

Linking Observation and Conservation:



Baboons and water buffalo share the savanna in Amboseli National Park, Kenya.

Joanne and Stuart Altmann

Baboon Research and Conservation at Brookfield Zoo

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A team of scientists and students, headed by Brookfield Zoo Research Curator Jeanne Altmann, has been studying baboon behavior and ecology for over 30 years as part of the Amboseli Baboon Research Project in Amboseli National Park, Kenya. This long-term research project has contributed to our basic understanding of primate behavior and social organization, and helped to define and strengthen the role that behavioral research can and does play in conservation efforts. The Amboseli Baboon Research Project has received the support of the Chicago Zoological Society since 1985.

In 1963, behavioral ecologist Stuart Altmann, accompanied by his wife Jeanne and their young son, set off for the Amboseli Game Reserve in Kenya to study yellow baboons (*Papio cynocephalus*). Stuart would observe and follow individual animals to develop a clear understanding of the social and environmental factors that influence baboon life. Although she would serve the project as a research assistant, Jeanne, whose background was in mathematics, was not a major player. She never dreamed that the research would one day become her life's work, nor that they were embarking on one of the

most important, ongoing research projects ever undertaken on primate behavior and ecology: the Amboseli Baboon Research Project.

Better Behavioral Methodology

As Stuart began his studies of baboons, Jeanne occupied her time by examining the methodology behind naturalistic behavioral research. A fairly unstructured enterprise, behavioral research depended on the astute observations of field researchers, who simply observed the animals and noted any behavior that seemed important. In the case of baboon research, baboon males tend to be bigger, louder, and attract more attention than do females. Not surprisingly, most early research tended to focus on males as the core of the group.

To truly understand an animal's behavior, a scientist would have to follow it 24-hours-a-day, 7-days-a-week—an unrealistic technique. Jeanne and Stuart were confident that they could develop a better way to collect behavioral data. Surely, there was a way to focus behavioral studies so that researchers could compare behavioral information collected on different animals. Jeanne developed a set of observational



Stuart Altmann

Jeanne Altmann's work with yellow baboons in Amboseli began in 1963 as a research assistant for her husband Stuart. It was then that she began to refine observation techniques that refocused the field of behavioral research.

Female baboons inherit their dominance rank from their mothers. A female's rank can influence access to food and other resources, and remains little changed throughout her life.



Jeanne and Stuart-Altmann

techniques, which she called "observational sampling." By conducting a series of short, but systematic and structured observations, researchers could draw conclusions about what animals do the rest of the time. Jeanne formalized her methods in a landmark paper published in 1974 that refocused behavioral research.

Based on these now formally defined methods, a very interesting picture of baboon behavior and social interaction began to emerge. It soon became apparent that females, and not males, formed the core of baboon (and many other

primate) societies. Females usually stay in the groups into which they are born (their *natal* groups), and maintain long-term relationships and dominance hierarchies. Grooming reinforces these bonds. Males, who emigrate from their natal groups when they reach maturity, don't maintain such strong social relationships.

Jeanne began work on a doctorate in human development at the University of Chicago. Six thousand miles from Chicago, the Amboseli baboon population provided the ideal research subjects for this thesis work.

Jeanne focused her early research on the development of baboon infants and the influence of the social organization on mothers and their offspring. She observed that baboon mothers varied in their mothering styles (much as human parents do), with some mothers being very restrictive and protective, and others allowing their infants more freedom. Some of the protective mothers were low-ranking females whose infants were likely to be harassed, and the laid back, or "laissez faire" mothers were high-ranking females whose infants were less likely to be harassed.

In baboon societies, daughters inherit their mother's dominance rank—daughters of low-ranking mothers are low-ranking, daughters of high-ranking mothers are high-ranking. Position within this dominance hierarchy for female baboons is very important: it affects her access to resources, like food. The rank of mothers matters much less for that of their sons as they change rank frequently as adults within their new groups. Since high-ranking daughters benefit more from social position than sons or low-ranking daughters, Jeanne wondered if high-ranking mothers rear more daughters than sons and if low-ranking females rear more sons than daughters. Her hypothesis proved true. In 1979, Jeanne completed her doctoral thesis based on this research, and became the first person in University of Chicago history to receive a Ph.D. in human development without ever studying humans.

