

# Chapter 67

## Engineering Metaphorical Landscapes and the Development of Zoos: The Toronto Case Study\*

Paul Harpley

### 67.1 Introduction

The public institution of the zoo has been changing and evolving to meet the dynamic aspirations and needs of its visiting public and managing bodies and to reflect the diverse habitat needs of animals in various geographic sites. Zoo exhibit design and site architecture have followed a number of directions over the years, ranging through realistic, abstract sculptural, architectonic, romantic, formal, impressionistic, representational and ornamental (Polakowski, 1987). More broadly, zoos must be regarded within the wider category of wild animal keeping, a practice with deep roots in human culture. The domestication of animals and our developing knowledge of the natural environment allowed the evolution of animal husbandry into animal collections, from menageries through zoological gardens, the zoo, and now conservation parks and many related constructions (Kisling, 2001: Preface).

We see today a certain urgency for a better understanding of the connections between humans and nature. Relationships between human culture, nature, wilderness and conservation and our view of the environment are fundamental to our daily lives. Nowhere are these issues more apparent than at the modern zoo, where visitors are confronted with native and exotic animals and plants in integrated habitats. This resource has incalculable value for scholarly interpretation and public education in such matters.

The planning, design and construction of large zoo projects are intimately involved in the recreation of place, ecosystems, habitats and landscapes. Many of the modern zoo exhibit design initiatives can be considered megaengineering projects by virtue of their large size and cost. Also the ancient history of the zoo institutions in various forms has always been of a dynamic and large scale. Megaprojects and

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P. Harpley (✉)

PhD candidate, Department of Geography, York University, Toronto, ON, Canada; Director of the Zephyr Society of Lake Simcoe, Sutton West, ON, Canada  
e-mail: paul@harpley.ca

\*Retired, Manager of Interpretation, Culture and Design Branch at the Toronto Zoo, Toronto, ON, Canada.

their interrogation in planning and development forums and resource analysis studies have a long history (Mitchell, 1989: 91). The foundation of all large zoo outdoor exhibit projects rest on the physical geography of unique zoo sites. Though there is relatively little work by American geomorphologists in the new field of megamorphology (Abler, Marcus, & Olson, 1992: 269) the development of zoo megaprojects has zoo professionals, engineers, architects and landscape specialists involved in complex interdisciplinary collaborations with a foundation rooted in physical geographic manipulation. Successful zoo exhibit megaprojects consequently rely on local geomorphologies using local features to emulate larger scale landscape and environmental features in the animal habitat recreations. The Toronto Zoo, in large outdoor recent megaprojects and, indeed, its original creation and installation in 1974 relied on it.

## 67.2 Ancient Origins of Animal Keeping and Zoos

The development of the institution of the zoo from its ancient origins and forms to the early western zoos and their evolution from the colonial period to the present are an area of study only now being documented (Hanson, 2002; Kisling, 2001; Rothfels, 2002). Wild animal collections, menageries and related constructions have existed for centuries, principally in ancient Mesopotamia, China, India, Greece, Roman Empire, Persia and Europe (Kisling, 2001: Preface; Polakowski, 1987: 18).

The beginnings of recorded human history must lie somewhere in the fifth millennium B.C. from about that time date the earliest artistic achievements worthy of superior cultures, the first decipherable records of humans' higher rational development, and the beginnings of political and social organizations which deserve to be called "states" (Kirchner, 1960: 2). In the human cradle area between the Tigris and Euphrates rivers, prehistoric Mesopotamia and its immediate surroundings, the most important thing is that it supported an unbroken chain of occupations which led, stratum by stratum, to the beginning of recorded history (Speiser, 1963: 743). The essential spine of the developments of human history, and cultural and social chronologies has been delineated for the Near East and related places (Egypt, Hittites, Syria and Palestine, Mesopotamia, Crete and Indus) (Saggs, 1989: 4–9).

## 67.3 Origin of Civilization and the Development of Zoos

The history of zoos has a similar genesis to the evolution of other western human social institutions such as museums, botanical gardens and universities. With civilization came urbanization. Shortly after we had developed cities on a grand scale, zoos and botanical gardens sprang up in countries as far apart as Egypt and China (Robinson, 1996: VII). It is not surprising, therefore, that there is a strong and ancient bond between humans and the acclimatization, keeping, and exhibiting of animals in virtually all human cultures through time. There can be no question about the real authorship of the civilization which we know as Mesopotamia (Speiser, 1963: 734–739).

As Zuckerman (1980: 3) notes, no one knows exactly when or where zoos first appeared on the scene. What we would be inclined to say is that zoos certainly existed in ancient Egypt, but by then they had already become so full-blown, so much part of a codified form of life, that it is hardly possible that they did not develop from something more primitive. The first zoo may have been a collection of several thousand animals in Saqqara, Egypt around 2500 B.C.; the first botanical garden was probably the Shen Ming garden in China at about the same time (Robinson 1996: VII). The royalty of ancient Egypt, Rome, and China had collections or menageries of caged animals for their personal entertainment and that of privileged guests (Polakowski, 1987: 18).

## 67.4 The Rise of Cities and The Relationship Between Humans and Keeping Animals

The rise of cities represents the first most important development in civilization affecting the keeping of wild animals in urbanized human settlements. The earliest settlements known in south Mesopotamia date from 5,000 B.C., or a little before (Saggs, 1989: 31).

The ancient origins of zoos are shrouded in the historical, archaeological and social excavations of ancient city sites. Around the world at varying times, the first human animal collections emerged as the broad range of ancient collections of animals we might term zoos today, from the very ancient to contemporary is represented chronologically as an historical summary of zoos.

Actually, Kisling (2001: 8, 9) has documented ancient animal collections in Mesopotamian societies developed as riverine city-states along the Tigris and Euphrates Rivers. By the later Babylonian and Assyrian period, between 1000 and 330 B.C., references to gardens and the larger royal parks become even more common. Likewise, land records during this later period indicate the extent to which gardens had become common features of the wealthy citizen's property holdings. Interestingly, the animal keeping practices, exhibitry and animal capture methods were quite similar to methods used even into the nineteenth century:

Property holdings included both domesticated and wild animals. Animals kept included household pets, fish in ponds, birds in flight cages, falcons for sport, lions in cages, and wild game in parks. Individuals used blunt arrows to stun wild animals, and traps (usually concealed pits) were used to catch these wild animals alive for pets, collections, and trade. Some animals, particularly those species rarely seen, were valuable luxury items. Royalty frequently kept tame lions as pets, and other lions were used for hunting or fighting. Lions and other animals were kept in cages and pits during the Ur III period (beginning ca. 2100 BC). It is conceivable, therefore, that cages were constructed to hold other dangerous or rare species as well

(Kisling, 2001: 10)

Eventually, the ability to maintain animals and plants in large park areas was taken to a new level of sophistication with the re-creation of entire habitats. Sennacherib (Assyria, 704–681 B.C.) simulated a marsh environment of southern

Babylonia to exhibit rarely seen marsh species from that region of Mesopotamia (Kisling, 2001: 12). He also re-created mountain habitats, one of which is now thought to have been the site of the fabled hanging gardens of Babylon (actually in Nineveh), regarded as one of the wonders of the world and which new evidence suggests were actually at the palace garden of Senacherib located in Nineveh, also known at the time (ca. 700 B.C.) as Old Babylon. There is also recent evidence of the northern Palace of Babylon, at the time of Nebuchadnezzar as being the site (Dalley, 1993: 8–10; Finkel, 1998: 38–58; Kisling, 2001: 12; Finegan, 1963: 426):

His (Nineveh) successor, Esarhaddon (Assyria, 680–669 B.C.) and Ashurbanipal (Assyria, 668–627 B.C.), also provided mountain habitats that resembled the nearby Amanus mountains. Within the cities, the terraces of the monumental, pyramid-shaped, terraced buildings known as ziggurats sometimes were planted with trees, shrubs, and vines to give a mountain-like appearance, similar to the hanging gardens of Babylon.

(Kisling, 2001: 12)

Ancient Babylonia and Assyrian royal parks and hanging gardens were the result of Mesopotamian garden evolution. Some of these parks and gardens may have been public parks for the benefit of the cities in which they were established. However, for the most part, they were for the use and enjoyment of the royal family. Royal parks and gardens were often the site of royal hunts, a place to entertain guests, and a place to keep animals. The conquering Achaemenid (Persian) kings (539–331 B.C.) and Greek rulers that followed continued this tradition of extensive gardens, parks, and animal collections. Some of these collections still existed when Roman armies invaded the region in A.D. 363. The gardens were fabled throughout the ancient world for their magnificence. Recent artists' renderings of them show terraced promenades lined with plants and statues, with ziggurats (spiralling towers) and wild and domestic animals (Finegan, 1963: 426, 428).

