

PRECEDENTS INVESTIGATIONS



3.1. PRECEDENTS A – WORLD ZOO FEATURES

World Zoos are assessed to view trends, types of spaces, and facilities offered in animal and human spaces. Each is assessed on the three main criteria of animal spaces; human spaces; and heritage considerations. Human space types available in the zoos include eating facilities; event facilities; picnic spots; children's or petting zoo; playgrounds; educational or discovery centers; amphitheater or show spaces; commercial services. Animal spaces criteria include types of advanced space concepts. Heritage consideration include; reused cage for animals; and reused cages for alternate facilities.

Table 1. *World Zoo Facilities* (a dash denotes none; an empty cell denotes information is not known.)

	1. Atlanta Zoo	2. Bronx Zoo	3. Cincinnati Zoo	4. Detroit Zoo	5. Los Angeles Zoo	6. Lincoln Zoo	7. Philadelphia Zoo	8. Phoenix Zoo	9. San Diego Zoo	10. San Diego Wild Animal Park	11. London Zoo	12. Whipsnade Wild Animal Park	13. Singapore Bird Park	14. Singapore Zoo	15. Melbourne Zoo
3.1.1 HUMAN USED SPACES															
1. Eating Facilities	6	8	2	4	10	2	10	13	8	6	3	5	6	9	5
2. Event Facilities	9	3	1	1	3	-	5	2	8	1	2	-	2	5	3
3. Picnic Spots	-	-	1	1	3	1	4	-	-	6	-	-	1	1	2
4. Children's/Petting Zoo	1	1	1	-	1	2	2	1	1	-	1	1	-	1	-
5. Playground	3	-	-	-	2	1	1	-	1	-	-	-	2	1	1
6. Educational/ Discovery Centre	1	2	3	4	1	2	2	2	1	1	2	1	1	1	3
7. Amphitheatre/Show Space	1	-	-	-	1	-	-	2	3	2	2	1	2	1	1
8. Commercial Services	1	2	2	2	2	3	3	3	8	3	3	2	3	1	3
OTHER – HERITAGE RESPECT & CONSIDERATIONS															
Reused Cage for new animals			√	√	√	√					√		√	√	
Reused Cage for other facilities			√	√		√					√				

3.1.2 ADVANCED ANIMAL SPACE CONCEPTS:

1. Atlanta zoo is divided into two main zones: the African Rain Forest Plains, and the Asian Forest.
2. Bronx Zoo has a precinct approach for the Gorilla Forest.
3. Cincinnati Zoo uses the animal island concept, and has a barless Tiger Enclosure.
4. Deroit Zoo has a Penruinarium with life support systems used to maintain a penguin environment.
5. Los Angeles Zoo has mixed species in a walk through aviary.
6. Lincoln Zoo has an enriched Africa Apes Enclosure.
7. Philadelphia Zoo has birds in an open-air exhibit.
8. Phoenix Zoo has an open air Monkey Village.
9. San Diego Zoo uses moats to separate enclosures.
10. San Diego Wild Animal Park has large spaces and enriched enclosures.
11. London Zoo uses enriched environments.
12. London Whipsnade Park has mixed bird species in a Bird Garden.
13. Singapore Bird Park has a large mixed species aviary.
14. Singapore Zoo has dry and wet moat boundaries of vegetation or boundaries dropped below visitors' lines of vision.
15. Melbourne Zoo has a mixed species Butterfly House.

3.2. PRECEDENTS B – SA PLACES WITH ANIMAL AND HUMAN SPACES

A study on Monte Casino, Johannesburg Zoo; Bester Birds and Animal Park; Rietvlei Nature Reserve (the precedents to follow) will indicate different animal enclosure design concepts, and the different kinds of human spaces that are offered. The assessment points of animal spaces of each precedent include types of animal spaces offered; the structural components used; enrichment offered; advantages of materials used; the environment within enclosures; shading, and human(keeper) access and breeding spaces. The human spaces are studied regarding covered walkway spaces; viewpoint and pathways; materials of viewpoints and pathways; spaces for educational shows or demonstrations; furniture; spaces for parties relaxation and play; spaces for people to interact; signage; landscape concepts; and consumer services.

The Rietvlei Nature reserve has one open space for small and large wild animals including predators to roam in, and interact with each other freely. The human spaces are limited, and the visitors experience and view these animals from the safety of their cars, and at partly secured designated view point structures.

