

One-Hundred Years of Evolution in Great Ape Facilities in American Zoos 1896 – 1996

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In our 1987 paper, "In Search of Eden – A Brief History of Great Ape Exhibits" (Coe and Maple 1987), Dr. Terry Maple and Jon explored important trends and events leading up to the veritable explosion of new great ape facilities in zoos around the world. Today, nearly ten years later, the rapid evolution of great ape facilities continues. It is time for an update.

It is also 100 years since R.L. Garner first suggested keeping gorillas and chimpanzees in large outdoor environments resembling their natural environments (Garner 1896). Today that advice is being followed not only in terms of replicating wild habitats, but also in attempting to provide the animals with behavioral opportunities and choices following models from wild, free living great apes.

The evolution of animal displays may be measured by progress in three basic areas:

1. The public display settings;
2. The off-display holding areas and;
3. The management methods used to maintain the animals.

This paper will compare great ape facility development through time in these three areas. While the description of Victorian and "Grotto" exhibits apply to the generic type, later discussions focus on facilities which we consider trend setters. A more extensive listing of new exhibits is beyond the scope of this brief paper.

Some students of zoo history have characterized their development in terms of generations. The **First Generation was the Victorian Zoo**. The great ape exhibit was typically a barred cage which confined animals which were too old, large or dangerous to be taken out among the public. The animals were considered curiosities, but were presented as if they were felons. Animals lived in their display cages nearly full time. Little was known about proper diet or hygiene, and great ape mortality was high.

The Second Generation may be called the blue tile period. Great advances in health and hygiene resulted in facilities designed to be easily cleaned and durable. The result was a great increase in great ape longevity as management practices and diet improved. However, behavioral needs of the animals were not widely appreciated, and reproduction was very low. In American zoos, the first birth of an orangutan was in 1929. The first gorilla birth was in 1956 (Maple and Hoff 1982). Animals were still displayed and housed in the same enclosures.

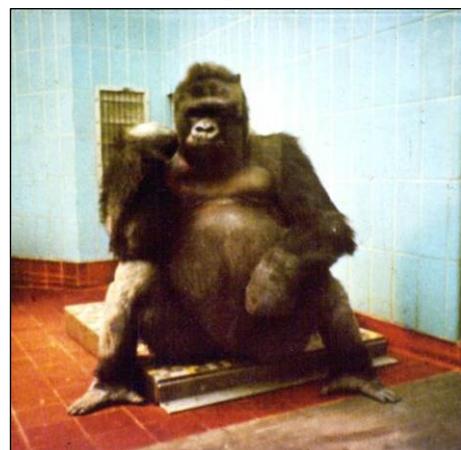


Figure 1: Blue Tile Period. Photo: Zoo Atlanta

Hagenbeck grotto period (also second generation): Grottos were developed in Germany early in this century (Hagenbeck 1910) for "bar-less" containment of large carnivores. It was nearly fifty years later that gorillas were first displayed out of doors in an open-moated grotto at the then **Bronx Zoo** (Shubert 1950). A much larger moated gorilla exhibit was developed at the **San Diego Zoo** in 1965. Animals were displayed on grass and provided with timber platforms for climbing and shade. These models were widely copied and represent a very significant improvement over the tile lined rooms, still favored for indoor display and holding areas. The San Diego Zoo exhibit was later heavily planted.

Arnhem and the park displays: The Bergers Zoo in Arnhem, the Netherlands, developed an approximately two acre display for chimpanzees in 1970 (de Waal 1982). The habitat resembled a park with open lawns and scattered trees, most of which were protected by electrified wires. Dead trees and logs provided behavioral opportunities and a broad water moat and walls provided containment. The indoor area was equally innovative with a large "day room" or group room in addition to more typical night holding cells. From the beginning, the facility, while open to the public, was designed to study chimpanzee behavior. So successful was it in this regard, that many papers and an important book resulted, Franz de Waals' *Chimpanzee Politics, Power and Sex among Apes* (1982). The large chimpanzee exhibit at the Taronga Zoo in Sydney (opened in 1980) follows the Arnhem model, and the Detroit Zoo's chimpanzee facility (opened in 1990) borrows heavily on the Arnhem Zoo's ideas.