Clearly, naturalistic immersive zoo exhibits, the standard today are not new. Even in ancient times the naturalistic re-creation of place and landscape was practiced. Some of the descriptions, especially those involving mountain landscapes are remarkably similar sounding to the famous so-called revolutionary theatrical exhibit constructions of Carl Hagenbeck in Germany in the by the 1870s to be discussed later.

## 67.5 Western Perspectives on Nature and Zoos

The western relationship between nature and humans is well known and yet confused. Historically, they have been viewed as separate one from the other (Glacken, 1967). The modern view of nature continues to see the mind as separate from nature. Nature has been seen as something essentially mechanical and non-mental. The mind makes nature; nature is so to speak, a by-product of the autonomous and self-existing activity of mind (Collingwood, 1957). It is vitally important that zoo staff, designers and those responsible for the interests of zoos understand these ideas because zoos are about nature and humans, probably more so than any other public institution. Our human attitudes toward nature have influenced our understanding

and knowledge of animals, in the wild, in captivity, their keeping and exhibition. Indeed, nowhere else is our relationship with nature more close than at the zoo (Harpley & Simpson-Housley, 1998).

In the history of Western thought there have been three previous periods of constructive cosmological thinking, first recognized by Hegel. At these times the idea of nature came into the focus of human thought. At these times nature has become the subject of intense and protracted reflection, and consequently acquired new characteristics, which in turn, have given a new aspect to the detailed science of nature that has been based upon it (Collingwood, 1957). These three periods were the Greeks Ionian philosophy, the Renaissance in Europe, and the modern view of science from the end of the 18th century to present.

Zoos and their design have rarely been seen within the context of the broad development of Western thought, even though they are well established and accepted institutions. Nature today in the zoo is being seen as more than the animal alone. Important interpretive themes of historical relationships between animals and humans are common in the history of the West and are only now being recognized in contemporary zoo design and philosophy (Cherfas, 1984; Polakowski, 1987).

In science and geography texts where animals do make an appearance, there is still something missing: a sense of animals *as animals*; as beings with their own lives, needs, and (perhaps) self-awareness, rather than merely as entities to be trapped, counted, mapped, and analyzed; as beings whose lives are indelibly shaped by the uses that humans formulate for them, but whose fates resulting from these taken-for-granted uses (along with the human rationales behind these uses) are almost never subjected to critical scrutiny (Philo, 1995). At the zoo this is most certainly the case.

It is often thought that people visit zoos because there is something very rewarding about being in the presence of wild animals. Respect for animals, contempt for animals, oneness with animals, all are feelings that we need to express and we can do so at the zoo. People are fascinated by animals. I think this is something to do with our evolutionary past, when we depend on an intimate association with, and knowledge of, animals to survive as gatherers and hunters. Perhaps it goes even deeper than recognition that no matter what are religions tell us, we are indeed related to those creatures (Cherfas, 1984). Ancient human associations and the relationship of ideas to nature and the formation and development of zoos is, I would contend, ancient, and complex like the dualism of humans and nature in broader society. Zoo administrators should be aware of and plan with knowledge of these complexities that go right to the heart of our pluralist societies. Modern social science researchers must also be very aware of the ancient notions of western and other perceptions of nature in informing their work about modern zoos today.

It is perhaps the venerable relationship between animals and art that is most clearly indicative of the creative connections with humankind that is the zoo. Artists have rendered their feelings about animals, their intimate relations with animals and their habitats from ancient cave paintings in Niaux, France to the most contemporary interpretations (Lank, 1975). Cherfas (1984) has described the captivation by drawing attention to the caves shaped since the Pleistocene Ice Age. Here in the

mountains of the Pyrenees between France and Spain can be seen the famous Salon Noir of Niaux painted by early people some 15,000 years ago. Bison, horses and other hunting animals are rendered by humans intimately involved with the animals.

Historical excavations of Western thought, particularly the relationship between humans and nature, are vital to our understanding of the zoo. Postcolonial theories and the study of collecting, including animal collections is explored. Social constructions of nature and recent postcolonial and related feminist critiques are informing ancient historical perspectives on captive wild animal's management and exhibition. Arguably, the most important public part of the zoo, the exhibit, is here studied and future prospects of this most important of zoo sites are discussed in the difficult, ecologically challenged future of the 21st century.

## 67.6 Colonial Zoos and Gardens

Geography in the service of Colonialism started early with Western science tools like the map and survey instruments. It celebrated a certain idea of history, and at the same time obscured the fundamental geographical and political reality empowering that idea. Literary critique has recently exposed the salutary vision of a "world literature" . . .and "world empire" commanded by Europe found in the works of early professional Geographers Halford Mackinder, George Chisholm, Georges Hardy, and others (Said, 1993: 46).

The importance of science and the colonial penchant for collecting is clearly seen in the creation and evolution of museums, botanical gardens and zoos. Indeed, many early East African explorers, even missionaries demonstrated strong interest in science and observation. James Hannington, an English missionary leader, was an excellent example. To the end of his life Hannington reportedly could not resist turning aside to see some strange insect, or to note some new plant, or examine some interesting geological specimen. "Of this faculty for observation and interest in that book of Nature the pages of which are opened wide-spread before him who has eyes to see, there are many traces in his Letters and Journals" (Marsh, 1961: 93).

The taking of observations was a central part of any expedition especially those of the Royal Geographical Society. However, only recently (since the eighteenth century) was the scientific motif for exploration a significant consideration. Historically, plunder and trade were the main motivations, and East Africa prior to the 18th century was not known for riches (MacNair, 1954: 12).

These varied collections arrived in Europe and almost immediately private and public spaces were needed for their storage, study and eventually exhibition; whether, rock, animal, ethnographic or plant.

. . .the Crystal Palace gallery was also a direct descendant of the gallery in the botanical hothouse, which functioned as a watering platform and a vantage point from which to view the plants. An engraving of the Kew palm house in the Illustrated London News of 1852. . . shows visitors 'transported into a tropical forest', wandering along shaded walks among 'the vegetable Titans' while above, on the gallery, others look down not on the people below but on the profusion of the forest. The text accompanying the engraving invites the visitor to

enjoy a 'bird's eye' view from the gallery, but it is a view of the gardens outside, not of other members of the general public.

(Driver & Gilbert, 1999: 186)

The development of the institution of the zoo as a colonial and imperialist institution, viz., the modern zoo as we know it dates most definitely from late 18th century Europe. The problem of keeping up to date in terms of policy and presentation was certainly very difficult for the old established collections. The Menagerie du Jardin des Plantes in Paris is an early example, originally founded in 1626 by Louis XIII with plants and later animals added by 1794. Later the Emperor Napoleon added several animals to this collection and the menagerie grew in importance until, by 1841, the Jardin des Plantes was also boasting a zoological museum, a museum of comparative anatomy, botanical and geological museums, and a library of some 28,000 books (Hancocks, 1971). The similarity of these colonial institutions in Europe in the 18th century and the Mesopotamian sites like the Hanging Gardens of Babylon and the Egyptian Great Library of Alexandria are stunningly similar, all great engineered earth and architectural feats of their time and place.

Vestiges of these early zoo institutions' form and architecture can still be found in cities almost anywhere in the world today in various stages of devolution. Dating from 1894, Toronto's Riverdale Zoo, located on the banks and tableland of the Don River in the eastern Toronto, Ontario, Canada is a representative example. Critical to our understanding of modern zoos is the realization that although animals have been exhibited for thousands of years, the greatest changes in this phenomenon have taken place in the last one hundred years, following the evolution of public zoos from private menageries in 18th and 19th century imperial Europe (Polakowski, 1987: 19). Most references to these historical zoos and human geographic sites are skeletal and anecdotal (Hancocks, 1971; Hanson, 2002; Polakowski, 1987). Little empirical work has been done to fully and critically document specific colonial zoos.

Colonial zoos in Europe were intimately related to, and enmeshed in, ideas of exploration, the exotic and the pursuit of scientific knowledge, too. Western science accompanied colonialism in the exploration and exploitation of lands perceived as virgin wilderness territory with ideas of science and technology, nature and culture, heroism and progress, and national destiny. The era of exploration included geographers, geologists, botanists and missionaries. These adventurers collected an incredible range of items from rocks and minerals to plants, sundry cultural objects, and live animals.

The history of the Western zoo institution is similar to other related institutions like the botanical garden, museum, and public art galleries.

Collections of exotic animals have a long history preceding the zoological parks built in the United States, of course, and much has been written about them.