Monte Casino, the Johannesburg Zoo, Bester Birds and animal Park are assessed and show different ideas in captive animal enclosure designs, and the human spaces surrounding them. Monte Casino is a great example of the use of different kinds of enclosures that birds can breed and live in. The Johannesburg Zoo, shows how different animals enclosures can be designed in different ways. The Bester Bird and Animal Park shows how much closer humans can get to the animals, and roam with, feed and touch them.

ANIMAL SPACES
Types

(a) Free Roaming animals with designated eating/resting space.

Monte Casino Bird Park



Figure 47. *Open-air Macaw Enclosure.*

Johannesburg Zoo



Figure 48. *Open-air Lemur Island.*

Bester Birds and Animal Zoo park



Figure 49. *Enclosed and free roaming animals.*

Rietvlei Nature Reserve

The game roam free and have no specific living space designed by humans.

(b) Breeding Enclosure



Figure 50. *Protected bird breeding enclosures.*



Figure 51. *A variety of animal breeding spaces.*



Figure 52. *A Small Cockatoo Breeding Enclosure.*

Rietvlei Nature Reserve has no designated breeding enclosures.

(c) Mixed Species



Figure 53. *A mixed species walkthrough Bird Aviary.*



Figure 54. *A large mammal mixed species enclosure.*



Figure 55. *A mixed species protected enclosure.*

The reserve has small and large wild animals.

ANIMAL SPACES

Types

(d) Protected
Open-air
enclosure.

Monte Casino Bird Park



Figure 56. An open-air Crane Enclosure.

Johannesburg Zoo

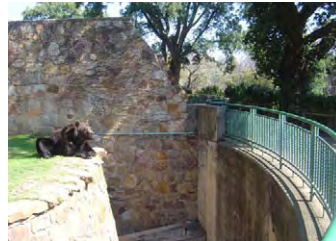


Figure 57. A moat boundary at a Bear Enclosure.

Bester Birds and Animal Zoo park



Figure 58. An open-air mixed species enclosure.

Rietvlei Nature Reserve



Figure 59. A large open-air enclosure protected at the park limits.

(e) Protected
enclosures



Figure 60. The Snake Enclosures are of heavy solid architecture.



Figure 61. Some protected animal enclosures densely vegetated.



Figure 62. A protected bird enclosure.

There are no defined protected enclosures in Rietvlei Nature Reserve.

Monte Casino Bird Park

ANIMAL SPACES

Structures

(a) Structure for a visual barrier to hide from humans.



Figure 63. A protective barrier Cranes in breeding.

Johannesburg Zoo



Figure 64. A wooden visual barrier for animal hiding.

Bester Birds and Animal Zoo park



Figure 65. Wooden poles form a visual barrier wall for the Kelp Gulls.

Rietvlei Nature Reserve

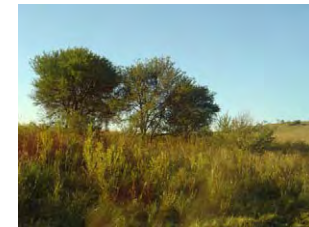


Figure 66. Vegetation used as visual barriers for animals to hide behind.

(b) Structure



Figure 67. Slender mesh connections for protected breeding enclosures.



Figure 68. Steel supports forming the skeleton of enclosures.



Figure 69. Steel frames and mesh protect the enclosures.

Wire mesh boundary material.

(c) Playful enrichment tools/environment



Figure 70. Play components in the open-air Macaw Enclosure.



Figure 71. An enriched environment with a deep soil level for animals to burrow into.



Figure 72. Play components enrich a Black-Faced Spider Monkey Enclosure.

No enrichment components are used.

ANIMAL SPACES

Structures

(d) Useful boundary material

Monte Casino Bird Park



Figure 73. Birds can grip onto enclosure mesh.

Johannesburg Zoo



Figure 74. Primates grip onto enclosure mesh.

Bester Birds and Animal Zoo park

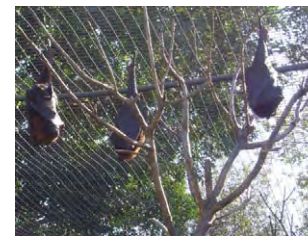


Figure 75. Bats grip onto enclosure mesh.

