Do Chimpanzees Survive the 21st Century?

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Chimpanzees Teach Us Man's Place in Nature

Forty years of field work and twice as many years of captive study in this century have produced rich evidence that chimpanzees share most, if not all, of the characteristics that were considered unique to human beings. The evidence consists of social units comparable in size to the bands of human hunter/gatherers, fission-fusion grouping patterns, male philopatry or female transfer systems, altruistic behavior such as the adoption of orphans, and dominance hierarchies accompanied by coalitions and ostracism. Chimpanzee unit groups are not only antagonistic to each other, but also even engage in war-like raids. These traits remind us of human society.

Chimpanzees are excellent mind-readers and experts in social awareness. They tease, console, and reconcile. Chimpanzees can conceal their intentions and information, when broadcasting this is not to their advantage. Chimpanzees understand multiple relationships, not only between themselves and others, but also those between third parties. They even manipulate the social relationships of others to their own advantage. There is also plenty evidence of high nonsocial cognitive abilities, such as complex tool-using patterns.

Current Conservation Status of Chimpanzees in the Wild—An Overview

Chimpanzees have very slow intrinsic population growth in the wild. According to the reproductive data from Mahale, the median age of chimpanzees at first birth is 14, their age of last birth of viable offspring is 35, and the median inter-birth-interval is as long as 6 years when the previous offspring is weaned. As a result, the median number of offspring that reaches adulthood is 2. Mahale is not an exception. Reproductive profiles of wild chimpanzees are broadly similar, although the female reproductive rate is influenced to some extent by the quality of the habitat (Wallis 1997).

1. Distribution

Chimpanzees are critically endangered species. According to Peterson and Goodall (1993), twenty-five African countries had chimpanzee populations until recently (Table 1). In three of these range countries, namely, Benin, Burkina Faso and Gambia, chimpanzees were extinct by 1990. However, chimpanzees have been reintroduced into a Gambian National Park (River Gambia National Park). Chimpanzees were also listed as extinct in Togo by Peterson and Goodall, but according to WCMC (the World Conservation Monitoring Center), they are present in Togo in the Parc National de Fazao-Malfakassa.

We only have a very rough estimate of the number of wild chimpanzees—around 200,000. The current population density of wild chimpanzees is extremely concentrated in a few countries (Fig. 1). Two countries, Democratic Republic of Congo (DRC, hereafter) and Gabon, are responsible for seventy-seven percent of the total estimated population. However, this estimate would be optimistic given the current political disorder in DRC and recent intensive bushmeat trade in central Africa.

2. National Parks

Although there are still twenty-three countries that have wild chimpanzee populations, the apes are not necessarily adequately protected. Three countries (Gabon, Equatorial Guinea, and Guinea Bissau) do not have national park systems. Four other countries (Guinea, Mali, Rwanda, and Sudan) have national park systems, but none of the national parks in these countries contains chimpanzees. In total, the 25 range countries have 98 national parks, but two-thirds of them have no apes at all (Table 1).

Table 2 shows that a total of 31 national parks reportedly contain African apes. These parks represent about 32% of all national park areas in the 25 ape range countries. Of these 31 National Parks (a total area of 115,344 sq. km), only one contains bonobos, 28 contain chimpanzees, and 10 contain gorillas.

3. Nonpark Conservation Areas (NPCA)

National parks are not the only conservation areas. According to the WCMC, 308 conservation areas outside of national parks include Game Reserves, Game Controlled Areas, Faunal Reserves, Hunting Zones, and Nature Reserves. These areas tend to be smaller than National Parks and the number of these Nonpark Conservation Areas (NPCA) that actually contain apes is unknown, but this number can be estimated from the 188 such areas for which we found data. Table 3 shows that a little over 8% of the land surface of NPCAs for which we found data contained apes. Extrapolating these findings, NPCAs containing apes is about 43,000 sq.km.

From these data, we can see that in the 23 African countries known or suspected to contain apes, a total of about 74 sites, covering 158,720 sq. km, currently bear the principal responsibility for protecting them (Table 4).

4. Other Factors Related to Conservation

Of course, this is only a very generalized estimate of the conservation status. National parks are supposed to stringently protect animals. However,we cannot simply assume that countries with national parks can and do protect chimpanzees better than those without them. For instance, Gabon has no national park at all, but has game reserves. Gabon's human population is only one million in the whole country of 270,000 sq. km, and the country is rich from its petroleum exports. Thus, chimpanzees and gorillas are better conserved there than most of the other central African countries because people do not need to depend so much on wildlife resources. It is ironic that Benin and Burkina Faso, two countries where chimpanzees recently became extinct, do have national parks.