The "Chimpanzees of Harambee" at the **Detroit Zoo** was modeled after Arnhem, but upgraded with the immersion viewing concept, two outdoor habitats (total area two acres), and two very large, high day rooms. Visitors view the day rooms from inside the chimpanzee interpretive center, which also provides views into the outdoor habitats.

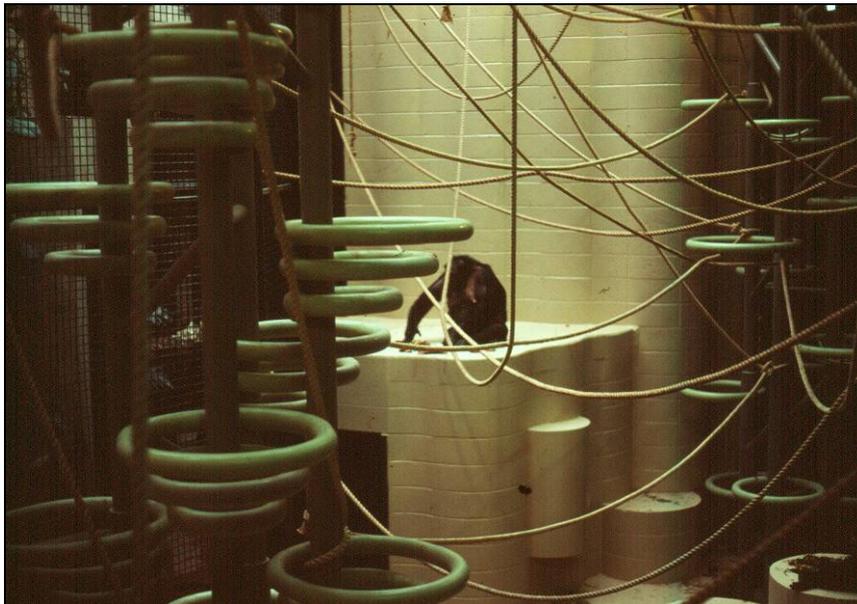


Figure 2: Fischer Great Ape House, Lincoln Park Zoo, circa 1975. Photo: J. Coe

Third Generation large indoor habitats were developed at **Lincoln Park Zoo** (opened in 1975), **Toronto Zoo** and **Brookfield Zoo** (1982). Lincoln Park's, "Fisher Great Ape House," provided very high spaces with abundant climbing structures to which ropes and cargo nets have been added more recently. While no attempt was made to appear "natural", the facility provided some important innovations to encourage natural behavior. For example, the wide environmental gradients, light-dark, warm-cool, high-low, provide the animals with many behavioral choices not found in most great ape facilities (Coe 1992). These large display rooms also function as day rooms supported by many off-exhibit holding cells. Continuous transfer chutes circle the entire facility allowing for the possibility of

animal rotation, only now being used in other zoos.

The large artificial trees and geologic features developed for orangutans, gorillas and other primates at the "Tropic World" facility at Brookfield Zoo have been further improved in indoor great ape facilities at the **St. Louis Zoo** and **Pittsburgh Zoo**.



