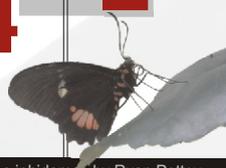


Hartbeespoortdam Butterfly Conservancy

Precedent Study

PART 4



**Butterflies for Africa**

AFRICA'S TOP BUTTERFLY HOUSE

Pietermaritzburg, South Africa

Lightness novel different m  
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At the beginning of 2004 I visited the butterfly conservancy in Pietermaritzburg. Since then I have been able to contemplate, evaluate and gain a full understanding of the concept.

**B**UTTERFLIES FOR AFRICA

Apart from this facility being the best precedent of butterfly conservancies in South Africa, it is also a prime tourist attraction and serves as a valuable educational tool and vital conservation asset.

**B**UTTERFLIES FOR AFRICA OVERVIEW

Butterflies for Africa, situated in the heart of the Pietermaritzburg industrial area, has been developed to combine the best elements of top butterfly houses from around the world. The complex houses a walk-through Butterfly Conservancy (housing both exotic and indigenous butterflies), Butterfly Craft Shop, Art Gallery, Coffee Bar, African Art & Craft Centre, Butterfly Nursery and a Butterfly Garden planted with a large variety of food plants for butterflies.

**B**UTTERFLIES FOR AFRICA DESIGN

The prime attraction of Butterflies for Africa is the conservancy which is housed in an old shoe factory. Butterflies fly freely in a lush environment which is climatically controlled so as to create an artificial tropical climate. This is achieved by using the green house principal. If however, the required temperature and humidity is not reached by passive means heaters and sprinklers are activated automatically.

An interesting aspect of Butterflies for Africa is the indigenous garden which has been established on a 6000 sq.m erf. The sole purpose of the garden is to attract butterflies. To date it has attracted over 100 different species of butterflies which have made a new home in this urban environment. The garden aims to create an awareness in the general public, of how they can play a part in attracting butterflies to their own gardens and thus help preserve these fragile creatures.

The benefits of first hand knowledge is vital to fully understand the intricate systems involved in precedents. After visiting the butterfly conservancy in Pietermaritzburg it became much easier to comprehend and also the systems involved in generating a sustainable living environment became real. Thus for the rest of the South African precedents I have also tried to give a first hand account of what I experienced.



# Kirstenbosch

NATIONAL BOTANICAL GARDENS

Cape Town South Africa

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The conservancy at Kirstenbosch Botanical Gardens forms one of the best precedents with regard to different climatic controlled geographic zones. The design is influenced by the South African climate and depends on environmentally passive systems to regulate the interior climate.

## DESIGN ACQUISITION

The opportunity to investigate different cycles such as climate variation, season changes, life cycles and the interacting of these is highlighted by this precedent.

Seasonal variation and enhancement of the interaction of different components within the conservancy which makes every experience unique. Combining this with different climatic zones, as I wish to do in the butterfly conservancy, will allow the manipulation of climate and season to enhance the visual and educational experience.

Another important concept is the connectedness of the three elements namely air, water and land. In this precedent as well as in the Butterfly Conservancy this relationship is very important and needs to be highlighted.

## KIRSTENBOSCH OVERVIEW

“Kirstenbosch National Botanical Garden is world-renowned for the beauty and diversity of the Cape flora it displays and for the magnificence of its setting against the eastern slopes of Table Mountain.

Kirstenbosch grows only indigenous South African plants. The estate covers 528 hectares and supports a diverse fynbos flora and natural forest. The cultivated garden (36 hectares) displays collections of South African plants, particularly those from the winter rainfall region of the country. It was founded in 1913”.

## KIRSTENBOSCH CONSERVANCY

The Kirstenbosch Conservancy was completed in January 1996 at a cost of R5.5 million. It is the

only conservancy of its size designed to house arid-adapted flora.

## KIRSTENBOSCH CONSERVANCY DESIGN

The Conservancy has a triple-pitched roof designed to blend in with the backdrop and climate of Table Mountain. It is situated on the warm north face of the hill adjoining the eastern part of Table Mountain. The conservancy was partly dug into the red granitic soil and occupies an area of 1 600 m<sup>2</sup>.