American zoos took inspiration most directly from European zoos, and in some cases looked to them as specific models. In Europe, during the late 18th and through the 19th century, menageries that had once been the property of royalty increasingly became open to the public. Paris had the oldest public animal collection, founded as part of the *Museum National d'Histoire Naturelle* during the French Revolution. In London, animals that had been displayed in the Tower menagerie, as well as animals collected in the colonies of the British



Empire, were incorporated into a new zoo in Regents Park that opened in 1828. Because the Paris and London zoos were founded to serve scientific research and education—they were intended as more than just exhibitions of curiosities—chroniclers of zoo history often point to them as the first modern zoos.

(Hanson, 2002: 14)

The idea of zoos quickly spread throughout Europe, America and other parts of the world, similar to societies of science and exploration, most particularly The Royal Geographical Society of Britain (Heffernan, 2003: 8–11).

A zoo, in its most meagre sense, is a collection of wild animals on display; it has ancient roots, as discussed previously above. Both the Chinese and the Romans had court menageries, and subsequent rulers in Europe followed their example. The only surviving example of these royal collections is the garden at Schonbrunn, near Vienna, founded in 1752 by the Austrian Emperor Franz I. It typifies the essential difference between a menagerie and a zoological garden, for it was built with the attitude of displaying animals so that they could be admired by their royal owners and the cages were designed more for the convenience of the spectators than that of the inhabitants (Hancocks, 1971). By the late 1860s, there were zoos and related professional associations in Europe in Germany, France and Britain. In 1903, a guide book to European zoos was published; it described sixteen in German cities, four in Britain, and four in France (Hanson, 2002: 15).

The word “zoo” was appropriately coined for the Zoological Gardens of London in a popular music hall song of 1877, called “Walking in the Zoo is the OK thing to do.” Appropriately, the London Zoo is the oldest surviving example of the proper zoological garden (although in recent years many changes have been made), as opposed to the exhibition of animals in a menagerie. It should be remembered, the concept of displaying animals in a garden setting had not been seen for thousands of years, since the great temple gardens of China and Egypt, and in its history London Zoo has presented many other novel inventions, which have since become familiar throughout the world’s zoos. In 1849 it opened the first reptile house, followed by the first public aquarium in 1853 and the first insect house in 1889 (Hancocks, 1971).

The collection administered by the Zoological Society of London was granted a royal charter “for the advancement of zoology and animal physiology.” Intended as more than just facilities for exhibiting curiosities, the Paris and London zoos were founded to serve scientific research and education. Chroniclers of zoo history thus often point to them as the first modern zoos (Hanson, 2002: 14, 15, 16). American zoos took inspiration most directly from European zoos, and in some cases looked to them as specific models. The Philadelphia Zoo, which opened to the public in 1874, took the London Zoo as a model for organization. The Riverdale Zoo in Toronto, had first animal acquisitions in 1894 (Rust-D’eye, 1975). It is a metaphor for the colonial zoo in Canada. Indeed, Rust-D’eye documents the Harry Piper Zoo in Toronto which commenced in 1872 and would challenge previous assumptions about the earliest zoo in North America. Similarly, Andrew Downs Zoological Gardens In Halifax, Canada, established in 1847 pre-dates even the Harry Piper Zoo (Dougan, 2004: 1; Canadian Parks Index, 2010: 1).



But arising as a colonial and imperialist institution, the modern zoo as we know it dates from late 18th century Europe. Some of these sites at their time involved major earth works and architectural and engineering works. Usually the type of housing provided for any animal was never designed around its requirements, but often rather to try and create a mood which seemed sympathetic to its legendary history or its country of origin. For example the ostrich house at Cologne which was founded in 1860 typically was built to resemble a mosque. Indeed, the imagination in producing exhibition architecture for the European menageries was, quite literally, fantastic. Dusseldorf (opened in 1896) built a ruined castle at vast expense for their Barbary sheep, and it was popular for lion cages to include fanciful grottos or painted backcloths to convey an “Eastern” image. At Leipzig, founded in 1876, the lion house included a large stained glass window showing two lions, among rocks, looking out over an open plain. It was amidst this impressive setting that Miss Heliot, the famous lion-tamer, had attracted over 17,000 people to her show in August 1900 (Hancocks, 1971).

## 67.7 Twentieth Century, the Modern Zoo and Design

At the same time, however, we can see a transition in zoo design and purpose as early as the start of the 20th century with the opening of the zoo at Hamburg-Stellingen, Germany, in 1907. The figure of Carl Hagenbeck is important here. Partnering with the skilful architect, Urs Eggenschewiller, Hagenbeck used reinforced concrete to create artificial rock formations as a backdrop for the wild animals. The cage bar was eliminated as a physical and visual barrier and replaced by moats, many of which were hidden, to contain the animals and to permit unobstructed views of the staged display (Polakowski, 1987: 20). Ironically, this artificially created landscape was intended to give the illusion of animals within a “natural habitat.” Like the colonial zoo, Hagenbeck’s design presented wild animals for the entertainment and enjoyment of the general public. But his creative approach also recognized the importance of the setting, the position of observer and the spatial needs of the animals in exhibits developed as panoramas (Hanson, 2002: 140; Polakowski, 1987: 21). He advertised these exhibits as “Carl Hagenbecks’s Zoological Paradise—The Zoological Garden of the Future” (Rothfels, 2002: 165). It inspired similar zoo design by others and changed the appearance of zoos forever, marking the passage from what I am calling the colonial zoo to more contemporary forms of the institution. For the most part, it eliminated such sites as the “Bear Pit,” the “Monkey House,” and the “Cat House.” These transitions in the development of Toronto Zoo, out of Riverdale Zoo to the modern Toronto Zoo, are complex and involve master planning, multivariate analysis, and major landscape design and earthworks (Fig. 67.1).

Most zoo development goals underlie modern management philosophy in major zoo institutions. These goals form the basis for formulating strategy with regard to Zoo Development and Exhibit Design. Central to the modern zoo is multidisciplinary planning and a design team spanning many specialties and expertise. A fundamental and very important foundation to Exhibit Design is an understanding



**Fig. 67.1** Riverdale zoo monkey cages, 25 September 1913. (Credit: City of Toronto Archives—archives for use must be secured)

of the physical geography of the local zoo site to be developed. Also essential is the knowledge of the geomorphology, climate, vegetation and related geographic awareness of the place to be recreated and the relationship of that place to the animals, geography, geology and plants exhibited. These are first and foremost issues relevant to geography.

Previous to the 1970s analysis of zoo planning issues of design dilemmas, illusions of place recreation, exhibit design and long range development planning were not well developed. In particular, the exploration of perspectives on site organization themes for zoological parks and landscape aspects of exhibit design, especially with respect to the central importance of landscape and the role of physical geographic features in the modern zoo exhibit.

The modern period brought foundations in site organization themes for zoos and set their importance in design and construction of contemporary zoos. Polakowski identified the three key zoo organizing themes in modern zoos. Virtually all established institutional zoos can be categorized as Taxonomic, Zoogeographic (the original Toronto Zoo organizing system) or Bioclimatic in organization. Taxonomic is clearly a zoological organization and the most traditional system. These early western zoos began as menageries, for the collection and exhibition of animals (usually exotic). Historically, zoos have concentrated on collecting and exhibiting animals from all regions of the earth. The success of the zoo was equated to the number of different species. The more exotic the species the better. Today as Polakowski (1987) points out, it appears that the majority of zoo planners, managers, and staff believe a zoo must contain some exotic animals (e.g. tigers, elephants, etc.) to attract

the visitor. Modern taxonomic zoos (traditional zoological gardens) in a sense are simply sophisticated menageries (Kisling 2001). In recent decades most zoos have been moving away from this organizational model.

The Zoogeographic theme (the original Toronto Zoo system) groups animals in accordance to natural geographic regions. The elements that contribute to this diversity are the selected geographic region, animals to be exhibited, size of the site, physical conditions (eg. vegetation, soil, climate) interpretation goals, and the development history of the zoo. Indeed, Toronto Zoo was the first large zoo collection to be arranged entirely zoogeographically representing much of the world in its collection. As Cherfas (1984) states, the Metropolitan Toronto Zoo was the first collection to be arranged zoogeographically and on which, the more recent Minnesota Zoo, which Polakowski (1987) discusses, was similarly modeled. Academically, Zoogeography is an old and established sub field of Biogeography also known as Animal Geography being the study of the relations of living and extinct faunas as elucidating the past changes of the earth's surface (Wallace, 1962). At Toronto the conception of the original Metropolitan Toronto Zoo from 1969 to its opening in the summer 1974, an intense public support process, the "Zoo Fund" combined with strong community support, school programs and academic interest resulted in the conception of a revolutionary new large world zoo. In the late 1960s to the early 1970s the relatively cheap cost of labour and materials, expanding economy combined with a brave new world attitude in Toronto for architectural renewal and public works made possible the new Zoo, replacing the old colonial Riverdale Zoo that was on a different site.