Figure 3: Gorilla Exhibit, Woodland Park Zoo, circa 1978. Photo: J. Coe

The Third Generation Landscape Immersion movement began at the **Woodland Park Zoo** in Seattle (Jones et al, 1976; Coe, 1985). Heavily influenced by the field research of Schaller, Goodall, Fosse and Geldikas, the gorilla exhibit (opened 1978) attempted to replicate a natural clearing in the highland forest of Rio Muni, West Africa. Zoo visitors were "immersed" in the simulated forest habitat

before glimpsing the gorillas (across a hidden barrier) in the same forest landscape. Thus, for the first time, the living landscape became a tool for educating visitors about the gorillas' place in the ecology of the tropical forest. This facility also provided an innovative day room -an open shelter for the gorilla troop to retreat to in inclement weather. Off-exhibit holding facilities had skylights, flexible bunks, acoustic mitigation, deep bedding and other features aimed specifically at improving the quality of life for the gorillas.

Most of the examples of great ape facilities which follow were strongly influenced by the advances made at the Seattle facility.

The large gorilla and chimpanzee displays at the **North Carolina Zoo** resemble the Seattle model in their use of very natural vistas. However, their designers were unaware of the immersion concept (Holland 1995), and simply placed Arnhem-like displays in a highly natural site and simulated surrounding geology with artificial rock with excellent results. The large artificial termite tower, provided for the chimpanzees, housed a mechanical treat dispenser. This was an early attempt at mechanical behavioral enrichment in an outdoor setting.



Figure 4: Ford African Rainforest, Zoo Atlanta, circa 1988. Photo: J. Coe

Zoo Atlanta took the immersion and intra-group behavioral display concepts developed at Woodland Park Zoo and multiplied them with four separate gorilla display areas, (and three areas for orangutans), encouraging both intra-group and inter-group interaction in a heavily landscaped setting. While the facility opened in 1988, these concepts were first set forth in 1984 (Coe and Maple). The Zoo Atlanta "Ford African Forest" exhibits also established a new emphasis on interpretation with a simulated research field camp, poacher's snare, and gorilla interpretive center.

Like the Arnhem facility, Zoo Atlanta set out to provide a public attraction which also served the needs of behavioral research. To this end the Yerkes Regional Primate Research Center became a full partner in the design of the facility.

I believe that one of the most interesting features of the Zoo Atlanta great ape facilities is the built-in ability to rotate the family groups of gorillas or orangutans among the many display areas and indoor day rooms on a daily basis. While this feature has only been partially utilized to date, two gorilla troops are successfully trading outdoor areas with beneficial results to the animals in terms of increased levels of exploratory behavior and a general increase in activity (Lucas 1995). This **animal rotation concept** is more fully discussed in my 1995 paper (Coe 1995a).

The **Dallas Zoo's** gorilla exhibit (opened in 1990) carried the immersion exhibit concept to a new high in terms of both the density and variety of plantings maintained with the gorillas. In their off-exhibit day room, indoor tropical plants are provided to help create a satisfying backdrop for the gorillas. Here too, excellent interpretive features, including a simulated "research station", are provided.

The **Busch Gardens** "Moimbe Forest" exhibits for gorillas and chimpanzees appears to build upon the Seattle and Dallas models, but adds true tropical plantings and increased landscape drama (high cliffs and waterfalls). This spectacular exhibit seems very popular with the visiting public.

The **Cheyenne Mountain Zoo** opened their great ape facility for gorillas, orangutans and other primates in 1989. While this facility also provides the combination of indoor interpretive areas, day rooms and viewing into outdoor display areas, the most innovative feature may be the outdoor orangutan habitat. Forty feet high and more than 70 feet in width, the aviary-like enclosure of ultra-strong, ultra-fine woven stainless steel mesh, provides a huge volume of accessible space for these highly arboreal orangutans. This mountainside location also provides a benefit few zoo-dwelling primates have - views of vast extent!



Figure: 5: Great EscApe, Oklahoma City Zoo, circa 1994. Photo: CLRdesign inc.

The **Oklahoma City Zoo's** "Great EscApe" provides facilities for gorillas, chimpanzees and orangutans. The facility, which opened in 1993, has many notable innovations including highly effective manual shift door mechanisms, and excellent interpretive facilities. The most innovative feature is the juxtaposition of animal and public viewing facilities. The animals can move from small

night rooms to climate controlled, skylighted day rooms, to sheltered outdoor areas, to open moated outdoor display areas, depending upon climatic conditions. Visitors in indoor interpretive areas can follow the primates' progress from day room, to outdoor shelter, to open immersion exhibit.

