than primates. VI. The general character of the menstrual cycle. VII. The morphology, physiology, and interpretation of the menstrual cycle. VIII. The oestrous cycle and behaviour. IX. The menstrual cycle and behaviour. X. The individual within the group. XI. Apes and monkeys in the Wild: General. XII. Baboons in South Africa. XIII. The social groups of wild apes and monkeys. XIV. The hamadryas baboon colony. XV. Dominance and the liberation of sexual responses. XVI. The communal life of the baboon. XVII. The development of social and sexual responses. XVIII. Altruism and society. XIX. The social scale. Bibliography. PART II. POSTSCRIPT AND APPENDICES TO THE SECOND EDITION. POSTSCRIPT. APPENDICES. 1. Biological basis of the sense of property. 2. The biological background of human social behaviour. 3. Extract from *Functional Affinities of Man, Monkeys and Apes*. 4. The evolution of the human family and social group. 5a. Review of *The social organization of hamadryas baboons*. 5b. Review of *The social organization of sub-human primates*. 5c. Review of *The mountain gorilla*. 6. Review of *My friends the baboons*. 7. Review of *On aggression and Civilized man's eight deadly sins*.

*The human primates*. Richard Passingham. San Francisco: Freeman, 1982. Soft cover. 390 pp. [Price: \$7.50]

The purpose of this book, written for students, is to provide an account of what can be learned about human behavior by studying that of nonhuman primates. Contents: OTHER PRIMATES. 1. Relatives. ANATOMY. 2. Senses. 3. Limbs. 4. Brain. ABILITIES. 5. Intelligence. 6. Technology. 7. Culture. 8. Language. SOCIAL ORDER. 9. Family. 10. Competition. CONCLUSION.

### Bibliographies

*PIC indexing vocabulary alphabet list and hierarchal list*. Maryeva W. Terry, Ed. Seattle: Primate Information Center, 1982. 158 pp. [Price: \$10. Send orders to: Primate Information Center, Regional Primate Research Center SJ-50, University of Washington, Seattle, WA 98195]

*Adolescent behavior in nonhuman primates: A bibliography*. Jean Balch Williams. Seattle: Primate Information Center, 1982. 162 Citations with Primate Index. [Price: \$6. Ordering information same as in previous reference.]

*Responses of nonhuman primates to injured, ill or dead conspecifics: A bibliography*. Jean Balch Williams. Seattle: Primate Information Center, 1982. 123 Citations with Primate Index. [Price: \$5. Ordering information same as in previous reference.]

*Behavioral observations of feral gorillas: A bibliography*. Jean Balch Williams. Seattle: Primate Information Center, 1982. 104 Citations with Species Index. [Price: \$5. Ordering information same as in previous reference.]

*Behavioral observations of feral and free-ranging orang utans (Pongo pygmaeus): A bibliography*. Jean Balch Williams. Seattle: Primate Information Center, 1982. 63 Citations. [Price: \$5. Ordering information same as in previous reference.]

*Behavioral observations of feral colobus monkeys: A bibliography*. Jean Balch Williams. Seattle: Primate Information Center, 1982. 123 Citations with Primate Index. [Price: \$5. Ordering information same as in previous reference.]

*Intergroup migration of nonhuman primates: A bibliography*. Jean Balch Williams. Seattle: Primate Information Center, 1982. 226 Citations with Primate Index. [Price: \$6. Ordering information same as in previous reference.]

### Disease

Herpesviruses of nonhuman primates: Their significance. Kalter, S. S. (Dept. of Micro. & Inf. Dis., Southwest Fdn. for Res. & Ed., PO Box 28147, San Antonio, TX 78284) *Microbiologica*, 1982, 5, 149-159.

A brief review of the present state of knowledge concerning herpesviruses of nonhuman primates.



Evaluation of a killed rabies vaccine for rhesus monkeys (*Macaca mulatta*). Kessler, M. J., Summer, J. W., & Baer, G. M. (Caribbean Primate Res. Ctr., PO Box 1053, Sabana Seca, PR 00749) *Journal of Zoo Animal Medicine*, 1982, 13, 74-77.