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Table 1
National Parks that Contain Apes in African Range Countries: Distribution by Country

	# National Parks	Bonobo	Chimpanzee	Gorilla	Chimpanzee and Gorilla	No Ape
Angola	6	0	0	0	0	6
Benin	2	0	0	0	0	2
Burkina Faso	3	0	0	0	0	3
Burundi	3	0	1	0	0	2
Cameroon	7	0	0	0	1	6
CAR	4	0	0	0	1	3
Congo	2	0	0	0	1	1
Cote d'Ivoire	8	0	5	0	0	3
DR Congo	7	1	1	0	3	2
Equatorial Guinea	0	0	0	0	0	0
Gabon	0	0	0	0	0	0
Gambia	3	0	1	0	0	2
Ghana	6	0	1	0	0	5
Guinea	1	0	0	0	0	1
Guinea Bissau	0	0	0	0	0	0
Liberia	1	0	1	0	0	0
Mali	1	0	0	0	0	1
Nigeria	6	0	1	0	1	4
Rwanda	2	0	0	1	0	1
Senegal	6	0	1	0	0	5
Sierra Leone	1	0	1	0	0	0
Sudan	7	0	0	0	0	7
Tanzania	12	0	3	0	0	9
Togo	3	0	1	0	0	2
Uganda	7	0	3	1	1	2
Total	**98**	**1**	**20**	**2**	**8**	**67**

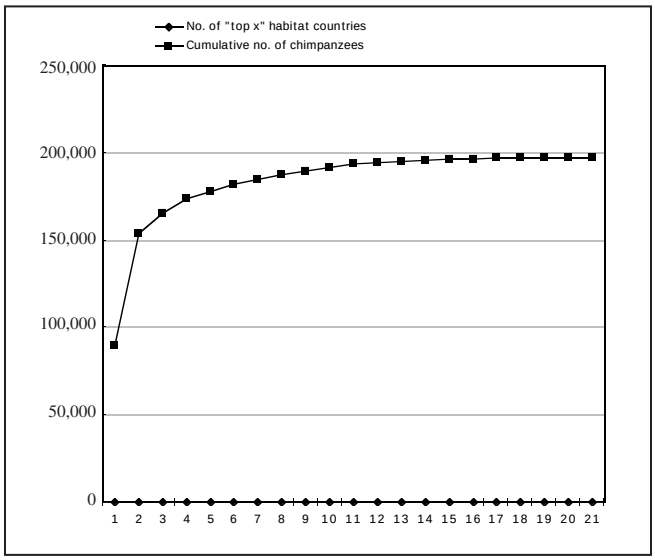

Figure 1. Cumulative representation of number of chimpanzees in African countries (from Peterson and Goodall 1993).

Table 2
Number and Size of National Parks that Contain Apes in African Range Countries

National Parks	Bonobo	Chimp	Gorilla	Chimp and Gorilla	No Ape	Total
Number	1	20	2	8	67	98
Total area (sq km)	36,560	47,058	169	31,557	246,035	361,379
% All National Parks	1.0	20.4	2.0	8.2	68.4	100.0
% Area of All National Parks	10.1	13.0	0.0	8.7	68.1	100.0

Data taken from the World Conservation Monitoring Center (www.wcmc.org.uk/protected_areas/data/nat.htm).

Table 3
Number and Size of Conservation Areas Other than National Parks that Contain Apes in African Range Countries

	National Parks	Bonobo	Chimp	Gorilla	Chimp and Gorilla	No Ape	Total
Number known to contain:	0	14	2	10	162	120	308
Total area (sq km)	0	12,113	98	20,435	360,934	129,021	522,603
% (excluding "No ape data found") that contain:	0.0	7.4	1.1	5.3	86.2		100.0
% size of all NPCA with data available, that contain:	0.0	3.1	0.0	5.2	91.7		100.0

Table 4
Estimated Conservation Areas Containing African Apes

	# sites containing apes	Area (sq km)
National Parks	31	115,344
NPCA	43	43,376
Total	74	158,720

NPCA= Nonpark Conservation Areas (estimates)

Table 5
Sites, Proportion of Ape Population Included in the Great Ape Status Survey (from Wrangham et al. 2000)

Species	# sites	# apes in sites	est. world pop.*	# sites no estim.
Chimpanzee	9	8,900	120,000 (7.4)	2
Bonobo	7	6,500	20,000 (32)	1
Gorilla	8	13,900	115,000 (12)	0
Orangutan	3	9,400	20,000 (47)	0
All species	27	38,700	275,000 (14)	3

Estimated world population: Bowen-Jones (1998) for African apes, orangutans from Yeager (1999).

** Number in parentheses indicates the approx. percentage of the total world population covered by this survey.*

Let us be clear, however, that it is very important to have national parks for apes. It is only before the pressures of increased human population become unmanageable that governments are able to formulate and implement adequate conservation schemes and set up reasonable land use policies to fully consider biodiversity.