The conservancy was based on the South African climatic conditions as local conservatories designed on European principles tend to overheat during summer months and costly cooling apparatus has to be installed.

The brief required that the sides of the structure open during the warmer months so as to provide passive cooling of the conservancy. In the final design three of the four sides of the building are permanently open and air drainage directly above the upper cement frame is also available. This design has already proved ideal, as even on the hottest day there is some airflow. Should the temperature rise above 28°C, roof windows open automatically and when the temperature reaches 34°C, fans drain the hot air from the roof.

A planting design was formulated using a holistic approach and taking into account plant culture, education and a natural design. The plants were not only grouped ecologically, but also orientated in the conservancy according to their natural distribution in the country. Thus the northern parts of the house represent the northern parts of South Africa, and so on.



4.10 - 4.12



Precedent Study - Kirstenbosch Botanical Gardens



University of Pretoria etd – Pettey, R P (2005)  
**Institute for Forestry and Nature Research<sup>2</sup>**

IBN-DLO INSTITUTE

Holland, Netherlands

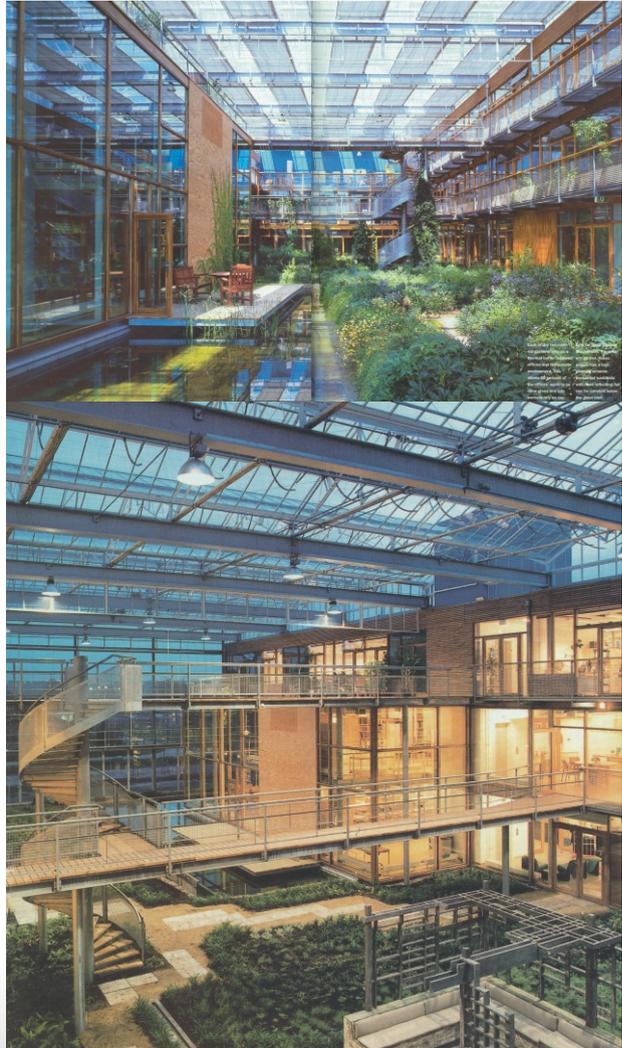
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As a pilot project in sustainability and user-friendly architecture, the IBN-DLO institute is - literally and figuratively - as green as they come.

Stefan Behnisch, the partner-in-charge of the project, describes the design as a low-tech building with a high-tech result. "I don't want to change our lives and go back to the Stone Age, but if we are prepared to accept it's warmer in summer and cooler in winter, I am convinced that we can attain an acceptable degree of comfort by following the rules of nature."

Built on a former cornfield, the IBN-DLO building is shaped like an E, with two glazed gardens between the offices in the three "fingers." The north-facing spline of the E houses the laboratories, the only mechanically ventilated spaces. The south-facing fingertips house a library, where on bright days a warm light falls through pink and orange sunscreens, a meeting room, and a small restaurant. A patterned concrete path leads from the entrance, past the reception area, across the office wings, and through the green oases, weaving indoors and outdoors together.