A number of large outdoor breeding colonies of nonhuman primates have been established in areas where monkeys may be exposed to rabid wildlife such as raccoons, skunks, foxes, bats, and mongooses, or to rabid stray dogs. Naturally-occurring rabies is rarely reported in nonhuman primates, but their inquisitive nature may easily provoke an attack by a rabid animal. The authors reported that two 1.0 cc intramuscular doses of a commercially available killed suckling-mouse-brain (SMB) vaccine licensed for veterinary use in domestic animals was effective in producing consistently high antibody titers to rabies virus in rhesus monkeys.

Herpesviral pneumonia and septicemia in two infant gelada baboons (*Theropithecus gelada*). Ochoa, R., Henk, W. G., Confer, A. W., & Pirie, G. S. (Upjohn Co., Kalamazoo, MI 49001) *Journal of Medical Primatology*, 1982, 11, 52-58.

Pneumonic and septicemic lesions in two *Theropithecus gelada* newborns were ultrastructurally diagnosed as due to herpesvirus. This report underlines the need to differentiate herpesviral from adenoviral pneumonias and is the first report in zoo-born *T. gelada*.

Mycoplasma colonization in primate animal laboratories. Khatamee, M. A. (877 Park Av., NY, NY 10021) *International Journal of Gynaecology and Obstetrics*, 1982, 20, 245-249.

The role of bacterial and protozoal infections in reproductive failure and fetal loss has been difficult to establish in humans. This study was done in 78 female primates (chimpanzees, gibbons, baboons, rhesus monkeys, and cynomolgus monkeys) to determine if ureaplasma urealyticum was present. The highest overall incidence of positive cultures (36.4%) occurred among the chimpanzees, who also had the highest number of breeders (i.e., sexually active females.) This suggests that the organisms may be transmitted sexually. An opportunity is now available to study the role of ureaplasma urealyticum in reproductive problems, to determine the exact nature of its pathogenicity.

Nasal and cutaneous anatrachosomiasis in the free-ranging rhesus monkeys (*Macaca mulatta*) of Cayo Santiago. Kessler, M. J. (Caribbean Primate Res. Ctr., PO Box 1053, Sabana Seca, PR 00749) *American Journal of Primatology*, 1982, 3, 55-60.

129 free-ranging rhesus monkeys on the island of Cayo Santiago were surveyed for the nematode *Anatrachosoma cutaneum*. The average prevalence of the nasal form was 23.2%. Adults were more commonly affected than yearling monkeys with 31.2% and 12.8% parasitized, respectively. Newborn infants were negative. No cases of the cutaneous form were identified. Further studies are necessary to establish how anatrachosomiasis has persisted for over 40 years in this colony.

Disseminated strongyloidiasis in *Erythrocebus patas*. Harper, J. S., III, Rice, J. M., London, W. T., Sly, D. L., & Middleton, C. (NINCDS Bldg. 36, Bethesda, MD 20205) *American Journal of Primatology*, 1982, 3, 89-98.

5 fatal cases of disseminated strongyloidiasis were identified in *Erythrocebus patas* caged singly or in groups of 2 to 4 in an indoor research facility. This is the first report of fatal hyperinfective strongyloides infection in a species other than great apes and man. Severe pulmonary hemorrhage, duodenitis, and proximal colitis with microscopically demonstrable larvae in affected tissues were the key necropsy findings. *E. patas* is an available, suitable model for the study of disseminated strongyloidiasis.

Clinical hematology of the common marmoset *Callithrix jacchus*. Hawkey, C. M., Hart, M. G., & Jones, D. M. (Inst. of Zool., Zool. Soc. of London, Regent's Park, London, NW1 4RY, England) *American Journal of Primatology*, 1982, 3, 179-199.

