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A DNA | ZOO for the 21st Century

DECLARATION

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Caitlyn Amber Manicom

28 November 2011

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Master of Architecture [Professional] at the University of the Witwatersrand, Johannesburg, South Africa,
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save don't save

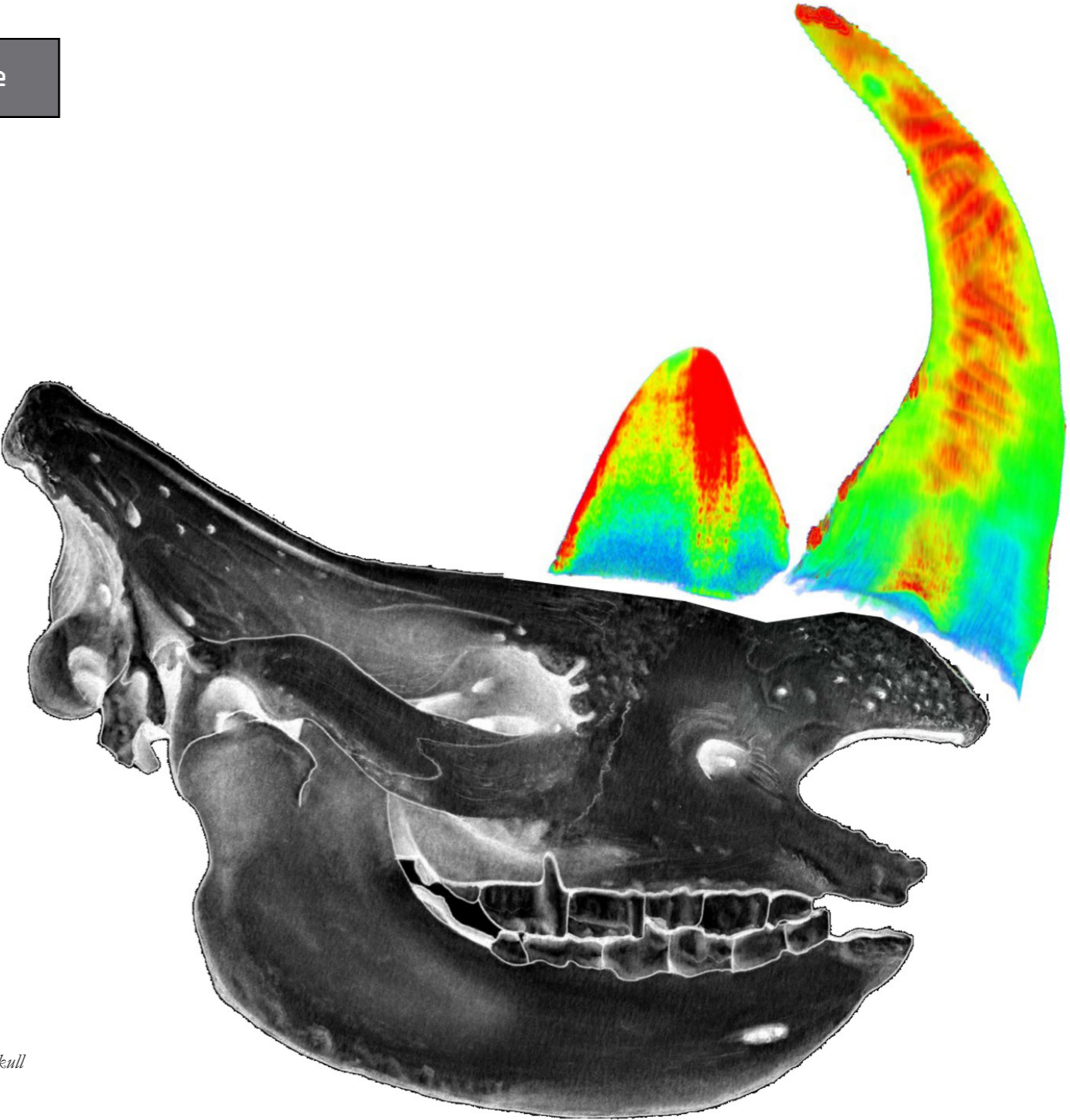


Fig. 1: Ultraviolet analysis of rhino horn with skull

How can we UNDO & prevent animal extinction ?

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[cryonic tissue research lab & zoo]

A DNA | ZOO for the 21st Century

ABSTRACT

The disappearance of naturally occurring organisms, their extinction, and their reinterpretation through science, reinvents the ancient allegory of Plato's cave. The story is a scenario in which reality and illusion are confused:

Socrates asks Glaucon to imagine a cave inhabited by prisoners who have been chained and held immobile since childhood: not only are their arms and legs held in place, but their heads are also fixed, compelled to gaze at a wall in front of them. Behind the prisoners is an enormous fire, and between the fire and the prisoners is a raised walkway, along which people walk carrying objects on their heads. The prisoners watch the shadows cast by the men, and hear their echoes, not knowing that they are shadows and reflections.

Socrates suggests that the prisoners would take the shadows and echoes to be reality, not just reflections of reality, since they are all they knew, and the whole of their society would depend on the shadows on the wall.

We are currently confronted with a similar conundrum where information can be misconstrued as both reality and myth.

The headlines are a riot of outcries since the escalation of rhino poaching for new-age traditional medicine. The result of rhino poaching is their imminent extinction. Without the media frenzy, animals would silently disappear and man would neglect to acknowledge the part he has played before it was too late.

Our relationship with animals provides us with a useful mirror of society. The incomprehension between man and any other species forces us to project emotions and meaning onto them in order to understand them. The synapse of ambiguity creates a void that is filled with questions, curiosity and guilt.

The rising number of vulnerable species highlights the fact that measures taken to stall extinction are ineffective. The artificial landscapes attempted by man to preserve animals: namely nature reserves, zoological gardens and natural history museums; construct new versions of reality into which we file nature so that it corresponds with human logic. Our incessant need to control, dissect, and extrapolate habitats has amounted in anthropomorphic and anthropocentric typologies.

Through assessing these preservation models as well as their priorities, which seem more concerned with capture and display for capital than re-establishing a natural order; I argue that the current situation is outdated and requires a reinvention.

The human population has hindered the natural migration of animals, however, it is now possible to reinstate some of this natural order through establishing a network of genetics between zoos, natural history museums and nature reserves. In the process of collecting animal DNA data, we are creating a back up system for animals in the future.

My thesis proposes the integration of the concepts of game reserve, zoo, natural history museum and cryobank into a single 'DNA Zoo' concept for the 21st century.



Fig. 2: Ultraviolet analysis of transverse section of rhino horn



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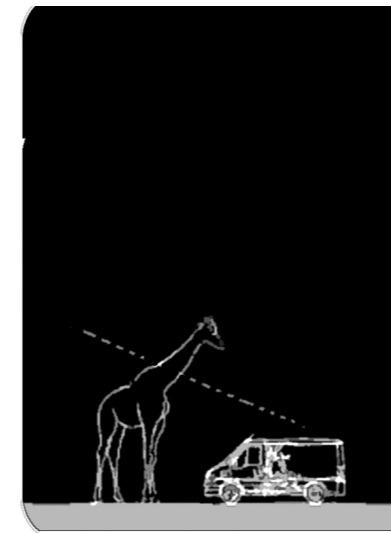
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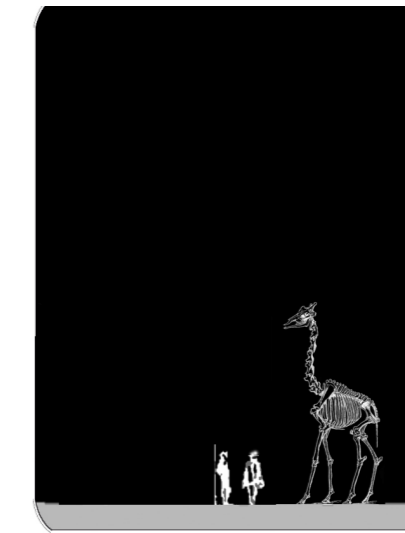
Fig. 3: How we look at animals:



Nature Reserve



Zoological Garden



Natural History Museum

INTRODUCTION

There are three ways in which wildlife is ‘preserved’ and managed. Firstly, we accord legal protection to the species itself. Secondly, we surround the habitat and the species with a real or imaginary fence, protecting the habitat and its contained wildlife. And thirdly, we remove breeding stock from the natural habitat and breed from this culture in captivity under controlled conditions (Joffe 1969). These three methods are represented by the Natural History Museum, Nature Reserve and Zoo respectively.

Science constructs reality rather than copying it. My essay assesses the evolution and design of three intellectual and spatial constructs of wilderness and ecology in which man is always the central figure. The Pretoria National Zoo, Ditsong Museum and Kruger National Park are all man-made and controlled products inherited from a European model.

Through globalisation, experts have spun a confused web over conservation. On the one hand, wildlife is contained and preserved; on the other, the flux of humans, results in a ‘too-tightly-wound’ left over space for animals, often resulting in their extinction.

The human population explosion which James Lovelock (1991:153) refers to as the “the people plague”, has forced man to encroach on natural habitats, leaving in place permanent structures which envelope and destroy. As Lovelock puts it, a population of any magnitude is itself a kind of ‘pollution’.

“ I’d like to share a revelation that I’ve had during my time here. It came to me when I tried to classify your species and I realized that you are not actually mammals. Every mammal on this planet instinctively develops a natural equilibrium with the surrounding environment but you humans do not. You move to an area and you multiply and multiply until every natural resource is consumed and the only way you can survive is to spread to another area. There is another organism on this planet that follows the same pattern. Do you know what it is? A virus.”

— Agent Smith in ‘The Matrix’ (1999)

As man’s habitat encroaches on that of animals, we force them into fenced biospheres. As a result of compartmentalising species into manmade constructs, and constructing a territory of borders between them, we have disallowed the natural process of migration, thereby prohibiting natural selection. The result is diluted habitats of weak genetic makeup. In destroying the natural order, we have reduced the lifespan of individuals and as such the lifespan of collective species. If we do not ignore a species’ plight we simply capture and display them in zoos and reserves, or we document them by placing them in museums.

In evaluating the current systems for animal preservation and exhibition, I feel that there is need for a more effective system to



Fig. 4: “Human population explosion”



- fungus
- amoeba
- flagellate
- plasmodium
- spirochete
- trypanosome
- encapsulated tongue worm
- fluke
- roundworm
- spiny-headed worm
- tapeworm
- tongue worm
- leech
- bug
- flea
- feather louse
- fly larva
- louse fly
- mite
- tick

Fig. 5: A problem of Housing

“From the moment it hatches, a bird is subject to invasion by one or more of the parasites shown here: external fleas, flies, ticks and mites, and internal worms and flukes as well as microscopic protozoa, fungi, bacteria and viruses, some of which are transmitted by the bites of mosquitos and flies. By dust bathing and preening, the host holds down their numbers on the feathers and skin, and special blood cells and antibodies fight to prevent overcrowding in the lungs, liver, trachea and blood. if this balance is upset, the parasites take over, bringing disease and often death to the host.”

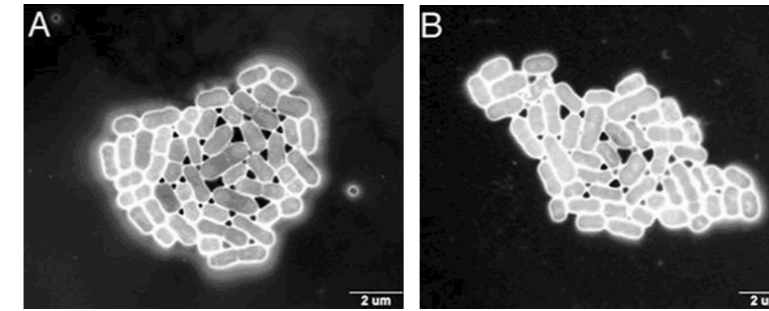


Fig. 6: Soil bacteria seen after exposure to normal gravity (A) + hypergravity in the lab. (B)

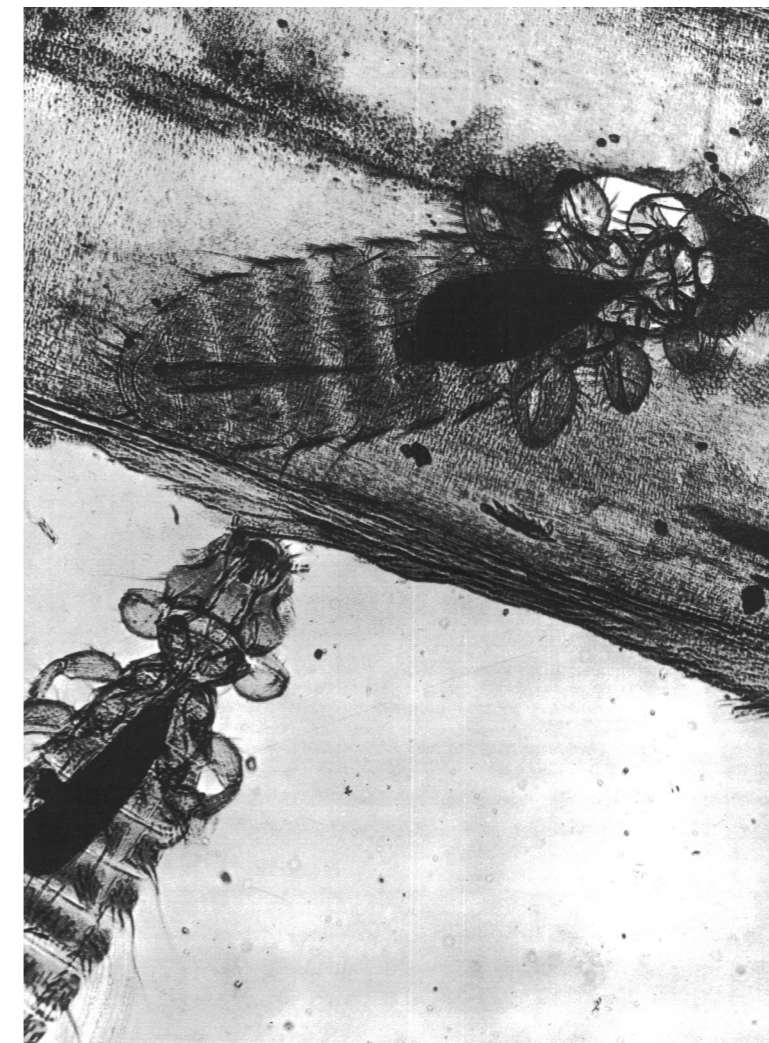


Fig. 7: Parasites and Barriers

undo and prevent animal extinction, taking into account migration and genetics. Migration has wider implications than humans had previously perceived. The ongoing progress in tissue banking allows us to break down the obstacles human’s have constructed, which disrupt movement paths and natural selection of animals. DNA, as an information transfer system, brings the diaspora of animal populations together in space and time, and amounts in a global gene pool. Through storing both living animals and usable fragments of already extinct or absent specimens, it might be possible to maintain an international archive for the future.

