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## The Genesis of Habitat Immersion in Gorilla Exhibits Woodland Park Zoological Garden and Zoo Atlanta — 1978-1988

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Short Title: Habitat Immersion in Gorilla Exhibits

### Abstract

Great ape exhibit evolution appears to closely follow the development of public attitudes and scientific research about these creatures. Ecological and behavioral information gained in the last twenty years has resulted in a new generation of gorilla exhibits presenting concepts of "realistic habitat simulation" and "habitat immersion". Gorilla exhibits typifying these approaches at Woodland Park Zoo in Seattle and at Zoo Atlanta are discussed showing recent evolution in exhibit and facility design. Possible future directions are suggested.

Key Words: Gorilla Exhibits, Great Ape Exhibits, Habitat Simulation, Landscape Immersion

### Brief History

Great Ape Exhibits have gone through many stages of evolution since chimpanzees and orangutans were first exhibited in Europe during the Eighteenth Century (Maple 1979). These stages may be seen as the results of interaction between public attitude, keeper knowledge and available technology. At first both knowledge and technology were rudimentary. The first animals were simply kept in cages or, being infants, were taken for rides in baby buggies and allowed to physically interact with the public. The germ theory of disease transmission was as yet unknown and keepers knew little about great ape nutrition. Capture and transport were extremely stressful physically and mentally. It is little wonder that longevity in captivity was low.

Western nations of the Victorian period seemed to have an almost religious zeal to explore, claim and tame the wild places of the earth. Souvenirs of these conquests, be they of cultural or biological interest, were popularly exhibited to enthusiastic crowds (Wonders 1984). Most viewers probably saw captive great apes as living curiosities and as "triumphant spoils of a war against savagery" (Coe 1987).

As early as 1914 R.L. Garner, an animal collector who supplied Hornaday, among others, suggested keeping chimpanzees and gorillas in extensive outdoor environments resembling their original habitats. (Garner 1896). Yet it would take sixty years before this approach was attempted. The attitude that great apes should be treated like human children or, if this was impossible, be confined to cages was probably too strong and the interest in wild habitats too weak to accept such an ecologically based notion.

As advances in medical knowledge and aseptic technology occurred, great ape longevity greatly increased. We had entered the "tile-lined lab" period of exhibit design. The war against nature, while still rampant abroad, had become focused as a war against germs, at least in primate facilities. This was a period of great public fascination with technology - the era of aviation, radio and rural electrification. No one saw anything incongruent about displaying gorillas in habitats of stainless steel, aqua tile, grey concrete and plate glass. In fact, there is still strong sentiment for this approach today and displays of this type have been opened in the last few years.

The first outdoor moated enclosures for great apes were probably those built at the Bronx Zoo as recently as 1950. The San Diego Zoo built large outdoor yards in Balboa Park in 1965 and at the San Diego Wild Animal Park ten years later. A smaller though similar exhibit was opened at the Cincinnati Zoo in 1978. All of these exhibits generally followed the same model as earlier bear exhibits, with walls on three sides and a dry moat barrier with public viewing across the front. The animal yards had little vegetation other than grass, but public areas were often lushly landscaped. In all cases, they greatly increased the animal's exercise areas, at least in summer.

These exhibits demonstrated a shift in public attitude towards "Barless, naturalistic" displays. This seemed to come not from any wish to display ecological or social relationships which were still largely unknown, but rather from a desire to avoid the prejudicial context of confining steel bars (Coe, 1982; 1985).

## Woodland Park Zoo Gorilla Exhibit

Although scientists such as Bingham and Nissen had studied great apes in the wild during the 1930's (Maple and Hoff, 1982) it was not until George Schaller's *The Mountain Gorilla* (1963) was published that zoo designers got their first detailed look at gorilla habitat and ecology, an event which profoundly influenced the present author's work. Further publications by Goodall (1968), and Fossey (1970) along with the many compelling photographic images published in *National Geographic* became major sources of information and inspiration in the design of the gorilla exhibit at Woodland Park Zoological Garden in Seattle during 1975-1976. Also, all three of these field scientists gave personal encouragement to the innovative direction this exhibit was taking during brief speaking engagements in the area, Dr. Schaller being particularly generous of his time and knowledge.