Ultimately, the most sustainable thing about the IBN-DLO building may be the example it sets. "The technology is very old and very new at the same time, says Behnisch. " The concepts - local materials, natural ventilation - have been around for centuries, we merely adapted them to modern times.



building's glass-enclosed gardens. Colorful awnings pull down to shade the west-facing library (below).

Precedent Study

026

4.13 - 4.15

Figure 001: *Parides iphidamas* by Ryan Pettey

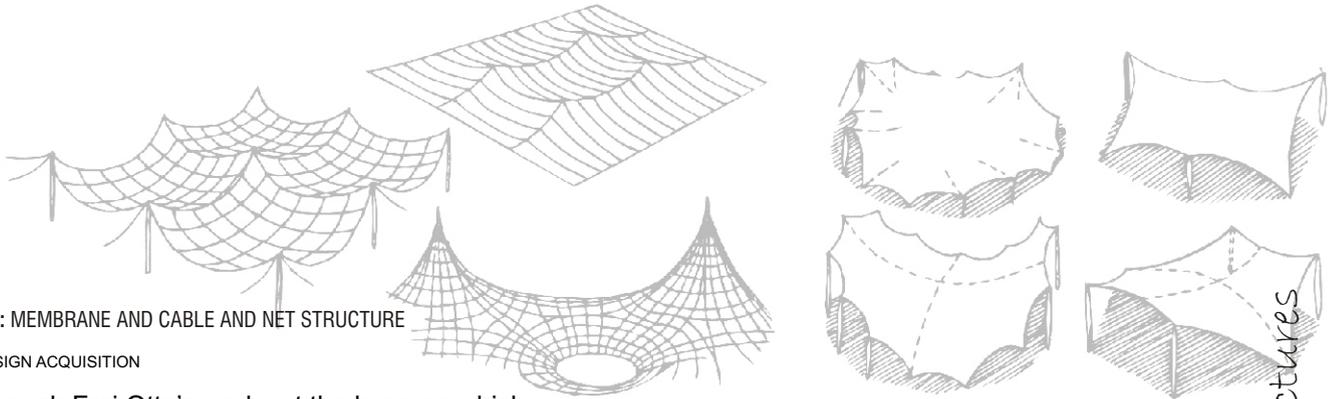
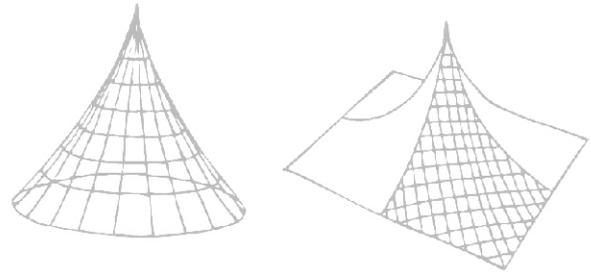
# Tent Structures<sup>3</sup>

INFLUENCE - FREI OTTO

## Tent Structures

lightness novel different m  
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Frei Otto's cable net and membrane structures were a huge inspiration and influenced the way in which the tent structure for the butterfly conservancy evolved. He has also shown that there is a huge range of possible configurations of pre-stressed and non-prestressed cable and net and membrane structures based on numerous methods of internal or external supports.



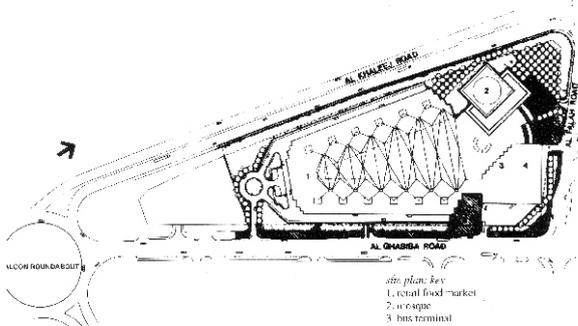
4.16: MEMBRANE AND CABLE AND NET STRUCTURE

### DESIGN ACQUISITION

Although Frei Otto's work set the base on which the technical aspects for the butterfly conservancy's tensile structure was modelled, the final design aesthetic, is based on a competition won by GMW architects - a retail food market and transport terminal in Dubai.



4.18: FOOD MARKET AND TRANSPORT TERMINAL



4.17

“...the substantial vierendeel lattice supporting towers continue at the same height and would have signalled an impressive desert landmark...”