In 1985, Jeanne joined the Brookfield Zoo staff and the Amboseli Baboon Research Project

garnered the support of the Chicago Zoological Society. Thus began a long and mutually beneficial relationship between the world's leading expert on baboons and Brookfield Zoo. Today, this research continues to make notable contributions to baboon conservation and education.

A New Revolution in Research

Landmark discoveries like these are made through careful observation. Researchers at Amboseli make it a point to observe baboon behavior, not impact it. Taking this high road makes obtaining some kinds of information from the baboons nearly impossible. Never underestimate the creativity of a behavioral researcher, however. Research on genetics, endocrinology (hormones),

growth, and development have become a part of the project. Researchers found their answer in a neat little package left behind by the baboons: feces. The amount of knowledge that can be gained from fecal analysis—information about genetics, hormones, nutrition, and health—is both surprising and worth the humbling effort of collection.

This developing field of scatology (the study of scat) has opened many doors that allow scientists to gather detailed information on baboons without disturbing them. Scats contain DNA that enable scientists to determine paternity and hormones that allow researchers to evaluate stress levels. This exciting new addition to the field of behavioral research has become possible



Jeanne and Stuart Altmann

The rank of baboon mothers matter less to their sons. Male baboons may change rank several times during their lives.

Ecotourists to Kenya enjoy the vacation of a lifetime, viewing megaherbivores such as giraffes and elephants, predators such as big cats, and prey in a natural environment. But, even tourists armed only with cameras can impact the environment in substantial and negative ways.

Brookfield Zoo supports responsible ecotourism by requiring each business that offers services or accommodations to Brookfield Zoo tour participants to meet the zoo's strict ecological requirements. These include minimizing their impact and that of their guests on the environment and local wildlife.

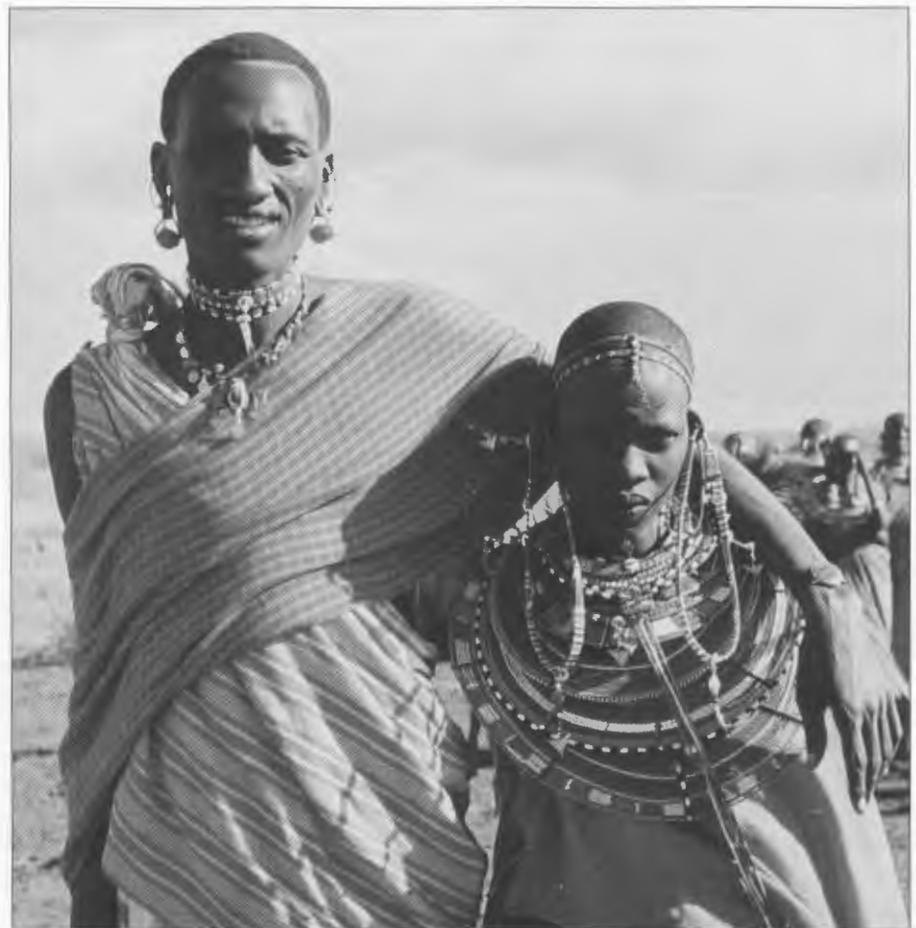
This past June, a Brookfield Zoo "Family Safari" to Kenya visited Amboseli National Park, where visitors from the Chicago area were able to see some of the baboon groups studied by Jeanne and her colleagues. Tour participants rose before sunrise and joined Jeanne at her research site to see how baboons start their day. Jeanne returned to the lodge later that evening to answer questions about baboons, her research, life in the field, Kenyan culture, and conservation issues.