Zoo designers have traditionally begun a project by touring other zoos, which then greatly influence their design. Jones and Jones, the design firm for the Seattle Zoo work (the present author was a member of this design team) took a different approach. Encouraged by the zoo's lead planner and future director, David Hancocks, Jones and Jones set out not to design another zoo gorilla exhibit, but rather "... a landscape with

gorillas" (Jones et al. 1976). Thus the lush landscapes illustrated in *National Geographic* and the ecological relationships they inferred became the real models for the design of the exhibit.

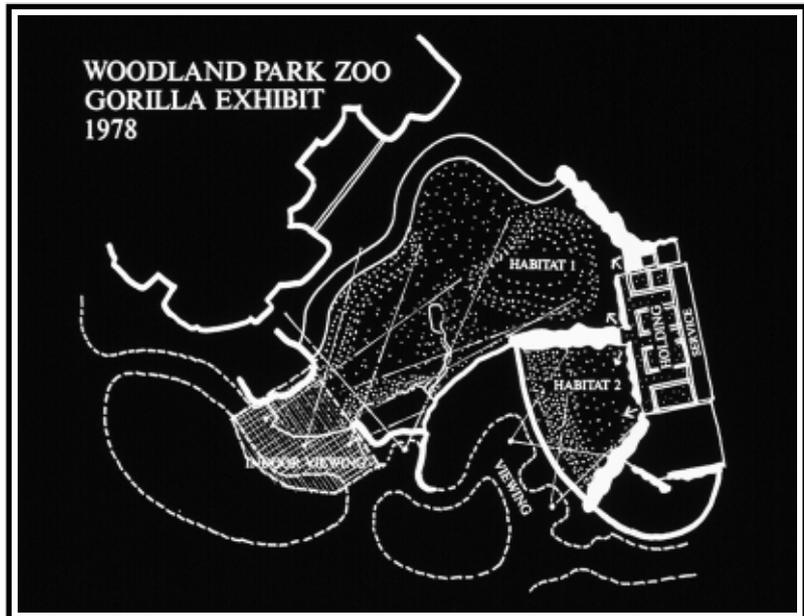


Figure 1. Woodland Park Zoo Gorilla Exhibit Plan prepared by Jones & Jones. Drawing: J. Coe

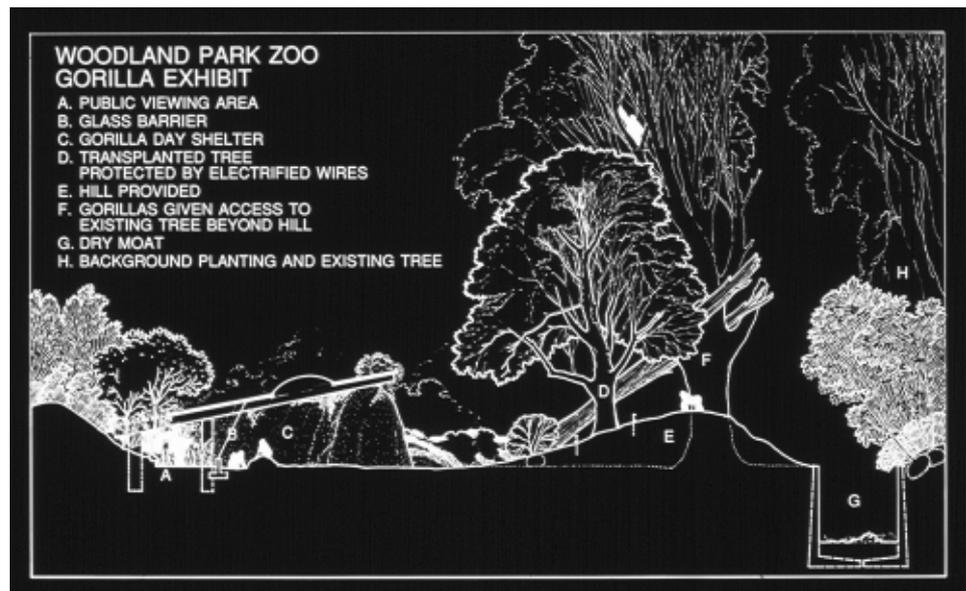


Figure 2. Woodland Park Zoo Gorilla Exhibit 1976 cross-section prepared by Jones & Jones. Drawing: J. Coe

## Woodland Park Zoo Gorilla Exhibit Plan

Since the gorillas to be exhibited were of the western lowland subspecies rather than the mountain gorillas illustrated in the magazines, considerable interpolation is necessary to convincingly recreate the lowland habitat and the theoretical model became the granitic highlands of Rio Muni, from which few photographs were available. The resulting exhibit opened in 1978 after a one year long plant establishment period. The designers attempted to recreate the general appearance of an early successional hillside meadow in a disturbed tropical forest - the type of area whose rampant herbage provides ideal foraging for gorillas.