5. Preliminary Results of Great Apes Survey 1999-2000

In November 1999, Kyoto University Primate Research Institute (PRI) held a major international symposium on the great apes under the leadership of Professor Osamu Takenaka. More than 100 experts attended, and we discussed the conservation of great apes. During that discussion, Wrangham proposed a joint effort to survey the current great ape population in protected areas by using a questionnaire, and then, based on the results, to prepare an action plan. Here are preliminary analyses based on the data that have been collected so far. The raw data were provided by many colleagues listed in the Acknowledgments.

We have obtained data from 27 sites (23 protected areas in 11 countries), and this covers about 7 to 47% of the estimated world population of the great apes (Table 5) . Researchers were first asked to assess whether the populations they are studying were rising, stable, or decreasing (Fig. 2). The majority of field workers (92%) indicated that their populations were declining. Assessment was mostly based on empirical measures such as counts of ape carcasses in markets, data on number of ape kills by poachers, recordings of the number of infants confiscated from pet traders, mortality rate due to human diseases, or systematic surveys that were at least 6 years apart.

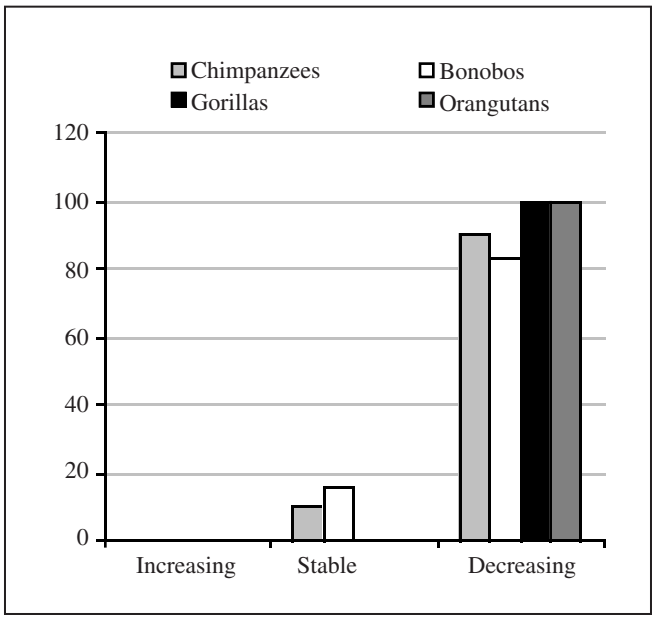

Figure 2. Graph of the percentage of PAs with populations stable, declining, and rising (from Wrangham et al. 2000).

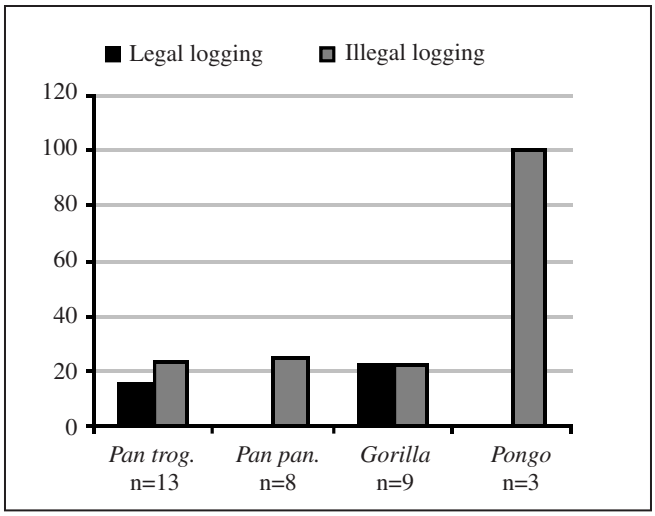

Figure 3. Percentage of PAs in which logging is reducing ape habitat (from Wrangham et al. 2000).

Researchers were also asked to venture an estimate of what they thought the percentage of ape populations would be in 50 years. Researchers estimated only 7% of ape populations would be at their current size in 50 years, while 63% of populations would lose more than half of their numbers. Eleven percent of the researchers felt that their study populations will vanish within the next fifty years.

There is a variety of threats to the great apes: hunting, logging, trapping, armed conflicts that hamper research, and human population increases around protected areas. Logging is leading to a loss of ape habitat in 42% of the 33 protected areas that were surveyed (Fig. 3). Although not nearly to the extent of orangutan habitats, logging is still leading to a significant loss of chimpanzee habitats. All the great apes are hunted severely, in particular, bonobos (Fig. 4). Overall, apes were hunted in 64% of the 33 protected areas that were surveyed.

Current Conservation Status of Chimpanzees in the Natural Habitat

Case Studies in East Africa

Chimpanzees outside of the protected areas have decreased in number because of the transformation of forest to farmland, forest destruction caused by timber production, firewood collection, and market hunting. All of these causes are being exacerbated by the rapid human population growth in Africa. Here, we point out problems by giving examples from east Africa where we are studying.