DOMESTICATION

Myrdene Anderson (in Sebeok 1991: 1) describes humans as being caught up in “Edens and Armageddons”. The implication is that we are obsessed with the past and future more than we are interested in the present. Humans believe that once our birth planet is irrevocably spoiled, we can simply move on to the next one. However, this unlikely detour into outer space would probably find ‘microbial hitchhikers’ (Margulis 1970), not Homo sapiens, the successful colonisers of this exotic terrain. We would become the involuntary vehicles for a microbial diaspora in outer space (Sebeok 1992: 3) while manipulating our own demise.

Man has always collided with nature. During the period of what some scientists call the “Pleistocene overkill”, about fifty thousand years ago, man is largely blamed for the extermination of nearly half of the larger North American and Australian mammals (Joffe 1969). Fossil records show a mass extinction in a relatively short period of time coinciding with the appearance of the first human populations to inhabit these landscapes.

About nine thousand years ago, in the period known as the Neolithic Revolution, man became pastoral, and began to domesticate some of the wild animals that he had previously only hunted, thus reducing his complete dependence on his environment. Animal domestication

started with man's excess: food waste attracted dogs, and later pigs. By 2000BC, contemporary livestock were all domesticated. Once man was sufficiently independent of animals as a danger to himself, he could regard living things, not simply as food but also for their intrinsic value (Joffe 1969). "Animals became gods and at the same time capital." (Wendt 1959).

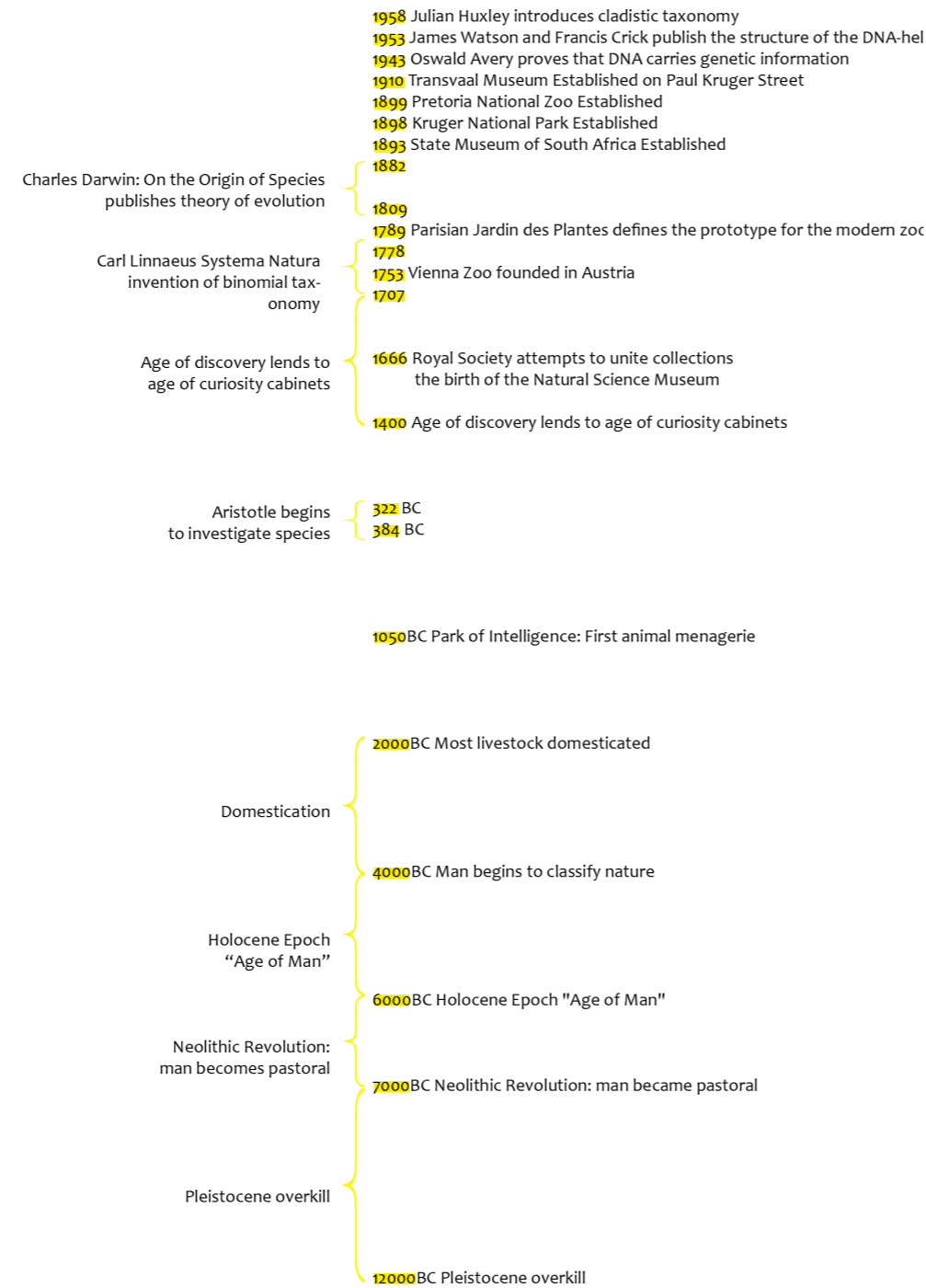
During the twentieth century, the internal combustion engine displaced the role of animals as transport; while crowding and the expansion into suburbia, replaced and rarefied field animals, in some instances driving them to extinction (Berger: 1980). Society's ongoing negligence contributes to the demise of animals. Satellite research indicates that architectural elements such as reflective glass and skyscrapers kill thousands of birds that collide with their reflections during migrations.

The current status quo implies that non-humans are expendable and that man is a permanent feature in any landscape. In fact, the only species that seem constant are those supported by man's lifestyle: from bacteria to pigeons to man's 'best friends'.

John Berger asks, "Is there not one way in which animals, instead of disappearing, continue to multiply?", he goes on to identify that we have never encountered as many household pets as we hoard in first world countries today.

Pets are a modern innovation, a result of the "universal but personal withdrawal into the private small family unit" (Berger 1980). The small family unit exists in isolation of its natural surrounds: it is artificially lit, scented, and heated, disinfected and insulated: thereby lacking seasons, earth, space and variation. Breeding in itself constructs artificial species for companionship. We manipulate specimens into chimera of our choice, and order them from catalogues. The pet is most often sterilized, isolated, enclosed, fed with artificial foods, and deprived of inter-specific contact.

TIMELINE 1: *A History of Zoology*



ZOOLOGY

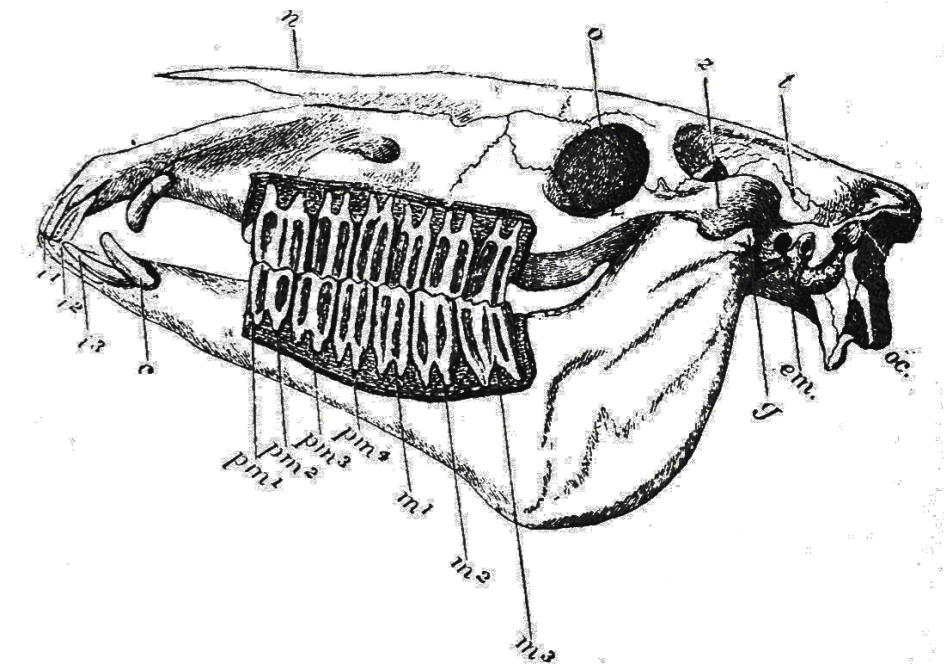
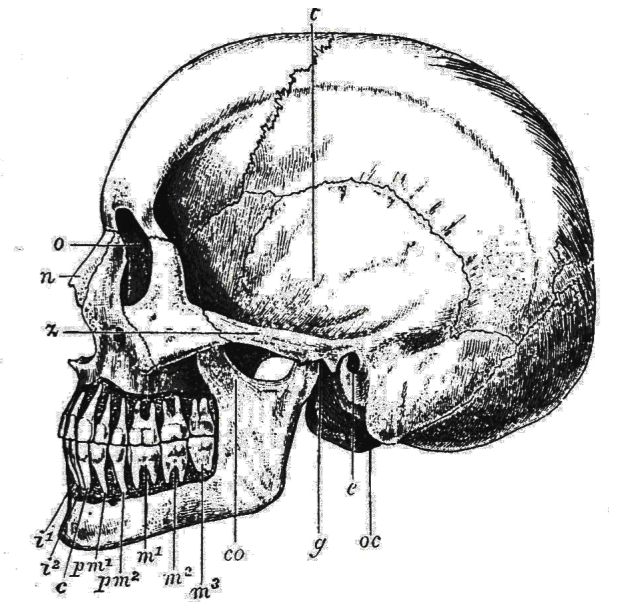
People looking at prehistoric cave art, "feel their way back in thought to those remote primeval times when Man began to depict animals, to make them his totems and to understand them": Wendt (1959). The paintings of Ice Age Man were not merely mythical; they also rendered accurate and functional observations. They were means of instruction. "They rendered all that Man knew about the magical significance and practical exploitation" (Wendt 1959) of the animal kingdom. Animals, according to John Berger (1980) initially entered man's psychology as messengers and promises. The great zoological works of civilized nations were, and arguably still are, organised in this same dialogue. Myth making and curiosity live on, (Wendt 1959) "and runs like red thread through the history of zoology".

In the 4th century BC, people progressed from simply reiterating animal myths and began methodical investigation of the recent discovered species. (Wendt 1959) Aristotle was arguably the first natural historian, who began an investigation leading to the identification of five hundred species in his ten-volume work 'History of Animals'. He inquired into their genesis, their evolution in the womb and their inter-relationships, and was the first scientist to raise the question of whether the form of living beings might be determined by environmental influences.

During the next three centuries Greek, Roman and Oriental travellers endlessly imported fresh animal wonders from India and Africa. Roman authors encountered an array of zoological material unparalleled in Europe until the 18th century (Wendt 1959). All over the empire there were natural and artificial enclosures of zoological gardens and game-parks set up by the elite and Emperors. A single spectacle, put on by Titus, apparently amounted in the slaughter of over five thousand animals. Natural history hoped to derive at least some benefit from this spectacle.

Our relationships with animals provide us with a useful mirror of society. The evolution of zoology lends more discourse on society than on animals: from the spectacle of exotic animals in Roman arenas to our own attempts to revive endangered species in modern zoos.

Fig. 8: Comparative Anatomy: Skull of Man and (below) horse



“The way we perceive animals illuminates our own values, concerns, and aspirations” (Belozerskaya 2006). The anthropologist Claude Levi-Strauss remarked that zoological societies accord animals special status not because they are “good to eat”, but because animals are “good to think” (Schunk: 2007).

Zoology started not with the utility of animals but with curiosities. Although zoology began at a Greek university, many centuries lapsed before it regained academic attention. The science of zoology in the meantime was no more than a practical appendage to medicine, chiefly used for the purpose of dissection by medical students. (Hays: 1972) When dissected, animals were probed as substitutes for human beings.

John Berger (1980) identifies Descartes as a key figure in defining the relationship between man and animal. In dividing the body from the soul, unconditionally, he limited the body to the laws of physics and mechanics, and since most religions teach that animals have no souls, the animal was reduced to the definition of a machine. He goes on to recall that eventually Descartes model would be applied in the industrial revolution in which animals were employed as machines, and later converted into raw material. “Animals required for food are processed like manufactured commodities”.

CLASSIFICATION

Animals, as both like and unlike man, are seen to intercede himself and his origin; perhaps this is why we place such emphasis on plotting their evolution. For Schutz: “Species are man-made constructs, rather than real entities in nature” (Schutz in Sebeok 1991: 318). As put by Dobzhansky, ‘The boundaries of species whereby men sort them are made by man’ (Dobzhansky 1958: 19), even Charles Darwin conceded that in nature there are no species, but only individuals.

