

## CONTEXT STUDY

## 2.1. ARCHITECTURAL DIVERSITY - AN EXPANSIVE ENQUIRY INTO THE FIELD

### 2.1.1. Architecture habitats

Architecture creates spaces for human use, however, there is a world trend towards creating people and environment friendly habitats which moves away from total destruction and heads towards the co-habitation and improvement of these spaces. Architecture may also deal in creating animal spaces especially those in confined spaces. Polakowski states that the design of animal spaces can depict a particular attitude about the relationship of humans, animals and the environment. The design of enclosures, services for enclosures and objects within the enclosures are all contribution factors. Using a multidisciplinary approach to contribute to zoological park design, promotes creative thought and unique design solutions according to Polakowski. Including Architects and Interior Architects at early stages of designs can result in creative design solutions for educational messages, ecological principles and conservation issues. Today a typical multidisciplinary team for exhibit designing includes wildlife management professionals; exhibit designers; landscape architects; botanists; architects; graphic designers; environmental educationalists; and professionals from schools of natural resources. Interior Architects today are fully equipped to partake in the designs of these environments together with the aforementioned experts.

### 2.1.2. Interior Architectural Habitats

As previously stated, contemporary Interior Architects have a wide range of skills relating to 'internal' space creation. IA focuses on "humanistically conceived space, distinguishing [it] from the current practice of either arch or interior design" (Kurtich, Eaken 1993:3). It is the "link between art, architecture, and interior design" and is thus "created by the fusion of related disciplines" (Kurtich, Eaken 1993:3). Most importantly IA is 'the holistic creation, development, and completion of space for human use' (Kurtich, Eaken 1993:3). Currently the realm of IA boasts a diversity of space creation categories. Contemporary projects include, claiming spaces by designing conventional Interiors in projects with Architects, Landscape Architects, and other professionals. In addition to these projects, Interior Architects are involved in restoring and rehabilitating existing structures; designing spaces for transport; claiming internal space in external space in (not only in architectural shells) – see figure 1, 2; claiming internal spaces in temporary structures; designing thresholds (approaches and entrances) and also creating an experience.

Simple construction in space creation is becoming increasingly well accepted in various applications.

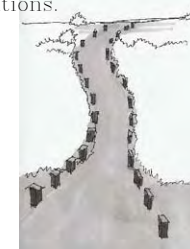


Figure 1. A defined walkway. Internal space is claimed in the external by the addition of small

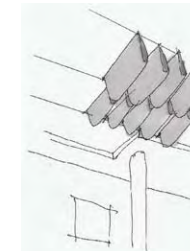


Figure 2. Lightweight sun protection device. The creation and accommodation of space on a patio with use of lightweight retractable canvas sheets as a sun protective

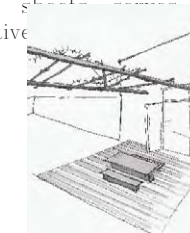


Figure 3. A defined patio. Contrasting floor materials and simple overhead construction further defines an

To conclude, the contribution to the design of animal enclosures and their visitors' spaces, design elements and principles (see section 2.6) must be applied after careful consideration of animals and humans, their needs, their behaviours, and other aspects by using a similar analytical design process as would be followed with the design of human spaces.

## 2.2. OUTDOORS AND RECREATIONAL ENRICHMENT FOR MAN: a habitat for all life forms

To design a successful *animan* precinct, the importance of recreational nature spaces and reasons for their conservation should be noted. Animal and plant habitats are in danger all around the world, and the less responsive we are to this problem, the worse their habitats become. Their environments should be conserved to meet their basic needs for survival. With an "environmental" or 'green movement' in society it is contradictory that the more we improve the standard of our housing and develop new technologies (to the extent that we can completely shut ourselves off from the environment), we are turning more and more to outdoor leisure activities and holidays to take us from the environment we live in and have invested millions in" (Cave 1998:2). We need nature spaces for peace, restoration, mastering of new skills, stimulation seeking, and to confirm our basic activities. Outdoor recreation also provides humans with intellectual stimulation, helps us unwind from our busy lives, encourages socializing, provides solitude and aesthetic expression.

### 2.2.1. Importance of outdoor spaces in South Africa

According to Norberg-Schulz humans need 'centres' or places where activities and interaction can take place. Animals also require such centres where the natural environment can be preserved and recreated. Humans also need 'paths' (circulation) which connect our places/centres. In addition, places defined in areas represent 'domains', which in conjunction with places and paths can provide us with 'existential space'. This kind of space becomes a real dimension of human existence. Map 1 shows some South African existential spaces where people can carry out activities and interact with animals. These include game reserves, nature parks, animal rehabilitation centres, zoos, breeding facilities, aquariums and more. These places are important for tourism, conservation, breeding, recreation, education and other reasons. Each of these places offer a variety of animal spaces, and diverse human spaces.

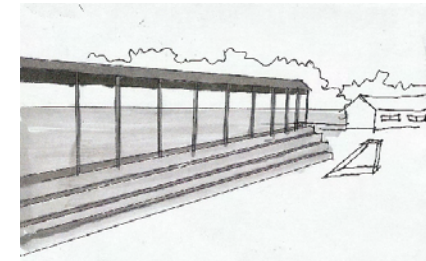


Figure 4. A pavilion at Glenstantia Primary School, Pretoria. The design of a school pavilion offers weather protection.

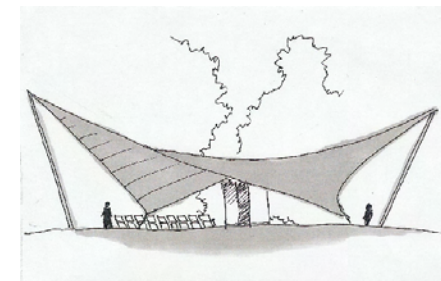


Figure 5. The Federal Garden Kassel, Germany 1955. A music pavilion, space is claimed and protected by a lightweight structure.