The Ugalla area (Fig. 5), which harbors chimpanzees in one of the driest habitats, had been safe from human activities until the beginning of the 1980s. However, a recent survey by a Japanese team (lead by Professor Takayoshi Kano) revealed that the area has been heavily exploited for timber since 1989. It is now very difficult to find such important trees as muninga (*Pterocarpus angolensis*) there, and in 1997 people began to cut another species of the same genus, mkulungu (*Pterocarpus tinctorius*), which is less valuable (Ogawa et al. 1999). This species is crucial to the survival of chimpanzees (Nishida, unpublished). The flowers in March, seeds in July and young leaves, in particular, from September through November constitute very important food for savanna chimpanzees. The trees are also the favorite bed sites of chimpanzees. Thus, the selective logging is likely to unfavorably influence these chimpanzees.

The second concern is the destiny of chimpanzees living in Lilansimba, a pocket-like region on the right bank of the Malagarasi River, which is isolated from the southern population by the River Malagarasi and from northern population by cities, village and bush (Kano, 1972). Recently, because of the population increase, residents have begun to colonize the area from the lower stream, converted the forest into farmland, and cut trees to get building materials and firewood (Kano et al. 1999).

The Tanzanian government's acceptance of refugees from DRC and the establishment of the refugee camp near the Lugufu Stream in 1997 has exacerbated the situation. The chimpanzees have begun to be killed for bushmeat by the Congolese who have no food taboo against chimpanzees. Since 1998 when rebels started attacking the government of President Kabila, refugees have greatly increased in number, and their impact on the chimpanzees and their environment should be the object of grave concern (Kano et al. 1999).

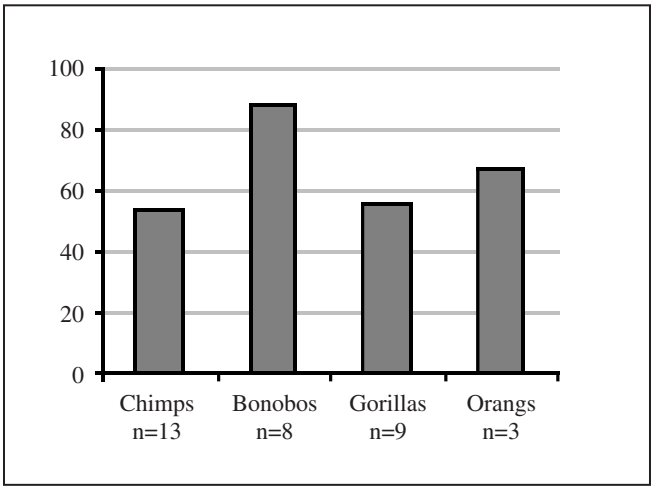

Figure 4. Percentage of PAs in which apes are being hunted (from Wrangham et al. 2000).

In 1996 a new habitat of chimpanzees, which is isolated by 200 km from the known boundary of chimpanzees in Tanzania, was discovered in the southwestern Rukwa region (Ogawa et al. 1996). It is 50 km further south than the known southernmost limit of the chimpanzee distribution in the Marungu Mountains in DRC (Ogawa et al. 1997). However, here woodland and forest trees are being cut. Before any important scientific findings are done, it is possible that this newly discovered population will vanish forever.

Even national parks are far from safe. The Gombe National Park is the oldest park where chimpanzees are the most important targets for protection. The chimpanzees used to range outside of the park. In 1969, Nishida observed two adult males walking in the Brachystegia bussei woodland in close proximity to the city of Kigoma about 20 km south of the park boundary. The problem is that there is no buffer zone surrounding the park. Human population has increased in the neighborhood of the park in the past 3 decades, and the forests outside of the park have been almost completely transformed into farmland or barren land. Only 3 chimpanzee groups remain in the park now. A recent survey by Greengrass (2000) has elucidated that the largest Kalande group is considerably reduced in number from about 80 to less than 30. Poaching and human encroachment are considered the most probable cause for this reduction (Greengrass, 2000).

The Mahale Mountains National Park, which is 30 times larger than Gombe, and is situated in a more remote, thinly-populated place, is considered to be relatively safe from human disturbance. However, refugees (mainly from Zaire) had built a fishing camp before the park's establishment and refused to move out of the park. After several years of negotiation with the local government, the people were still not forced to move, but continued to stay in the narrow strip of land including the fishing village. Subsequently, the park boundary itself was redrawn in order to keep the village out of the park. Rumors spread about the corruption on the part of the local government since these fishermen were very rich. Now, the fishermen plant bananas, cassavas and other crops in their narrow strip of land (Fig. 6). Since they regularly burn their fields in the dry season to fertilize the soils, fire tends to spread into the park. Since resident horticulturalists from olden times evacuated from their land, there is a possiblity that frustration will bring political troubles between old residents and the local government/newcomers (Nishida, 1996)

Another problem is the aggressive growth and spread of the alien tree species *Senna spectabilis* (Leguminosae). This species was introduced from South America to the region long ago as shade or ornament trees. The trees had not been able to spread to the natural habitat before the national park was established because the trees were not resistant to fire. Once fire was forbidden within the national park, the species, through its allelopathic capcity, began to spread at the expense of indigenous food trees of chimpanzees (Nishida 1996, Turner 1996, Wakibara 1998).