The **Toledo Zoo** renovated their great ape house in 1994. While a large, naturalistic outdoor gorilla display was added, most of the new displays can trace their origin to Lincoln Park Zoo's "Fisher Great Ape House." As in the earlier model, the emphasis is on behaviorally enriched vertical space. To make the spaces more interesting to the animals, operant conditioning training facilitates ape's rotation throughout the facility. Thus, gorillas, chimpanzees and orangutans occupy the same space consecutively (Petiniot 1995).

Kansas City Zoo opened their large Kahuzi-Biega tropical forest exhibit in 1995. The center piece is a 1.8 acre gorilla exhibit. All pathways, structures and signs appear as they would around a field research camp in the Zaire National Park for which the project is named. Leopard, duiker, bongo and colobus monkeys are also featured,

The Fourth Generation Great Ape Facilities of the Future: Here are some features which will characterize the fourth generation great ape facility:

- Landscape immersion outdoor habitats
- Large volume, highly enriched indoor day rooms
- Operant conditioning training allows apes to rotate among many indoor and outdoor areas
- Emphasis upon giving animals "choices" and "control"
- Combinations with multiple species including non-primates
- Cultural elements
- Encounter (behavioral demonstrations)

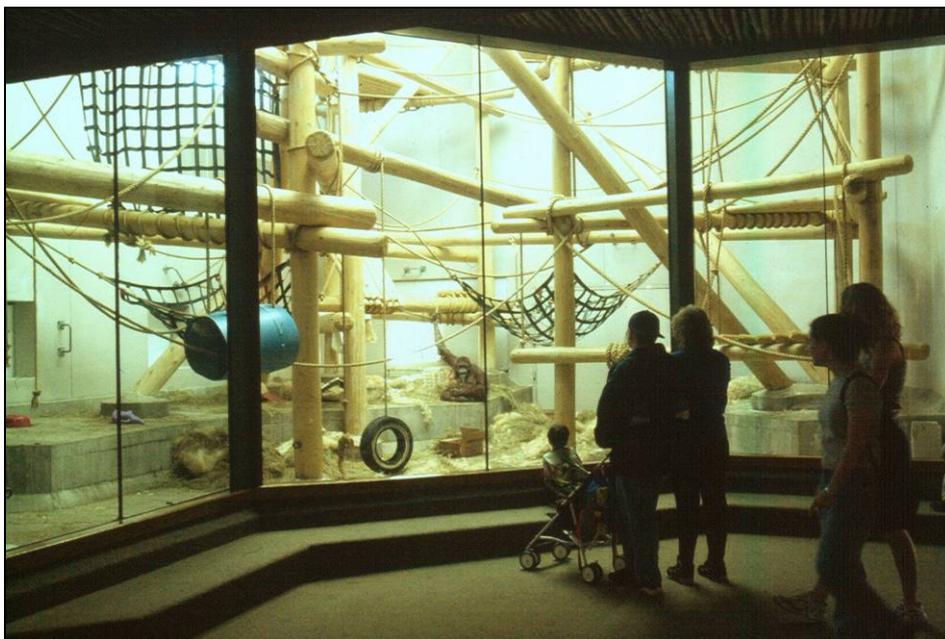


Figure 6: Dayroom in Primate Panorama, Denver Zoo, circa 1988. Photo: J. Coe

Denver Zoo's "Primate Panorama", which is about to open, represents a culmination of one hundred

years of evolution in great ape facility design. This 7.3 acre project combines the third generation immersion concepts developed at Seattle and improved in Atlanta and Dallas, and the integrated night-room/day-room/outdoor shelter/open habitat connection sequence of Cheyenne Mountain and Oklahoma City Zoos. Denver displays far more types of primates than any other new facility. It also incorporates an African forest village and a beautiful renewal of the old Primate House, "Jewels of the Emerald Forest" which features small primates in treetop living dioramas. In all, this extensive exhibit complex displays twenty nine species of primates, eleven species of other mammals and eleven species of birds.