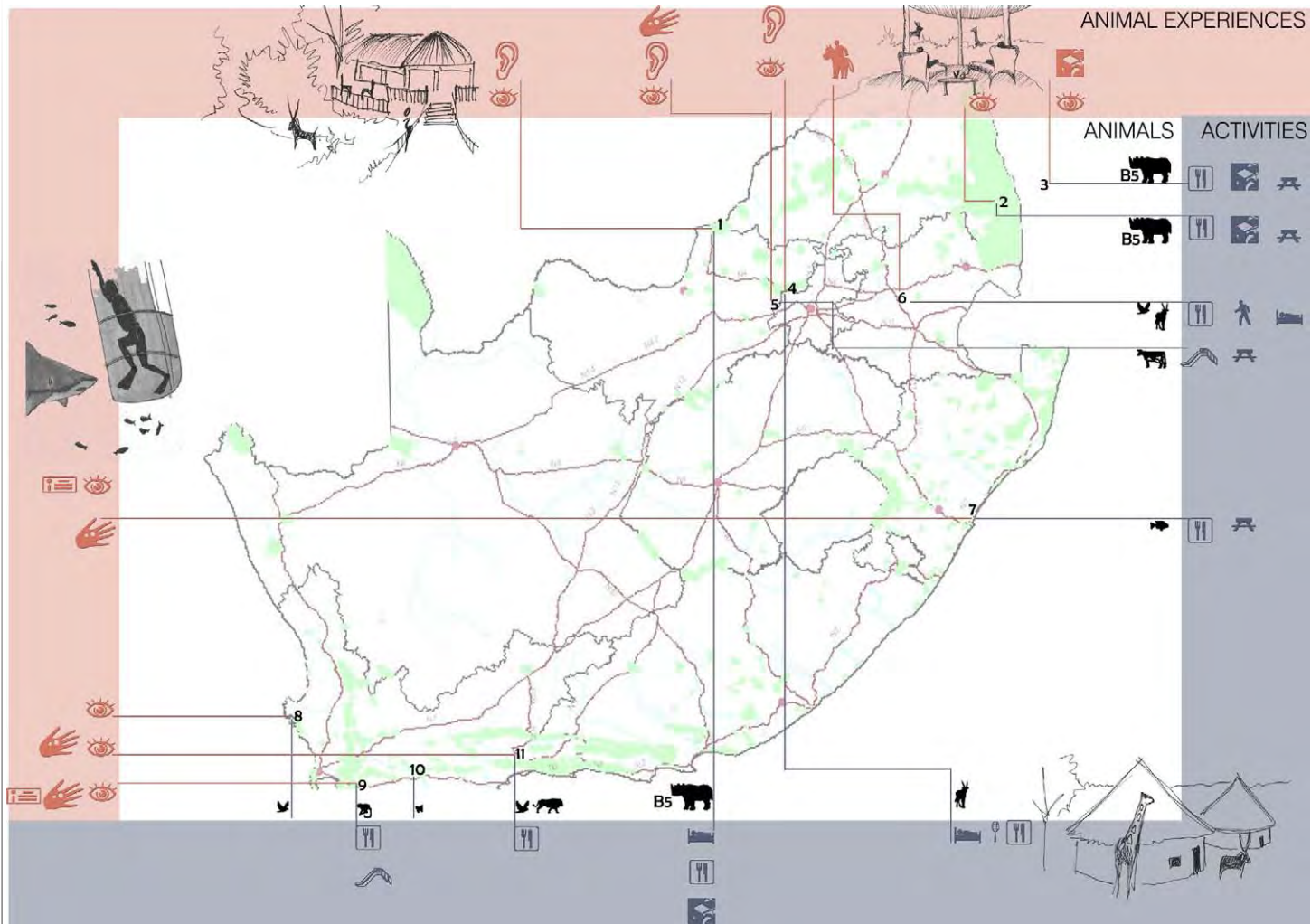


Humans can interact and exist amidst animals in these areas. Hence they are designed specifically to accommodate animal well-being and a range of human experiences. Specific human use spaces within these nature places (whether it be a simple lapa area or a hotel at a game reserve) are significant to human spaces. "Humans act in space, perceive space, experience the sensation of space" as Leonard suggests (as cited in Norberg-Schulz 1971:11), exist in space, think about space, and also create space. It is important for these mentioned places to offer a diversity of spaces for people. This can heighten visitors' experiences and encourage revisits that will in turn boost revenue valuable to the conservation of the enclosed animals.

The sheer vastness and openness of a game park enables humans to see, and experience live animals in what is perceived as their own environment because human encroaching is at a minimum.

Visitors are left with the impression that they have become part and parcel of the animal habitat. The Parrot *Animam* Precinct aims to achieve this on a much smaller scale.

Within the microcosm of our society we are unfortunately reliant on zoos for the majority of our people to be able to experience and view animals. The aim should be to make these enclosures as animal friendly and true to life as possible.