Third is the Bioclimatic organization theme and is the result of analyzing the world environments from an ecosystem point of view. This theming focuses on the habitat of the animals to be exhibited. Consequently, Polakowski (1987) points out, we find animals in the rainforest of Brazil similar in form and behavior to the rainforest animals of Malaysia. He recognizes that animals are usually found in areas created by the unique cause-effect relations of climate and vegetation. This system organizes the world into similar natural units or biomes, irrespective of their geographic location. In instituting this organization system, zoos become increasingly concerned with the habitat of the animal. An example of the application of this approach is the Indianapolis Zoo where water and its relevance to biomes is the common feature recreating desert, forest and plains biomes and animals not from particular geographic locations.

Zoo exhibit design is dependent on existing site physical geography and existing landscape features. Polakowski (1987), in a discussion regarding duplication and simulation of Bioclimatic Zones in zoo design, notes that an analysis of the zoo's site conditions is an extremely important task when planning design/development. All aspects of physical geography must be considered. In addition to geomorphology the microclimate of the site is influenced by existing factors like aspect, slope, soil, vegetation, water features etc. These site factors should guide the selection and location of the bioclimatic zones to be represented. Indeed, the microclimatic conditions of the zoo's site will be the primary factor in determining the feasibility of duplicating the bioclimatic zones.

Even basic Site Organizational Themes for Zoological Parks are dependent on physical geographic features. For example, in the design approach used for the P.J. LaFortune North American Living Museum it was accepted that the entire site should be looked upon as having exhibit potential with the animal specimens interacting with their environment and the visitor being offered an interpretation of the scene before him/her. The individual display was not to be viewed in isolation (Zucconi & Nicolson, 1981).

Exhibit design is characterized by Polakowski as the complete interpretation process through which a person conceives, in the light of group judgment, an understanding of the natural, physical, cultural, and behavioral data to be used in creating a zoo exhibit. It is an act of synthesis that combines diverse concepts, elements and parts through a systematic set of theories, ideas, principles, and procedure, into a harmonious whole.

The wide range of spatial characters associated with the term “natural” defies precise classification. Polakowski (1987) clarifies the variances within this “natural” continuum more clearly by detailing three exhibit habitat types. The Realistic Natural Habitat reproduces the real habitat in appearance (landforms, plants etc.). The Modified Natural Habitat uses the elements of the real habitat, but substitutes plants, landforms etc. and integrates the habitat into the existing surroundings. Naturalistic Habitats makes little or no attempt to duplicate elements of the real habitat.

The definition of what is meant by realistic, natural exhibits, and the impact and effect of them on the animals exhibited compared with previous methods of zoo exhibitry is touched on, but not well developed. New ideas in this area are emerging and represent future works. I would conclude that most zoos are moving toward more natural based exhibit concepts, but they also provide a good analysis of their difficulties and surveys arguments against the approach such as safety, exhibit honesty, construction and maintenance costs, and veterinary problems.

## 67.8 Post-Colonialism and Zoos

The issue of control has implications for “the nature of nature” for wilderness, conservation, wild animals and zoos, and in particular animal geographies within the modern critique of “social nature.” As Whatmore (2002: 7) reminds us, “social nature” and hybrid geographies work to invigorate the repertoire of practices and poetics that keep the promise of the geographical craft alive to the creative presence of creatures and devices among us and the corporeal sensibilities of our diverse human being.

The binary “civilization” and “the primitive” seems too rigid, and the boundary between “human” and “animal” blurs (Wolch & Emel, 1995, 1998). As my analysis will reveal, such complex relationships between animal geographies, hybrid geographies and social nature have informed and continue to inform the theory and practice of wild animal keeping and zoo design at Toronto Zoo, particularly

in the development of the African Savanna, the Gorilla Rainforest, the Tundra Trek project.

In another context, evolutionary and developmental theory has played a part in the history of wild animal keeping and zoos. The concept of change in nature and its application to the zoo need to be taken into account. In the past, zoo exhibits confined animals to small, static, often sterile compounds. Modern ideas of ecosystem change, notably our understanding of the dynamic global energy systems of the biosphere, bring new ideas to zoo design and development and to wildlife management. Animal geographers and animal managers in zoos have begun to think about new concepts of naturalization, mixed species exhibits, exhibit rotations and the creation of activation structures, like animal enrichment devices. Engagement with such concepts and their implementation in contemporary zoo design and wild animal keeping constitutes what the author calls the “future zoo,” following Adams term “future nature.” It is now increasingly accepted that there are very few genuinely wild places left in the world. Human influence has been almost universal. It has seemed that nature retreated in the face of massive economic and social forces (Adams, 1997: 27). But a future nature, a new nature is unfolding in our midst. It is much like the constructed nature in parks and zoos. It is this nature that is forming the basis of the contemporary zoo exhibit. Constructing nature, particularly wilderness, evolved where wilderness could be controlled, managed, even re-engineered to serve human conceptions of wilderness at the time. Cronon (1996: 41, 91) provides two examples: (1) Frederick Law Olmsted’s designs for Central Park, Yosemite National Park, Niagara Falls Park and Biltmore (Pisgah) National Forest in North Carolina at the turn of the twentieth Century; and (2) the more contemporary example of nature recreated by California planners of the city of Irvine in the 1960s. There are many possible future natures, but Adams stresses the creative design future (1997: 159). With regard to zoos, conservation parks and related modern constructions, future nature begins with fundamental questions about what society “does” to nature (and vice versa), and who constructs what kinds of nature(s), to what ends, and with what social and ecological effects? (Castree & Braun, 2001: xi). Most zoos have yet to really explore the implications of these questions for the future zoo, taking particular account of recent debates about conservation, environmental activities and contributions toward sustainability solutions, as these matters are reflected in the design and construction of new exhibits at Toronto Zoo. The concept of Engineering Earth and the impacts of these megaengineering projects like large zoo projects raise many environmental, engineering and social and cultural issues that are only now being uncovered. A continuing discourse is needed to support sustainable design and development of these initiatives at zoo sites that can lead us into the future as we re-envision nature in our design of the future zoo.

Today the close relationship between art, animals and the zoo is strong. In fact nowhere is this more the case than in zoo exhibitry. At the Toronto Zoo virtually all the exhibit designs for the five (5) major habitats in the African Savanna project were tied directly to the author’s field sketches from Kenya. Indeed, the original creative resort to nature through field work, sketches, photographs and casts of objects supported the final design development experience. This experience and knowledge

informed the reflective recreation of place and time in the project and should be the foundation of all zoo exhibit design. Hog-backed ridges and termite mounds are typical examples. Similarly, the role of geography and its accurate, creative and original rendition in zoo exhibitry is essential to successful recreation of place and habitats. In the African Savanna project physical geographic features were recreated from field sketches, field measurement and observation and surface casting of geologic formations with academic understanding of geographic feature genesis and erosion.

In other respects, the ways in which human beings relate to components of the natural environment are expanding quickly beyond traditional Western perspectives. Scientific analyses of environments of subsistence, like hunter-gatherer societies, do not always ring true in terms of the ways in which the inhabitants of such “life-worlds” imaginatively construct themselves and their relations to their environment in myth, religion and ceremony. For example, in the eastern boreal forest of Canada, the attitudes of Cree indigenous hunters and the accounts of Western biologists differ with respect to caribou behavior in episodes of predation. Such perspectives have been shown to be culturally constructed (Ingold, 2000: 9). Restoration and recovery have become important areas of ecological and environmental theory and practice. Animal stories, whether of traditional aboriginal or of “indigenized” western origin, are a vital resource for interpreting and understanding how we view the world and our relationship to animals and their habitats, and in these respects, such discourses have obvious importance for zoos and the motives and goals informing wild animal keeping. The recent Toronto Zoo Tundra Trek project interpretation explores this relationship by presenting zoo visitors with Western science and traditional and contemporary Cree and Inuit knowledge and perspectives about animals, habitats and environment in exhibits, signage and interactive media.

## **67.9 The Toronto Zoo and Megazoo Projects**

When the Toronto Zoo opened to the public in August 1974, it was one of the largest zoos on one site and the first fully zoogeographically organized zoo in the world (Cherfas, 1984). With an area at 710 acres (1754 ha) only 340 acres (722 ha) are intensively developed. The rest of the site is a wild urban forest and wildlife refuge now part of the famous Rouge Park, the largest urban wilderness park in Canada. The current Toronto Zoo replaced an old city zoo called the Riverdale Zoo. The Toronto Zoo 35 year anniversary arrived in 2009.