Hematological studies have been carried out on a group of 96 common marmosets (*Callithrix jacchus*) on which full clinical histories were available. The group included both healthy and sick animals. Reference values for red-cell, white-cell, and platelet counts; hemoglobin levels; packed cell volumes; red- and white-cell absolute values; reticulocyte counts; and fibrinogen levels were calculated from results obtained in 43 clinically normal individuals. These reference values have been used to identify hematological abnormalities in sick animals so that relationships between the blood picture and the clinical findings could be defined. Leucopenia, raised platelet counts, and high fibrinogen levels were found in animals with bacterial infections and carried poor prognosis. Heinz bodies occurred in a significant number of the group as a whole, and were associated with a variety of hematological and clinical abnormalities. These findings illustrate the diagnostic and prognostic value of clinical hematology in *C. jacchus*.

A fatal epizootic of undetermined etiology in New World monkeys. Kessler, M. J., Brown, R. J., Kalter, S. S., & Altman, N. H. (Caribbean Prim. Res. Ctr., PO Box 1053, Sabana Seca, PR 00749) *American Journal of Primatology*, 1982, 3, 253-261.

A peracute epizootic disease, strikingly characterized by profuse terminal hemorrhaging from the lungs, caused the deaths of 104 squirrel monkeys and 3 capuchin monkeys over a 22-month period. The case fatality rate was 100%. The pulmonary hemorrhaging was often accompanied by pulmonary edema and congestion, interstitial pneumonia and hydrothorax. Additional histologic lesions included interstitial nephritis, hepatitis and hepatic necrosis, adrenitis and adrenal necrosis, myocarditis, splenic atrophy or hypoplasia, pancreatitis and pancreatic necrosis, sialoadenitis, and encephalitis. Macaques maintained under identical conditions were clinically unaffected by the epizootic. Due to the association of the disease outbreak with abundant rodent and cockroach populations, and because the histologic features of the disease were suggestive of a viral etiology, encephalomyocarditis virus infection was implicated. However, a variety of tests all failed to reveal the causative agent, to provide a definitive diagnosis, or to reproduce the disease.

A five-year study of tetanus in the Cayo Santiago rhesus monkey colony: Behavioral description and epizootiology. Rawlins, R. G., & Kessler, M. J. (Address same as above.) *American Journal of Primatology*, 1982, 3, 23-39.

Tetanus is a major cause of death in the free-ranging rhesus monkey colony on the island of Cayo Santiago, Puerto Rico. During the 5 yr period of observation, the mean annual tetanus mortality rate was 1.74%. The mean annual total mortality rate was 6.77%. The tetanus mortality rate varied among the 6 troops on the island. Clinically confirmed tetanus accounted for 24.68% of the 231 deaths which occurred on the island during the study. Of the 67 confirmed tetanus cases, 57 proved fatal. Infection of juveniles and adults of both sexes occurred chiefly through septic wounds. The peak incidence of tetanus deaths for both sexes occurred during the mating season of the annual reproduction cycle, as a consequence of increased levels of aggression and subsequent wounding. The diagnosis of tetanus was based solely on clinical signs. The course of the disease in fatal cases ranged in duration from 24 hr to 10 days. Survivors did not have demonstrable antitoxin titers to *Clostridium tetani* toxin, thus confirming that tetanus is a nonimmunizing disease. An immunization program had no significant effect on either the total or tetanus mortality rates during the study.

## Physiology and Behavior

Growth and developmental body composition of the cebus monkey (*Cebus albifrons*). Ausman, L. M., Powell, E. M., Mercado, D. L., Samonds, K. W., Lozy, M., & Gallina, D. L. (Dept. of Nutrition, Harvard Sch. of Pub. Hlth., 665 Huntington Av., Boston, MA 02115) *American Journal of Primatology*, 1982, 3, 211-227.

The carcasses of 37 *Cebus albifrons*, Colombia (19 male, 17 female, 1 unknown) with ages ranging from premature stillborn to 8 yr were analyzed for body composition. The absolute content of water, protein, fat, and ash were determined by standard techniques and were analyzed as functions of carcass weight and age. It was calculated that chemical maturity, with regard to water and protein, probably occurred by 8 wk of age. Longitudinal growth data from 89 male and 76 female *C. albifrons*, born and reared in the departmental breeding colony, were obtained over 12 yr. An exponential equation relating body weight to age described the pattern of growth for the first 2 yr of life; thereafter, the pattern was more varied as the animals approached and reached sexual maturity.