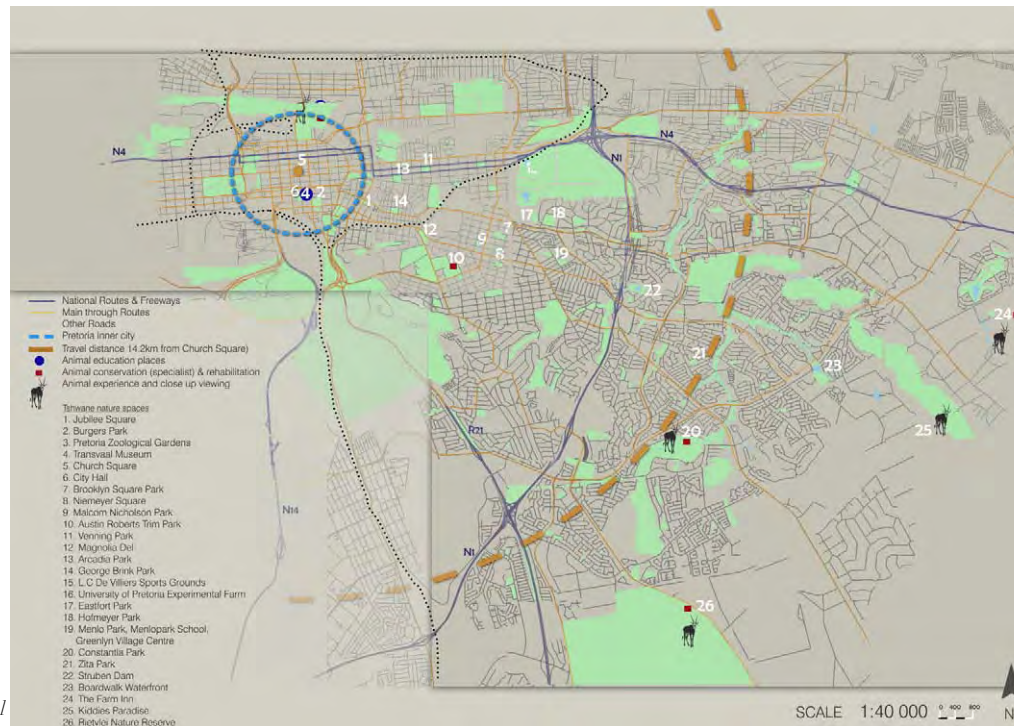


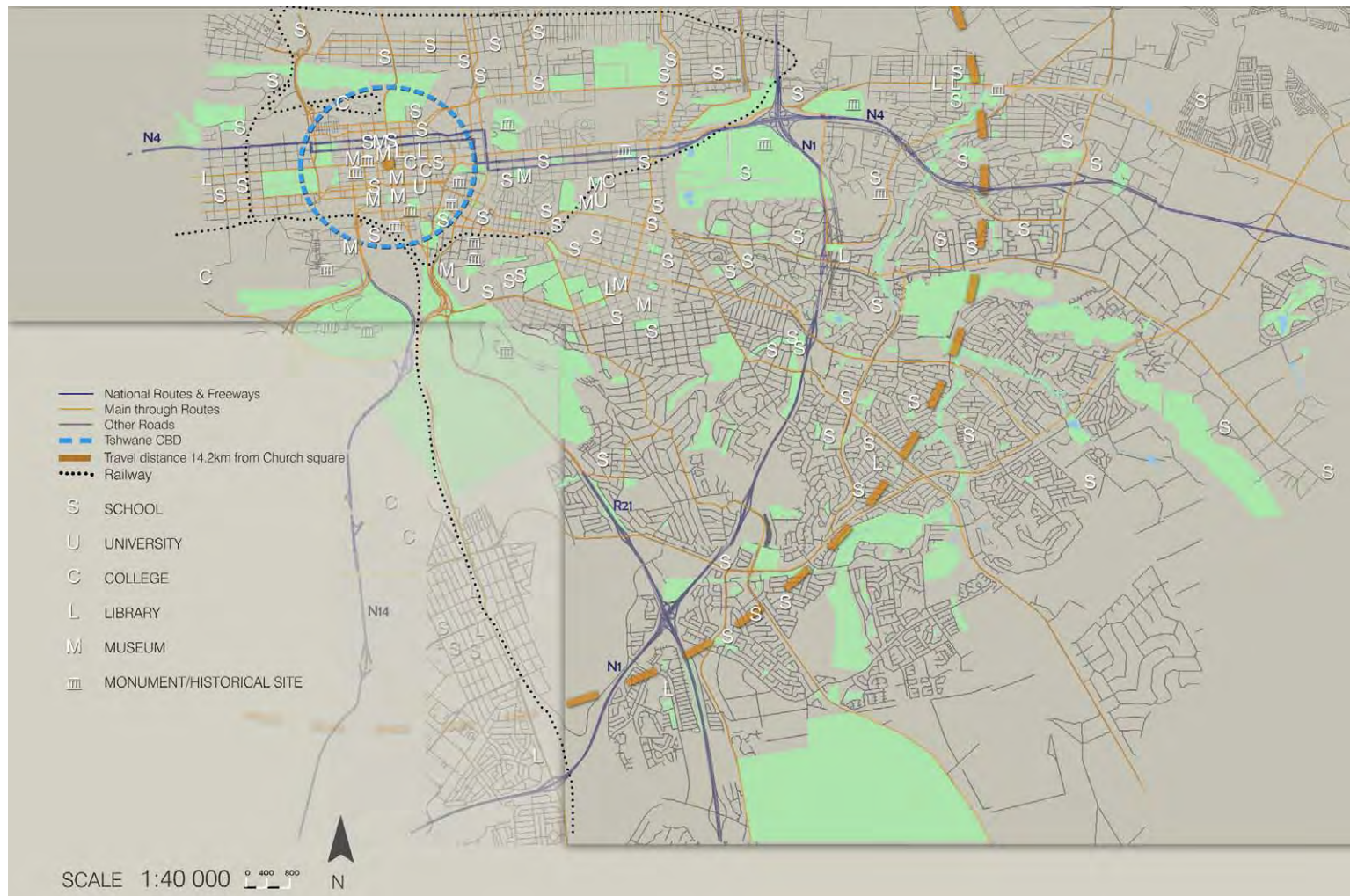
1. Madikwe Game Reserve
2. Thornybush Game Reserve
3. Motswart Game Reserve
4. Heia Safari Game Reserve
5. Moms & Tots Farmyard
6. Forever Resorts
7. uShaka Marine World
8. Birdwatching Salt Marshes
9. Butterfly World
10. Monkey Town Primate Centre
11. Safari, Ostrich Show farm

Map 1. Some South African existential nature spaces with animals.

### 2.2.2. SA Zoo as an important establishment in Tshwane

Appendix A shows some semi-experiential nature areas in Tshwane CBD and 21km eastwards include parks and greens offering minimal of only small animal interaction and education (nature spaces 1,2,5,6,7,8,9,11,12,13,14,15,17,18,21,22,25) – see Map 2. Some of these parks do not even provide creative play areas. Few of these nature areas within the designated Tshwane area that provide animal interaction, include nature spaces 3,4,10,16,19,20,23,24,26. Interaction here includes feeding, touching, riding animals, dining among animals and learning about animals. But these areas offer moderate animal interaction mainly concentrated 14km from the CBD (except for the SA Zoo). The SA Zoo boasts varieties of animal environments among a concrete city. It has the potential to offer animals and city dwellers rich natural recreation spaces that suburban dwellers have in abundance. The city dwellers can also find easy and cheap transport to visit the zoo. If any of these areas mentioned above could use improvement and advancement, it would be the SA Zoo, for animal benefits, and also to bring more city dwellers and those from afar to a variety rich nature area.





Map 3. Educational institutions in Tshwane CBD and some of its eastern suburbs.

To conclude, the *animan* precinct approach to improving facilities for both animals and humans at the SA Zoo, should thus propose new and extra experiences for people, and be a suitable living habitat for animals, that people can recognize as suitable (not harshly captive) in its nature. The *animan* precinct approach should encourage other green areas and parks in Tshwane to become more experiential and educational about nature and its inhabitants.



### 2.2.3. Contribution to the Tshwane Innercity Regeneration Strategy

The aim of the *animan* precinct approach is to enhance and improve animal spaces as well as new human spaces and experiences to the SA Zoo as this could help the Tshwane Inner City Development and regeneration strategy.

Improving human and animal areas at the SA Zoo will educate people about fauna and flora and including their conservation and rehabilitation. Such an improvement will support Tshwane's cultural prominence as the SA Zoo is seen as an important provincial and national asset. New ideas for the improvement of the SA Zoo and its exhibit design could help build Tshwane's international image and reputation regarding zoo design. The strategy states that natural and cultural resources must be preserved, utilized and enhanced – see figure 6. Experiential development of the inner city is important as it could help attract people again to the Inner City for recreation and entertainment purposes. Improving animal living conditions and human spaces could help in changing negative perceptions of the inner city and in turn help to boost investor confidence. Tshwane needs an exceptional public environment (public spaces–parks, recreation areas and squares– and streetscapes; architectural quality of buildings; urban forestry; natural environment) that can compete with all the best cities in the world. The neglected area in front of the SA Zoo detracts from this world–renowned attraction. This project will assume that the proposal to redeveloped the neglected area is on its way. It aims to provide attractive small business opportunities for creative industries that will contribute to the creation of a tourism hub around the SA Zoo. It is thus evident that reviving parts of the SA Zoo will thus aid in reviving the inner city.

#### 2.2.3.1. Locations of Zoos worldwide

The SA Zoo is one of the many zoos around the world that exist in a CBD. It has responsibilities and is a valid area that should not be discarded even if the idea of a zoo is a contradictory statement. Zoos among “urban concrete landscape that excludes animals and discards insects” should be preserved according to Polakowski (1987:40). Captive animals are the “...reminders, in countryside or inner city, of their counterparts still remaining in the wild, of a finer period in the world's history, a period that is by no means lost and has the potential of reclamation” as stated by Jones & Jones (as cited in Polakowski,1979).



Figure 6. *Tshwane CBD*. Nature life at zoo filtering into the Tshwane CBD via the Paul Kruger street corridor.