In Uganda, the Kibale Forest National Park has also had problems (Wrangham 2000). As in Gombe, the problem is mainly caused by "the edge effect." The chimpanzees suffer from heavy casualties and mutilations due to snares intended for other terrestrial mammals such as duikers and bushpigs. Some chimpanzees attack human beings and also damage human crops, which amplifies aggression among resident people against chimpanzees. Similarly, snares cause important problems in the Budongo (Waller and Reynolds 2000) and Kalinzu Forests (Hashimoto 1999, Hashimoto et al. 1999).

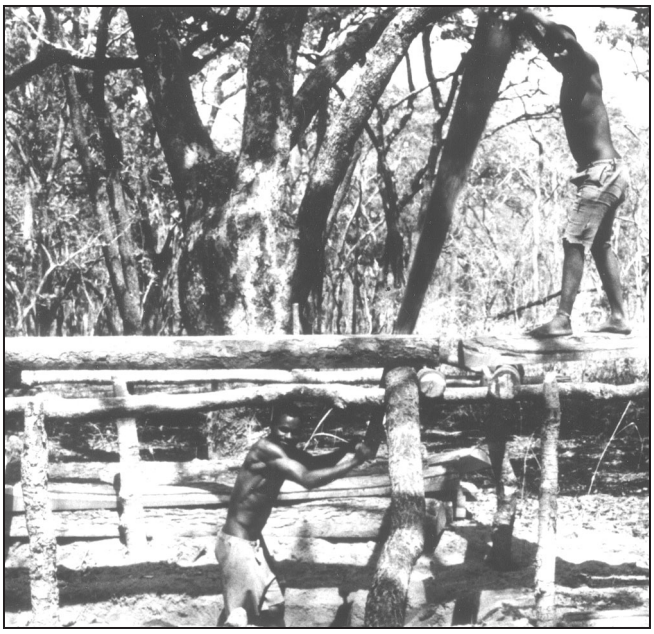

Figure 5. Selective logging of Pterocarpus trees in the Ugalla area, Tanzania.

Figure 6. The Kalila fishing village. The people of Kalila are still continuing to live inside the Mahale Mountains National Park.

Bushmeat Crisis

Bushmeat is not a grave problem in east Africa. However, we must point out that exploitation of bushmeat is now the most important cause for the decrease of apes in central Africa, which has been called "bushmeat crisis" (see Bowen-Jones 1998 for review). The major catalyst responsible for this devastation is growth of the timber industry. Timber companies cut the logging roads, and thus provide measures for both access to the wild animals and transportation of meat to urban consumers. Hunters are given guns and ammunition, and paid by timber companies to provision logging camps. Moreover, the kills of freelance hunters are carried by logging vehicles to remote towns and even capitals (Amman 1998, Rose 1998, Weiss and Wrangham 1999). Rose (1998) estimates that bushmeat trade is a billion dollar annual business in Africa.

It will be difficult to stop the bushmeat trade quickly because there are many stakeholders in this trade (Kano and Asato 1994, Eves 2000, Wilkie 2000). The great ape meat occupies only the minority of the trade, however, its effect on the ape population is devastating. We should first aim to stop ape meat trade rather than to ban the whole bushmeat trade. Since women also play a great role in the bushmeat trade, job cultivation for them is as important as for men (Ellis, 2000). Conservation organizations and many other nongovernmental organizations are calling for immediate action to stop the commercial bushmeat in tropical African countries (Anonymous, 1999a). U.S. Senator Jim Jeffolds introduced legislation to assist in the conservation of great apes and attempt to halt the illegal trade of wild animals including great apes. "The Great Ape Conservation Act of 1999" would provide support and financial resources (US$ 5 million per year) for the conservation programs of ape habitat countries, and projects of persons with demonstarted expertise in the conservation of great apes (Anonymous 1999b).

Conservation Strategies in the 21st Century

Benefits of Conserving Chimpanzees

1. *Chimpanzees as eminent long-distance seed dispersal agents.* Since chimpanzee are large-bodied fruit-eaters and long-distance walkers, they are eminent seed dispersal agents that contribute much to the maintenance, expansion and regeneration of the forest. There is evidence that seeds taken from chimpanzee feces germinate (Takasaki 1983, Takasaki and Uehara 1984, Wrangham et al. 1994). Sizes and shapes of some fruits eaten by the chimpanzee suggest that these fruits evolved in response to the feeding behavior of chimpanzees. These plants form interesting examples of animal/plant coevolution. Important food include fruits of *Voacanga lutescens, Saba florida, Landolphia owariensis, Strychnos cocculoides,* and *Myrianthus arboreus.* (Nishida, personal observation). All of them are sweet or sweet/sour in taste, large-sized, have large seeds and thick fruit skin which change in color from green/brown to yellow, orange or red when ripe.