Earth lacks a mental biography; it therefore openly exposes its history until natural forces and life processes eventually erode its memory. This is contradictory to the animate body, which as an autobiography is often more aware of its mental past than its physical past.



Fig. 9: Man as animal: a dissection of the Disney themepark character

Every species embodies a selective memory of its genetic history, tracking its evolution to the beginning of life. Most genetic information -species, phyla, genera, and families- has been lost from the evolutionary jigsaw puzzle, making it vital to record the autobiographies we have, before their imminent extinction.

Attempts to classify animals and plants were among the earliest human occupations (Dobzhansky 1958). (Günther 1971) Hunter-gatherers were careful to name all the animals and plants in their environment, even those not of immediate use. Logic demands order, thus early man was a taxonomist, and since he studied animal habits in order to capture the creature upon which he survived, an early zoologist, and instinctive ecologist (Hays: 1972).

The evolution of taxonomy (the science of classification) is an extension of man’s own need to compartmentalise and organise nature has evolved from the Linnaeus system of distinguishing species at macroscopic level, to Cladistics, using DNA. While we are moving further away from Eden on Earth’s surface, biologists are getting closer to Eden, in their capacity to label all of its constituents, through science.

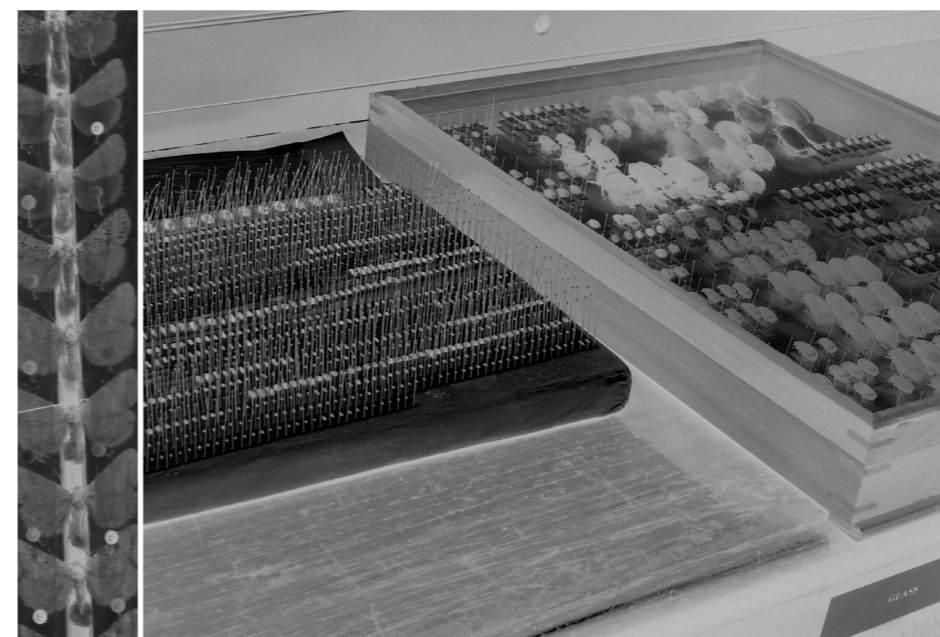


Fig. 10: Butterflies being prepared, beetles being sorted, and the final display board sealed in glass

Notes from an Interview with Dr. Martin Kruger, Lepidopterist at the Ditsong Museum:

April 2011

08:00 - 12:00

Most of the museum archive is not on display: biologists are quietly organising millions of specimens into their rightful compartments in the back rooms. The process of taxonomy begins with a glass jar containing plaster of paris that has been saturated in ethyl acetate. The jar is placed over the organism, rendering it asleep and helpless. The insects are then piled into a sorting cabinet. Duplicates are disposed of, and once it is decided that their species has not yet been described, those that remain are organised into the gigantic jigsaw puzzle.

Until recently, the process of naming could take years.

Improvements in communication assists the system, museums must constantly network internationally to avoid cross labelling.

Once the specimen’s family is deduced, it is categorized into its phyla and its species is named. The insect is moistened to relieve rigor mortis and taped by the wings to a board to set it in an observable position. Once they have dried out, they can be pinned with their name label attached to the board that represents specimens closest to their characteristics with their respective family. The families are organised precisely within the drawers, which are sealed with glass lids and placed in filing cabinets. The archive contains hundreds of cabinets containing thousands of drawers and millions of specimens.

The rarest or extinct specimens are kept as duplicates within a strong room in case of fire or any other disaster.

Dr. Kruger is the only lepidopterist in South Africa, he is dismayed by society’s priorities: “It is sad that we know more of stars in galaxies, than we do Earth’s own organisms”.

ZOOLOGICAL GARDEN

China was the birthplace of zoological gardens. As early as 1050BC according to Chi-King, the ‘Sacred Book of Songs’, Wu-Wang built “Park of Intelligence”, in which he decreed a reserve for exotic animals (Hays: 1972). However, by 670 BC the Park of Intelligence had dequated to hardly more than a collection of the currently domesticated animals.

Zoos, as we know them, grew out of royal collections only in the nineteenth century. Before that, menageries were privately owned, exclusively enjoyed and sometimes signified a culture. Menageries served the practicalities of empire building, and reflected the splendour of God’s creation, while promoting exploration and science. Vast resources were splurged on tracking down, capturing, transporting, and maintaining exotic animals from far-off territories (Belozerskaya 2006).

Public zoos came into existence at the beginning of the period that was to see the disappearance of animals from daily life. The zoo, to which people go to meet and observe animals, is in fact, a monument to the impossibility of such encounters. Modern zoos are an epitaph to a relationship that was as old as man.

Zoological Gardens were designed at the beginning of the nineteenth century as part of the new urban framework of open public spaces, and became increasingly popular in industrialised Europe (Steiner 2003). “Protected from urban expansion, the areas committed to parks and zoos were treated as lungs for the newly configured city centres”.

The Parisian Jardin des Plantes, renovated in 1789 from a royal menagerie of curiosities, arguably, became the prototype for the modern zoo. After the French revolution, the sharp perspectives of formal gardens, with their rigid allegory, were seen to be an ideal setting for the popular pursuit of scholarship and science. The “English garden” style, in contrast to the French formal style, appeared as an “oasis of captured nature” (Steiner 2003).

“English” (or “picturesque”) design philosophy “posed the garden as a laboratory in which to study sensory knowledge” (Steiner 2003). Paths directed the flow of bodily movement in relation to props in the landscape, such as plantings or architectural landmarks. (Steiner 2003) Perspective, colour and texture were manipulated as navigational aids to direct movement and visibility. “Packaged as a fragmented series of scenic views, nature was condensed into a heightened experience of contrast, surprise, irregularity and variety. [...] Exotic collections of plants and animals that had been culled from ‘the darkest parts of the earth’ were integral to this encounter” (Steiner 2003).

Follies, paths, permanent pavilions and other landscape design elements, provided a platform of psychological comfort from which to analyse “untamed” nature. The circulation system, or human habitat, mediated between what was presented as utterly constructed, on the one hand, and purely natural, on the other. Conventions in animal display changed over the course of a century from the menagerie to serviced glazed cages (Steiner 2003). The incremental changes to the layout recorded transformed ideology concerning the balance of nature and culture.

“The job of the picturesque landscape had been to construct a terrain for naturalism in the face of encroaching civilization” (Steiner 2003). Industrialized topography was understood through the management of movement, whether of people or props in the landscape, or of the landscape itself. Public entered the habitat along designated paths and “followed the route to the brink of the wild”. The circulation system, meanwhile, retained an actual engagement with nature, “from an unpleasant whiff to preventing a fatal mauling” (Steiner 2003).

Fig. 11: Pretoria National Zoological Gardens: Site plan north of the Apies River





Lookout towers

Tiger enclosure II

Tiger enclosure I

Lion enclosure

Mountain goat enclosure

Lookout Boma

Walkway

Moat

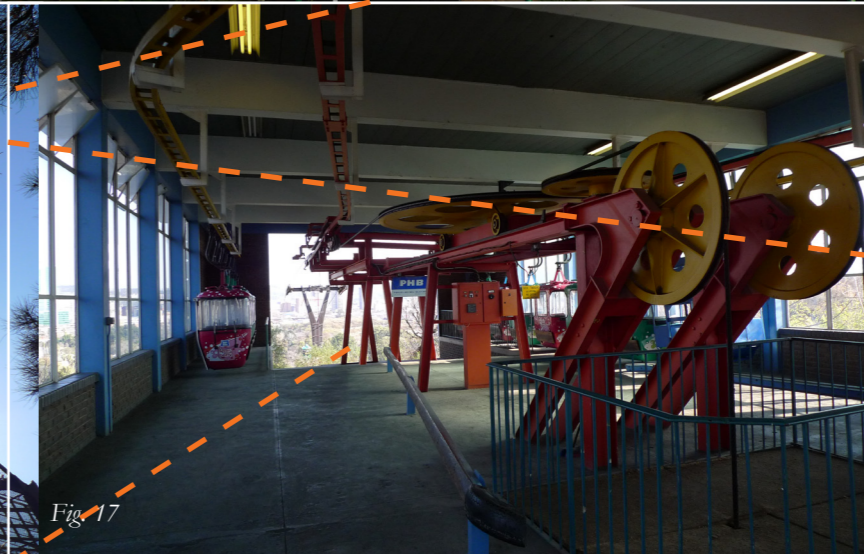
Union Buildings

Urial Enclosure

Tshwane CBD

Fig. 12: Pretoria National Zoological Gardens: panoramic view eastwards from tiger enclosures

- Dr. Gunning serves as director
 - 1899 Dr. Jan Willem Boudewyn Gunning, director of the State Museum, moves a collection of animals, kept for taxidermy, from the museum's back yard to the farm "Rus in Urbe".
 - 1902 Building of a lion house
 - 1907 Camp for buffalo and zebra
 - Swarm of bees invade the Zoo killing animals.
- Animals deposited in the Zoo for King George V to be transferred to the Royal London Zoo (King's official menagerie).
 - 1910 Elephant- and Rhinoceros house
- Dr A. K. Haagner serves as director. Zoo serves as a kind of intermediate home for animals on their way to Europe or America.
 - 1911 1911 Sammy Marks fountain donated
 - Bear house
 - 1912 Raptor aviaries
 - 1913
 - 1915 Primate house
 - 1916 Zoo officially known as the national Zoological Gardens of South Africa and gained its national status
- Dr R. Bigalke
 - 1917 Giraffe house
 - 1920 Ostrich house
 - Vivarium for reptiles
 - 1927
 - 1928 Tea room and orchestra podium for entertainment
 - 1930 Carnivore House
 - 1932 Development of the mountain area
 - 1938 Inauguration of the mountain terrace
 - 1939 Eileen Orpen bird aviary
 - 1940 Completion of the bear enclosures
 - 1958 Carl Jeppe terraces
- Dr F. Brand serves as director: Night quarters move to sides of enclosures to provide more privacy for the animals. Aware of the need to breed with endangered indigenous and exotic animals, but issue of space
 - 1960
 - 1963 Office block and Rudoph Bigalke Institute
 - 1969 New hospital, bomas, and breeding rooms.
 - 1974 Aquarium and Reptile Park opened
 - Breeding Centre at Lichtenburg made available
 - 1980 Main entrance changed
 - 1981 Potgietersrus Breeding Centre founded
 - 1982 Frank Brand educational building
- Mr. Labuschagne
 - 1984 New Elephant Night quarters
 - 1989 Pretoria Portland Cement sundial
 - 1990 First insectarium in Africa
 - 1995 Parrot enclosures
 - Sammy Marks fountain
 - 1996 Walkthrough aviary
 - Upgrading of the Chimpanzee enclosure
 - Hippo Lapa
 - Upgrading the old Elephant night quarters to conference centre
 - Animal Nursery
 - 1997 Entrances to the Zoo and aquarium merged
 - Upgrading of hippo enclosure
 - Dukuduku Bauma (Restaurant)
 - Zoo Mobile
 - 1998 Upgrading of the main entrance and parking area
 - Cable car purchased
 - Plant nursery
- 1999 Upgrading of the aquarium, bear, baboon, takin and siamang enclosures
- Koala enclosure
- Completion of the main entrance



Zoos simulated an experience of unbound nature. Circulation obscured the boundaries that were crucial to the functioning of the environment. Beginning with the relation of the isolated zoo enclosures, which as Hitchcock (in Steiner 2003) observed, were mise-en-scene stage settings rather than habitats, to the surrounding landscape that expressed an entirely different order. Nature and boundary is often at paradox to the organised geometries that dictate the way the public flow around the enclosures and how the animals are separated from one another. The zoo typology has remained for the most part unchanged since the nineteenth century, however new technology has challenged the health benefits of the open spaces.

PRETORIA NATIONAL ZOOLOGICAL GARDENS

The Pretoria National Zoological Gardens were founded in 1899, when Dr. Gunning, the director of the State Museum of the Transvaal Republic, moved a collection of animals kept in the museum's backyard for taxidermal purposes, from the museum to the farm, "Rus in Urbe", just beyond its periphery, on the banks of the Apiesriver. Initially, the precinct was more of a harbour than a zoological garden, temporarily housing indigenous animals en route to England, Europe, and America (Venter [Sa.]). The zoo relied on this temporary flow of animals for its showcase until 1914, but during this time, permanent animal habitats were erected, starting with a lion house in 1902.

People enter the large expanse of land housing the 3117 specimens of the Pretoria National Zoological Gardens via Boom Street. They walk a short distance from the ticket kiosk to their rentable golf cart, which makes for a less arduous trip around the catalogue of live animals. Like most organisms, humans prefer to take the least strenuous path to reach a destination. However, if one chooses the path of least resistance, they neglect to see the view from the top of the zoo, which requires a quick ride on a cable car to make a full circuit.