A vocabulary of abnormal behaviors in restrictively reared chimpanzees. Walsh, S., Bramblett, C. A., & Alford, P. L. (Patricia L. Alford, D.V.M., Univ. of Texas System Cancer Ctr., Vet. Res. Div., Science Park, Rt. 2, Box 151-B1, Bastrop, TX 78602) *American Journal of Primatology*, 1982, 3, 315-319.

The purpose of this paper is to establish a vocabulary for the systematic documentation of abnormal behavior in restrictively reared chimpanzees. Such a vocabulary facilitates communication regarding the range of behavior patterns indicative of psychopathology. The behavior of restrictively reared chimpanzees was observed and descriptive statistics on abnormal behaviors are presented. Succinct descriptive terminology is developed to aid in documentation of the range of abnormal behavior observed in restrictively reared chimpanzees. Such documentation is the first step in monitoring and evaluating a rehabilitation program.

## Facilities, Care, and Breeding

Use of genetic markers in the colony management of nonhuman primates: A review. Smith, D. G. (Dept. of Anthropology, Univ. of Calif., Davis, CA 95616) *Laboratory Animal Science*, 1982, 32, 540-546.

Genetic markers in blood were used to identify paternity and reconstruct genealogical relationships in six captive breeding groups of rhesus monkeys (*Macaca mulatta*) using paternity exclusion analysis. The theoretical and observed incidence of inbreeding and its deleterious effects were discussed and colony management alternatives proposed for minimizing these effects. Genetic markers for disorders and both desirable and undesirable phenotypic characteristics have been sought so as to maximize the reproductive success and vitality of the colony by selective breeding. A sound genetic component such as that described here is a necessary adjunct to any successful long-term program for breeding nonhuman primates.

Inbreeding in three captive groups of rhesus monkeys. Smith, D. G. (Address same as above) *American Journal of Physical Anthropology*, 1982, 58, 447-451.

Using electrophoretic and serological genetic markers each of 17 potentially inbred matings in 3 groups of rhesus monkeys could be classified as either inbred or noninbred matings. Although 9 of these 17 matings involved either father-daughter or paternal half-sib matings, only 7.4 were expected by chance alone. At least 2, and possibly as many as 3, of the 9 cases of inbreeding involved father-daughter matings. Thus, no evidence of avoidance of inbreeding was observed in the closed captive groups of rhesus monkeys studied. Colony management policies must be developed to minimize the opportunity for or the deleterious effects of both father-daughter and half-sib matings. Furthermore, kin selection theory should consider why kin recognition, if it occurs, does not lead to avoidance of inbreeding.

Effects of inbreeding on infant mortality in captive primates. Ralls, K., & Ballou, J. (Dept. of Zool. Res., Nat. Zool. Park, Smithsonian Inst., Washington, DC 20008) *International Journal of Primatology*, 1982, 3, 491-505.

Breeding records for 16 primate colonies representing 6 families and both suborders were examined. Inbreeding coefficients relative to the founding population were calculated for each individual born. Infant mortality was defined as all deaths prior to the age of 6 mo. Infant mortality of "inbred" young was higher than that of "noninbred" young in 15 of the 16 colonies surveyed. The higher mortality rate of the inbred young was significant in 5 of the individual colonies: *Lemur fulvus*, *Saguinus fuscicollis illigeri*, *S. fuscicollis*, *Leontopithecus rosalia*, and *Mandrillus sphinx*.

Reproduction, infant survival and productivity of a colony of common marmosets (*Callithrix jacchus jacchus*). Poole, T. B., & Evans, R. G. (Dept. of Zoology, Univ. Coll. of Wales, Penglais, Aberystwyth, Dyfed, SY23, 3DA, U.K.) *Laboratory Animals*, 1982, 16, 88-97.