Rietvlei Nature Reserve

No man-made boundary is used by the animals.

(e) Environment movement, through space

Each bird enclosure has different components spaced apart to encourage bird movement.

Each animal enclosure has different components spaced apart for animal movement.

Figure 76. The Bat-caved Fox Enclosure. Shaded, feeding, cleansing, drinking, hiding, and breeding spaces are placed throughout the enclosure to encourage animal movement.

Animals roam freely.

(f) Shade



Figure 77. Textiles provide shade in the protected breeding enclosures.



Figure 78. Wooden branches and textiles provide shade for the birds.

Double mesh layers and overhead shade textile provide protection and shade in the Red Panda protected enclosure.

Animals rely on vegetation for shade.

ANIMAL SPACES

Structures
(h) Access and breeding spaces

Monte Casino Bird Park



Figure 79. Human access in a breeding enclosure are visible to visitors.

Johannesburg Zoo



Figure 80. Human access doors are visible to visitors.

Bester Birds and Animal Zoo park

Access doors are from the front of the enclosures.

Rietvlei Nature Reserve

No protected enclosure access doors exist.

Human Spaces

(a) Covered walkways



Figure 81. Wooden walkways are supported by solid construction.



Figure 82. A covered walkway at the Snake Enclosure.

No covered walkways exist.

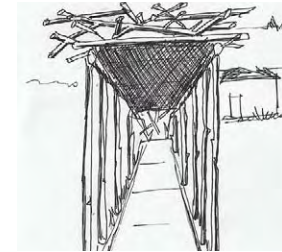


Figure 83. Natural materials are used for covered pathways.

Human Spaces

(b) Interesting viewpoints & pathways

Monte Casino Bird Park



Figure 84. Adventurous pathways wind and rise.

Johannesburg Zoo



Figure 85. Pathway barriers blend into the surroundings.

Bester Birds and Animal Zoo park



Figure 86. Uncovered unexperiential visitor walkways.

Rietvlei Nature Reserve



Figure 87. An elevated pathway to a viewing structure.



Figure 88. Natural and subtle pathway materials.

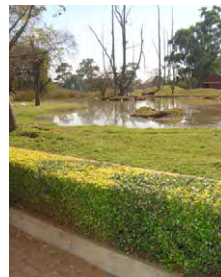


Figure 89. Pathway barriers are of natural materials.

Pathways are of masonry.



Figure 90. An enclosed walkway encloses human scent and hides visitors for protection.

(c) Shows or demonstrations




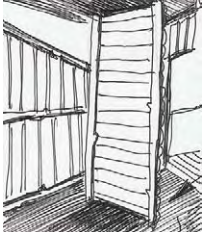





Figure 91. An open-air amphitheater provides sun and rain protection.

The Bandstand event area facilitates for shows and events.

Visitors are allowed to feed animals.

None.

<p>Human Spaces & elements</p> <p>(d) Furniture</p>	<p>Monte Casino Bird Park</p>  <p>Figure 92. Wood topped concrete seats at the Amphitheater.</p>	<p>Johannesburg Zoo</p>  <p>Figure 93. Benches are placed at different places.</p>	<p>Bester Birds and Animal Zoo park</p>  <p>Figure 94. Plastic furniture is placed under trees for resting.</p>	<p>Rietvlei Nature Reserve</p>  <p>Figure 95. Furniture is limited to viewing structures with partitions and seats.</p>
<p>(e) Play, party, relax</p>	<p>No known party accommodating facilities exist.</p>	 <p>Figure 96. Play structures do not allow animal views.</p>	 <p>Figure 97. Play, party and relaxing spaces are very close to animal enclosures.</p>	<p>Lapa areas offer facilities for parties</p>
<p>(f) People interacting</p>	<p>People walk amongst free-roaming Parrots.</p>	<p>People cannot interact with animals.</p>	 <p>Figure 98. Low enclosure walls allow children to interact with farm animals.</p>	<p>People are not encouraged to interact with the animals, but horse-riding is available.</p>

OTHER
Signage

Monte Casino Bird Park



Figure 99. Uninteresting signage is small and unaccommodating to the visually impaired.

Johannesburg Zoo



Figure 100. There are a few unadvanced interactive signages.

Bester Birds and Animal Zoo park



Figure 101. Uninteresting unaccommodating signage.