Precedent Study - Tent Structures

027



# Constitutional Court

CONSTITUTIONAL HILL

Braamfontein, South Africa



INKAD TOLD YEMTSETIDD

4.19



In June 2004 I visited the Constitution Hill precinct which is home to South Africa's first Constitutional Court, the highest law of the land. Like the Constitution itself, the new Court is designed to be open, accessible and transparent.

4.20



The Court is built on the site which previously housed the Old Awaiting Trial Block. As a symbol of South Africa's progress and in recognition of past atrocities the new court encompasses some old architectural elements which used to form part of the Awaiting Trial Block.

4.21



The foyer of the Court is a light-filled area populated by slanting columns, an architectural metaphor for trees under which African villagers traditionally congregated to discuss matters of social importance with the elders.

4.22



## DESIGN ACQUISITION

KHOTO YA

- Light and Material Use
- Historical Richness - the past
- Reuse

4.23



INKAD TOLD YEMTSETIDD

4.24



## HISTORICAL RICHNESS - the past

KLORDTSWEKO YA MOLAD

4.25



LKHOTO YOMIHETHOSI

CONSTITUTIONAL COURT

4.26



LEKGOTLALAD

KONSTITUSI

4.27



KGOTLATSHERELO YA M

Precedent Study - Constitutional Court



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# Apartheid Museum<sup>4</sup>

JOHANNESBURG

Johannesburg, South Africa

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The apartheid museum as a building is very powerful and represents an aspect of South Africa's history which people today want to remember so as not to forget the atrocities of the past.

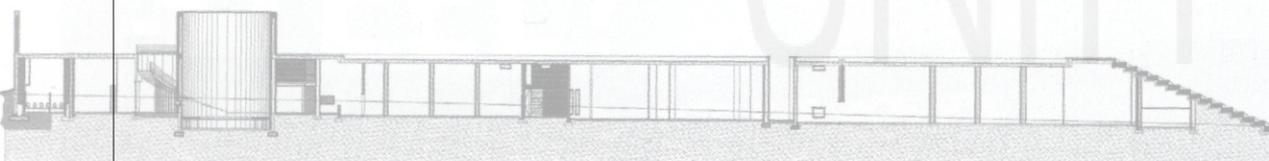
The museum consists of 5000m<sup>2</sup> of exhibition space laid out in 10 display spaces along a concrete service duct, 500m<sup>2</sup> of administration space and a low-slung building - at the end of the journey overlooking the 100m long 'slimes dam' - that houses the book shop, coffee shop and security office.

The unique material qualities of the surrounding physical landscape are present on the building: rock-filled gabion baskets in rusting steel frames recall nearby mining structures and activity while large planted earth mounds recall the planted mine dumps partly concealing and revealing the 'dark world' of apartheid within.

The building as an architectural masterpiece represents metaphors which reinforce the apartheid theme and enhance the exhibits. The journey through the museum is a passage through space and time that takes one back into the years of apartheid, isolating, harsh and cold.

## DESIGN ACQUISITION

- Material use within the Apartheid museum
- Architectural enhancement of museum experience



Precedent Study - Apartheid Museum

**Vulcania**

**EUROPEAN VOLCANO PARK**

**Saint-Ours-Les-Roches, France**

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 k 4 0 1 :

Giscard d'Estaing, the former president of France and now Governor of the Province of the Auvergne developed the idea of a European Centre of Volcanism and a theme park to foster tourism in the region.

Situated within extinct volcanoes this complex serves to inform about, educate on and experience the primeval forces of nature and the creation of our planet. Mostly underground, it's approached by a long ramp towards a metaphorical volcano-the cone clad in dark volcanic stone, lined inside with golden metal animated by light. Research and conference facilities, IMAX theatre, green house showing the positive effects of volcanism-fertility and a restaurant.

**D**ESIGN ACQUISITION

The design project is interesting and focuses on an unusual accommodation requirement. Education and tourism are the main objectives for which the building needs to accommodate activities. These activities are all contained within the depths of what is meant to mimic a volcano. Overall an interesting concept and an inspirational different theme.

Precedent Study - Vulcania

030



4.33



4.34