2. *Sources of intellectual pleasure.* Chimpanzee behavior is flexible, idiosyncratic and shows an extraordinarily varied repertoire. Even after spending several thousand hours watching them, we still see forms of behavior totally new to us. Chimpanzees remind us of the pleasures of living on the Earth.

3. *Teaching us what constitutes human nature.* Knowledge of human nature obtained from the study of chimpanzees will be useful for reconsidering and reorganizing inappropriate human social institutions (Nishida 1999).

4. *Key species for education about evolution and anti-anthropocentrism.* Needless to say, chimpanzees are one of the most pertinent species that bridge humans with nonhuman creatures (Goodall, 1986). Chimpanzees teach us that evolution really occurred and that humans have close relatives on the Earth.

5. *Screening of medicinal plants and edible plants.* It is possible that animals use natural drugs to treat disease and expel parasites (Janzen 1978). Evidence exists that chimpanzees chew bitter piths of Vernonia and swallow the hairy leaves of some shrubs for some medicinal purposes (Wrangham and Nishida 1983,

Huffman 1998). Therefore, chimpanzee behavior is useful for screening potential medicines. Moreover, much chimpanzee food is edible to humans (Nishida 2000) although most African people have forgotten this. It is likely that we can learn some important food resources from chimpanzees.

6. *Ecotourism.* Ecotourism is important in bringing benefits such as foreign currency to ape habitat countries (Weber, 1993). However, the protection of great apes is difficult if the local people do not share in tangible benefits such as employment, the selling of souvenirs and local food, and the establishment of medical facilities.

Problems Regarding Ecotourism

A serious problem with ecotourism has recently been noted, however. This is the transmission of disease from humans to chimpanzees, and vice versa (Goodall 1986, Nishida et al. 1990, Hosaka 1995, Hosaka et al. 2000, Wallis and Lee 1998). Many chimpanzees are suspected to have been killed by diseases of "anthropozoonotic" origins. The danger of human-transmitted disease to habituated chimpanzees is real.

To return to the main point, what field workers should really be worried about is that habituated chimpanzees have decreased in number without exceptions. The main study group in Gombe National Park has decreased from 60 in 1961 to 30 in 1997 (Greengrass 2000), the M group in Mahale from 100 in 1980 to 50 in 1999, and the N group in Tai from 80 in 1980 to 25 in 1998. Polio and pneumonia have struck the Gombe population several times. An "AIDS-like" disease struck the M group of Mahale once and a flu-like disease has struck them twice (Nishida et al. 1990). Lion predation also occurred (Tsukahara 1993). It is possible that at least some of these epidemics originated from humans. Regarding Tai, the population decrease has been attributed to leopard predation and the Ebola virus (Boesch and Boesch, 2000). However, there is some possibilty that human disease also killed some Tai chimpanzees (Ilka Herbinger, pers. comm., June 2000).

Wallis and Lee (1998) pointed out the strong possibility that researchers have transmitted disease to chimpanzees. This is because the chimpanzees of the Mitumba community at Gombe were infected with a flu-like disease before they were habituated. The only humans in contact with the wild chimpanzees at that time were researchers. Therefore, researchers, park staff, and tourists must be very careful. They should keep adequate distance from the chimpanzees, and take appropriate hygienic precautions.

Of course, humans also have a risk from contact with chimpanzees. It is said that chimpanzees play a role as vectors of HIV in central Africa. There were discussion on the internet last year on whether we should use this information to ban the bushmeat trade (Weiss and Wrangham 1999). If we say that chimpanzees are very dangerous and that they should not be eaten or even touched, will this be useful in protecting chimpanzees because African people would begin to avoid eating the meat of chimpanzees? Or, they might not care and continue to eat chimpanzees since they have not found any risks for many years. Or, will this news encourage people to massacre chimpanzees because they will consider them dangerous and useless animals? We are not sure, but the latter would be more likely than the former.