Rietvlei Nature Reserve

There is no signage with species information.

Landscape



Figure 102. An exotic landscape sets an interesting atmosphere.



Figure 103. Lush vegetation creates a mysterious pathway.



Figure 104. Variety in the landscape.

Consumer services



A restaurant provides refreshments.

Figure 105. A conference facility overlooks the Lion Enclosures.



Figure 106. Birds and bird accessories are sold at the entrance.

Braai and event facilities are available in the reserve.



3.3. PRECEDENTS C – LIGHTWEIGHT STRUCTURES

Simple construction can provide comfort, function and flexibility.

3.3.1. Frei Otto

Frei Otto, (with skills in architecture, structural engineering, philosophy) designed lightweight, and demountable structures. He generated tent-like interior spaces; hydro's and pneus; suspended constructions; grid shells; arches; and branching structures. The structures avoid the use of expensive expanses of solid construction materials. The works minimize mass and energy usage. It implements building adaptability and changeability. This method and choice of construction proves that complex structures are not needed to improve people's living conditions.

3.3.2. Marquees

Temporary marquees (mostly A-frame) are popularly used for people who want to be protected by the weather while at an outdoor event. The structures consists of aluminium profiles that are solid, hard pressed, four-groove hollow poles. Ground anchoring is achieved with base plates (with peg holes) and ground stakes/weight (depending on the floor surface). These marquees have extra facilities and materials available to suit different needs. These include aluminium hinged and sliding doors; aluminium windows; porticoes; hard wood flooring; and roof ventilators. Canvasses can be translucent and can have transparent sections to allow light in while keeping the rain out. Marquees are mostly imported (from Germany), and these are more elegant structures than the South African manufactured marquees. They both however offer similar facilities. To add to both types' advantages these structures have easy to fit connections, and can take one to afternoon install a 30x15m marquee. Marquees come in different sizes range from R1000–R34560 per structure (excluding transport and labour costs). There are standards in place for these types of temporary demountable structures.

These structures are temporary in nature, easy to install and demount, and use simple anchoring methods. They have different materials and elements to allow light and air penetration and offer views to the external surroundings.

(Berman Hire, and MPR hiring personal communication)

(Berman Hire, and MPR hiring product information pamphlets)

3.3.3. Canobrella

These shading structures are custom designed for different kinds of spaces. Consultation with a Canobrella Operation Manager (Volkan Eriltutmus) made it clear that different construction methods and materials can form shading to suit the needs of the different spaces. Custom designed awning coverings are also installed using simple construction methods (steel frames with meranti strips, canvases stapled to meranti strips and rubber strips stapled over canvas staple connections to protect the joints and finish aesthetically).

3.3.4. Cable mesh structures - Carl Stahl

After researching the Carl Stahl Product guide 2006, it was noted that lightweight architectural stainless steel cable mesh (X-Tend) can be used in various applications. Tensioned flexible stainless steel cables are available in different diameters, lengths and widths, with various ferrule fixture sizes. This architectural mesh can be used for custom designed, diagonal and irregular spaces. X-tend supports loads and creates tension in three dimensions. The product is available in different colours. X-Tend minimizes material usage, and has a high economic efficiency. In South Africa however, cables and cable mesh are imported at high prices. There are various connection possibilities, and these include net ferrule connections; round tube or rod support and border frames or border cables. Architectural mesh blends easily into its' surrounding environment. Through careful study of this product, it was decided that instead of using expensive imported architectural mesh, South African manufactured welded, expanded or flexible diamond wire mesh can also be used in various applications.

Thus we see that lightweight structures can claim space using simple assembly techniques and materials when compared to solid construction. By adding different elements, the moods of these spaces can be further enhanced. This product can also be used in conjunction with awning material and glass for overhead weather protection. The better a structure blends into the surroundings the better suited it is for a application for animal spaces and the humans that view them. No matter the size or location of the space (inside of or external to an architectural shell), if the space claiming structure is simple, if one is reminded of the surrounding context, if the structure interacts with nature, and if it is a product of space-time, it is indeed a piece of architecture.



Figure 107. *Sandton*. Photograph taken by Volkan Eriltutmus

Figure 108. *A stainless steel cable and ferrule connection.* (Carl Stahl p143, 2006 photo by Kuhnle & Knödler) (Radolfzell, Germany)



Figure 109. *A balustrade of X-tend mesh, Germany.* X-tend offers transparency.