## 2.3. ZOOS CONTRIBUTIONS TO SOCIETY, ANIMALS AND THE ENVIRONMENT.

### 2.3.1. Zoo Philosophy

In order to redesign or enhance existing animal and human spaces, the many contributions of zoos must be identified. This can provide solutions in the designs of spaces at the SA Zoo. We are in an age wherein humans are finally being forced to become concerned with the health of their environment. Visitors see the SA Zoo as ill-equipped in contributing to the preservation of animals, however this is an exact place that conserves animals successfully. Visitors see cages, and concrete walls, but are blind to the Zoo's conserving and preserving nature. The SA Zoo is aware that some animal enclosures need to be redesigned to better suit animal needs, but without visitors, resources are limited. The *Animan* Precinct needs to uncover new ways of designing animal and human spaces by studying the zoos' duties towards animals and people. These duties include conservation and also (in no order of importance) recreation, education, experience, research and community values.

### 2.3.2. Conservation

According to Jones & Jones (as cited in Polakowski, 1979), zoos and aquariums have a responsibility to assist in the conservation of the world's wildlife heritage. Jones further sees that we have finally become aware of the connectedness of everything on our planet and the ability of our species to wreak it in such a short time. A major conservation message to zoos, is to remind the visitor to "think globally and act locally" (Polakowski 1979:41). Signage showing threats to the environment can educate people, but poor quality and placement of these signs may further uninform people of these issues. Zoos keep a variety of life forms, exotic and endangered animals; commonly found animals; and animals from other countries and continents. Zoo keepers constantly monitor the wellbeing of these animals and enrich their lives daily. In conclusion, any design of an animal space the SA Zoo must conserve the animal as its natural habitat would. In addition, any design of a human space near an animal enclosure at the SA Zoo must therefore make visitors aware of the conservation in place, and the importance thereof.

### 2.3.3. Recreation

Recreation is an important reason for zoo attendance by visitors. As Polakowski states, providing recreation is an important service to the community in its own right, apart from its value to the zoo in attracting paying customers. Most people need a break and an interesting time, and this attitude is shared by many different individuals (seniors, toddlers, intellectuals, mentally disadvantaged, and the physically handicapped). For the city dweller "...a good zoo offers a respite from the artificiality of the city, an oasis of living diversity among its architectural bones, bricks, and busses" as Conway suggests (cited in Polakowski).

Problems include that zoos, providing a recreational experience of some length, are considered places to visit primarily on weekends and holidays. The SA Zoo is also unaccommodating to the physically and mentally disadvantaged. As Polakowski states, "recreation facilities provide the primary attraction for the visitor and it is necessary for the economic survival of a zoo"(as cited in Polakowski 1979:30). It is therefore paramount to note that when redesigning or enhancing any new and existing recreation spaces, they should be accommodating to all. An advancement of Recreational spaces at the SA Zoo require advanced materials and techniques, but any solutions must be unintrusive to the surroundings, and need not compromise the animals' wellbeing. These recreation spaces can be made more experiential by the addition of educational experiences.

#### 2.3.4. Education

Joslin (as cited in Polakowski 1979:30) presents the thought that "however, it is also recognized that this is not how the zoo or aquarium is perceived in the eyes of the average visitor whose primary interest is in the institution as a recreational resource". Recreation and education as goals should not conflict with each other or the environment, but instead be integrative to these. Conway, (as cited in Polakowski 1979:30), "Generations are growing up without any natural contact with wild creatures.." and the "opportunity to observe and learn directly from a living collection of wild animals is a zoo's unique educational offering". "Even at the simplest level, direct contact with live animals can stimulate the imagination, sharpen observation, and enrich the thinking of zoo visitors". (Polakowski 1979:30).

People are generally ill-informed about unique characteristics of each animal species; wildlife ecology, and the relationship of the environment with humans, fauna and flora. Educational information can inform on scientific (see figure 7), and non-scientific levels (see figure 8). Educational tools can better educate visitors. Firstly designing enclosures to allow close viewing; and using participatory displays (dynamic labelling; technical and less technical information; unanswered labels; and conversation promoting information) are educational tools, in that they have animal knowledge and the ability to strengthen visitor experiences. The circulation paths between enclosures also serve as a tool to heighten a visitor's absorption of information. This can be achieved by combining walk-through; ride through; and float through enclosures (figure 9, 10). Animal demonstrations are educational tools and promote contact and experiences of a different kind. Special Tours are also educational tools that involve different visitors. These include specific tours for disadvantaged visitors.

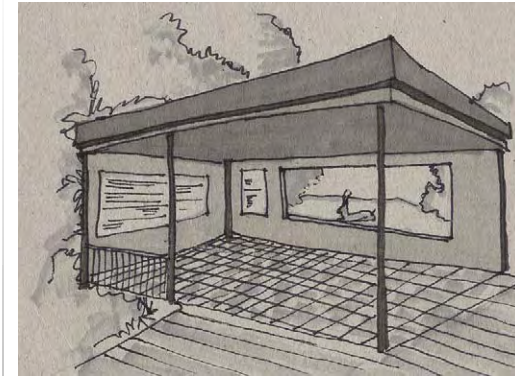


Figure 7. *CBD Zoos*. Information sheds at the SA Zoo. These sheds are few and uninteresting.



Figure 8. *Interactive signage*, Chimpanzee Enclosure pathway, SA Zoo. Diagrammatic signage can involve humans in understanding animal characteristics.

### 2.3.5. Zoos offer visitor experience

As previously stated Norberg-Schulz reveals that man's existence is dependant upon the establishment of a meaningful and coherent environmental image or existential space. The task of the architect, therefore, is to "...help humans to find an existential foothold by concretizing his/her images and dreams" (Norberg-Schulz 1971:114). This approach is well used at the uShaka Marine World in Durban, South Africa. There are different levels of existential space used at the uShaka Marine World that can be incorporated at the SA Zoo. Norberg-Schulz Levels: Level 1 is an experience of objects of a size determined by the hand (e.g. pamphlets or touching animals). Secondly, level 2 is an experience of furniture and elements of sizes determined by the body (e.g. being immersed in a tank lowered in the animals' environment - see figure 9. Level 3 is an experience of a structure or element with dimensions determined from extended bodily movement and actions (e.g. being immersed in the greater fish enclosure free to move with the animals - see figure 10. Level 4 is the experience on an urban level determined by social interactions (becoming the sponsor of animals). Level 5 is an experience on a landscape level determined by humans' interaction with the natural environment (e.g. programs helping to clear litter from beaches). Level 6 is the experience on a geographic level determined by traveling from one landscape to another (e.g. traveling to other oceans and diving). From a family perspective. The zoo has been traditionally the first point at which humans are introduced to the animal kingdom.

### 2.3.6. Research

Breeding programs and animal conservation requires much knowledge and skill. Research needs to be done in order to understand animals and their environments. Not only do zoo keepers use the research conducted at the zoos, but scholars and students require different information for assignments. Recorded information and special magazines and books that are kept at zoos should be made available to the public. Daily records and documentation about the enclosed animals, their behaviours, and their environments can in turn benefit these animals and their environments (as stated by Polakowski).

### 2.3.7. Community Values

An *animan* precinct should thus provide archives and research spaces. It is important to realise that the nature or design style of a zoo exhibit can depict a particular attitude about the relationship of man, animal and habitat. "Zoos are a reflection of their communities" ( as cited in Polakowski 1979:46). Zoos must be sensitive to community feelings and encourage an increase in public funds for zoo operation and animal enrichment.



