

Letter from the Desk of David Challinor
March 2007

When I was seven (1927), I had a small collection of stuffed bears and apes made by Steiff, a German toy company that is still in business. These effigies were about six inches long and their arms and legs moved on simple joints. I loved the apes best, which I am sure were meant to be chimpanzees, but their fur was brown instead of black and their faces were light tan, similar to juvenile chimps. Knowing nothing of these inaccuracies, they were my favorite childhood toys, and I eagerly took them to the beach to share my explorations of the crevices along the rocky shore. My affection for them continued well past the age when I should have been engaged in more adolescent activities. Fast forward 80 years to today as scientists study what the minds of living great apes perceive, an approach that has led to intense debate on the ethics of using chimpanzees as experimental animals in human health research. This month's letter will trace the change in human attitude towards the use of animals, especially primates, in research and particularly the arguments about ethical conflicts that are just now arising.

In adolescence I was a Tarzan movie fan and Johnny Weissmuller (the original Tarzan) had a chimpanzee companion who accompanied him on his jungle adventures. I did not then give the animal much thought, although I admired how well he had been trained. It was about this time that I heard many stories from my parents about a female gorilla that had been raised from infancy in a household in Havana. Her name was Toto and my parents were friends of her owners, an American family called Hoyt. The animal was recovered by the Hoyts while on safari in the then Belgium Congo when her parents were shot. Toto was completely imprinted on the Hoyts, and when she grew too large for them and the full-time caretaker they had hired, they sold her to Ringling Brothers Circus, then owner of Gargantua, a large silverback. The hope was that they would breed, but despite the efforts of Mrs. Hoyt who moved to the circus's winter quarters in Sarasota, FL, the two gorillas never bred. Considerable publicity was generated about the "marriage" in the press and radio. We have learned much since then.

Even after WWII many zoo-born gorillas and chimpanzees were taken from their inexperienced mothers and raised in the families of zoo personnel. Former Director of the National Zoo, Ted Reed and his wife, raised at least one infant gorilla in their house. When grown, these human-raised apes were seldom able to breed successfully much less raise their own progeny because their upbringing lacked experience and contact with other apes. Pioneering work by the Dutch primatologist, Frans de Waal, showed how important it was to maintain colonies of chimpanzees and gorillas to achieve successful breeding. This approach to great ape husbandry was soon adopted by major zoos worldwide and, closer to home, at the National Zoo with the opening of the Great Ape facility in 1981. This building has a large interior space to accommodate an extended gorilla family—one or two silverbacks with females and young. Adjacent enclosures

allow newly arrived gorillas to interact with the established family visually, olfactorily and even tactilely through gaps in the enclosures to ensure their acceptance before being released into the group. In clement weather, a large outdoor area with trees for them to climb is also available.

Equivalent facilities are incorporated for the orangutans. In addition, these apes have an “o-line” consisting of five or six stout 30-foot towers, each topped with a platform and connected to the next tower by two strands of plastic-coated cable. Midway down each open tower are hot wires to discourage the apes from mingling with the visitors. The orangs thus travel from one building to another some 100 yards over the heads of the Zoo visitors. Such amenities are a marked improvement over the old menagerie-like ape house with its vertical bars and cramped quarters. The new facility has lived up to its promises and the great apes are thriving. By the mid-1980’s this new attention to the apes’ welfare resulted in more births than deaths in North America. This was an important turning point since the Convention on International Trade in Endangered Species (CITES) had been signed by the United States in 1973, banning further importation of any great ape worldwide.

In the old ape house in the early 1970’s, I remember Ham, an aged chimpanzee that NASA had launched into space as a prelude to human astronauts in our race with the Soviet Union. The Soviets had previously sent a dog aloft in their initial research into manned space flight. Ham, however, must have been an extraordinary chimpanzee, not only to have survived that relatively primitive space flight, but also the elaborate training he endured before he was wired up and strapped into his seat in the capsule.

When the Zoo’s new ape house opened, Ham was sent to a chimpanzee colony at the North Carolina Zoo in hopes that he might breed; the National Zoo had decided to keep only gorillas and orangs in its collection. Although Ham successfully integrated into the colony there, he died four or five years later without leaving any progeny.