In the last 15 years the Zoo has been involved in a major project management program of planning, redevelopment, and construction of capital and operating project improvements. Since its initial construction the world has changed greatly. Labor, materials and other resources are much more expensive. The role of the Zoo in conservation, environmental programs, animal breeding, arts and social issues and many other areas of operations increased greatly. In response, the Toronto Zoo embraced project management some 15 years ago and began, with a systems approach to



project, implement necessary change working on up to 20 projects a year, varying from small indoor and outdoor exhibit renovations to large many acre redevelopments. A strong goal of current planning at the zoo is consolidation and shrinking the developed part of the site providing a more intensive educational and recreational experience stressing environmental themes of sustainability, conservation and research.

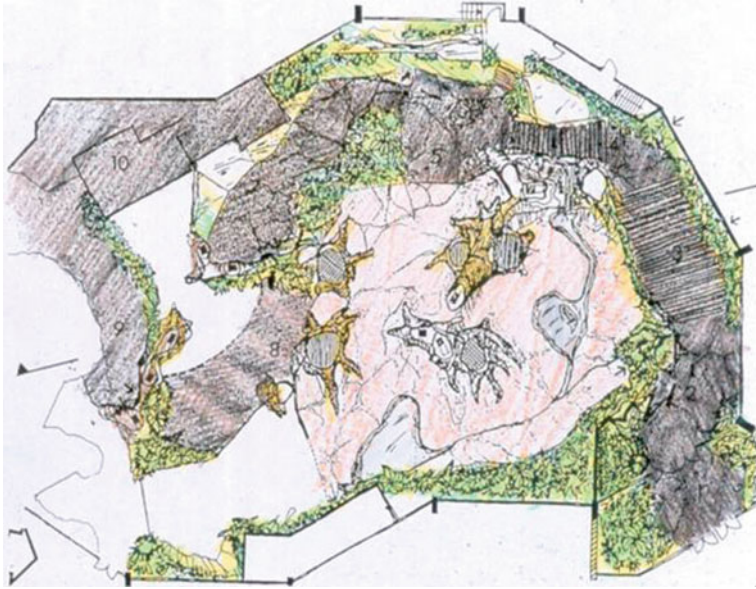
It is essential for the modern zoo to understand deepening perceptions of its visiting public. For example as Ittelson et al. (1974) comments “What we properly seek today, therefore, is a relationship with the environment that not only preserves what we have, but indeed, may help to recapture what has been lost.” A major thrust in natural history museums and zoo exhibitry today is striving for this ideal around the world. The African Savanna, Gorilla Rainforest, and the recent Tundra Trek exhibit are project initiatives at the Toronto Zoo in this direction. The need to ensure appropriate academic social science research and evaluation, consultation, and collaboration with diverse human communities, with reflective design thought and action before final concept design decisions are made, is essential. Zoos, through exhibiting wildlife, plants and landscapes, are of great importance as an aid to nature interpretation and experience. Indeed, they perhaps operate more immediately and directly than any other institution or collective kind of public space to impart complex environmental information to lay members of society in an accessible and comprehensible way. This engineered earth approach in megazoo projects through landscape manipulation, place recreation, and the vehicle of the emotional device of the animal on exhibit is very powerful in the outside context of extensive spaces like the Toronto Zoo African Savanna and Tundra Trek, and intimately successful in a large indoor tropical rainforest development like the Gorilla Rainforest (Fig. 67.2).

### **67.10 Toronto Zoo Exhibit Design and Replication of Place: Gorilla Rainforest, African Savanna, and Tundra Trek Projects**

Past exhibit planning and design at the Toronto Zoo has evolved extended inquiry, probing visitor knowledge and understandings of connections between the zoo “place” (site), conservation, human culture and art (broadest sense/aesthetic). The role of designs and the creation of varied art objects, senses, and presentation were integral to three large capital projects conceived, planned, designed and constructed in Toronto in the past decade. Especially relevant to environmental interest is the scientific/artistic dynamic of the recreation of unique accurate physical geographic and geomorphic forms to replicate the real landscape forms (place). Below I discuss specific place recreations in three large Capital projects, the African Savanna, the Gorilla Rainforest, and the Tundra Trek. All exhibit projects at the Zoo, regardless of size, benefit from this design approach today.







**Fig. 67.3** Gorilla rainforest very early concept plan. (Photo by Author)

The gorilla habitat was designed as four times the size of the original exhibit. The exhibit is for a group of eight Western Lowland Gorillas. The new natural rainforest was based on the ecology of lowland forests of Cameroon. A Jane Goodall grant was secured that provided for field work for staff in Cameroon which informed design details of the natural habitat geography, ecology, plants and the wide range of animals of the lowland forest habitat. Collaborative concept design workshops with Zoo staff and other advisors, and later with consultants and others, confirmed a naturalistic rainforest theme direction for the exhibit development.

The project provides for a more stimulating environment for the gorillas, such as climbing trees, nest sites, “feeder logs,” a play puddle and an “interactive” log (visitor on one side, a gorilla on the other). Spectacular viewing is from an overlook, a bamboo forest screen and a large glassed area. The exhibit is the largest indoor Gorilla Rainforest. With creative design layout and on-going horticultural management, the exhibit remains grassed and clearly is a rare natural recreation rainforest habitat. The device of the painted mural is used to a great effect in the exhibit and transforms the exhibit to a truly inspiring immersive environment in combination with planting and layering which provides a tremendous depth effect. The device of the mural has been generally poorly used in zoos. Unless it is well planned, uniquely devised and competently painted a mural is rarely successful. Images of the Toronto Zoo Gorilla Rainforest exhibit shows the aesthetic combination of real plant shrubs, living grass, a logged rainforest mural, a real and artificial log, and a silverback and other gorillas in the Toronto Zoo exhibit.

The program included a new and separate Play Room that was a building addition to the Pavilion. It was located at a strategic location linking the large new exhibit,

the original holdings and the existing outdoor exhibit. It was equipped with a jungle gym, platforms, ropes, and scramble nets, as communal area where the primates can be together at night and when not on display. In the evening it is a family night room, in the management of the Gorillas as communal space. The project is distinguished by having indoors the three existing barriers of Gorilla exhibit viewing, traditional glass, large overview moat and an artificial bamboo barrier in naturalistic sensitive detailing. There are many African tropical plantings strategically located throughout the rainforest. The common bamboo, fragrant dracaena, oil palm and leafy canes of spiral ginger are examples of species planted.

The project includes more than a Gorilla exhibit. Indeed, it is a complex recreation of an entire rainforest habitat. There are other animal exhibits including dwarf crocodile, spotted-necked otter, hingeback tortoise, green-crested touraco and violaceous plantain eaters and other planned free-flight birds. There are two large and dramatic aquaria, one of African Congo River fish, the larger tank with Lake Malawi cichlids highlighting the beauty and diversity of African aquatic life of the Great Lakes of Africa and riverine sources of Central Africa.

Project signage was originally collaboratively designed and sensitively sited with African Cultural Advisors and Zoo staff input. Many interactive media distinguish the project, including an Overlook Research Station, a Loggers' Shack, a Rainforest forest cutting interactive display, original West African animal theme carvings, an indigenous Fishing Camp and an associated dugout canoe. These are a few of the many experiential educational elements of the project.

### ***67.10.2 The African Savanna***

The African Savanna, a major capital project during early planning, was the subject of a perception of environment survey designed to test zoo visitor knowledge and perceptions of actual East African landscapes. Response to notions of Western conceptions of nature and savannas, recreation of landscapes and related issues, and their planning value to exhibit designs and interpretations were probed.

The African Savanna, a 30 acre (12.1 ha) redevelopment project, resulted in an existing rolling field, drop moat, and a fenced original African paddock landscape re-designed to simulate natural African geomorphologic formations, and plant and animal species associations and habitats (Fig. 67.4). The project won the Canadian Landscape Architects Annual Design award in 2001.

#### **67.10.2.1 Recreation of Place: The African Savanna Project—Metaphor and the Visitor Survey Device**

Modern zoo exhibits, created through the imaginative process, with fieldwork in wild places and solid connections to conservation projects are also cognizant of historical influences with authenticity, emotion, feeling, and the perceptive recreation of place all will attain higher levels of success than with traditional survey methods.