## Woodland Park Zoo Gorilla Exhibit at Opening in 1978

It had been almost universally accepted that significant plantings could not be maintained in gorilla yards, but this exhibit proved otherwise. Today, ten years later, herbs and shrubs (and protected trees) continue to thrive. (2006 Note: This continues to be true twenty-eight years later.) This success can be attributed to three factors. First, the soil was properly engineered and plant species well selected (good planning); second, plantings continue to be well maintained and third, all plantings had one full year to become established before the gorillas were introduced to the plants. The gorillas entered a yard full of established plants. Plants that were particularly conspicuous and vulnerable, such as small trees were quickly destroyed, but overall the plantings largely were left alone.



*Figure 3 (above right). Woodland Park Zoo Gorilla Exhibit under construction in January 1977. Photo: J. Coe*

*Figure 4 (right). Woodland Park Zoo Gorilla Exhibit after establishment of planting in 1978. Photo: J. Coe*



*Figure 5 (below right). Woodland Park Zoo Gorilla Exhibit in 1980. Photo: J. Coe*

## Woodland Park Zoo Gorilla Exhibit after Ten Years of Use in 1988

As innovative as this concept of "realistic habitat simulation" was, perhaps a more profound concept was inherent within it, the concept of "landscape immersion" (Jones et al. 1976). Adherents of this concept suggested that in order to fully appreciate an animal (or plant) you must experience it while immersed in its natural habitat. The jungle-like plantings surrounding the approach pathways establish the exhibit context (Coe 1982). Similar plantings within and surrounding the gorilla areas reinforce the conception that zoo-goers are visitors in the gorilla's natural habitat (Coe 1985).

The resulting exhibit has two outdoor gorilla areas measuring 1300m<sup>2</sup> and 278m<sup>2</sup>. The larger enclosure holds two silverback males and two adult females plus offspring. For three years this group also included a young black-back male, making a total of seven gorillas.





**Figure 6.** Woodland Park Zoo silverback Kiki in his favorite lookout tree. 1980 photo: D. Hancocks



**Figure 7.** Woodland Park Zoo. Photo: J. Coe

Habitat complexity is thought to have been an important factor in allowing these three males to coexist. The smaller yard is used occasionally when animals are separated. Ten years of behavioral observations of this group were done by Lockard (unpublished).

A special feature of the exhibit is a day shelter providing approximately 75m<sup>2</sup> of covered space for the gorillas and a somewhat larger covered area for visitors. The areas are separated by large viewing windows. The gorilla shelter provides radiant heaters and heated artificial rocks and is open along one side, allowing the animals free access to their outdoor enclosure.

The gorilla holding facilities were provided by renovating existing bear dens.

Because of the height of these existing structures it was possible to have keeper access directly over animal transfer areas. Night quarters include one room at 14.2m<sup>2</sup> x 2.76m high and four rooms of 9m<sup>2</sup> x 2.76m high. A squeeze gate operates in the central shift corridor. The facility was designed for up to six animals to be quartered separately. There is no public viewing into the holding facilities.

The Woodland Park Zoo gorilla exhibit is maintained by the full-time equivalent of 1.5 staff and one volunteer. The outdoor enclosure requires 1.5 hours per day. (V. Sunde, pers. comm.).