Gorilla ectourism in Rwanda was certainly a great success at least until very recently (Weber 1993). Then, how useful is the ecotourism for the conservation of wild chimpanzees? There are only a few national parks whose main target is chimpanzees: Gombe and Mahale in Tanzania, and Kibale in Uganda. According to recent unpublished Tanzania National Parks statistics (TANAPA, 2000), no remarkable increase in the number of foreign tourists has been recognized in either Gombe or Mahale (Fig. 7). The two parks have not earned enough money to even sustain themselves (Fig. 8). From the current trend, it will be difficult for either park to earn a million dollars annually (which Virunga was earning before the recent war began). As a matter of the fact, of the 12 national parks, only four major parks of "the northern circuit" of Tanzanian park system (Serengeti, Lake Manyara, Tarangire and Kilimanjaro) make a profit and all the other parks have been being sustained by these four parks (TANAPA, 2000). The situation in the Kibale National Park may not be so different from Gombe and Mahale. To obtain more profit, the combination of ape ecotourism with other attractions (bird watching, photography, mountaineering, swimming, fishing etc.) will be necessary. We should be satisfied if the income from the ape ecotourism balances with the costs of conserving ape habitat and community conservation. Too much stress should not be given to the wild chimpanzee populations since they are fragile resources.

Release of Confiscated Chimpanzees

How do we treat chimpanzees confiscated from poachers and merchants? This has become an increasingly important problem since legal enforcement against poaching has broken down in some countries such as DRC and Brazaville, Congo. Releasing confiscated chimpanzees to one of the chimpanzee habitats is not a viable option. Chimpanzees in the Mount Assirik project in Senegal directed

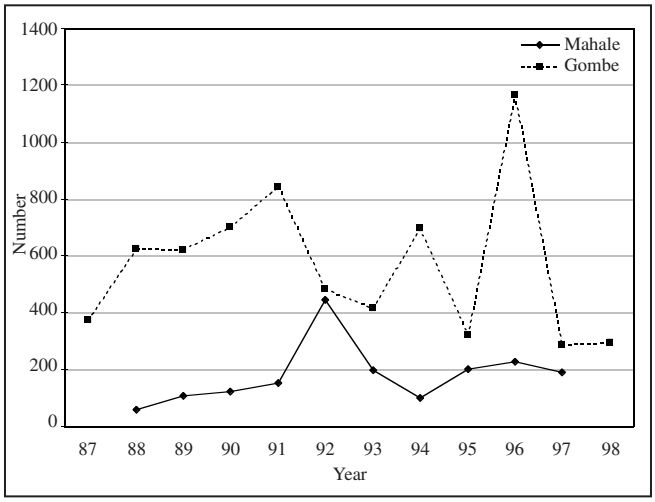

Figure 7. Changes in number of nonresident tourists.

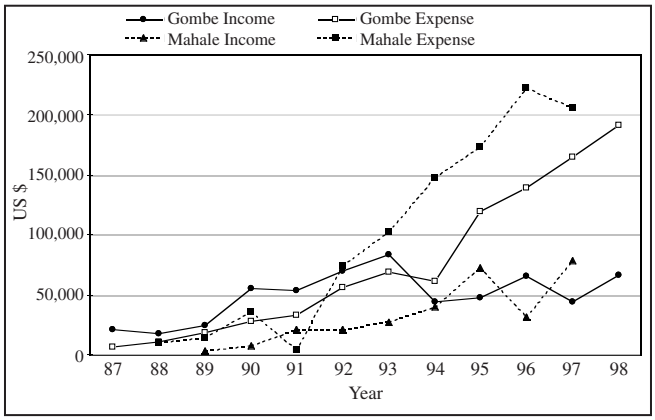

Figure 8. Changes in income and expense in two national parks.

by Stella Brewer had to be recaptured and released on Baboon Islands in the River Gambia with no resident chimpanzees (Peterson and Goodall, 1994). Such island habitats, or enclosed "sanctuaries" within the original chimpanzees range would be an only option as a place to accommodate orphans.

Medical Experiments and Retirement Program

Chimpanzees have been used as experimental animals for AIDS and hepatitis. It is increasingly likely, however, that we no longer need to use chimpanzees as subjects for medical experiments (Fouts 1997). There are other alternative measures to testing for the validity of medicines. It should be the policy of the 21st century that no more chimpanzees should be used as experimental animals.

In addition to physical, nutritional and reproductive necessities, social, psychological and mental needs of captive chimpanzees have been recognized recently, and effort by primatologists such as Goodall and Fouts have begun to bear fruits at least in the USA (Peterson and Goodall, 1993; Fouts 1997). What is most important appears to be keeping chimpanzees as a multi-male heterosexual group (van Hooff 1973, de Waal 1982). Only then, social intelligence will be fully activated among chimpanzees, and they may find their life worth living.

It will be morally recommended that chimpanzees that have been subjected to various medical and/or scientific experiments should be retired to sanctuaries where they no longer need to give any service to humans. Such attempt is going on in the USA, as a bill entitled "Chimpanzee Health Improvement, Maintenance and Protection Act" has been proposed in the Congress to ensure a national chimpanzee sanctuary system (Rowan, 2000). The cost of such retirement program is not inexpensive, but should be covered by the institutes, individuals and government that used the chimpanzees as experimental subjects.