The question of how well zoo visitors' perceptions, goals and aspirations, arising from the burgeoning conservation and environmental movement favored by the

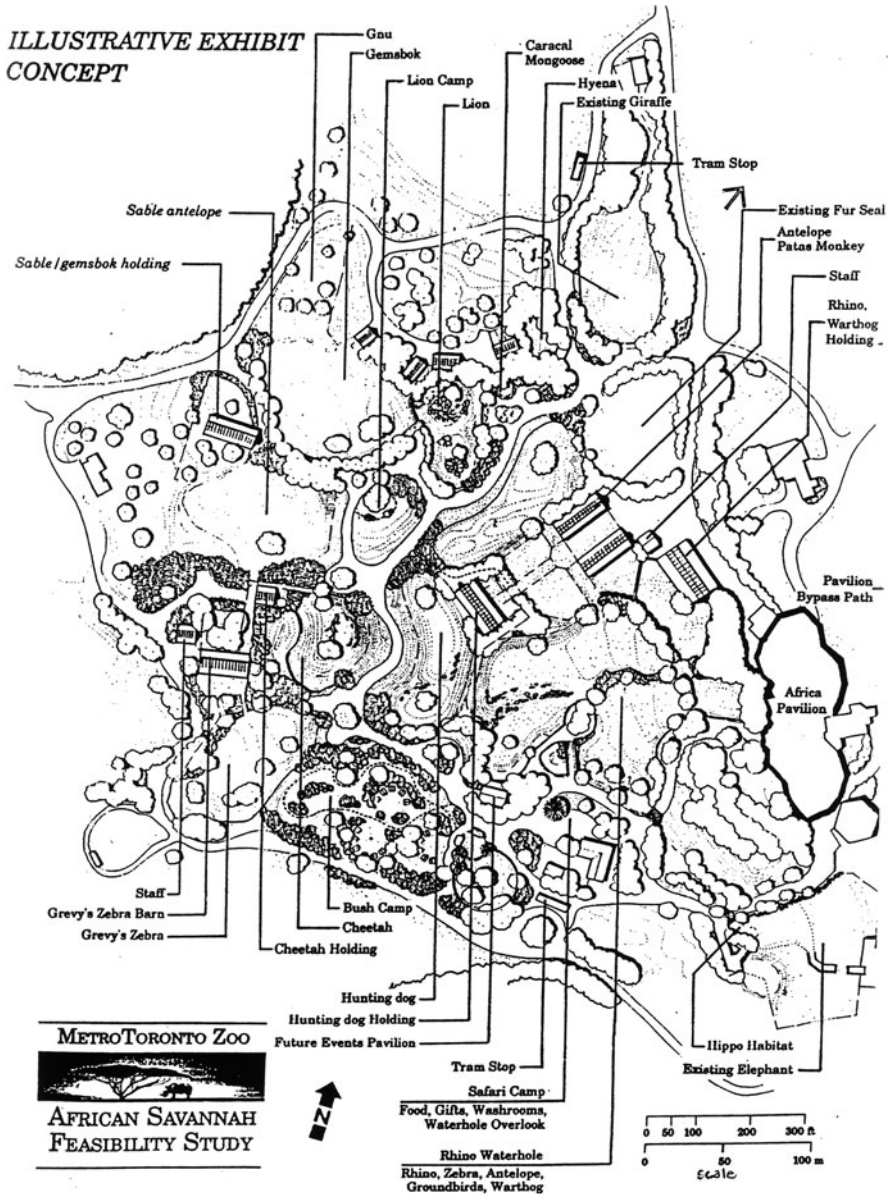


Fig. 67.4 African Savanna very early illustrative concept 1987. (Credit: Coe, Lee, Robinson, Roesche Design)

general public are being reflected in zoo design, needs more rigorous study and evaluation. Numerous commentators have stressed the lack of rigorous psychological support for many routine architectural design decisions (Sommer, 1966).



A realization is developing that indicates other avenues of inquiry regarding human perception and experience of environments may be more rigorously derived and supportable than traditional architectural approaches (Sommer, 1966). Social scientists, psychologists, sociologists and geographers have much to contribute in this regard to the design of zoo places.

To understand public perception with reference to specific recreations of natural landscapes in zoos, the testing of zoo visitor reactions to specific visual images of natural landscapes concerned can be conducted before a project is designed (Harpley, 1992, 1999, 2005; Harpley & Simpson-Housley, 1998). The survey instrument was designed to seek insight into specific themes of zoo exhibit design. Through the research instrument of the survey, visitor knowledge and understanding of African Savanna landscapes were measured and evaluated before the project entered the detailed design process. Visitor responses were considered a reflection of the public's notions of nature and wilderness (Frome, 1984; Olwig, 1984).

Participants in the study included a representative random sample of visitors to the Zoo's African Pavilion in a random selection method of sampling from a population which satisfies the purpose of probability sampling (Babbie, 1990). Study results indicated a lack of knowledge of African people and culture; this finding was considered important given present relationships between humans and wildlife conservation in East Africa (Anderson & Grove, 1987; Newark, Leonard, Sariko, & Gamassa, 1993). The results also showed the importance of African cultural perspectives, providing new directions to detailed design, including an important parallel planning process with the academic, African Canadian cultural community and an East African NGO, where a rigorous and on-going African Advisors committee with Zoo staff was struck. Valuable new ideas emerged, like a working African "Shamba" farm, a Market Bazaar entrance with "Duka" building structures, an overnight Serengeti Bush Camp experience, and African food being offered at the new Simba Safari Lodge; also a Baobab tree Termite mound and Nomadic structure interactives were some of the creative ideas realized from the process (Fig. 67.5). Current issues of post colonial literatures, the politics of representation, and cultural representations of place were discussed and mediated into supportive project design with broad community concurrence.

Information arising from the environmental perception was instrumental in project design. Survey results suggested that it is appropriate to question the philosophical basis of some past zoo exhibit design methodology. Rather than copy other zoo replications, innovative ideas based on sound informed decisions of front-end social research findings were sought based on rigorous knowledge of the Toronto zoo audience. Recognition of the problem of replication, very prevalent in zoo project design recognizing that only a few consulting firms specialize in zoo design and it is often more economical for them and their undiscerning client zoos to afford copies of other zoos exhibits in their developments. This problem has been recognized in discourses on issues of zoo design, with Plowman and Tonge (2005) providing the most critical examination of this issue. Frequently, the landscape and architectural consultants are hired precisely because they created the same design in two or three other institutions. Replication is indeed pervasive in our



**Fig. 67.5** African Savanna project, baobob tree. (Photo by Author)

collective consciousness at zoos, and original reflection on ideas, themes, features and experiences, is often lacking.

In sharp contrast to the concerns above about the Toronto Zoo exhibit development, and where the three megaprojects discussed above were conceived. Originality was at the foundation of the planning process. Although all benefited from so-called Zoo designer expertise the essential uniqueness of vision and final detailing of all the projects were informed by Toronto Zoo interpretation, culture and design development (Harpley, 2005). There was an awareness of what Hancocks (2001) observed, viz., that in many cases modern rainforest exhibits bear virtually no visual, ecological, or other resemblance to real tropical rain forests because they are not modeled on real ones. At Toronto many planning components of the design have ensured originality of the megazoo projects. These include original field research in project location habitats, local Toronto academic institutions' involvement in design, local cultural communities' invitation and cooperative design of interpretive features, and the sustainable selection of unique existing geographic site features to design the final engineered landscape solutions for the place recreations of the megazoo projects.

### 67.10.2.2 Cultural Advisory Committees

These are keys to authenticity of recreation of place. Clearly, with issues of post colonialism, the politics of representation and cultural sensitivity are issues every zoo should be aware of if they are representing human culture in their exhibitory. This is particularly important for zoos whose exhibits are usually large and do not get up-dated for many years. Rigorous and appropriate, social science based research, and formal liaison with the local cultural community members and academics is essential to avoid current and future problems. At the Toronto Zoo, establishment of an African Cultural Advisors Committees was set up to mediate the planning and design of these features of the African Savanna and the Gorilla Rainforest.



**Fig. 67.6** Consultation about Tundra Trek project with Inuit elders at Baker Lake in Nunavut, Canada

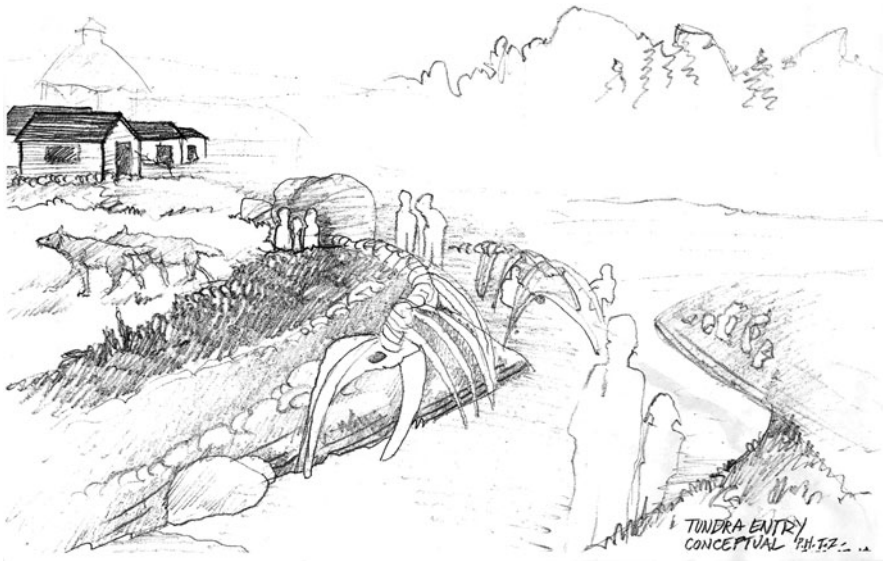
This planning tradition was continued and extended into the Tundra Trek project to include travel, consultation, and cooperative design and interpretation input from Cree and Inuit representatives in Ontario, Manitoba, and Nunavut as collaborators and partners in the project (Fig. 67.6).