**Figure 8.** Woodland Park Zoo holding area. Photo: Woodland Park Zoo



**Figure 9.** Woodland Park Zoo in 1988. Photo: J. Coe



**Figure 10.** Woodland Park Zoo silverback Kiki plays with young gorillas born in the exhibit as mother Nina looks on. 1990 photo: J. Coe

## Zoo Atlanta

In 1981 this author met with Dr. Terry Maple at the Georgia Institute of Technology and, having some free time, joined in some impromptu "brainstorming" on the question "if you designed an ideal gorilla exhibit from a behavioral basis, what would it be like?" (Coe & Maple 1985). Previous exhibits had been designed for a single troop. This concept would accommodate four troops in adjacent habitats. Rocky promontories would be located in each exhibit so that silverbacks (or entire troops) could display back and forth across hidden dry moats. This interaction had been described by Fossey (1983) as an exciting event in the activities of wild gorillas and it was thought that in captivity such opportunities would provide silverback males with an appropriate occupation and could perhaps increase sexual activity.

Dr. Maple became director of the Atlanta Zoo in 1984, changed its name to Zoo Atlanta and asked the author to join him in planning a major new gorilla complex based upon the multi-troop concept. CLRdesign inc of Philadelphia joined with Turner Associates/Robert and Company of Atlanta as project designers, architects, landscape architects and engineers.

The Yerkes Regional Primate Research Center of Emory University generously agreed to relocate twelve gorillas in three established breeding troops to the new facility and Drs. Kenneth Gould and Brent Swenson of the Yerkes Center became active members of the design team. As plans progressed, the Ford Motor Company became a major contributor.

### Ford African Rainforest

Habitat research was carried out in 1987 by the author together with Dr. Dietrich Schaaf, General Curator at Zoo Atlanta and others in Korup National Park and Campo Forest Reserve in the Republic of Cameroon. This work was greatly assisted by Dr. Stephen Gartland of the University of Wisconsin and Dr. Duncan Thomas of the Missouri Botanical Garden, who are leading research scientists in West Africa. Photographs and field sketches of both characteristic tropical vegetation and plants known to be utilized by gorillas were matched with plants of similar appearance which are cold hardy in Atlanta. These

"replicator species" were used in the design of both public and animal areas as a further development of the "habitat replication" and "habitat immersion" concepts developed at Woodland Park Zoo.

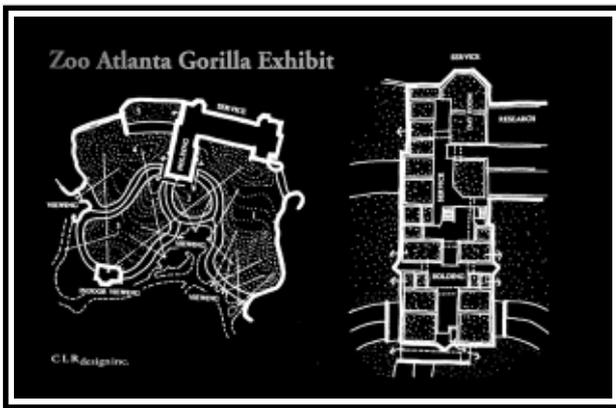
In the field particular attention was paid to disturbed sites such as forest clearings, abandoned logging roads and garden plots regenerating after "slash and burn" farming. Agricultural plant species such as banana, taro, maize and beans were commonly associated with these latter sites and are utilized by gorillas and other primates. Since large areas of the Zoo Atlanta site were treeless, it was decided to landscape some of these areas to simulate abandoned farm plots. Piles of dead brush were covered with fast-growing vines and thickets of banana, maize and elephant ear were planted, with interpretive panels placed to explain them. Large dead trees were bolted upright or placed horizontally to recall forest clearing and provide the gorilla with climbing opportunities.



*Figure 11. Zoo Atlanta staff and consultants visit wild gorillas in Rwanda in 1987. Photo: J. Coe*



*Figure 12. Zoo Atlanta gorilla exhibit, Ford African Rainforest in 1989 recreating experience of visiting wild gorillas. Note apes are in elevated or superior positions requiring visitors to "look up to them". Photo: J. Coe*



**Figure 13.** Zoo Atlanta gorilla exhibit plan by CLRdesign inc. Drawing: J. Coe

The granite geology of Cameroon is represented by characteristically dark outcrops of artificial rock, sometimes featuring waterfalls for the gorillas to play in. The artificial rock outcrops provide sunning and display locations or hide the holding building.