Figure 9. Visitors swim with sharks, uShaka Marine World, Durban.



Figure 10. Diving visitors, uShaka Marine World, Durban.



## 2.4. DESIGN FOR BEHAVIOURAL ENRICHMENT

Visitors are presented with illusions about nature and see animals as ‘docile’, approachable, and as ‘man’s friends’, different from their counterparts in the wild. They are the same physically, but behaviorally different from their wild counterparts (Polakowski 1987:3). People go to the zoo to be entertained by frisky and friendly animals. Visitors may be upset to learn about the reality of survival in nature. The risk of offending the public by presenting images of reality may be too great and costly for zoo management. Animals however need to act out normally and programmes offer this. As Polakowski poses, resolving the dilemmas mentioned in a manner that respects the animals and excites the visitor, requires an innovative and creative design philosophy and approach.

### 2.4.1. Why Behavioural Enrichment

Animals in captivity may become stressed and act in stereotyped manners when taken care of in captive environments. They can not act out all of their usual behaviours as they would in their natural habitats. Behavioural enrichment co-ordinators are employed by zoos to help provide stimuli for the animals – see figure 11. Enrichment programs are designed to help in building animals’ immune systems and reduce stereotyped behaviours (Carlstead p172–183). Stimulation can take place in the form of interactive techniques. Hot spot temperature elements; raising and lowering beaver water levels, creating an illusion of instability; fake wood rats in puma cages are moved to induce the running of the puma and artificial termite.

Behavioural enrichment takes place, and visitors are generally unaware that animals are very carefully monitored and cared for by co-ordinators. If this aspect of the zoo contribution could be visible to the public, visitors would understand the caring nature of the zoo and not feel negative about captive environments. Design opportunities to increase and encourage natural behaviour must go beyond the provision of gadgets or props – an appropriate enriched environment is a better solution (Polakowski 1987:98). Risks when designing environments need to be considered (Baer p277–301). Animals’ sensory modalities should be considered, and thermal qualities of the environments should not affect the animals psychology and behaviour.

Enrichment structures and programs can become part of the design of the *animan* precinct visible and beneficial to the public as well. Animal enrichment can improve enclosure designs, and involve visitors in the future, thus helping to change mindsets about animal spaces and zoos.



Figure 11. A Rhino Enclosure, SA Zoo. A curator interacting with a rhino.



Figure 12. Enrichment props at a Chimpanzee enclosure, SA Zoo.

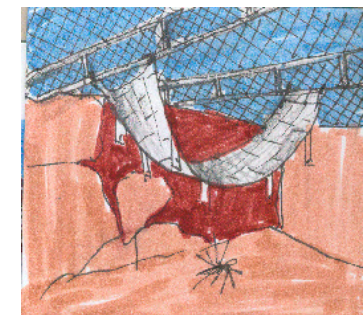


Figure 13. A play element at a Baboon enclosure, SA Zoo.



**2.5. ZOO EVOLUTION** on page 18

### 2.5.1 The concept of travelling menageries

The travelling “menagery” concept has not completely fallen away. Today some zoos offer a mini-travelling zoo for entertainment at parties held at zoo facilities. These concepts should be substituted with tours, and event facilities that overlook animal enclosures. Animals should not be moved or adapt to human event, unless the interaction offers animal stimulation.

### 2.5.2 Animal enclosures using architectural styles

Many animal enclosures have buildings of solid construction that create unnatural habitats for the animals. These buildings attempted to imitate illusions and architectural styles associated with the animals’ native habitat. Alternative construction techniques need to be developed.

### 2.5.3 Mixed species exhibits and barless zoo concept

In 1907 Carl Hagenbeck developed a cageless zoo at Stellingen, Hamburg. He developed a system of moats and ditches (instead of fences) as barriers giving the public open views of the animal exhibits creating the illusion of animals “exposed to each other in a continuous vista” (Polakowski 1987:10). These enclosures require more space, but today many zoos continue to incorporate this concept into the enclosures to rid animal-human thresholds of typical fences. (Polakowski 1987:20) Game Reserves and Wild animal parks are important places that offer different animal-enclosing spatial concepts.

### 2.5.4 Human educational and interactive experiences

An important shift in educating and entertaining visitors is currently taking place. This shift is from using 2D printed information to using exciting, experiential, educational tools.

### 2.5.5 Human and Animal Existence at zoos

The “unzoo” concept is developed to create a place where the residents share the land. “Create a place where the viewer is not the owner but a humble guest. Remind people that we are all connected and that wild places have spiritual and emotional wealth beyond dollar value. Make that your mission!” argues Mendez (as cited in Jon Coe :2005)



1600

1700

1800

1900

2000

2006



Industrial Revolution begins

1973 Endangered Species Act



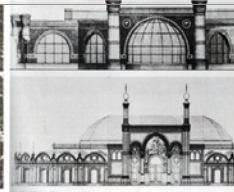
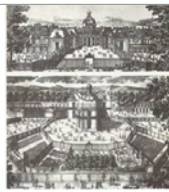
14. Yarmouth Beach 1891; Travelling mini-zoos, Las Angeles Zoo 2006

15.

16.

17.

18.



Versailles Zoo 1600-1700; Bear cages in Berlin Zoological Gardens; Old Carnioe House, Pretoria Zoo, 1930; Elephant Nightquaters, Pretoria Zoo

19.



Hagenbeck revolution, Hamburg Zoo, 1907

Game Reserves and wild animal parks

Printed species information on the visitor paths

20.

21.

22.



Educational & interactive experiences for visitors (Ushaka Marine World; Bester birds and Animal Zoo Park; Monte Casino Bird Park;

Animals live according to human standards

Humans adapt to nature's standards



### 2.5.6. Zoos of tomorrow

To generate new concepts for zoos, we can thus reaffirm that shifts in mindsets need to take place in order to improve these environments. Enclosed caged animal spaces, open 'barless' grottos and mixed species exhibits can be further replaced by 'immersion' exhibits with hidden barriers. Zoos outlooks should tend to an "unzoo approach" as Coe points out (Coe 2005:1). As they state, a zoo was originally a "park displaying live animals...from different parts of the world...kept in cages or enclosures for people to come and see, and where they are bred and studied by scientists." (Coe 2005:1). It can become instead an unzoo: "a place where the public learns about wild animals, plants and ecosystems through interaction with and immersion in original or recreated natural habitats". In reaffirmation, an important concept for future zoos is to become a place where humans adapt to nature's standards. We need to "[c]reate a place where the residents share the land [and create] a place where the viewer is not the owner but a humble guest." He also states that it should be zoos' missions to "[r]emind people that we are all connected and that wild places have spiritual and emotional wealth beyond dollar value" (Mendez 1999 :11). Exhibit design must be well researched to bring about successful changes in zoo concepts for the future.