through Brookfield Zoo and the Amboseli research group cultivating many collaborative relationships with scientists around the world. The information it yields also provides a baseline for health and behavior that allow Brookfield and other zoos to examine their success in husbandry and health care for their animals.

The Problems With Ecotourism

Tourists traveling to Kenya who are fortunate enough to listen to Jeanne Altmann or one of her colleagues speak and to see the famous

baboon groups will come away from the experience with a better understanding of the many pressures on this region. The Amboseli ecosystem is home to Maasai herdsmen and a wealth of African wildlife, both of which bring tourists and money into the local economy. Lodges now dot the landscape in and around Amboseli. Ecotourism is a wonderful way to communicate conservation objectives, and it brings money and jobs to the local community, but not all aspects of tourism are beneficial to the local environment.



Living a traditional lifestyle, Maasai families traverse Amboseli with their cattle.

Jeanne and Stuart Altmann



Jeanne and Stuart Altmann

Grooming is an important social behavior that establishes and reinforces bonds between group members.

With the expansion of lodges came an increase in lodge-related activities, like traffic (tourist vans) and garbage. One group of baboons found the lure of the garbage dump too appealing, and settled in for the long run. This Lodge Group has become the wildlife equivalent of couch potatoes. Jeanne, her assistants, and former student Philip Muruthi, studied the Lodge Group, and found that they spend less time foraging and feeding than their wild-feeding cousins, they are fatter, they mature earlier, they reproduce more often and more successfully, and they have more time for activities like socializing and fighting. They are also more likely to have conflicts with their human neighbors, especially as their group grows larger. In the

long run, the baboons usually lose these conflicts. Jeanne's efforts to persuade the lodge operators to alter their behavior (dumping trash) so that the baboons would alter theirs (feeding on trash) have met with occasional success. Researchers have submitted recommendations to Park management for responsible ecotourism policies and advocated consumer education. In the meantime, the Lodge Group continues to feed on the discards from the tourist lodges.

Conservation Training in the Field

Long-term research projects, such as the Amboseli Baboon Research Project, reach far beyond the work of a few scattered individuals. Those scientists and students fortunate enough to participate in the



Oria Douglas-Hamilton

Above: Training a future generation of conservation biologists is an important part of the Amboseli Baboon Research Project. Here Jeanne works with Raphael Supeet Mututua.

Left: A great deal of the Amboseli research project has focused on the development of baboon infants and the influence of social organization on mothers and their offspring.

Amboseli Research Project have studied on the cutting edge of behavioral research. Numerous students from the United States and Kenya have trained and received degrees for research conducted as part of the project. Students from the University of Chicago and from abroad also travel to Brookfield Zoo to work with Jeanne and the zoo's baboon group of Guinea baboons. Researchers associated with the Amboseli Research Project maintain significant collaborative ties with local scientists, as well as with the community in and around Amboseli.

To succeed, conservation and research efforts require the cooperation and commitment of local residents and scientists. Early on, the Project drew research assistants and camp workers from the communities surrounding Amboseli National Park. Some of these assistants are now highly trained field biologists. Cooperation supports both the research efforts and the community as money is drawn to the local people and to those employed by the Project. Such intensive interaction and participation is crucial since, ultimately, it is the scientists and conservationists of Kenya who will be responsible

for long-term research and conservation efforts. The participation of local people in research projects worldwide hones skills and helps to establish valuable international networks that can benefit future research and conservation efforts. Local scientists also bring valuable knowledge and insights into the ecology and sociology of the area.

Today, Jeanne usually spends two to four months in the field each year, but the research continues in her absence. Three full-time field assistants, as well as visiting graduate students and scientists from around the world, continue to collect that long-term data that are the essence of the Amboseli Baboon Research Project. Its influence will be felt for generations to come.