The public education and nature interpretation aspects at the Ford African Rainforest are far more ambitious and better integrated than the attractive but modest beginning made at the Seattle Zoo. To begin with, visitors are encouraged to pretend that they are actually "on safari." For example the entry sign displaying the park rules states that "Animals have the right of way" implying that visitors could perhaps encounter wildlife along the trail. The Takemenda Research Camp simulates a field research station with elevated observation deck and camp tent. Volunteers introduce zoo visitors to aspects of field research and interpret hands-on displays.

The interpretive center contains models, graphics and video presentations as well as large windows looking out on a multi-troop panorama. Areas of four separate enclosures are visible from this carefully sited vantage point. There is even a low small window in a special alcove where children can view the gorillas while seated with a life-size plush gorilla doll.

### Zoo Atlanta Gorilla Holding Facility

The entire complex, which opened in June 1988, features four outdoor habitats of 2721m<sup>2</sup>, 1505m<sup>2</sup>, 1443m<sup>2</sup>, and 340m<sup>2</sup> surrounded by dry moat barriers. Where habitats adjoin the moats are doubled.

The night quarters are located in an expanded and remodeled feline house. The 786m<sup>2</sup> holding facility includes nine night rooms ranging from 9.25m<sup>2</sup> to 26.6m<sup>2</sup>, four squeeze/metabolic cages of 4.6m<sup>2</sup>, two dayrooms of 64.8m<sup>2</sup> and 22.2m<sup>2</sup> (one subdivided by a double line of mesh to facilitate animal introductions), and two quarantine rooms of 9.25m<sup>2</sup>. All animal areas are interconnected by a system of overhead transfer chutes which allow virtually any animal to be transferred to either dayroom or any of the four outdoor habitats.

Hydraulic transfer gates use water rather than potentially toxic liquids. Laboratory areas of 452m<sup>2</sup> are provided for up to four permanent zoo and Yerkes Center researchers and their outside collaborators. Roof top and other areas surrounding the exhibit are accessible to scientific observers.



**Figure 14.** The Interpretive Center provides overlapping views of all four gorilla displays. Photo: J. Coe



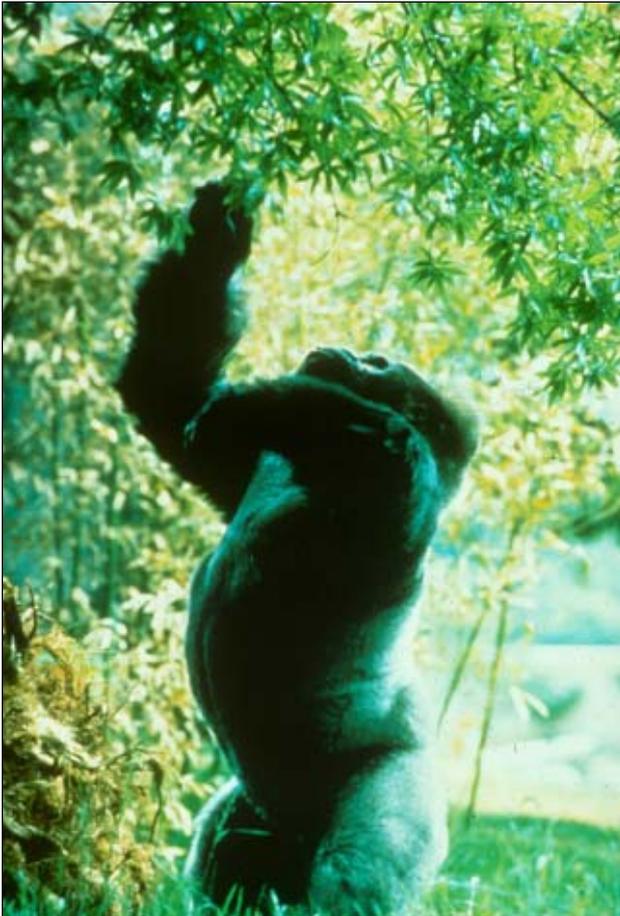
**Figure 15.** Takemenda Research Camp displays gorilla artifacts. The camp is surrounded by gorilla habitats. Photo: J. Coe



**Figure 16.** This sculpture at Zoo Atlanta in the Research Camp allows children to envision playing with gorillas. Photo: J. Coe



**Figure 17.** Zoo Atlanta's large night quarters includes nine night rooms, two day rooms and extensive research areas. Photo: K. Kingsbury