### **67.10.3 *The Tundra Trek***

The Toronto Zoo completed a major capital project the Tundra Trek; it opened in August 2009. The project is approximately 10 acres (4.47 ha) in size and cost \$10 million. The philosophy and design/development foundation of the project is the interpretation of the Canadian subarctic and Arctic tundra landscape. The development includes polar bears, Arctic wolves, Arctic fox, reindeer, snowy owl, Canada geese and snow geese.

Higgs (2003: 263) contends that ecological restoration must develop beyond western ecological science to include non-Western cultural perspectives. Similarly, Cajete's (1994: 29.30) account of new non-aboriginal approaches to environmental education shows how many of the ideas they contain reflect ancient aboriginal principles. These important relationships between the environment and indigenous traditional knowledge are developed in the Tundra Trek project. Also considered is the relationship between sacred landscapes, sense of place, reverence for nature and local knowledge so prominent in aboriginal North American cultures, especially with respect to historical and contemporary relationships between the polar bear and





**Fig. 67.7** Hudson bay coast entrance, bowhead whale skeleton entrance, Tundra Trek design. (Photo by Author)

its habitat and the indigenous Cree people in the Hudson Bay lowlands of Ontario (Fig. 67.7). The nature of tundra wilderness, Cree traditional knowledge, and its value and application to non-aboriginal knowledge of animals and their conservation is presented.

Ecotourism and the rapid shifting of resource uses farther north, that is, above the 50th parallel, are beginning to indicate a new urgency in natural and cultural conservation. Numerous contemporary government projects attest to this concern. The recent Cochrane Polar Bear Habitat facility is a new model of ex-situ animal keeping and management (zoo) and conservation interpretation in the north; it is close to the animals “natural” habitat. This facility also participates in the species survival plan for polar bears. An extensive settler culture recreated Pioneer Village is also part of the attraction. Contemporary societal issues thus inform this research. Toronto Zoo staff, including the lead design involvement by the author in this project, ensured the highest level of design for this facility; he took the lead on the project construction. The Cochrane facility participates now as a partner institution with Toronto Zoo in the Species Survival Plan (S.S.P.) for the American Zoo Association (A.Z.A.) for polar bears. The importance of habitat conservation, the global environmental crisis, and effects on peripheral biomes like tundra and Polar bears are an international concern. Specifically, the Tundra Trek project research examined the importance of different perceptions of polar bear wilderness habitat in the planning and development of exhibit design, natural area recreation, and the interpretation of relations between humans and nature. Interpretive, educational and research philosophy and methodology from field study at Moose Factory, the Polar Bear Provincial Park,



**Fig. 67.8** Hudson Bay coast Tundra Trek project (a) Freighters Canoe for field research; (b) Field sketch of the region. (Photos by Author)

and adjacent Aboriginal communities of Peawanuk and Fort Severn, the Churchill area of northern Manitoba, Baker Lake in Nunavut provided keys to the habitat recreations of the engineered earth manipulations for Tundra Trek (Fig. 67.8).

In the Tundra Trek megaproject physical geographic features of the Canadian tundra landscape are skilfully woven into the existing geomorphology of the project site. Key in the recreation are Hudson Bay coastal bars, the complex geology of the Churchill area protoquartzite low coastal ridge formation intruding through Paleozoic bedrock (Riley, 2003) at the Polar bear exhibit, and riparian riverine bluffs at the Arctic wolf exhibit, Inuit interpretive node and reindeer exhibit, and the Arctic River Oxbow Lake at the Snow and Canada geese exhibits.

### 67.11 Architectural and Engineering Design Plans and the Toronto Zoo

The issue of interpretation of contemporary place versus historical place and their recreations in museums and zoos is an important area of thought to explore. It has been common and relatively easy to create historical structures and landscapes in western zoos of places like Africa, South America or Southeast Asia, and even the Canadian Arctic. But how accurate are these representations? In many cases they are generalized creations out of context, often historical, architectural structures and landscape features simply copied from another institution, from travel pictures and similar reference with no real connection to actual geographic landscape, people or experiential connection of the institutions to place. Clearly, the entrance of multi-disciplinary expert design teams of engineers, architects and landscape specialists in recent decades has advanced the science of zoo design immensely. It has also formalized design and helped lead to better design and construction standards everywhere. However, the propagation of vernacular landscape and architecture is often the artistic standard in zoo projects delivered by consultants, and has been carefully

recognized, managed and rejected consistently in Toronto Zoo projects where zoo staff have provided unique, academically supported research, information, sketches and designs incorporated into final project designs. It is important that in Engineered Earth megaproject designs the client Zoo lead design with local knowledge and vision supported by unique research and design.

At the Toronto Zoo for the African Savanna project the issues above were considered and the decision was made at the feasibility design stage to undertake an original East African field trip to East Africa. Six Toronto Zoo staff representing a broad representation of expertise, field of interest and ability to creatively contribute to later translation of ideas to detailed design, traveled to Kenya with one consultant to experience the geography, natural history, human culture and conservation concerns first hand in the Reserves and other places for over three weeks (Fig. 67.9). Much information, field sketches, measurement documentation, photographs and even casts of rock formations, termite mounds and other features were documented to be utilized later at detailed design and construction. It must be stressed that the cost of the field reconnaissance to East Africa was modest compared to the overall cost of this large 30 acre (12.1 ha) redevelopment project. Many of the unique site and routine design decisions could not have been sensitively and as successfully rendered, especially the balance between indigenous and post colonial representations in the project without recourse to experiential observations and information.

One important example of the success of the field information is the themed tourist experience of the Simba Safari lodge and Serengeti Bush Camp overnight tented experience contrasted with the African Shamba farm midway in the savanna experience. The Simba Safari Lodge features a covered outdoor restaurant colonial-looking lodge complex with a covered eating area where visitors can eat and overlook the large Rhino and mixed hoof stock and ground birds' waterhole. Through the East African Cultural Advisors Committee planning process the introduction of East African food "A Taste of Africa" was accomplished. The lodge is comprised of a large rustic round wood structure with cedar shakes roof with seating capacity of up to 150 people.



**Fig. 67.9** African Savanna field trip by Toronto zoo staff. (Photo by Author)

The Serengeti Bush Camp is a seasonal (May to September) overnight camping adventure themed like an authentic Game Drive overnight camping experience the project design team had in Kenya. Visitors are campers and provided special recreation educational activities while at the camp and throughout the African Savanna exhibit. Often groups rent the experience for company retreats, family functions or childrens' groups. This is a post colonial component of the project that is rustic and rooted in indigenous forms and modern western contemporary ecotourism features. Interpretation with special education/recreation staff provide campers with special programs when they are at the Bush Camp.

The African Shamba farm is an interactive working farm that was developed through the African Cultural Advisors Committee. In East Africa, shambas are small (often under 2–3 ha; 4.9–7.4 acres) vegetable garden and fruit farms. They are often associated with shifting agriculture; a patch in the bush is felled and burned to provide fertilizing ash, then planted with food crops, primarily for family subsistence, with any surplus being sold for cash. Main crops are maize (corn), beans, potatoes, spinach, cow peas, coco yams, sweet potatoes, cabbages, cauliflower, bananas and mangoes. In some cases coffee and avocado trees also accompany the garden. At the Toronto Zoo the Shamba is about a third of an acre ((0.7 ha) in size. It has a small out building/shelter associated with it that exhibits farm implements and related signage and artifacts. It is an operating farm designed by Toronto African community members and jointly maintained by them and Zoo staff. In the spring there is a ceremonial planting, throughout the summer weeding and tending occur as needed and in the fall it is harvested. During these periods there is active authentic interpretation as farmers interact with Zoo visitors. As far as we are aware this facility is the only working Shamba in the western Hemisphere. In 2009 Toronto Zoo also initiated an annual African Arts and Culture Festival in the Savanna experience centred on a Market Bazaar area designed for artists, artisans and performers to activate the human aspects of the African experience. Initial public response has been good.