## 2.6. EXHIBIT DESIGN

Exhibit designers must use a process to assess the needs of inhabitants and functions of the enclosure and its surrounds in order to design a qualitative animal space which humans can view and experience. A "good exhibit is about people, animals, and plants. It is an exhibit that makes people feel good about the animal, understand the animal/plant/people relationship, and educates the zoo visitor about major concepts of conservation" proposes Robinson (as cited in Polakowski 1987 :78). "Ultimately, the look and feel of our exhibits is symbolic of the linkages we try to make between our increasingly urban world and the receding domain of nature" (Bierlein 2003:1). The designer depends on design elements (size, shape, colour, texture etc.) and design principles (rhythm, repetition etc) to create a memorable exhibit for communicating, educating (educational messages; ecological principles; and conservation issues) and entertaining. Satisfying the diverse and often conflicting needs of the animals, visitors, and management can be difficult if each party's needs are not clear.

### 2.6.1. What exhibits must be for animals

Exhibits must be qualitative. As Hutchins, Hancocks, Crockett, (as cited in Polakowski 1984:85) state "If zoo visitors see animals in ugly conditions engaging in aberrant behaviour, they are likely to feel nothing more than revulsion". The exhibits should be designed according to the behavioral aspects of the animals. The exhibit should not be designed to go beyond physical sensations (loud noise, abrupt movement, unpleasant odours) suitable to the well-being of the animal. It is also stated that the exhibit should be influenced by the site, the character of enclosure, the topography, the orientation, the vegetation, and the services. The exhibit should not be overshadowed by man-dominated objects, and offer the animals spaces necessary to carry out their normal behaviour as they would if they were in the wild (for e.g. birds eating, resting, breeding, nesting, searching, hiding, moving). Animals also require protection from man and other animals.



### 2.6.2. What exhibits must be for humans

Any style of presentation of the animals will reflect the underlying philosophy and goals of the zoological park. For curators and zoo keepers the exhibit should have spaces to monitor animals easily without disturbing them and storage spaces for a variety of equipment (cleaning equipment and recorded data and literature). In addition, it should offer the keepers and maintenance equipment easy access to and from the enclosures. For visitors it should be a place where people feel good about the animals' environments and a place where humans can understand the animal/plant/people relationships as Robinson suggests (as cited in Polakowski 1985:78). It should educate people about a multitude of subjects (ecological and conservation concepts; adaptation; habitat threats). In addition, it should be accessible, recreational and experiential to visitors of a variety of ages, social classes, sizes and to those who are physically or mentally (partially or fully) disabled. It should also allow for positive interaction and it is the "[d]esigner's task to get the visitors involved with the exhibit to the highest level of interaction" (Polakowski 1985:86). The exhibit should also be a safe environment and designed from a holistic point of view, and focus on interrelationship between people, plants, animals, and our environment. As Polakowski also states, it should be tranquil and simple in mood so that educational, and conservation messages will not be lost. The exhibits may be adventurous and have elements of uncertainty/mystery/and exploration to heighten visitors' experiences.

To conclude, people visit zoos and captive environments to learn about animals and plants; to encounter the usual and the exotic; to relax in a pleasant environment; to be entertained by the strange curious behaviours of animals, and to become more aware of relationships between animals, plants, humans and the environment. Once different parties' needs have been studied, design styles can be researched.

### 2.6.3. Design Styles

Style is the aspect of design influenced by a designer's philosophy, nature of the message, place, time, locale (variables). Scene/exhibit styles are numerous and include realistic, abstract, sculptural, architectonic, romantic, formal, impressionistic, representational, ornamental, romantic-exotic ; and ornamental-exotic (Polakowski 1985:8) Each style mentioned has a rightful place in the role of communicating and presenting ideas, opinions, and facts to observers. Any style used should however allow adaptability. The exhibit should be designed in such away as to accommodate future changes. Zoo ideas have been changing ever since the idea of captive animals began. At the SA Zoo animals are occasionally shifted to other locations therefore the exhibit should allow for future changes if necessary.

#### 2.6.3.1. Exhibit Dilemmas and Illusions

Designs based on deceptions pose important issues and it must be remembered that the exhibit is more importantly for the life of an animal than for the education of man. Animals resort to deception for protection (camouflage, hiding, killing) yet in zoos, animals are easy to spot. This causes stress among animals animal which may lead to sickness or even death. To be a successful exhibit that will meet the needs of the abovementioned parties, adaptability and dilemmas in exhibit design were studied.

### 2.6.3.2. Design Illusions

*(a) Zoo as a theater.* Design illusions may bring stimulation to the animal's natural habitat; produce an atmosphere similar to the animal's environment; focus on the outstanding physical features of the animal; emphasize ecological relationships between animals, plants, and man; or even help educate the zoo visitor (about the reality of the animal's natural habitat, biological and ecological principles, the impact of man on plants and animals, and predator-prey relationships). "The zoo exhibit, like the theater, is concerned with creating illusions to carry a particular message or attitude. Its success is dependant on the images and messages it conveys to the visitor. The art and science of exhibit design relies on illusions to attract the visitor's attention, instill a memorable impression, promote an enjoyable experience, and convey a clear educational message" (Polakowski 1987:11). Design illusions using contour, size, perspective, depth and distance can increase the complexity of a scene and add to the mystery of the enclosure.

*(b) Boundaries.* The choice of materials for boundaries, their positions, and types can destroy or enhance the integrative qualities of exhibits. Boundaries should be interpreted as human protection barriers and not as animal confining barriers. In figure 23 the use of minimal and slender man-made materials and techniques together with natural materials and allow people to feel less guilty about an animal's circumstances when the focus is not placed on a man built animal environment.

Various mentioned illusions can be used in different approaches - e.g landscape immersion approach (placing visitors inside the habitat landscape and extending the complexity of the animal's environment into areas where visitors walk, stand or sit). This can remind visitors that they are respectful intruders in the animal's wild domain. This approach can allow our experiences of animals more on their terms than on ours. (Bierlein 2003:3). It is evident that many design styles are available and convey different ideas, but whichever illusions and approaches are used in the design of an exhibit, it should not compromise the wellbeing of the animal enclosed.



Figure 23. *Chimpanzee Enclosure and adjacent human space, Johannesburg Zoo.* The use of a variety of materials (natural and man-made) of different shapes for barriers between the animal and human space, creates an illusion of one space separated only by small vegetation. The spaces are on similar levels to portray the illusion of integrated spaces.

## 2.7. DESIGN ELEMENTS AND PRINCIPLES FOR SPACE DEFINITION (AS USED IN THE SA ZOO)

This study is based on Ching's and Miller's spatial design concepts. This will show that spatial concepts are used in the qualitative design of both human and animal spaces. Space claiming, enhancing elements and principles, as used by Miller, were also studied. These space enhancing sensory tools include temperature, tactility, sound, and scent. Miller's approach is to create spaces for functional requirement and also for ambience reminding us that when designing a space, design elements and principles and sensory tools all add to the psychology and well being of creatures in their spaces.

### 2.7.1. Primary Elements

#### 2.7.1.1. Point.

Indicates a position in space.

#### 2.7.1.2. Line.

An extended point with length, direction and position.

#### 2.7.1.3. Plane.

An extended line with length, width, shape, surface, orientation, position.

#### 2.7.1.4. Volume.

An extended plane with length, width, depth, form, space, surface, orientation, position.