*Figure 18. Zoo Atlanta's popular silverback Willie B in his first moments out-of-doors after 27 years inside. Photo: J. Coe*

### **Introducing Gorillas to New Facilities**

Willie B, the silverback gorilla had lived alone at the Atlanta Zoo for 27 years in a 73.5m<sup>2</sup> indoor enclosure. Since he was already at the zoo, it was decided that he should be introduced to the new facilities first to thoroughly test them before the Yerkes gorillas began to arrive. Animal Trainer Tim Desmond worked

with Lead Keeper Charles Horton, who had gained the silverback's confidence over many years of close contact. Willie B was conditioned to pass through transfer gates on command and was introduced to a wide range of novel objects during carefully controlled procedures to increase his confidence before he was introduced to a totally new environment. While it may not be possible to fully credit this training with Willie B's remarkably rapid acceptance of his new home, the training process clearly was very useful.

Within fourteen months of leaving his solitary cage, Willie B was successfully integrated with two females to form his own troop.

### **Performance**

A staff of three full-time and one relief keeper is able to clean and maintain the entire facility.

Dr. Duane Jackson, of Morehouse State University and Zoo Atlanta, observed both gorilla and public space utilization. His findings show that the exhibits are well received by the public, but that the midday time of greatest public viewing corresponds to the time of lowest gorilla activity when the animals retreat to the cool areas near their night quarters and are difficult to see. Attempts are underway to alter feeding schedules and provide more shade in prime viewing areas.

Thus far no dramatic displays have been recorded between silverbacks despite the provision of display locations. However, the silverbacks do seem to be aware of where other silverbacks are located. It is impossible to say whether this or other features of the exhibit design are responsible for increased sexual activity and reproduction as originally hypothesized, but two female gorillas were apparently impregnated within the first weeks after they entered the new exhibits and both births occurred in the display yards with the full troop present and their young animals, now nearly two months old, are thriving. A third healthy birth just occurred as well, accounting for three births among the eleven adult animals in the first fourteen months in the new exhibits.



*Figure 19. Zoo Atlanta's Willie B claims his new home with a "side display" stance in May 1988. Photo: J. Coe*

## Future Directions

The success of the gorilla exhibits at Woodland Park Zoo and Zoo Atlanta ten years later suggest that the development of heavily planted habitat replication exhibits will expand. Exhibits of this type are presently under design or construction at zoos in Dallas, Denver, Colorado Springs, and Milwaukee.

Exhibits in colder climates will provide public viewing into dayrooms which will be styled more like gorilla gymnasiums than realistic habitats. This approach, pioneered at the Lincoln Park Zoo in 1978, provides more opportunities for flexible, interactive enrichment devices. Public interpretation would focus on issues of management and captive conservation, leaving the subjects of primate ecology and habitat conservations to landscaped outdoor areas. Night quarters and dayrooms in the future may utilize simple electronic devices to give the primates greater control of their indoor environment, such as the ability to vary light intensity and color, and activate "basking lights". Simple occupation-providing devices, such as finger mazes, will become commonplace. Portable and flexible furnishings will tend to replace hard, fixed perches. More windows will be provided, giving primates views of some keeper areas, dayrooms and outdoor areas.

## Conclusion

Early Great Ape enclosures demonstrated an attitude of misunderstanding and exaggerated human dominion. This was followed by what appeared to be a detached, clinical approach typified by tile walls and stainless steel fixtures without outdoor yards. Medical and engineering technology kept apes more healthy but left them few occupations or choices. The habitat immersion approach developed in the mid 1970's showed gorillas as ecological beings and presented them to the public with far greater reverence. However, off-exhibit facilities continued to give animals little to occupy their lengthy periods of confinement. Zoo Atlanta points the way to far more complex and socially active outdoor and indoor environments, showing a greater sensitivity to gorilla, keeper and researcher needs. Hopefully, future exhibits will continue to develop in ways which demonstrate even greater levels of understanding and respect for these magnificent and complex creatures.

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2006 update: The gorilla facilities of Woodland Park Zoo and Zoo Atlanta have strongly influenced the design of gorilla exhibits in at least fourteen other US zoos, as shown in this photo from Louisville Zoo. Photo: Louisville Zoo