The mountain area exhibits to the north of the zoo were created under the directorship of Dr. Bigalke between 1927 and 1962. These enclosures marked the terminal point of small cages for zoo animals. However, the habitats to the south housing various species of ape and leopard are arguably still too small and enclosed to allude to any allegory of 'wilderness'.

THEME PARKS

No other imagery, illusion, or allegory can attempt to capture the hearts and imaginations of children like that of animals. Disneyfication has always relied on the animal kingdom to enhance universalised social practice into entertainment. Zoo animals have therefore been made to compete with fictitious man-filled counterparts; while zoos have been made to compete with fairytale wonderland theme parks.



Fig. 22: Theme park at the Pretoria National Zoological Gardens

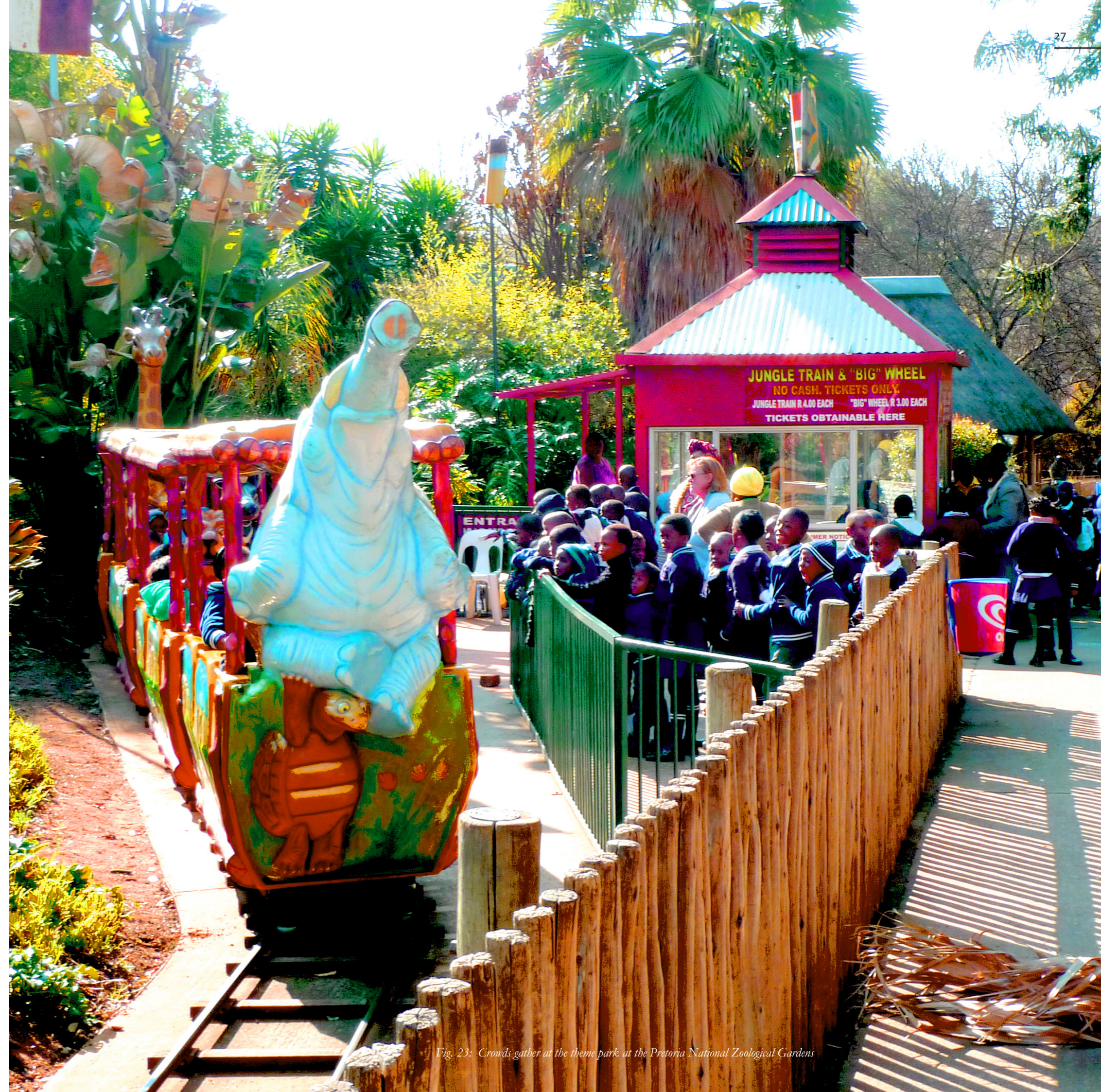


Fig. 23: Crowds gather at the theme park at the Pretoria National Zoological Gardens

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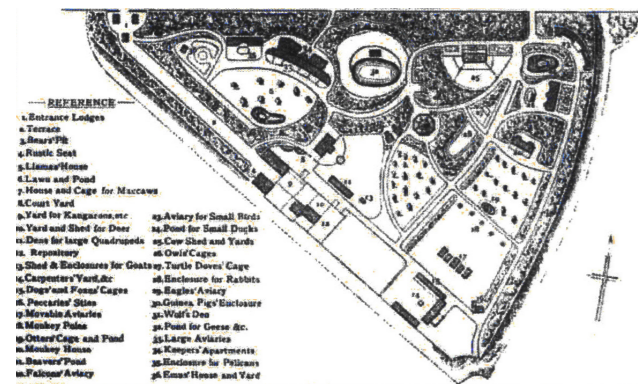


Fig 24: Site Plan of London Zoological Gardens

As human society has come to dominate the environment, perceived materiality has been replaced with a plastic or Disneyfied nature. As put by Dickens 2004: 137: “Everyday life becomes merely the consumption of a series of images, pictures and simulations rather than an active engagement with either the social or natural worlds”.

People are trapped in a world, where simulations of reality become dominant. Attempts to capture as many and as much experience as possible in the shortest amount of time has reduced nature to a commodified object. Manufactured nature intended for consumption, prioritizes “a lack of danger, dirt and anything too reminiscent of the original circumstances in which these environments were made”, Dickens 2004:138.

Interpretation of ‘Disneyfication’, as put by Baudrillard (1998:104), suggests the largely successful attempt to ‘colonise the imagination’. Personified Disney characters often displace our memory of lived animal habits and personalities, the result, as put by John Berger is that: “The animals in zoos seldom live up to the adult’s memories, whilst to the children they appear, for the most part, unexpectedly lethargic and dull: and so one might summarize the felt, but not necessarily expressed, question of visitors: ‘Why are these animals less than I believed?’” (Berger 1980)

He goes on to compare the zoo to an art gallery, in which each animal is framed by the cage it inhabits. The view is always distorted and out of focus. Berger describes the process of deciphering the animate artworks as an inward apology, which reads: “What do you expect?

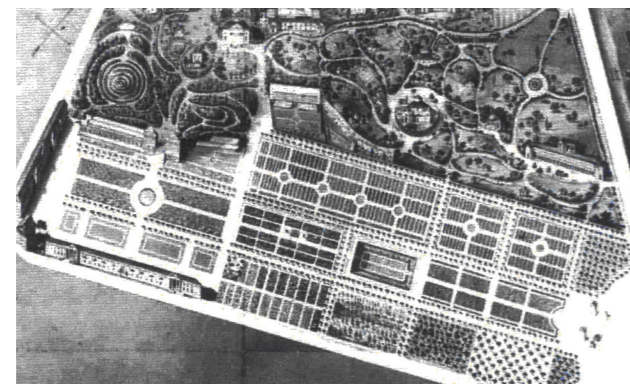


Fig 25: Site Plan of Jardin de Plantes

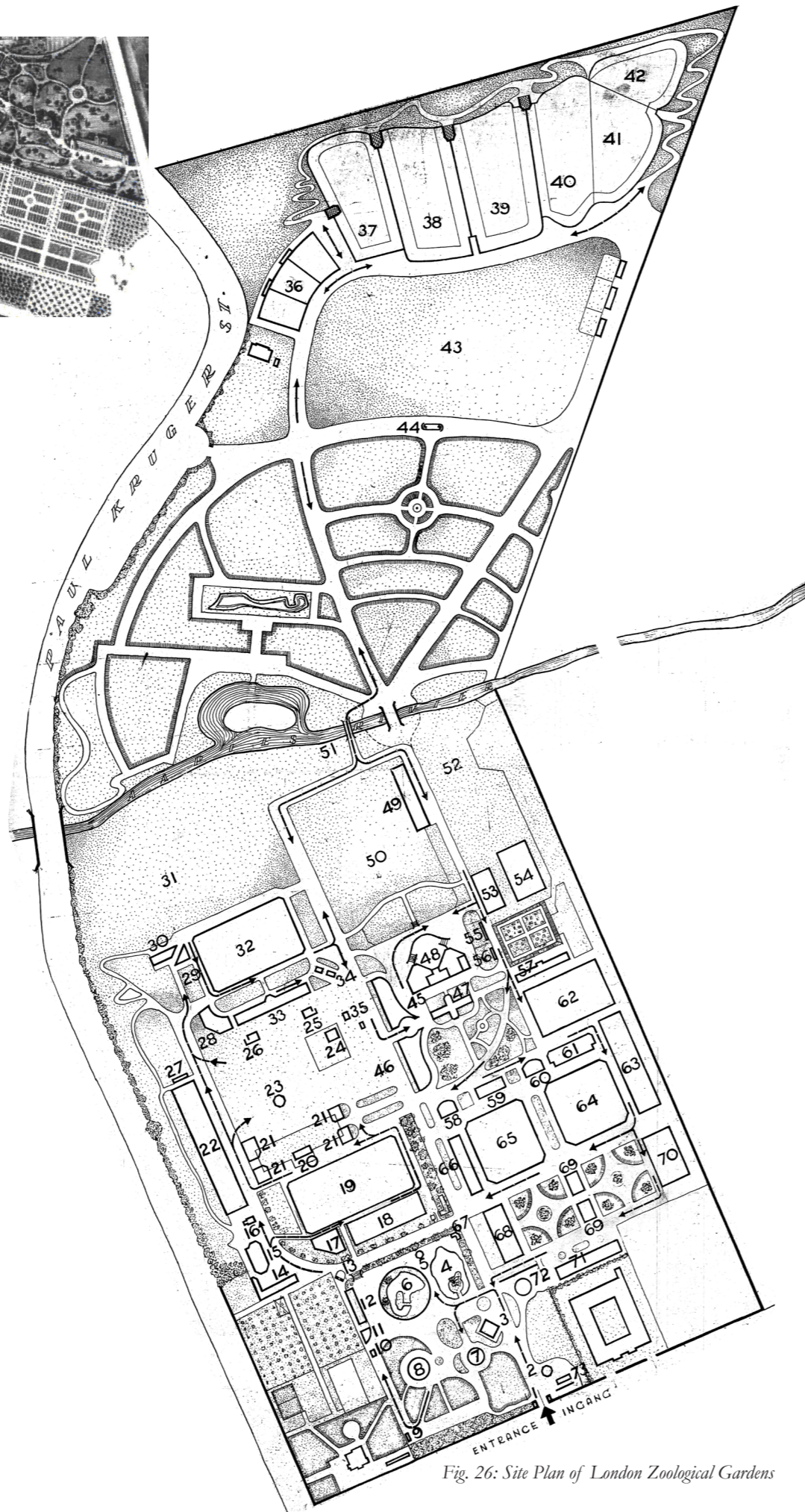


Fig. 26: Site Plan of London Zoological Gardens

It’s not a dead object you have come to look at, it’s alive. It’s leading its own life. Why should this coincide with its being properly visible?” Since disappointment is anticipated, the apology is continuous and accustoms the visitor to the reality that they are looking at a figure that has been rendered absolutely, and irrevocably, marginal. “Animals immunised to the encounter of humans, look blindly beyond, because nothing can anymore occupy a central place in their attention.”

Berger notes that the boundaries that skew the viewers gaze such as the visibility through the glass or the spaces between the bars or even the empty air above the moat, have been reduced to tokens.

“The décor, accepting these elements as tokens, sometimes reproduces them to create pure illusion - as in the case of painted prairies or painted rock pools at the back of the boxes for small animals”. These backdrops are additional props suggesting something of the animals removed world: decaying branches of a tree for vultures, artificial rocks for lemurs, shallow fibreglass ponds for alligators. These objects serve two distinct purposes: for the spectator they are theatrical devices; for the animal, they constitute the bare minimum of a diluted home in which they can physically exist.

TERRITORY

Animals are nomadic; their presence in one place is transient. In an attempt to protect them, we enclose single species in synthetic constructs, and attempt to recreate their environments. The results are poignant, diluted reminders of home that hint at the human dilemmas of global Diaspora. Philip Ursprung (2002: 32) noted, “It is impossible to incorporate Nature into a building. By exhibiting Nature and Architecture in juxtaposition to each other, the vulnerability of both becomes evident”. Man not only disrupts biological traditions of animal behaviour in zoos, but by eliminating interspecific competition by isolating large species from one another for control purposes, further undermines any natural order.