Starting with 4 pairs of marmosets, 204 young were successfully reared during 6 yrs. They were kept in family groups of 2-10. Litter size varied: singletons (2%), twins (35%), triplets (55%), and quadruplets (8%). The mean annual increase of weaned young was 3.24 per pair. The median interbirth interval was 154 days. Of 46 pairs of marmosets, 8 failed to produce young. Approximately 11% of young born were stillborn and a further 32% of all young born died within 3 wk; perinatal mortality is largely a result of the failure of parents to rear more than 2 young. Females did not accept and rear the young after Caesarian sections. The data from 4 marmoset colonies are compared and the relative efficiency of breeding methods discussed.

Chimpanzee holding, rehabilitation and breeding: Facilities design and colony management. Riddle, K. E., Keeling, M. E., Alford, P. L., & Beck, T. F. (Univ. of Texas System Cancer Ctr. Sci. Park, Vet. Res. Div., Rte. 2, Box 151-B1, Bastrop, TX 78602) *Laboratory Animal Science*, 1982, 32, 525-533.

A multipurpose chimpanzee facility was designed and constructed in Bastrop, Texas to provide the unique housing requirements of rehabilitating laboratory-raised, behaviorally-deficient chimpanzees. The housing complex provided quarantine facilities, single or group housing for long-term holding, and semi-free-ranging compounds for established breeding groups. The facilities were designed to accommodate 170 animals of diverse ages and group configurations. Reproductive performance of the chimpanzees resulted in the production of 0.41 live infants per adult female year. Information is also given on the care, diet, maintenance, health status, handling, and rehabilitation of the chimpanzee. Development of this facility has made it practical to house large numbers of chimpanzees economically and conveniently in an enriched environment which promotes breeding and contributes to the survival of this irreplaceable animal model.

Reproductive behavior in *Varecia variegata*. Foerg, R. (Duke Univ. Prim. Ctr., 3705 Erwin Rd., Durham, NC 27705) *Folia Primatologica*, 1982, 38, 108-121.

Reproductive behavior, sexual behavior, and aggression related to mating were observed in several different groups of captive lemurs (*Varecia variegata*) during a period of 4 breeding seasons. Vaginal smears were taken regularly from all subadult and adult females throughout their reproductive cycles. The testicle size of all subadult and adult males was measured periodically over the study period.

Reproduction in *Cheirogaleus medius*. Foerg, R. (Duke Univ. Prim. Ctr., 3705 Erwin Rd., Durham, NC 27705). *Folia Primatologica*, 1982, 39, 49-62.

The reproductive behavior of 20 captive dwarf lemurs (*Cheirogaleus medius*) was studied over 2 breeding seasons in 1980 and 1981. Seasonality, estrous cycle, sexual behavior, sexual maturity, and postpartum estrus are described. Reproduction of the different species of the family Cheirogaleidae as well as that of the Galaginae and Lemuridae is compared.

Fecundity in the captive howler monkey, *Alouatta caraya*. Shoemaker, A. H. (Riverbanks Zool. Park, Columbia, SC 29210. *Zoo Biology*, 1982, 1, 149-156.

7 female black howler monkeys from both wild- and captive-born origins have reproduced at Riverbanks Zoological Park. 3 of the 5 wild-born females arrived as juveniles and grew to maturity; the other 2 were already mature upon arrival and reproduced shortly thereafter. 2 females which were born within the park's collection have since reached maturity and also reproduced. The interval between the first and second young of wild-born howlers is longer than between subsequent birth intervals. Subsequent young are also more precocious than their preceding siblings. Females born in captivity conceived when 42 and 35 months old, the former situation being linked to low social status. Seasonality of birth does not appear to be a factor in howler monkey reproduction.

Temporal relationship of hormonal peaks to ovulation and sex skin deturgescence in the baboon. Shaikh, A. A., Celaya, C. L., Gomez, I., & Shaikh, S. A. (Dept. of Vet. Physiol. & Pharm., Coll. of Vet. Med., Texas A&M Univ., College Station, TX 77843) *Primates*, 1982, 23, 444-452.