Figure 110. *Burger's Zoo, Arnhem.* The Netherlands Leopard and jackal enclosures. Stainless steel cable net. Artificial trees are used for support to help the existing oak trees support the enclosure. (p111,114) (photo by Hans George Esch, Germany)



3.4. PRECEDENTS D – EDUCATIONAL DISCOVERY CENTRES

3.4.1. Bondi Beach Marine Discovery Centre

The Bondi Beach Marine Discovery Centre is a visitor centre that represents different characteristics of Bondi Beach with the use of theatrically designed spaces. The centre takes visitors from a known world of Bondi Beach (sand, sea, surf), to the little known underwater world in Bondi Bay. Sounds, LCD displays, live Aquaria, shimmering elements, and interactive touchscreens create an educational yet theatrical experience for the visitor.

3.4.2. University of Pretoria Discovery Centre

The University of Pretoria's Discovery Centre - accommodates for different information medium in a variety of zones. The changes in level; floor material; furniture and experiments create and define the different spaces.

Information in these different zones consist of static information (posters and labels); interactive displays and experiments (a variety of sensory stimulation – see figure 114); hardcover or paperback literature (see figure 117) and digital information (see figure 115). All the information is mostly inaccessible to the visually impaired.



Figure 111. The centre offers a theatrical and adventurous experience avoiding the typical discovery centre display of information or pictures.



Figure 112. A quiet literature information and reading zone.



Figure 113. Sub-zones with experiments and information on display tables.



Figure 114. A typical display table with interactive experiments.

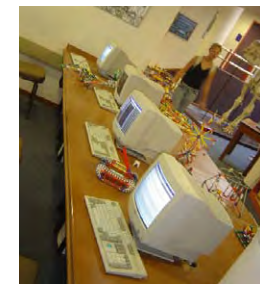


Figure 115. A computer information zone.

3.5. PRECEDENTS E – PLAYGROUNDS

Children enjoy learning about the environment, and manipulating it, by doing experiments. We can reinforce curiosity by designing spaces for children that have memorable experiences. “Children love to engage in creative play, using whatever materials are available (or e.g. pillows, chairs, blankets) to build tunnels, and form enclosures etc” (Miller 1985:24). “Children attempt to re-arrange furniture to build their play structures” (Miller 1985:25). It is important to reinforce childrens’ tendencies to control their environments. Typical outdoor adventure playgrounds include swings, jungle gyms and other play objects and spaces. To create an experiential environment for children, a variety of spaces is also needed. These spaces can include physically stimulating spaces; mentally stimulating spaces; nothing spaces; spaces where children can feel in control; sensory experiential spaces (water, texture, sound, visuals, scent); and ambiguous spaces where they can add their own creativity as opposed to typical jungle gyms.

3.5.1. Learning curves. A feast for the senses.” Unknown author Landscape Design, 1996/04 vol 1996/249 p22-28)

Learning curves by A. Frank is a sensory adventure playground that stimulates visitors with its interactive features. Ramps and raised pathways weave among the trees in the playground taking visitors on a journey. The playground offers slides and swings suitable for the disabled. Sensory experiences are achieved by adding height to the pathways making them exhilarating. Wind, water, light, sound, movement, textures colours, and smells were all employed. Tactile experiences include a multimaterial colourful sensory balustrade.

3.5.2. “A Different way to play” – L.W. Murray Landscape Architecture, 2004 Aug vol 94/8 p130-133

This playground by LW. Murray and J. White is a step toward bringing non-typical play elements into the American playground aesthetic. No aluminium or plastic play slides are used. Talk tubes, custom-made xylophones, prisms and columns create a sensory environment. A big feature in this playground was the underground tunnel system.

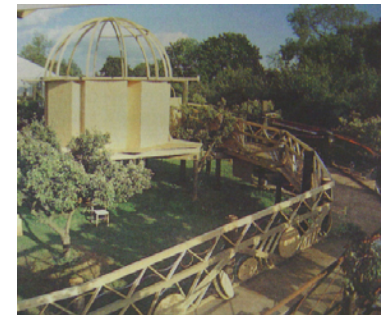


Figure 116. Meldreth Manor School Adventure Playground, Cambridge, United Kingdom.



Figure 117. The Head Start Adventure Playground, Massachusetts, USA.