While nature needs only scent and sound to define territory, man relies on physical fortification. Zoos are always essentially anthropocentric; man’s dominance is constantly reinstated with a flow of human

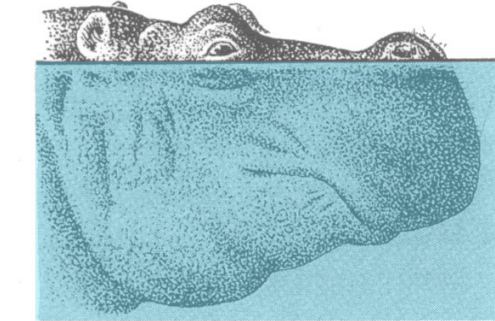
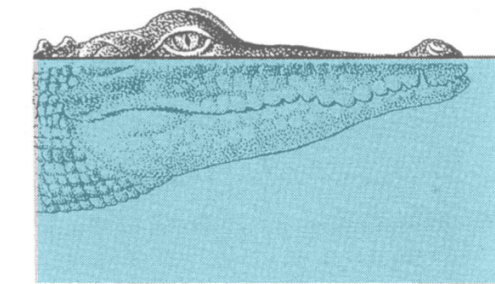
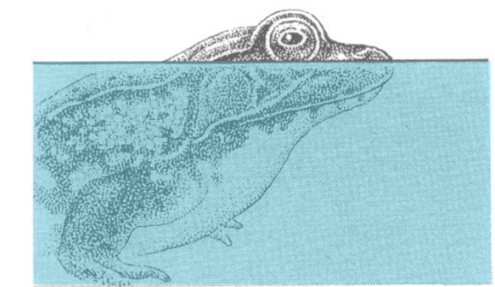


Fig. 27: Three Significant Profiles

An example of convergent evolution: The frog is an amphibian, the crocodile a reptile and the hippopotamus a mammal, yet all three breathe air and live in water. Therefore they all have nostrils and eyes that protrude above the surface while their bodies are submerged.

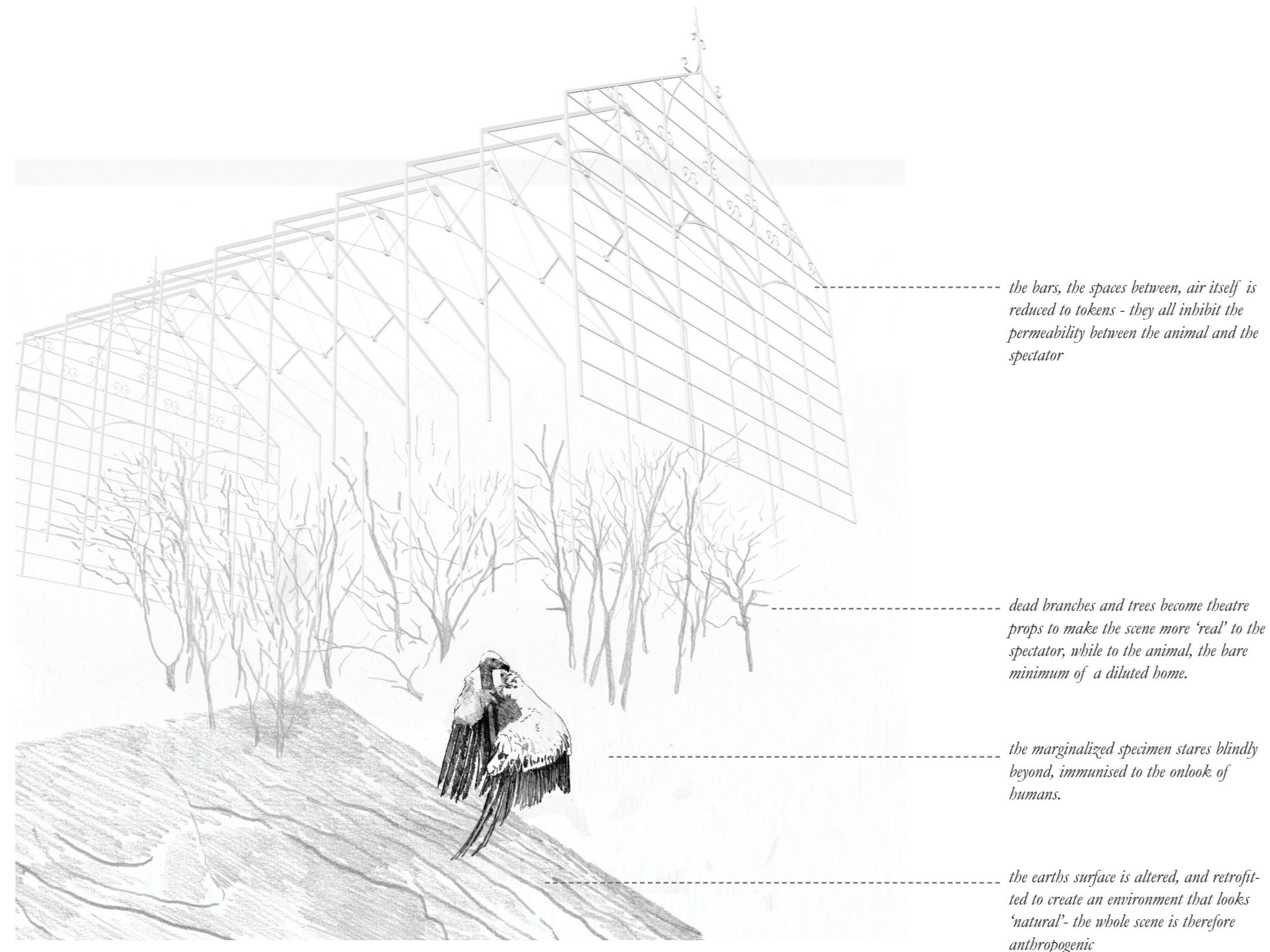


Fig. 28: Exploded rendering of the vulture enclosure and its elements

territory. We manipulate landscapes to trap animals, and then surround them with the constant flux of manmade paths. As David Greene puts it, “the public realm is an electronic surface enclosing the globe.”

It is an open question, whether Zoological Gardens are still appropriate in the twenty-first century. The animals seem listless or stressed in their role as exhibits. They border on the lifeless dioramas of museum collections. Considering artificial lighting and heating, and that the sleeping and eating patterns are governed not on the instincts of hunger or tiredness but rather by clockwork, one can argue that the specimens no longer exist in, or are representatives of nature.

Ignorant zoo visitors often throw empty objects at the animals in attempts to instil a reaction. The results are littered stage settings and a poignant recall that wild animals are out of place on the edge of the city; and that man too easily discards them, like the litter that surrounds them, as debris.

The observation that one of the functions of the animal brain is to make a representation of its environment emerged quickly in the scientific study of animal behaviour (Uexküll: 1931). From their interactions with various objects and environments, the brain and body form sensorimotor diagrams, to connect the perception and action in specific patterns for dealing with particular situations (Spencer 2006: 17). A dynamic, interactive model emerges and is continuously updated with new data by the brain. The behaviour of the model allows the animal to make predictions about changes occurring in its environment, these predictions cause the animal to adapt its behaviour in response.

Higher animals have very complex referential structures: “a higher organisation, a new superstructure, a new system in itself is created, with the mental ‘personality’ of the animal”. (Csányi in Sebeok 1991: 29) Rather than being universally given to feel ‘at home’ in particular spaces or geometries, the individual produces what biologist and philosopher Francisco Varela calls a micro-identity – a practised and

ready-to-hand response that guides us through everyday actions and situations.

Unlike animals, humans rely on infrastructure to mediate and control the boundaries upon which we insist. Fuller often pointed out, that even the lightest built form is necessarily fixed in place by an infrastructural network. It is an onerous task to lift structure from this permanent anchor. Even buildings as broadcasters of transient functions, such as energy or information, encompass a decentralized, closed circuit by necessity. Networks may be infinitely extendible and they may be endlessly adaptable, but ultimately they must be complete. Virtual environments depend on a net of cables. “The question remains of how an architectural instance could be, not a point on a map, but rather an event on the axis of time” (Steiner 2003). Despite the discourse on adaptability and the hope that the digital age would conclude in effervescent borders, a dichotomy of mobile structure and permanent infrastructure remains unchanged.

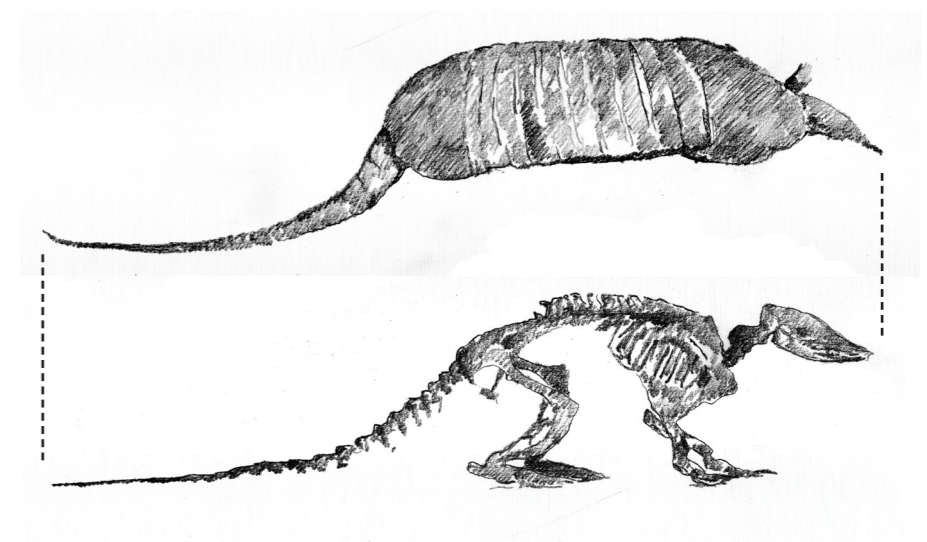


Fig. 29: Exploded diagram of armadillo and its mobile infrastructure

NATURE RESERVE

Paul Kruger declared the Sabi Game Reserve in 1898. In 1926, proclamation of the Kruger National Park resulted in the definition of South Africa's western boundary. By 1976, Kruger was entirely fenced (Biggs: 2003). Approximately twenty thousand square kilometres of African savanna was hermetically sealed off from its surroundings. For better or worst the system had to be self-contained (Biggs: 2003). However, Kruger is entrenched in a human dominated network of infrastructure, with an elongated shape that aggravates its borders, and with its major rivers all arising in or near South Africa's industrially and agriculturally developed periphery (Biggs: 2003): "It is therefore both vulnerable and valuable to its surrounding human environment".

It is more appropriate to define national parks as 'social constructs' than models for conservation. They reflect a Western perspective on human's relationship with the environment. The principles and ideology that influence resource conservation in national parks reflect specific histories. They are a result of European expansion from the middle ages to today, as well as the rise of capitalism and the industrial revolution during the same period (Igoe 2004). They therefore articulate how Europeans reacted to both nature and the resident, indigenous populations when they first located places like Africa, Asia, North America, and South America.

Africa offered the opportunity to experience a wilderness, which had already been ordered into the 'tamed' landscapes of Europe (Igoe 2004: 4). Northerners who had already squandered their Eden, states Marks, "sought to preserve African landscapes in the only way they could, by separating them from daily human activities and setting them aside as national parks where humans enter on holiday" (Marks 1984: 5-6).



Fig. 30. : Map of the Kruger National Park with rivers and main road networks

TIMELINE 3: Man in Kruger Over Time

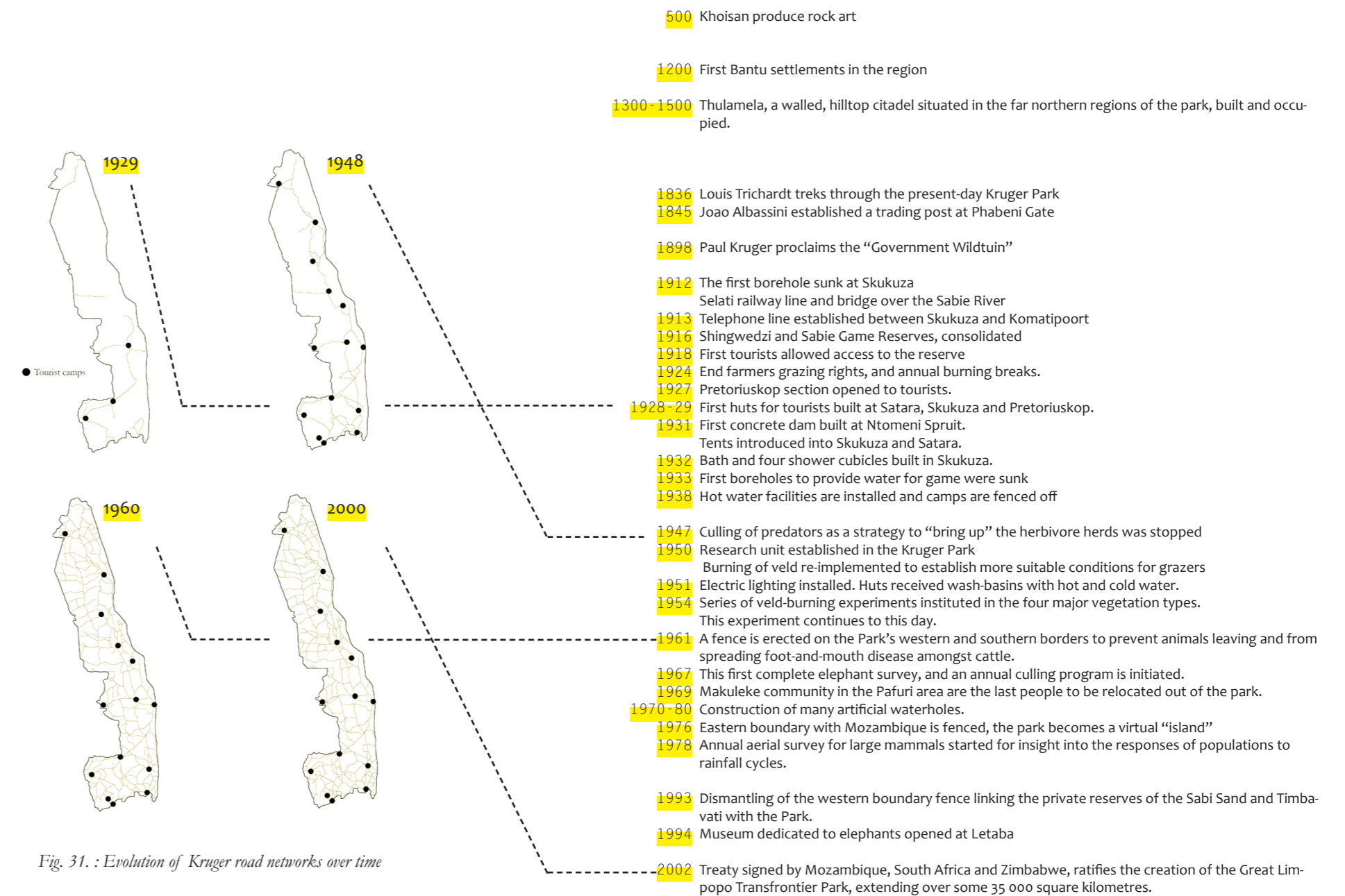


Fig. 31. : Evolution of Kruger road networks over time



Savanna woodland

Animals migrate at night across during the dry season - then more relaxed during the rains

Savanna grassland

Pilansberg mountains; animals collect on the escarpment where there is 'sweetveld', rather than on highground where the soil is older with less sodium resulting in bigger leaves and 'sour'

Fig. 32. : Zebra in the landscape of Pilansberg, South Africa

What these settlers failed to comprehend was that indigenous man actively managed the environment to engineer the functioning ecosystem. While Westerners believed the context to be a “pristine wilderness”, it was in fact an anthropogenic (or human created) landscape. Controlled burning regimes for example, culminated in “edge-environments” (Cronon 1983), which attract desirable wildlife.