What Captive Chimpanzees Cannot Experience

Psychological experiments have elucidated the mental ability of chimpanzees. They also have greatly helped to reveal the social, psychological and intellectual needs of the chimpanzees themselves. Environmental enrichment has been strongly advanced in many zoos, in particular in the United States. Zoo habitats have been modified increasingly to simulate the natural environment. It is nice and admirable to advance this trial further, however, we must point out that even an enriched environment still is far from the natural environment. There are many things that captive chimpanzees cannot experience.

Captive settings remove the intellectual, interesting and exciting experience that wild chimpanzees enjoy. They first lose locomotion and freedom of movement such as long-distance walking, expeditions, visiting many kind of vegetation zones, gymnastics, social play in a tree, climbing trees more than 20 m high, leaping from the canopy, running and brachiating in the tree, and stamping and slapping the buttresses of huge trees.

The second experience they lose is feeding behavior that includes finding food, selecting food from as many as several dozens of options, drinking from beautiful streams or Lake Tanganyika, licking gigantic rock slates and old wood, and looking for and ingesting plants for self-medication.

The third thing they lose is the tool-using behavior that includes constructing sleeping sites, selecting tool materials, making tools, fishing and dipping for live insects such as ants and termites.

They lose social experiences, such as engaging in various social displays which includes throwing rocks along the riverbed or the lake. It is difficult to select their favorite member of the opposite sex, to steal copulation, and to have inter-group visual and acoustic encounters. Females lose the most exciting opportunity to mate with one of the neighboring unit groups. Captive female chimpanzees are even forced to reproduce by artificial insemination.

More behavior that can never be simulated in captivity includes hunting various animals, running after prey through trees, cooperating in chasing, catching, killing, dismembering, and eating stomach contents and brains. Observing hunting is most interesting for human observers, and probably so for chimpanzees. They lose fearful experiences such as meeting leopards, bushpigs and warthogs. This is only a small list. There are a lot more things captive chimpanzees can never enjoy.

It should be a basic principle in the 21st century for us not to keep chimpanzees in captivity.

Cultural Primates as a Flagship Species

One of the most remarkable developments in past ape research was to elucidate the existence of local cultures among wild chimpanzees (Nishida et al. 1999, Whiten et al. 1999). Local patterns include food repertoire, ethno-medicine, subsistence tool use, and gestural communication.

What is most important in a culture is not the cognitive process that lies behind it, but its function. What matters is the transmission of information from one individual to another via nongenetic means. In this context, nonhuman and human cultures are not evolutionarily separated, but continuous. Anthropocentrism more than anything else has destroyed environments and endangered biodiversity. The dichotomy between human and nonhuman cultures is largely responsible for the inequality of rights granted to human and nonhuman creatures. It follows that we should not insist on the uniqueness of human cultures so much (Nishida 1999). In order to say farewell to anthropocentrism, we might well take children to an African forest and give them the opportunity to observe chimpanzee cultures. Chimpanzees in one population fish for carpenter ants, while in the neighboring one they dip for driver ants. Show children the behavioral flexibility and diversity of chimpanzees, and they will know that culture is not monopolized by humans but shared by at least a few other species on the Earth. In order to conserve nonhuman primate cultures, as many reserves as possible must be preserved. Of course, the great apes are important as flagship species that need wide home ranges, which can include many other narrow-ranging species as well.

Great Apes as World Heritage Species

Cavalieri and Singer (1993) proposed that chimpanzees and other great apes be included in the same moral community as human beings. Namely, great apes should not be killed. They are not to be arbitrarily deprived of their liberty. The deliberate infliction of severe pain on great apes is regarded as torture, and is wrong. Some have debated whether it is right to give great apes priority in this moral community over other animals. We would like to assert that we can and should immediately include the great apes in our moral community, because great apes bridge human beings with other creatures and they are becoming so rare. After great apes are given membership, we would be able to extend the right of membership to other life forms where and when that becomes possible. Thus, great apes should have the priority of conservation.

The Great Ape Project of New Zealand was earnest in legislating the ideal of the project, and it finally succeeded in passing the Animal Welfare Bill in which great apes, as nonhuman hominids,

should receive the same care and attention that human children and disabled humans are expected to receive. This admirable endeavor should be extended to other countries.

Wrangham (2000) is proposing that we persuade the United Nations to make the great apes "World Heritage Species." When the researchers of great apes gathered together in Japan in November 1999, his proposal was supported by all the participants. We are preparing joint resolution and petitions to UNESCO. Under the moral authority of UNESCO, we hope to elicit global support for the survival of the great apes. By this we hope to persuade developed countries to extend overseas development assistance to ape habitat countries only when special measures are taken for great apes by them. Without financial and technical aids by developed countries, all the apes would vanish permanently in the next century.

Let us hope that the great apes will survive the new millennium and continue to leave a great heritage to our great-grandchildren.

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