### Human spaces for viewing animals



Figure 24. *Chimpanzee Enclosure, SA Zoo.* Volumetric Linear elements are used as visual barriers between animals and humans for animal benefit.

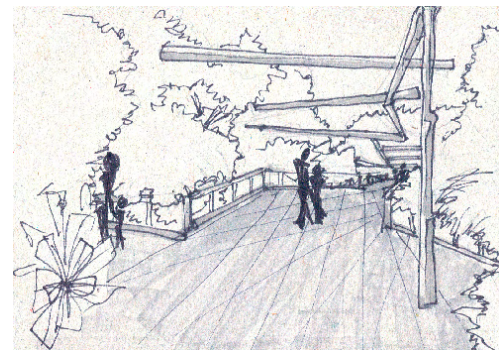


Figure 26. *A path to the Reptile Enclosures, SA Zoo.* Volumetric Linear elements approaching an enclosure defines a plane above to enhance an approach –

### Animal living spaces



Figure 25. *Gibbon Enclosure, SA Zoo.* Volumetric linear elements are used for animals to walk on and to play on (structural steel skeleton and wire mesh).



Figure 27. *Primate enclosure, SA Zoo.*



### 2.7.2. Form

Form refers to the internal structure and external outline of a three-dimensional mass or volume:

#### 2.7.2.1. Surface configuration of form

Shape manipulation can claim space

*(a) Primary Shapes.* The use of circles, triangles, and squares can define spaces. Extensions of these shapes exist (see figure 8). These can also define spaces.

*(b) Primary Solids.* Primary solids include sphere, cylinder, cone, pyramid and cube. Volumetric forms can claim spaces and by this way add validity and function to the spaces. Primary solids and irregular solids are used in human and animal spaces. Volumetric elements (as suggested by Miller) include movable objects; stationary objects; and furniture.

Regular and irregular forms. Many enclosures at the zoo have regular forms mainly cubic in volumetric form. These shapes are easy for visitors to understand, which may cause visitors to have bad attitudes about the enclosures in which the animals live.

Elements not included by Ching include movable objects; stationary objects, and furniture. They can create a sense of place, define a private or public space; enhance a focal point; and also add a feeling of permanence. For aquatic life some tank shapes allow water movement (figure 29).

#### Human spaces for viewing animals



Figure 28. *Space near the Vulture Enclosure, SA Zoo.* Humans understand that this place is different from the adjacent spaces due to its circular base shape.

#### Animal living spaces



Figure 29. *The Shark Tank, SA Zoo Aquarium.* Animals do not live in perfect primary shapes in the wild, but these cylinder shaped spaces are still used in the zoo.

### 2.7.2.2. *Visual tactile properties of form*

When manipulated to claim spaces, the properties size, colour, and texture of form can produce interesting results in both human and animal spaces. Texture can add visual properties to a form, and also add tactile properties to form that may claim different spaces (\*figure 30). For animal spaces (at the SA Zoo) forms are created with smooth textures (figure 31).

### 2.7.2.3 *Transformation of form*

Forms can be manipulated by changing the dimensions or by adding or subtracting to or from the form. These transformations include dimensional, subtractive, and additive transformations. Additive form (by adding elements to a form) further include spatial tension; edge-to-edge contact; face to face contact; interlocking volumes; centralized form; linear form; radial form; clustered form; and grid form. Animal spaces are designed to include some interlocking volumes like the fibreglass rocks in a Leopard Enclosure (figure 31.)

### Human spaces for viewing animals

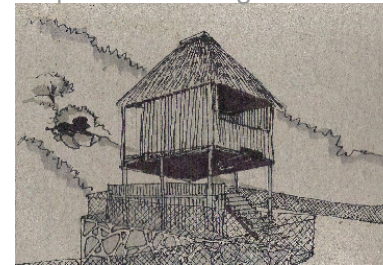


Figure 30. A viewing structure at the Lion Enclosure, SA Zoo. Thatch and wood gives the view space natural qualities, but the solid shape detracts from its surroundings.

### Animal living spaces

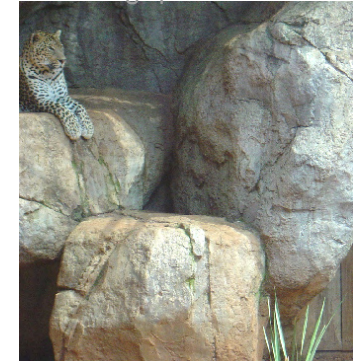


Figure 31. Perching space at the Leopard Enclosure, SA Zoo. Fibreglass rocks have smooth edges comfortable for perching.



Figure 32. A viewing path at the Baboon Enclosure, SA Zoo. Interlocking volumes are used in some viewing pathways. The themed use of fibreglass materials create an intimate viewing space.



### 2.7.3. Plans as Forms in Space

Horizontal planes (base, elevated, depressed, overhead) define spaces. In animal enclosure textiles as elevated planes can provide shade (figure 34).

#### 2.7.3.1. Light and Views

An opening in planar elements, can allow different functions to happen in the space and add a different mood to spaces. The mood may be attributed to the light that an opening can permit, and the views that the opening can provide. Openings may also enhance the air quality of spaces.

*(a) Light.* Light may add comfort (figure 35), and character to a space. Light can also be a vehicle of colour and help us distinguish between primary (size, shape) and secondary qualities of objects (colour, texture, sound, smell) as well. In addition, according to Abercrombie, light proves to be an important part of an objects message by showing highlights and shadows. Amount and quality of light can thus cause spaces to be perceived differently. Animals need protective shaded areas for their conservation. Food for exotic parrots is placed under a solid plane for sun, weather and contamination from above (see figure 36).

*(b) Views.* For animals, views give them a feeling of protection (figure 36).

#### Human spaces for viewing animals

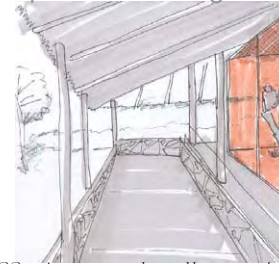


Figure 33. A covered walkway at a private enclosure, SA Zoo. Horizontal elevated planes, and a base plane are connected using vertical elements, creating an intimate human viewing space.



Figure 35. A pathway at the Leopard Enclosure, SA Zoo. This passage way uses enclosing planes to keep the majority of the space dark for a certain ambience, but gaps in these planes allow light and air into the space.

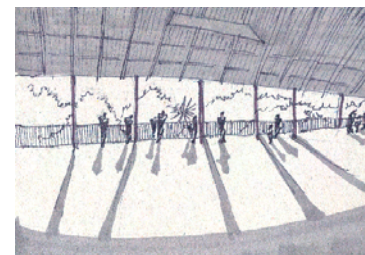


Figure 37. A viewing space above the Hippopotamus Enclosure, SA Zoo. An opening between a thatch lapa and the ground offers animal viewing.

#### Animal living spaces



Figure 34. A private enclosure, SA Zoo. Horizontal elevated planes of textile are used as a shading device for the enclosure.



Figure 36. A parrot breeding enclosure, SA Zoo. A recessed structure in a parrot breeding enclosure provides protection. The recess also allows views facing the rest of the enclosure.