Non-Western people did not always live in harmony with their environment. (Anderson: 1996). The Maori of New Zealand hunted certain species of animals to extinction before developing sustainable hunting methods; also, global archaeological records indicate that herding systems have crashed several times since their inception. Today pastoral systems mimic the seasonal migration patterns of grazing wildlife. During the dry season, wildlife concentrates around permanent water sources, as do villagers and their livestock. During the wet season, wildlife disperses away from these permanent water sources favouring fresh pasture and temporary water sources that have collected in the surrounding valleys following the rains (Igoe 2004).

Unlike indigenous resource management systems, which are based on specific local knowledge of the environment, (Igoe 2004) Western national park’s models of conservation claim that their system of Western science is based on knowledge that is “universal”. Science provides ‘logical’ explanations for why things are how they are, even if they are distant from actual realities. Since they are ‘scientific’, (Sullivan 2000:15) explanations are deemed to be true and become a substitute for reality.

Since its inception and sporadic development, Kruger management has been driven by a desire to minimise human interference and maintain ‘pristine’ ideals, no doubt shaped by the romanticised European view of the natural landscape before twentieth century modernization (Carruthers 1995). “Management of parks under the mandate to preserve natural conditions took two basic approaches: to ignore, or to manipulate.” (Sellars 1997) It was taken for granted that manipulative management did not critically modify natural conditions.

The scorching droughts of the early 1990s, with the lowest annual rainfall yet recorded for the Kruger Park, and the February 2000 floods, attested to our inability to control nature. Management plans can lessen or exacerbate the impact of natural forces. The consequences of interventions are irrational and may only manifest themselves years later (Biggs: 2003). Any ecosystem is continually updating through the interchange of the abiotic stimuli of climate and the biotic interactions of species and human populations. History indicates that attempting to prevent change, if not carefully considered, can culminate in an eventual catastrophe.

National parks are often a model for fortress conservation (Brockington 2002): this approach is founded on the impression that the wilderness is an asocial landscape, a place that is unconditionally free of human beings and their activities (Igoe 2004).

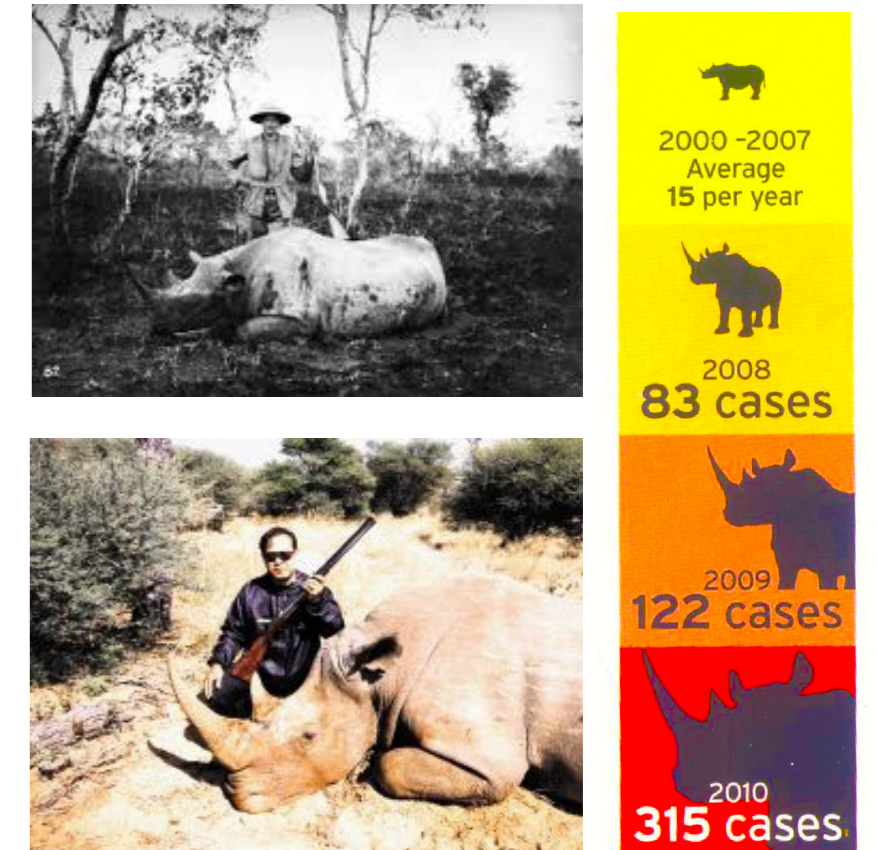
National parks during colonialism allude considerably to the English enclosure movement, which took place in the 18th and 19th centuries and encouraged a minority of wealthy elite to extend their control over large areas (Igoe 2004). Rural Europe was segregated into contrasting landscapes of production (“commercial farms”, “ruled by rationality and profit”); and of consumption (“ruled by recreation and contemplation”) (Frykman & Lofgren 1987). Sport hunting was introduced to Africa by the same aristocrats who campaigned the exclusion of subsistence hunters from their estates in England and remained an elitist activity.

“The recreational wilderness is both the product of a complex technological society and an escape from it”, as described by Igoe (2004: 145). The construction of reserved landscapes can only occur in a society with the technology and resources required to enforce this vision by forcefully segregating people from nature and perpetually maintaining this segregation. Western resource management models are as such, a product of social histories, particularly the history of European expansion.

The early years of Kruger were dedicated to establishing a human order: shooting predators, erecting fences, introducing water points, and infrastructure, “in what seemed to be a wilderness in need of some control” (Biggs: 2003). Fences were constructed, migrations stopped, the seasonal flux of surface water manipulated with boreholes and dams, seasonal grass fires tamed and managed (Biggs: 2003). Acceptable upper and lower population limits were set for species and an annual culling programme was initiated. A certified abattoir was erected in Kruger. The motto of Kruger became “management by intervention” (Pienaar 1980).

RHINO

The last naturally occurring white and black rhinos were seen in the region in 1896 and 1936, respectively. Reintroductions of white rhino started in 1960 and were followed by black rhino reintroduction in 1972. The Kruger white rhino are now used for translocation to other areas as part of their conservation program, with forty to a hundred rhino moved out annually (Biggs: 2003). Rhino’s have become mise-en-scene stage props when we consider that they are no longer a naturally occurring species.



Above, Fig. 33: A hunter, circa 1890, with a rhino he has killed

Below, Fig. 34: Punpitak Chunchom, a Thai rhino poaching kingpin with his kill in 2011

Fig. 35: Rhino poaching escalation over time

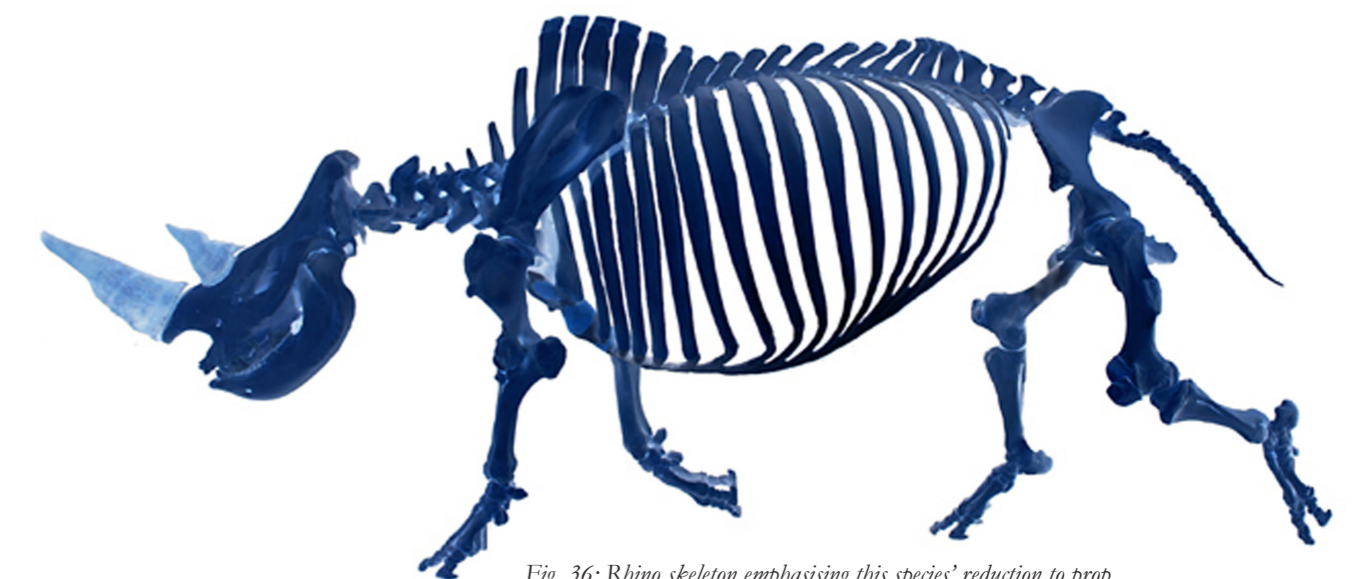


Fig. 36: Rhino skeleton emphasising this species' reduction to prop

Swiss ecologist Vinzenz Ziswiler (1967) noted that there are “essential, significant differences between the natural extinction of individual species and the extermination caused by man. Species dying a natural evolutionary death are almost always replaced by new forms or entire new groups of forms, which in turn bud, flourish, and blossom. When a species receives its death sentence through other than natural means, no new form appears in its place. Thus every species that is exterminated or killed off represents an absolute loss.” (Ziswiler :1967)

The ancient Greeks believed time was cyclical, excluding the Western idea that the earth had a beginning and will have an end. “The Christian notion of linear time is an essential element in the Western notion of advancement” (Igoe 2004). The emphasis is always on progress: an ongoing transformation of people and the environment. This in turn introduces the idea that it is possible to restore nature to this pristine condition through conservation and preservation. Nature is seen as an object, which people can transform or restore, and is therefore hovering between chaos and recovery.

Earth becomes the proverbial rebuilt ship of Theseus: an identity conundrum. When does a ship that gradually has its parts removed and replaced cease to be the same ship, and become another one?

No one foresaw, as Hays remarks, that when science could take away with one hand, and give back with the other. The natural balance is gone forever. (Hays 1972: 9)

For conservation funding, the public had to be allowed access into Kruger. The first tourist cars entered in 1927. This resulted in the development of tourism facilities and infrastructure, while still aspiring to maintain the natural qualities of Kruger as far as possible (Biggs: 2003). This essential paradox continues to this day, often with tension between activities (such as road construction) and the intended philosophy (minimum interference) behind them. An imaginary vision of an untouched wilderness is difficult to resolve when the reality is a traffic jam of safari vans surrounding a crash of rhino, wearing

transmission collars to allow authorities to monitor their movements with high-tech satellite tracking systems (Igoe 2004).

The central dilemma of national park management has long been the question of exactly what in a park should be preserved. Is it the scenery - “the resplendent landscapes of forests, streams, wildflowers, and majestic mammals” (Sellars: 1997)? Alternatively, is it the integrity of each park’s entire natural ecosystem, including not only the “biological and scenic superstars”, but also the variety of less popular species, such as grasses, lichens, and insects?

The idyllic backdrop of national parks has always given the impression that scenery alone is what makes them worthwhile and qualifying them protection (Sellars: 1997). As a result, a kind of “facade” management becomes the intended practice: protecting and enhancing the scenic facade of nature for the public’s enjoyment, but with [limited] scientific knowledge and little concern for biological consequences.

It was not until 2002 that steps were taken to open the channels, which hinder animal migration within the Kruger National Parks and other African nature reserves. A treaty between Mozambique, South Africa and Zimbabwe will allow the creation of the Great Limpopo Transfrontier Park, extending over some 35 000 square kilometres. In 2006 Giriyyondo Tourist Access Facility opened the border between the Kruger and Limpopo national parks in South Africa and Mozambique. However, the politics of boundaries still hinders the movement paths of animals, which if removed in time, will hopefully reinstate the natural order within Africa.