If present trends continue, and I believe they will, we will see wider use of improvements in exhibit technology and design. This means more realistic habitat immersion and more frequent use of cultural features, such as simulated research camps, temple ruins or Sumatran villages. These additions will greatly increase opportunity for both cultural and natural history interpretation.

The Denver Zoo's "Primate Panorama" features non-primates such as birds and wild pigs in its habitat presentation. Future exhibits will go even farther in presenting a wide-range of animal species. For example, the Wildlife Conservation Park/Bronx Zoo is planning the "Congo Gorilla Forest", a six and one-half acre rainforest simulation with Red River hogs and Congo peafowl, along with up to thirty western lowland gorillas. The Los Angeles Zoo's "Great Ape Forest" will allow visitors to see gorillas, bongo, antelope and duiker in the same view. Also at the Los Angeles Zoo, the "Chimpanzees of the Mahala Mountains" exhibit will show chimpanzees commandeering an abandoned logging camp. The display dramatizes the question "... how can local peoples and wildlife share resources?" This project will also raise behavioral enrichment to a new level, while allowing visitors unique views of chimpanzees tool use. The **Louisville Zoo's** "Islands" exhibit, which is about to open, will not only display orangutans, siamang, Sumatran tigers and tapirs, but the exhibit is designed for these animals to rotate through the same habitat areas (Taylor 1995).

Lessons from the Wild: As display habitats become larger, visitors complain that they can no longer get close to the animals. Yet, thousands of tourists, including this author, have had the unforgettable pleasure of sitting at the feet of wild mountain gorillas in East Africa. Perhaps future gorilla exhibitors will find a way, through a combination of design and training, to allow selected zoo visitors to enter the edges of large zoo habitats. There, gorillas would have the choice of ignoring the guests or "holding court". Of course, no actual contact would be allowed. Rules of behavior would be modeled after those in the Volcanoes National Park in Rwanda. The gorillas would be rewarded with novel experiences which they control, while guests would have the experience of a lifetime.

New Choices: As zoo animal managers know, improvements in public displays, in terms of area and ambience, are not found in off-exhibit areas. A visit to the animal holding areas of modern great ape facilities can be likened to a brief return to the Victorian era. Providing truly humane round-the-clock living quarters for zoo animals is our next big challenge. The introduction of behaviorally enriched day rooms represents a significant improvement for the primates; yet, even with these areas, most animals spend more than one-half of their life in night rooms scarcely better than those of Victorian times. While diet and health care are indisputably improved, facilities remain dismal. Behavioral enrichment activities attempt to remedy this situation, but unfortunately many of these activities are restricted to staff work hours. Many suggestions for improvement are found in the soon to be released *Orangutan SSP Husbandry Manual* (see Coe & La Rue 1996).

In an opinion piece for *Lab Animal* magazine, (Coe 1995b), I proposed a new model for primate holding facility design based upon **optimizing the animal's choices of environmental conditions**. The great apes could determine their own light, heat, humidity and sound levels, within predetermined parameters, and change them at will. They could have windows with views and free access to activity areas. In short, they would have many of the choices we ourselves enjoy, but take for granted. After all, there is no justification for keeping these highly sentient species in "protective confinement" as if they

were felons. The technology is available to achieve greatly increased levels of species appropriate behavioral choices in safety, while facilitating daily management. All that is needed is a fundamental redefinition of our role as caregivers for endangered species. When this realization does occur, opportunities will become evident that now remain hidden. We will make as much progress in the next decade as we have in the past century!

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