3.5.3. "For Children only" C. Cooper Marcus. Landscape architecture. 2001/12 vol 91/12 p66-71&85

A playground by Land Use Consultants in London's Kensington Gardens offers a variety of play zones for different ages. The playground blends into its surroundings. Distinct subareas are designed to promote a different kind of play experience, which addresses a different aspect of child development (one area has manipulative materials). Areas include a semi-underground building, an Oak Tree Village, a Mermaid's Fountain, a Beach cove, a shelter, a Tipi Camp, Tree house Encampment and Music and movement garden.

3.5.4. "Spray and splash water park" unknown author. Parks and grounds. 1996/06 vol 96/90 p 52-53

This is a safe playground among water, using water jets of different shapes and designs. Non-slip finishes are used around water slides, shallow pools and splash spaces. Interactive – kids stand on jets so water shoots out of others stronger.



Figure 118. *The Princess of Whales Memorial Playground*, London, United Kingdom.

3.6. PRECEDENTS F – AMPHITHEATERS - Steel pines. V.Mays. Architecture 200/08. vol 91/8. pg 62-67.

Regency Park, North Carolina.
By William Rawn associates.

A permanent open-air stage adapted for theater, opera and dance performances. With the use of slender steel and wood, this whole place is integrated into its surroundings with a great focus placed on an open grass slope for the audience to be able to sit in the pine woods while watching performances. The development includes a VIP dining shelter, and lawn where the audiences can sit on blankets and in folding chairs. It is not one complete building, but a series of spaces accommodating guests in different manners.

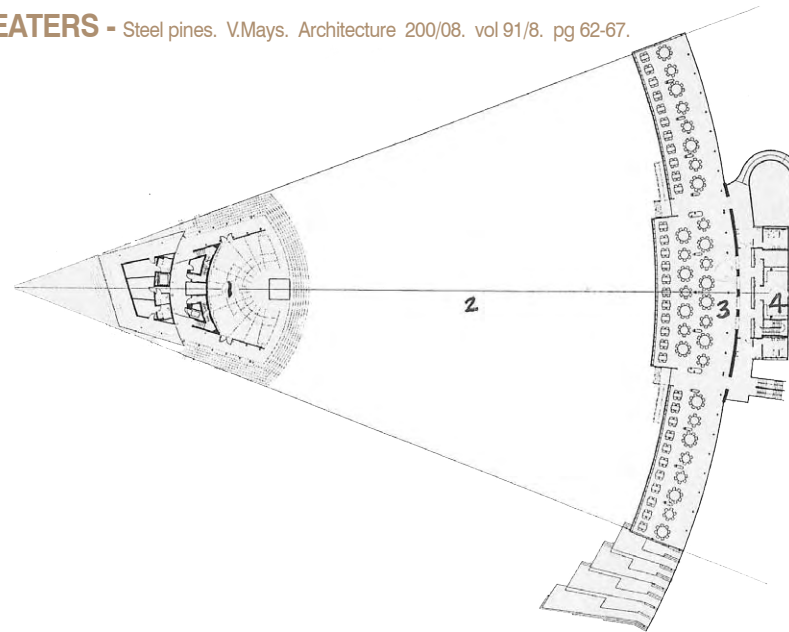


Figure 119. *Plan of Regency Park Amphitheater*. A variety of spaces accommodating the audience. 1 – Stage; 2 – Lawn; 3 – VIP Dining; 4 – Ablutions

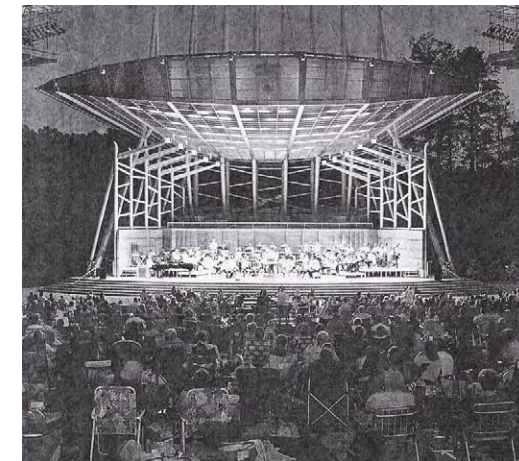


Figure 120. *Lawn at the Regency Park Amphitheater*.