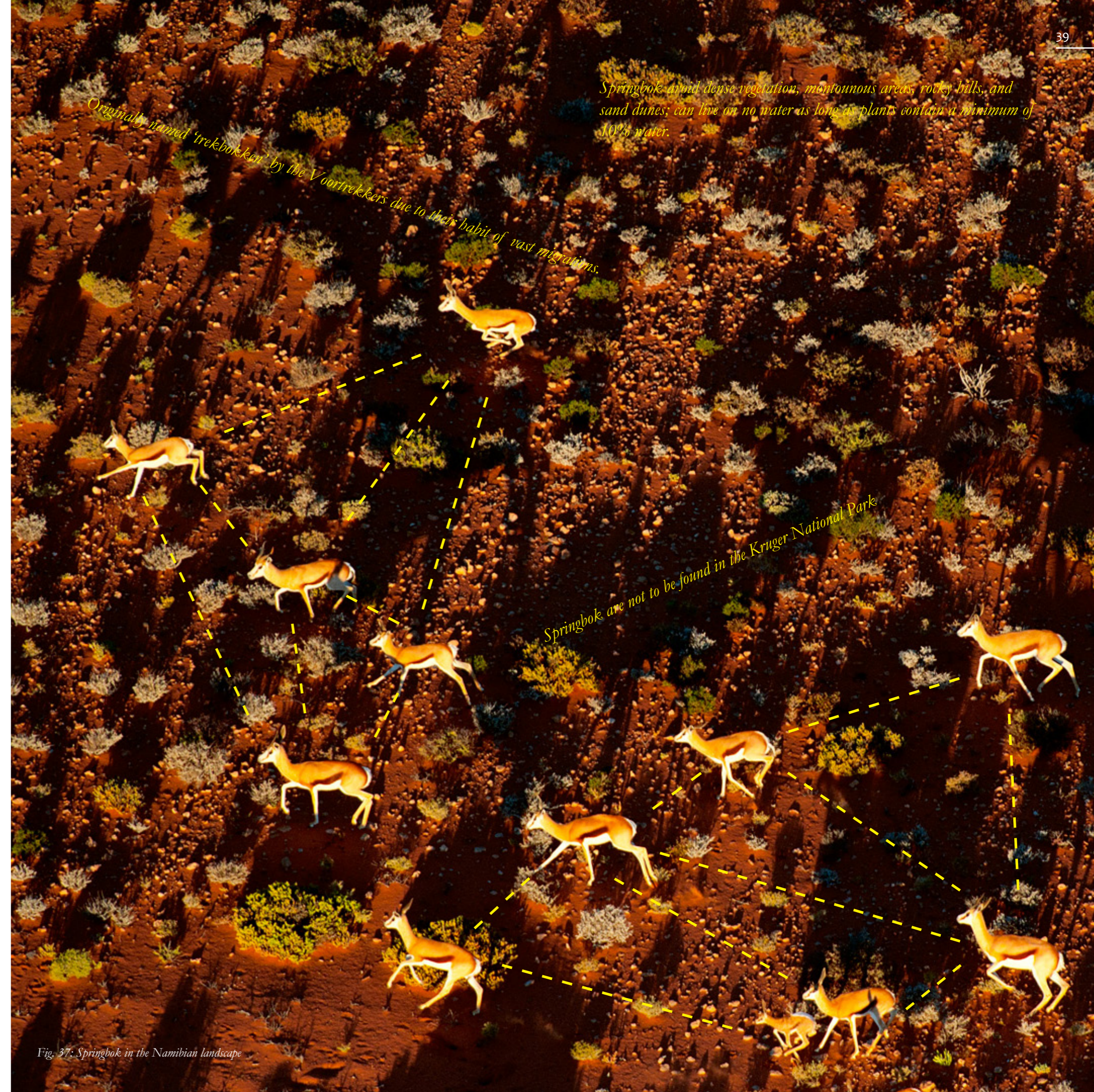


Fig. 37: Springbok in the Namibian landscape

NATURAL HISTORY MUSEUM

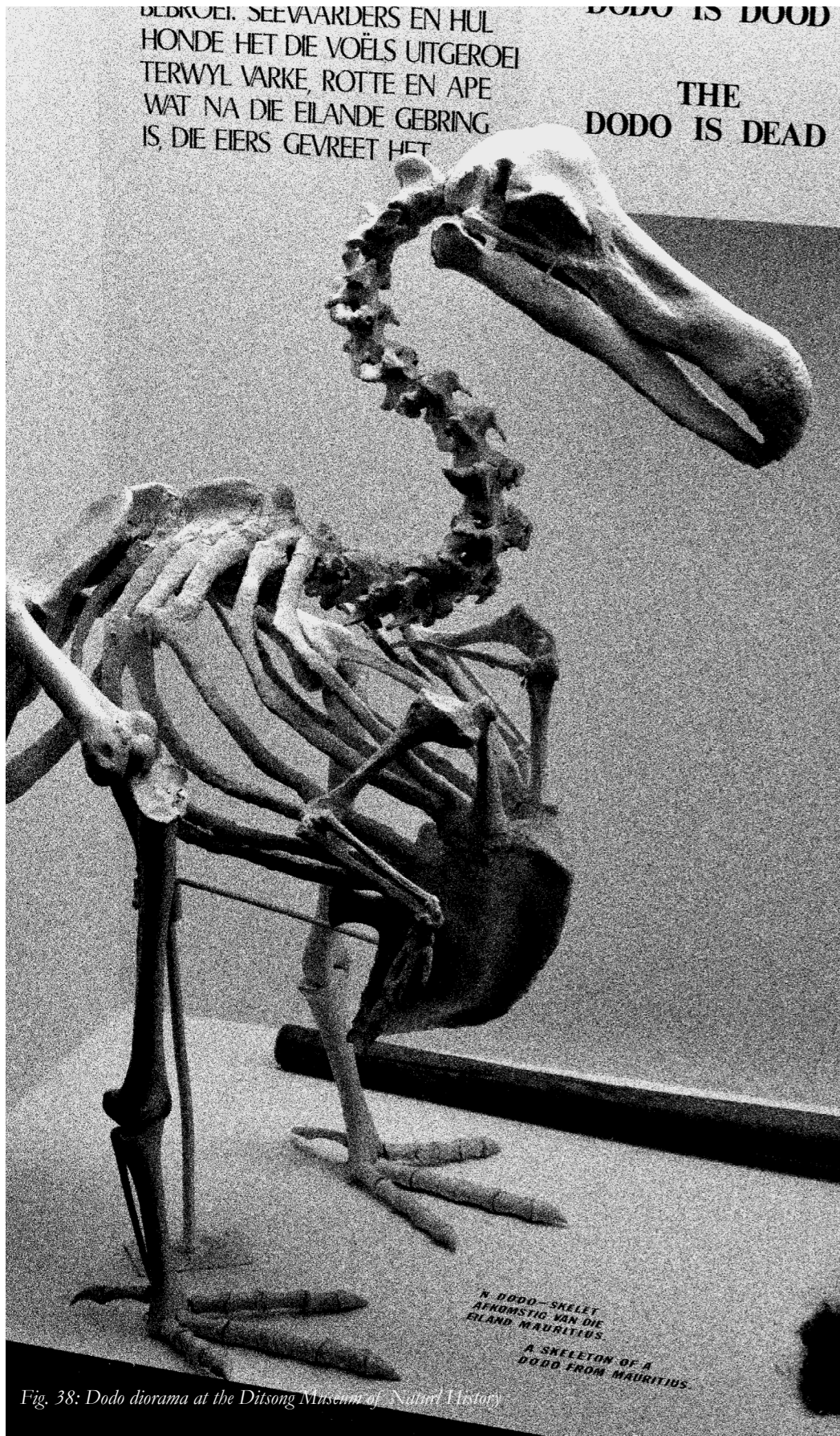


Fig. 38: Dodo diorama at the Ditsong Museum of Natural History

survey the whole static safari.

the palaeontologist

who could take a tooth and reconstruct the animal around it, who made wholes from the smallest part, who fleshed the bone and sealed the flesh with skin, dreamed a species from a femur, named it and made it breathe in our imaginations.

The next room. Light off. Lights on. We're caught between two darknesses, she whispered, the one ahead and the one behind... yet always somehow passing through them both, I thought (...)

(Extracts from the poem from the 'by Liviu Campanu (1932-1994): Museums in Bucharest' sequence in *City of Lost Walks*, 1985)

The museum as a labyrinth of preserved animals is more than just a repository for our visual consumption; it is a working, constantly growing database (Asma 2001: 27). In fact only about one tenth of the museum's collection is out on display at any one time (John Bates in Asma 2001: 17). If we simplified the definition of the natural history museum to a catalogue of preserved flesh behind glass vitrines and insulative vacuums; then we could elevate the butcher shop into the category of museum. However, we project meaning, and surround the objects on display with layers of questions; therefore justifying their extended lifespan and elevating their significance. The museum is, as such, as reliant on fetishism as was its predecessor, the curiosity cabinet.

MUTI SHOPS AND CURIOSITY CABINETS

European gentry became deluded by novelty in the century that followed the discovery of the 'New World'; collections of artefacts and oddities became popular, amounting in the curiosity cabinet, or Wunderkammers. Exotic artefacts were portals to, and offered fragmented encounters with, imagined, far-flung worlds.



Fig. 39: Sectional view through curiosity cabinet



Fig. 40: View of ceiling of a muti shop



Fig. 41: Muti items for sale

Curiosity cabinets were not unlike Traditional Medicine shops are today. In section, both appear not only to contain objects, but to be made of objects. Every surface is amassed with an insulative layer of fetish tokens. The props, which appear to construct their surroundings, are mostly projected upon with new meanings. In the Wunderkamers, through misinterpretation of exotic paraphernalia; and in Traditional Medicine through ancient and modern (for example the rhino horn in Chinese medicine) belief systems.

By the 17th Century, the need for a repository of knowledge for education and research was recognised (Asma 2001: 47-76). Collecting the aesthetically pleasing objects of separate curiosity cabinets into one museum could reveal deep truths about causes when studied comparatively and analytically. Understanding causes, the logic went, would lead to greater manipulation of nature, and in this manipulation would reside the secret of humanity's progress. The act of hoarding things and displaying them in groups was progressing and taking on new functions.

DITSONG MUSEUM

The old State Museum in Pretoria, founded in 1892 (Fransen 1978: 163), was located for the first two years in the Ou Raadsaal Parliamentary building. Originally created to collect items of both cultural and natural history, it was moved to the Old Museum Building on Boom Street on the periphery of what is defined today as the zoos south border in 1894, and is largely responsible for the founding of the Pretoria National Zoo. Over the years, the museum has expanded considerably. In 1964, the museum was divided, into the Transvaal Museum and the National Cultural History Museum. A bulk of its collection was moved to Paul Kruger Street in 1910, founding the Transvaal Museum (now known as the Ditsong Museum), which is still a fully functioning natural history museum and research archive.



Opening drawers allows the contents to be acknowledged and reinterpreted before they are closed and forgotten again.

Space is constantly delineated within the zoo typology: worlds of specimens are kept hidden in drawers.

Closed, cabinets assume organised pathways of smooth innocuous covers, opened, drawers charge into the space around them. Folded open, they reveal their complex anatomy of organised families of insects, or a natural chaos of dead insects in need of sorting.

Folded open, they reveal their complex anatomy of organised families of insects, or a natural chaos of dead insects in need of sorting.

Fig. 42: Drawer of butterfly specimens prior to sorting and mounting

Fig. 43: Floor plans of the public catalogue of specimens at the Ditsong Museum of Natural History