The purpose of this study was to determine the temporal relationship of peak levels of oestradiol ( $E_2$ ), LH and progesterone to ovulation and sex skin deturgescence in the baboon. A total of 55 baboons were used in these studies. Hormonal levels were measured in 47 cycles and ovulation was documented by laparoscopic examination in 26 of these cycles. A temporal relationship of ovulation to sex skin deturgescence was established in 57 cycles. The mean interval from  $E_2$  peak to ovulation was 41.4 hr, the interval from  $E_2$  peak to LH peak was 17.3 hr, and that from LH peak to ovulation was 18.4 hr. 11 baboons showed an LH peak on the day of the  $E_2$  peak. The number of days to the first sign of sex skin deturgescence after ovulation was  $2.07 \pm 0.14$  days. 19 cycles (33.3%) showed sex skin deturgescence 1 day after ovulation, another 19 cycles showed sex skin deturgescence 2 days after ovulation, and only 13 cycles (22.8%) showed sex skin deturgescence 3 days after ovulation. Sex skin deturgescence was observed on day 0, 4 or 5 postovulation in only 2 baboons.

A review of artificial methods of breeding in captive wild species. Seager, S. W. J. (Dept. of Vet. Physiol. & Pharm., Coll. of Vet. Med., Texas A&M Univ., College Station, TX 77843) *The Dodo, Journal of the Jersey Wildlife Preservation Trust*, 1981, 18, 79-83.

Artificial insemination would help eliminate the complicated legal procedures, difficulty, expense and danger in shipment of animals involved in breeding loans, improve blood lines and possibly eliminate undesirable genetic traits by means of securing superior sires. While many of our dreams have yet to be realized in the full utilization of these techniques in captive wild animal breeding, much of the ground work and the techniques have been perfected by the domestic industry. It requires energy, funds, manpower and cooperation of the many zoos in order to adapt and utilize these techniques.

A summary of gorilla breeding in the British Isles. Mallinson, J. J. C. (Jersey Wildlife Preservation Trust, Jersey, Channel Islands) *The Dodo, Journal of the Jersey Wildlife Preservation Trust*, 1981, 18, 44-51.

Based on the average population growth in the International Studbook for Gorillas by Kirchshofer (1979), it is estimated that by 1982, approximately 160 individuals of the captive population will be captive bred, and that over 200 full term pregnancies will have been recorded, all of these births having taken place within the last 25 years. The total captive population could be in excess of 650 individuals. Dixon (1981) focuses attention on the fact that if



zoos cooperate with each other, the present captive population of the Western lowland gorilla *Gorilla g. gorilla* should be adequate for captive breeding programs and it is unnecessary, as well as undesirable, to obtain further stocks from the wild. During the last decade, there has been great progress in the amount of cooperation between zoo directors and zoological institutions, which has as a consequence resulted in the establishment of a number of cooperative breeding programs, an increased amount of movement of specimens from one collection to another, and a fuller utilization of the available gene pools.

Comparison of behaviour between 2 subspecies of owl monkey (*Aotus trivirgatus*) in a laboratory environment. Jones, A. C., & Simpson, J. S. (Div. of Res. Support, Letterman Army Inst. of Res., Presidio of San Francisco, CA 94129) *Laboratory Animals*, 1982, 16, 274-277.

To evaluate potential factors affecting differences in reproductive performance, 6 monkeys of Colombian and 6 of Bolivian origin, housed as mated pairs, were observed via closed circuit television and a remote-controlled camera. Behavioral differences in feeding and drinking, locomotor activity, environmental interaction, positive social interaction, autogrooming, nestbox occupancy, and playing were observed. The differences noted indicate that the subspecies may have different social structures.

Variations in fecundity with age and environment in olive baboons (*Papio anubis*). Strum, S. C., & Western, J. D. (Dept. of Anthropology, Univ. of California, San Diego, La Jolla, CA 92093) *American Journal of Primatology*, 1982, 3, 61-76.