Results Benefit Brookfield Zoo

Those who work at Brookfield Zoo appreciate what a tremendous resource the Amboseli Project can be. This research offers a baseline for health and behavioral standards that allow zoos to examine their success in husbandry and health care for baboons and all zoo animals. Using the information culled from research projects supported worldwide, Brookfield Zoo is able to determine appropriate diets, levels of activities, and health standards that improve husbandry and care of all animals.

On behalf of Brookfield Zoo, the Project continues to advance conservation education and research efforts for Africa's wildlife. However, here at home, Brookfield Zoo

needed to educate its audience about their role in worldwide conservation efforts.

Nearly two million people visit Brookfield Zoo each year, and one of the highlights is a visit to Baboon Island. Despite the long-term research supported by the zoo and conducted by one of our own curators, the educational potential of Baboon Island was largely untapped.

In the summer of 1996, Jeanne and I joined with other Brookfield Zoo colleagues to revamp the zoo's Baboon Island interpretive program. The plan focuses on three main areas. First, it conveys the results of Jeanne's unique research to zoo visitors. Second, it makes visitors aware of Brookfield Zoo's



New observation windows installed in 1996 open another world to young visitors at Baboon Island.

substantial role in research and conservation efforts worldwide. Finally, it seeks to have visitors come away with a new appreciation for the importance of behavioral observation for conservation actions. With a generous grant from the National Science Foundation and additional funding from the Chicago Zoological Society and the University of Chicago, five permanent displays will soon be installed at Baboon Island.

"Can Studying Baboon Behavior Help Conservation?" will establish the crucial link between behavioral observation and conservation action. Indeed, we must understand more about how animals

live in the wild before we can take meaningful steps to conserve them. Observational sampling techniques helped to revolutionize our understanding of animal societies.

"Looking for Clues" introduces the field of scatology and describes how researchers acquire useful information about baboons by studying their feces. Expected to be a favorite of children, this station also conveys the sense that animal studies are collaborative exercises—a real team effort. More than a dozen researchers worldwide contribute to our understanding about baboons through this emerging scientific field.

"So Much to do, So Little Time" compares the time budgets of baboons. Time budgets are valuable tools that break down how much time animals spend engaged in various activities, like feeding, resting, and socializing. In the mid-1980s, Jeanne and Brookfield Zoo researcher Amy Samuels compared time budgets of wild Amboseli baboons, the Lodge Group baboons, and the baboons on Baboon Island at the zoo. The Lodge baboons, who had a constant and stable source of food, were more likely to become obese, and were more aggressive and less active than their wild counterparts. In terms of how they spent their time, Lodge baboons, in fact, were very similar to Brookfield Zoo's baboons: they had created for themselves a voluntarily human-dependent environment.

"Baboons in Two Worlds," is a unique informational station that answers real visitors' questions. The planning team interviewed 200 Baboon Island visitors to assess general levels of interest and knowledge about baboons, conservation, and behavior. One of the questions we asked visitors was: "What are some things you think visitors want to know about baboons?" This panel answers at least a few of these questions.

Finally, "Coping with a Changing Environment" focuses most directly on environmental change and how it influences behavior. Because behavior is often the first thing to change when an animals' environment changes, it may serve as an "early warning" that signals the need to address an environmental problem before it seriously impacts animals.



Erica Benson

New touch-cart activities are one part of a comprehensive interpretive renovation underway at Brookfield Zoo's Baboon Island, and are designed to communicate the important research supported by the Chicago Zoological Society.



Jeanne and Stuart Altmann

Yellow baboons in the shadow of Mount Kilimanjaro.

To accompany this new signage, innovative docent programs, touch carts, and self guides have been developed. In one activity, visitors undertake genuine behavioral research at Baboon Island. The zoo is undertaking a study to re-evaluate the time budgets of the zoo's baboons. Under the supervision of docents, visitors are collecting some of the data in this research project. Docents offer minimal instruction and lead visitors through a brief observation session. Visitors should come away with a new-found appreciation for the work of behavioral biologists.

While it is true that baboons are not endangered, their way of life certainly is, as are many of the other animal species with whom they share their habitat. The long-term data that we gather on baboons allow us to evaluate the relationship between behavior and changes in habitat. Because baboons have been so well-studied by scientists like Jeanne Altmann and colleagues here at Brookfield Zoo and elsewhere, Baboon Island can illustrate the importance of behavioral research and conservation.