1981 marked the completion of the new great ape facility, and also the beginning of the AIDS epidemic in North America. I clearly remember listening to a radio report about a new disease that seemed to infect mostly homosexual men. That evening at dinner we told the third-year medical student living with us what we had heard. He dismissed the report summarily with a comment “...that just shows how lay people can never get medical reports straight, because that’s the craziest thing I’ve heard.” A few nights later he came home as white as a sheet and told us he had just attended his first advanced AIDS patient at D.C. General Hospital. Our medical student was a changed young man.

The AIDS arrival in turn triggered a massive government-supported effort to breed chimpanzees for AIDS research. Laboratories attempted to infect these apes with Human Immunodeficiency Virus (HIV), although chimpanzees are much more susceptible to Simian Immunodeficiency Virus (SIV). Eventually, researchers succeeded in infecting a chimpanzee with HIV in order to further efforts to find a cure for the deadly disease in humans.

While these experiments were underway, many people, including medical scientists, expressed qualms about using our genetically closest relatives for such invasive research even though initially these apes seemed the most suitable animals to use. Opposition to the practice built up slowly so that today the United States is the last nation, with the possible exception of Gabon, still using laboratory-maintained chimpanzees for biomedical research. The principal supporter of ape-based experiments in the U.S. has been the National Institutes of Health, but this huge government research establishment is now openly debating whether to discontinue such research or to continue breeding chimpanzees as experimental animals for the study of human diseases from Alzheimer's to malaria.

In the six major government-supported primate centers scattered across the country, the current moratorium on breeding chimpanzees as experimental animals has been in effect for about a decade. Some breeding has occurred, but government funds may not be used to support these newborns, thereby enforcing the ban. As a result of this policy, the chimpanzee population declined from about 1500 in 1996 by almost a quarter in 2006 at these six primate centers.

With time, the chimp population is aging and thus becoming less fertile. Furthermore, Congress in 2000 ordered chimpanzees no longer being used in experiments to be sent to primate sanctuaries. Still undetermined: what are appropriate conditions for these sanctuaries and, even more important, who should cover the long-term operating costs? The average life span for a captive chimpanzee is >30 years; some individuals can live almost twice that long.

There is no question that the biomedical research involving chimpanzees has produced significant beneficial results for human health. VandeBerg and colleagues at the aforementioned primate centers made an impassioned plea to resume chimpanzee breeding while there are still enough fertile animals left.¹ Opponents argue that advances in biomedical technology reduce the need for invasive experiments on these apes and question whether any such research is ethical.

Not only are the ethics of chimpanzee use in medical research being challenged, but also their exploitation in the entertainment and advertising industry. I personally found the TV program that featured Mr. Jiggs, a trained chimpanzee, not only unamusing but embarrassing. Mr. Jiggs wore human clothing and performed various human-like routines as directed by his trainer. Former Zoo colleague Ben Beck, now at the Great Ape Trust in Des Moines, led a successful effort to halt the use of chimpanzees in the TV advertising campaign of a major Chicago company.

We have become more careful about using animals for research because we are no longer certain that we know how animals (apes in this case) feel about themselves. Chimpanzees were the first non-humans to manifest self-perception through the well-known mirror experiments. A smudge is put on the animal's forehead and then the

¹ VandeBerg, J.L., S.M. Zola *et al.* (2005) A Unique Biomedical Resource at Risk. *Nature* 437:30-32.

animal is shown itself in a mirror. The animal with true self-perception tries to wipe it off. Later the other great apes (gorillas and orangutans) showed the same ability. Now we can add Bottle-nosed dolphins and Asian elephants to this exclusive list—an ability considered only recently to be confined to humans. The two newest additions are all the more startling because unlike primates, their brains lack our frontal lobe—once thought to be essential to process self-perception. Our attitude towards all these highly social yet unrelated mammals perforce must change. Other species with a similar capacity will undoubtedly be discovered—perhaps even among invertebrates e.g. cephalopods. Such recent discoveries should give us pause, and I feel confident that my grandchildren's generation will husband such creatures with more care and understanding than we have shown.

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P.S. Much of the material for this letter came from Cohen, J. (2007) *The Endangered Lab Chimp*. *SCIENCE* 315:450-452 and from Beck, B.B., T. Stoinski, R. Shumaker, S. Ross and L. Perkins. (2005) Animals in Advertising, AZA's Member's Forum in Communiqué. May 2005. pp.47-49