### 2.7.3.2. Organization of space

Most spaces are composed of a number of spaces which may be related to one another by function, proximity, or a path of movement. Spaces can be connected by different principles. These include spaces within spaces (figure 38); interlocking spaces; adjacent spaces; and spaces linked by a common space.

Adjacent spaces may include spaces at different heights that can define separate areas. According to Miller, these different levels and the climbing devices that join them can become opportunities for evolving psychological states (figure 40).

Places require different kinds of spaces, and Ching states that these spaces can be organized and arranged in different manners by central, linear, radial, clustered, and grid organization. Animals in captivity also require different kinds of spaces to keep them as stimulated as they would be if they were in the wild (figure 39).

### Human spaces for viewing animals

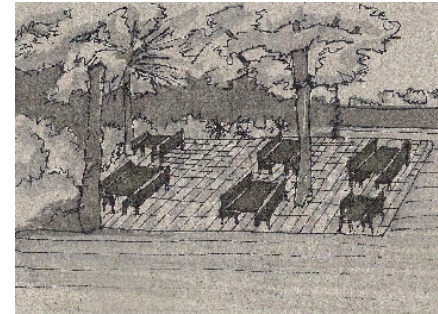


Figure 38. A space for relaxing and eating, SA Zoo. This area in front of the aquarium at the zoo has a subspace for picnic use, and this space is defined using a different floor material.

### Animal living spaces

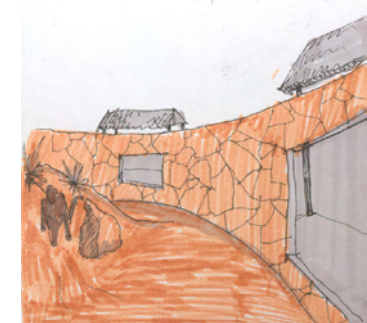


Figure 39. The Gorilla Enclosure, SA Zoo. Animal enclosures have depressed spaces adjacent to viewing windows in order to interact with the humans at the same level, and when they need their own privacy, they may move back up a hill.



Figure 40. Viewing structures of the Bear Enclosure, SA Zoo. Three covered viewing structures are repeated along the main path in a linear organization, for visitors to recess in these spaces while watching the animals at a different height.

### 2.7.4. Circulation through space

Circulation paths connect spaces. Circulation can occur to, from or through spaces, frontally, obliquely (figure 41) or spirally to the space. The configuration of the paths can also be linear, radial, spiral, grid, network, or composite in their nature. As previously stated, animals circulate differently than humans do, and not on a designated pathway. Animals decide on their own pathways, line of movement in their environments (figure 42).

#### 2.7.4.1. Entrance

Entrances to spaces may suggest a concept of the spaces in advance and are critical points in our appreciation of that space (figure 43). Entrance as well as exit points have psychological significance to humans.

Animals move freely in their enclosures and do not need man made entrance points in their habitats, unless they are moved to night-quarters (figure 44).

### Human spaces for viewing animals



Figure 41. *A pathway to the Elephant Enclosure, SA Zoo.* An oblique approach can be mysterious and interesting.

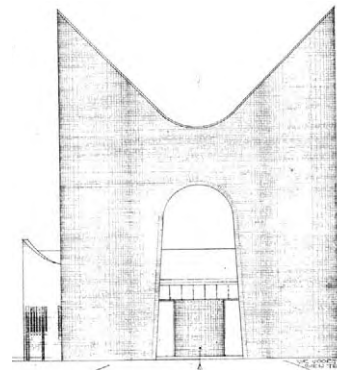


Figure 43. *The Main Entrance to the SA Zoo.* The form entrance is a preview to the theme of the zoo's original architecture -morphic and organic in form.

### Animal living spaces



Figure 42. *The Tiger Enclosure, SA Zoo.* The tiger creates his own path down the slope to a dry moat.



Figure 44. *A bird of prey enclosure, SA Zoo.* The service entrance parts at a bird enclosure.



#### 2.7.4.2. Path-space relationships

Paths may be related to the spaces they link by path-space relationships including paths that pass by spaces; pass through spaces; and terminate in a space. These properties of path-space relationships could further be categorized into enclosed paths; path spaces open on one side; and paths open on more than one side (figure 45).

For animals however, as previously mentioned, the form of the circulation paths depend on ease of movement for the animal. Contours should allow ease of movement, exercise, and replicate the natural habitat in which the animal would naturally live (figure 47).

#### 2.7.5. Proportion and scale

Material and structural proportions and scale may be used to define and enhance spaces. Different types and sizes of vegetation are used to add variety in animal enclosures.

#### 2.7.6. Principles

All forms and spaces can be ordered by using principles. These principles (as examined by Ching) include axis, symmetry, hierarchy, datum, rhythm, repetition, and transformation.

#### 2.7.7. Temperature

Controlling indoor climate can claim relaxation spaces. Adding irrigation for cooling in animal enclosures can claim cleansing spaces, and the use of solid materials that retain heat can become an area to promote breeding or living during the winter.

Animals' sequence of spaces include clear open spaces where they can view humans and each other, followed by dense landscapes for more private protected spaces.

#### Human spaces for viewing animals

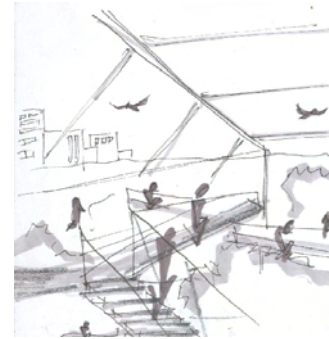


Figure 45. A walk-in bird aviary, SA Zoo. Passing through the space animals all round you.

### 2.7.8. Sound – Acoustic Planning

Depending on function and ambience of spaces that is required, sound isolation can be achieved using materials in the structure, and this can help claim private spaces. Certain animals claim their territory by noises, especially if another animal is trespassing.

### 2.7.9. Smells

The farm animal grounds have a strong scent, enriching a visitor's experience of this area. Zoo management adorns some animal spaces with fragrant vegetation. Unlike humans, animals claim their territory by releasing odours onto or around their space.

### 2.7.10. Activities changing spaces

Activities and equipment to carry out activities in spaces can define the function and mood of spaces. Some animals perch for extended periods on natural surfaces, and this may take the form or scent of the animal and in turn define its territory.

### 2.7.11. Signage

Signage can identify and give meaning to different spaces. Design elements and principles can be used to design signage and arrange it in a manner best suited to the space in which it must be. Signage can however not claim different zones in animal enclosures.

To conclude, each of the abovementioned spaces that were defined (using Ching's criteria) using design elements and principles, have a function and ambience that was created. Miller's focus is on environmental psychology in the architecture of interior spaces, and how design principles and elements can be manipulated to create a range of different types of spaces (stimulating, private, relaxing, comfortable, mysterious spaces). The animal precinct approach should consider the above mentioned spatial concepts and criteria to improve the animal and human spaces, while considering all the exhibit design criteria previously mentioned.



Figure 46. *The Aquarium signage, SA Zoo.* The glowing signage makes interesting learning in a dark space accentuating the fish and their colours.