10 yr of reproductive data on a troop of savanna baboons demonstrated that females had an age-specific fecundity pattern similar to that of other mammals. Average yearly fecundity has also varied over the period of study and can be explained by variations in food abundance with interspecific competition from ungulate competitors, rather than by female age structure or density-dependent factors. The implications of age-specific fecundity for primate ecology, behavior, reproduction, and life-history strategies are discussed. The need to consider primate ecology within a broader community framework which includes human activity is also considered.

### Ecology and Field Studies

Mammals of Saudi Arabia. Primates: A survey of hamadryas baboons in Saudi Arabia. Kummer, H., Banaja, A. A., Abo-Khatwa, A. N., & Ghandour, A. M. (Zoologisches Institut, Birchstrasse 95, 8050 Zurich, Switzerland) *Fauna of Saudi Arabia*, 1981, 3, 441-471.

The behavior and ecology of *Papio hamadryas* were surveyed at 4 sites between Taif and Abha. External appearance and motor patterns of these populations are very similar to those studied in Ethiopia and do not justify a separate subspecies. The Arabian baboons showed much less geographical variation in appearance than did the Ethiopian samples over a comparable distance. The evidence indicates the same polygynous social structure as that found in the Ethiopian hamadryas. However, the Saudi Arabian populations have a higher female to male adult ratio. Greater tolerances among males and a tendency for more antagonism among females suggest that the choosing of males by females may be more important in the formation of family units than male competition for females, as compared with some of the Ethiopian samples. Saudi Arabian baboons were less strict in selecting inaccessible cliffs for the night, which might be a response to lower predator pressure than in the Ethiopian samples.

Survey and census of howler monkeys (*Alouatta palliata*) in the rain forest of "Los Tuxtlas," Veracruz, Mexico. Estrada, A. (Estación de Biología Tropical, "Los Tuxtlas," Apartado Postal 94, San Adre s Tuxtla, Veracruz, M xico) *American Journal of Primatology*, 1982, 2, 363-372.

Howler monkey troops were censused at the biological reserve "Los Tuxtlas" in Veracruz, Mexico. The reserve includes 700 ha of rain forest. Censuses were conducted for a period of 26 mo, and they indicated the existence of 17 troops. The mean troop size was 9.12, and mean troop composition was 3.0 adult males, 4.12 females, 1.56 juveniles, and 1.54 infants. No discrete seasonality in births was noted. The population parameters fall within those reported for *Alouatta palliata* at other sites.

In search of rare forest primates in Nigeria. Oates, J. F. (Dept. of Anthropology, Hunter Coll. of CUNY, 695 Park Av., New York, NY 10021.) *Oryx*, 1982, 16, 431-436.

When the author visited Nigeria in 1981 to look at forests on the lower Niger, there had been no reports for 15 yr of the red-bellied guenon *Cercopithecus erythrogaster*, and only a single specimen of the olive colobus *Procolobus*

*verus* was known from the country. He found surviving populations of both monkeys, but each is threatened by widespread, intensive hunting, and by habitat destruction. If effective measures are not taken to protect the guenon and its rain-forest habitat, this species could become extinct, since it occurs only in southwestern Nigeria.

### Taxonomy

Genetic differentiation among three genera of family cercopithecidae. Kawamoto, Y., Shotake, T., & Nozawa, K. (Dept. of Variation Res., Prim. Res. Inst., Kyoto Univ., Imugama, Aichi, 484 Japan) *Primates*, 1982, 23, 272-286.

The degree of genetic differentiation among 3 genera of cercopithecines, *Macaca*, *Papio* and *Cercopithecus*, was quantified by the electrophoretic analyses of blood protein variations controlled by 29 genetic loci. The estimates of Nei's standard genetic distance between the pair of species belonging to different genera were in a range of 0.48-0.90. It was found that the degree of genetic differentiation between different genera of cercopithecines was comparable to those between congeneric species of other animal groups. This work failed, however, to determine definitely the branching order of the lineages of the 3 genera.

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