The actual envisioning of engineered landscape reproductions for the Savanna, and the Gorilla Rainforest and the Tundra Trek all benefited from the central role of an understanding of geography and its accurate, creative and original rendition in zoo exhibitions, all which are essential to successful recreations of places and habitats. In all cases designs for the major landscape areas were informed by original field sketches and photo reference panels of places (Fig. 67.10). Models of significant geographic features and geologic formations were modelled for integration into exhibit and public area design (Harpley, 2005: 57).

## **67.12 Reflection on Lessons Learned and Future Zoo Engineered Earth Landscapes**

The relationship between science and philosophy has always been intimate. The detailed study of natural fact is commonly called natural science or, for short, simply science and the reflection on principles is commonly called philosophy. Before the



**Fig. 67.10** Models and sketches used in Toronto zoo projects: (a) African Savanna Lion Kopje Model; (b) Gorilla Rainforest Concept Sketch, Dja Reserve Research Station; (c) Hudson Bay Tundra Trek Project Sketch; (d) Inuit Node Design Sketch, Tundra Trek Project. (Photos by Author)

19th century the more eminent and distinguished scientists had always, at least to some extent, philosophized about their science (Collingwood, 1957). The period of the last few decades of detailed work of exhibit design in zoos, in animal husbandry, behavior, new exhibit materials and techniques, and human social and behavioral research at zoos has left us questioning what has been won. This questioning is normal and we are now in a period of reflection on the principles which logically underlie our successes.

In reflecting on the megaengineering necessary in the recreation of place in zoo exhibits through the physical engineering of landscapes, one could not help but think that a more reflective philosophy of exhibition of wild animals in zoos would be desirable. An emerging focus on social and cultural aspects, major environmental issue interpretation (climate change in Tundra Trek) and accurate geographic representations of place of zoo megaprojects occurred; these initiatives are being led by new approaches to design and construction at the Toronto Zoo.

Other zoos have also been developing social and cultural aspects of their megaprojects. The authentic and original interpretations of these place recreations are avoiding simple replications; these remain challenges for many zoos. The more sophisticated our public becomes, the more we consider our animal charges' needs, keeper and administrative wants and accurate interpretations of nature in our exhibits. Consider the myriad of other design decisions to be made today as compared to only twenty years ago in zoo exhibit design, from, for example, the colonial



zoo. Becoming part of a larger global scientific community of collaboration (animal research, species survival plans (SSP's), mixed species exhibitry, animal enrichment and the like) has focused the public gaze on zoos as more than places to see live animals in cages. The additional environmental responsibilities zoos have taken on are focusing on many additional implications for zoo design and interpretation of place, environments and habitats.

### **67.13 The Large Scale Mission of Zoos and the Importance of Engineering Earth in Exhibitry Delivery**

The serious and rapidly changing global environmental conditions and human responses to them underlie a certain urgency to the success of the zoo exhibit. Indeed, the institution of the zoo can contribute greatly, through exhibitry, to nature education and social change. The Toronto Zoo is implementing this perspective in exhibit design initiatives. The African Savanna and Gorilla Rainforest projects are examples of what can be achieved with original thought, field research, design planning and rigorous accurate recreation of place. These are engineered places, one a large outdoor space and the other an intense and intimate indoor environment of complex architectural elements and engineering structures and controls.

The kinds of exhibits being built from design approaches today are becoming increasingly sophisticated, utilizing revolutionary building materials, and techniques and, in some instances, costing a great deal of money (Cherfas, 1984). Critical analysis of philosophical and epistemological foundations for natural landscape re-creations is essential and, ideally in the future, must be guided by informed, enlightened insight as well as sound artistic, social and aesthetic judgment. Design decisions must be based consistently on original social research, unique field science background and art.

### **67.14 The Future of Zoo Exhibit Design in the Changing Global World**

The institution of the zoo can contribute greatly to society in the future through outstanding exhibitry, new approaches to nature education, accurate geographical representation of sense of place perceptions, and social change to affect future conservation and habitat understanding. The quality of engineered earth projects and the complexity of the management of wild animal populations in these landscapes could in the future lead to animal management ideas and innovations that could be useful in wildlife management in wild situations. Indeed, some Nature Reserves and Parks, for example in East Africa with elephants, are similar to zoo exhibits as the animals are confined to controlled areas due to poaching concerns, elephant damage to crops in surrounding agricultural lands or elephant browsing damage to surrounding vegetation. In fact, as early as 1975 Cynthia Moss noted in Uganda in particular, after the

creation of national parks and reserves in East Africa in the 1940s and 1950s, that elephants were coming into conflict with humans as the human population rapidly grew and elephant ranges shrank (Moss, 1982: 2). This situation could be a project for polar bears, wolves and other large fauna in North America. Zoos and their engineered earth megaprojects might become designed models for a future nature, one unfortunately more and more designed and controlled by humans. The more we know, and the better this is done will define how we preserve, and as Ittelson has remarked, “may help to recapture what has been lost” (Ittelson et al., 1974). It must be remembered that modern zoos today are custodians of vast genetic storehouses of endangered and stable representative wildlife resources.

In the increasingly urbanizing future world, lessons learned from large scale zoo engineered earth projects could be very useful in designs and management decisions in natural wildlife areas in the future, and more even more important than breeding and trying to release endangered species to the wild. Zoos’ greatest mission in the future could be the leading the way in recreating a new nature subtly managing habitat, humans and wildlife, where original wilderness is no longer possible to conserve or has been long ago destroyed.

There is not great storehouse of animal genetic diversity for study, which would be an entirely new role for zoos. In fact, most of the early animal behavior observation and related research began in the controlled environment of the colonial zoo. Konrad Lorenz, Sir Solly Zuckerman, and W. Kohler (Ardrey, 1970) and Hediger (Moss, 1982) are only a few pioneer researchers who used zoos as key centers of their varyingly controlled studies in the 19th and early to mid 20th century. In the future the new engineered earth large scale landscapes of the new zoos should serve as much better laboratories of study of their animal residents.

Over a decade ago, large engineered earth zoo projects like the African Savanna at Toronto Zoo hinted at these possibilities with large animal paddocks, drop moats, sophisticated earthworks and moats, mixed exhibits and multiple paddocks and modern animal holding buildings. Today, with large scale world environmental stresses like global warming, deteriorating polar ice and sea-level rising, and potential pandemics for humans and other species, megaprojects like the Tundra Trek and Toronto Zoo with Polar bears and other arctic species may be much more significant arks for the future than they were intended to be.

The awakening knowledge and concern for wildlife conservation around the world demonstrates the very real need for educational prospects in zoos, and their exhibits. The necessity to interpret new viewpoints of wildlife and conservation, different from historical standard zoological conceptions, is recognized today. Long gone is the singular spectacle of the colonial zoo cage. Perhaps the new engineered earth megaproject design methodology of new zoo exhibits can be extended further to a radical move away from traditional exhibitry in zoos focused centrally on animals on exhibit, to explore the periphery of present mainstream notions of nature to develop other emerging viewpoints of conservation and the aboriginal cultural approaches and non-Eurocentric perspectives, all which are needed. At the Toronto Zoo traditional aboriginal knowledge was being explored in the African Savanna project in 1989, in a Canadian Aboriginal Trail opened in 2004, and the



Tundra Trek megazoo project in 2009. The recent relationships of Western zoos to postcolonial and feminist critiques (Anderson, 1995; Harpley, 1992; Harpley & Simpson-Housley, 1998; Whatmore, 2002) are recognized, but the larger ancient relationship of humans, nature and zoos is considerable. That historical and the contemporary are both in need of more study and potentially even further applications in zoos in the future is widely recognized.

The synthesis of arrangement of the myriad perceptual exhibitry elements identified by environmental behavior methods and converted, with reflection, through the artistic process like in the African Savanna, Gorilla Rainforest and Tundra Trek projects at Toronto Zoo make possible a new generation of rigorously definable, unique zoo exhibits in the future. Modern zoo exhibits, created through the imaginative artistic process, with rigorous social science research to inform decisions and that are cognizant of historical influences and with emotion, feeling, and original experiential connection to place, will attain higher levels of exhibitry methods of success. With the coordinated implementation of planning design and construction of Zoo staff, engineers, architects and community partners and with engineered earth methodologies, these exhibits could become landscapes that are symbolic of tourist and commercial traffic.

Zoo exhibits (as recreated place) can thus become metaphors for current natural and human circumstances situations and become appropriate interpretive vehicles for education and communication of an unlimited range of modern natural and social research findings. Indeed, the zoo exhibit can "...reinforce that the importance of the relationship between human culture and our view of the environment is fundamental to our daily lives" (Glacken, 1967). Nowhere is the relationship more apparent or urgent than in the visioning of the ever changing world of the ancient and contemporary institution of the zoo.

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