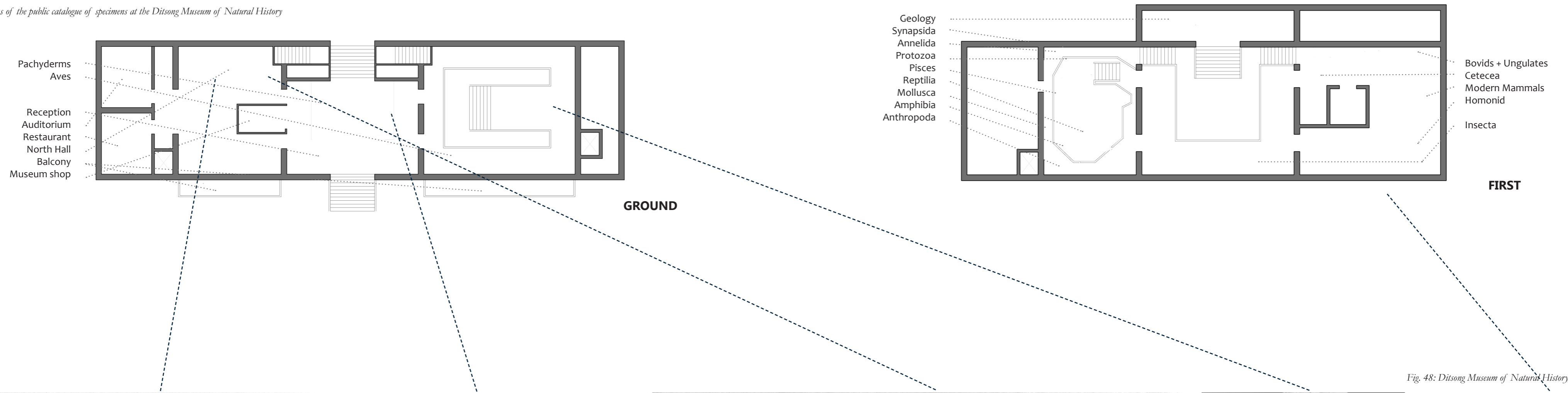
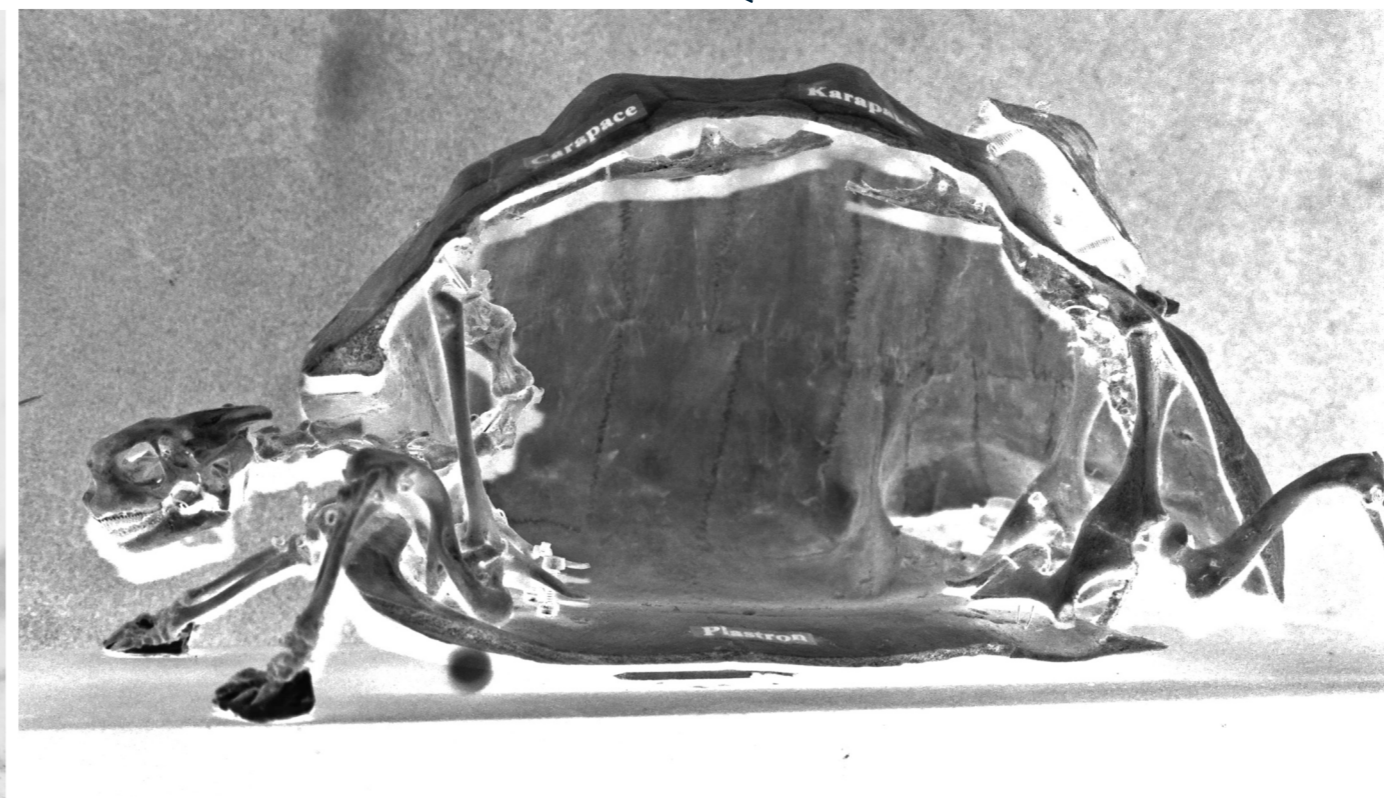
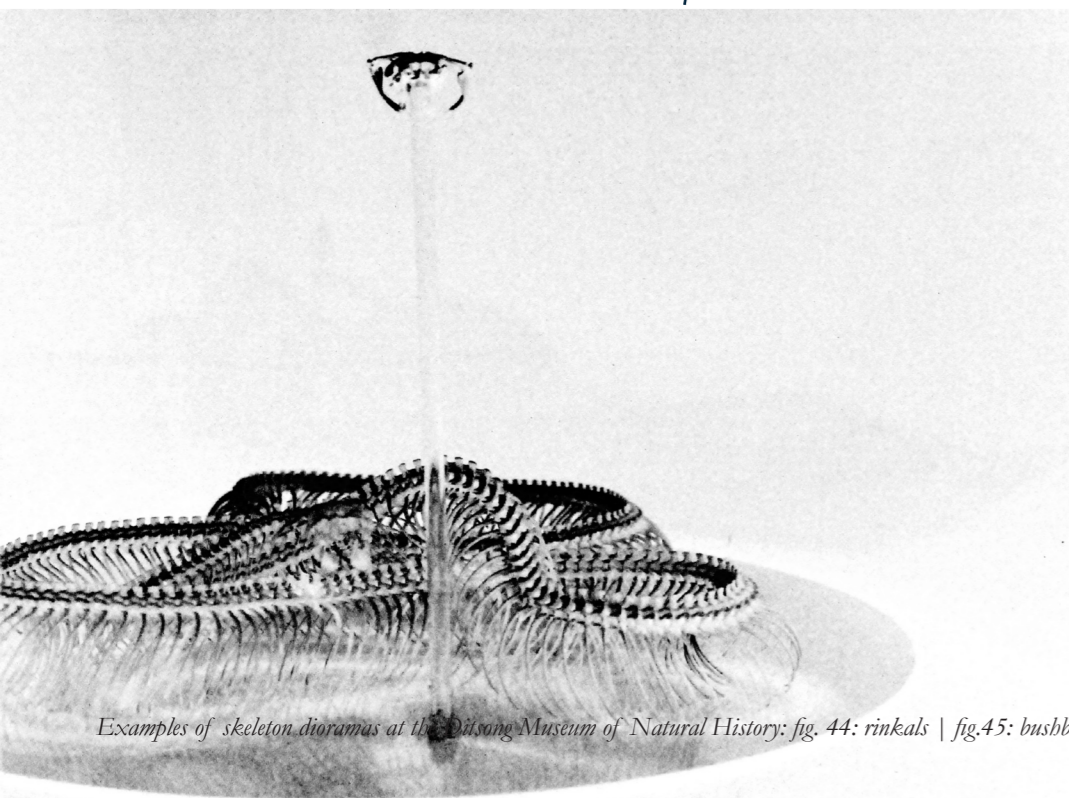


Fig. 48: Ditsong Museum of Natural History, west facade



Examples of skeleton dioramas at the Ditsong Museum of Natural History: fig. 44: rinkals | fig. 45: bushbaby | fig. 46: tortoise | fig. 47: antelope

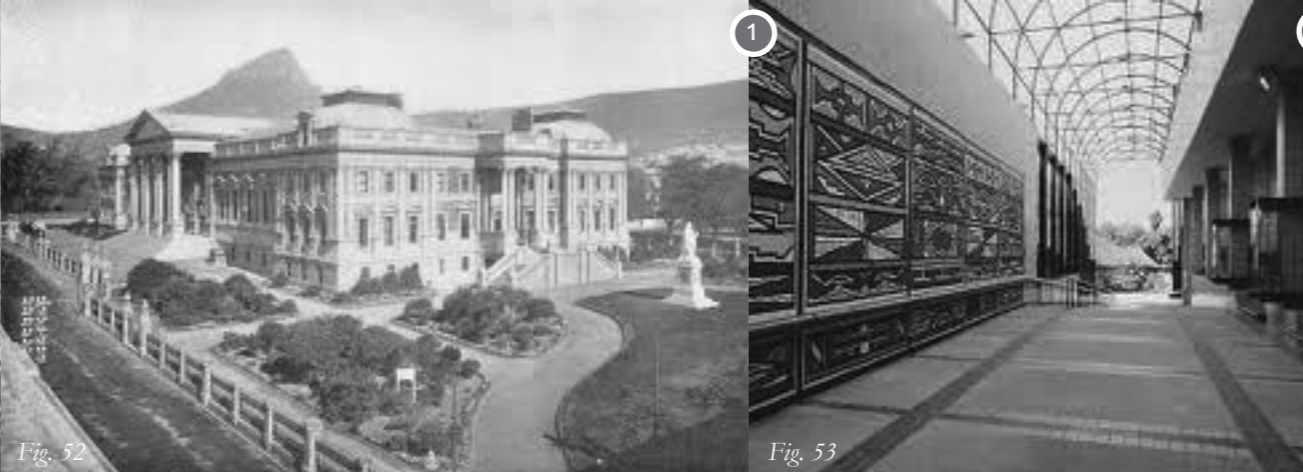
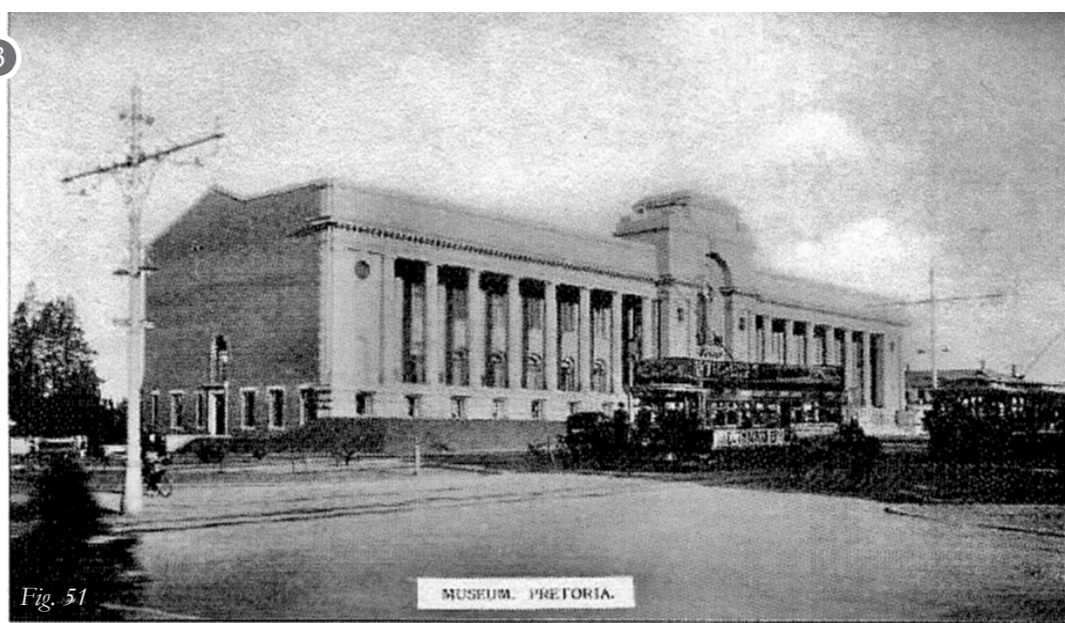
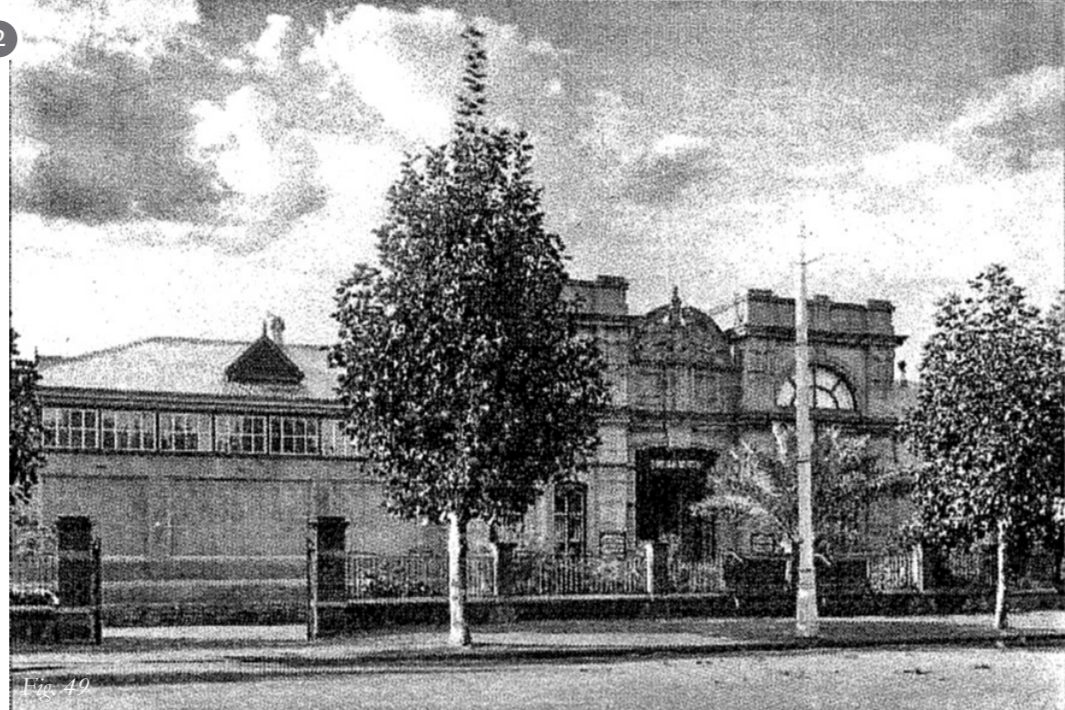
The Ditsong Museum's humdrum of weather-beaten exhibitions is divided into ornithology, invertebrates, mammals and geology. Its displays are largely didactic, but its archives consist of an incredible array of collections behind the scenes, and are far more captivating. Dr. Martin Kruger, the only lepidopterist in South Africa, is disheartened by society's priorities: "we know more of galaxies than we do Earth's own organisms". He is, as Jean Baudillard would describe it, the sole 'sultan' of an incredible 'seraglio' of South Africa's grvida of insect species: which he meticulously mounts and classifies, as part of Earth's growing jigsaw puzzle.

All museums have a front stage and a back stage, with knowledge itself consciously engineered from behind the curtain (Friedl 2011). Museum presentations are three-dimensional windows into the world of ideas. Curators are actively assembling ideas into objects, while onlookers reinterpret the productions back into ideas.

Through deep ideological commitments, scientists quietly shape and edit the information different cultures and different historical epochs consider to be knowledge, and therefore, worthy of display. Scientific display is part education and in some small part deception. The academic research of collecting and analyzing specimens is a function that directly renders the public conscious of biodiversity and conservation issues (Asma 2001). Museums become veritable arks of inert animals quietly haunting the visitors and curators with poignant cautionary tales of our exploitative tendencies.

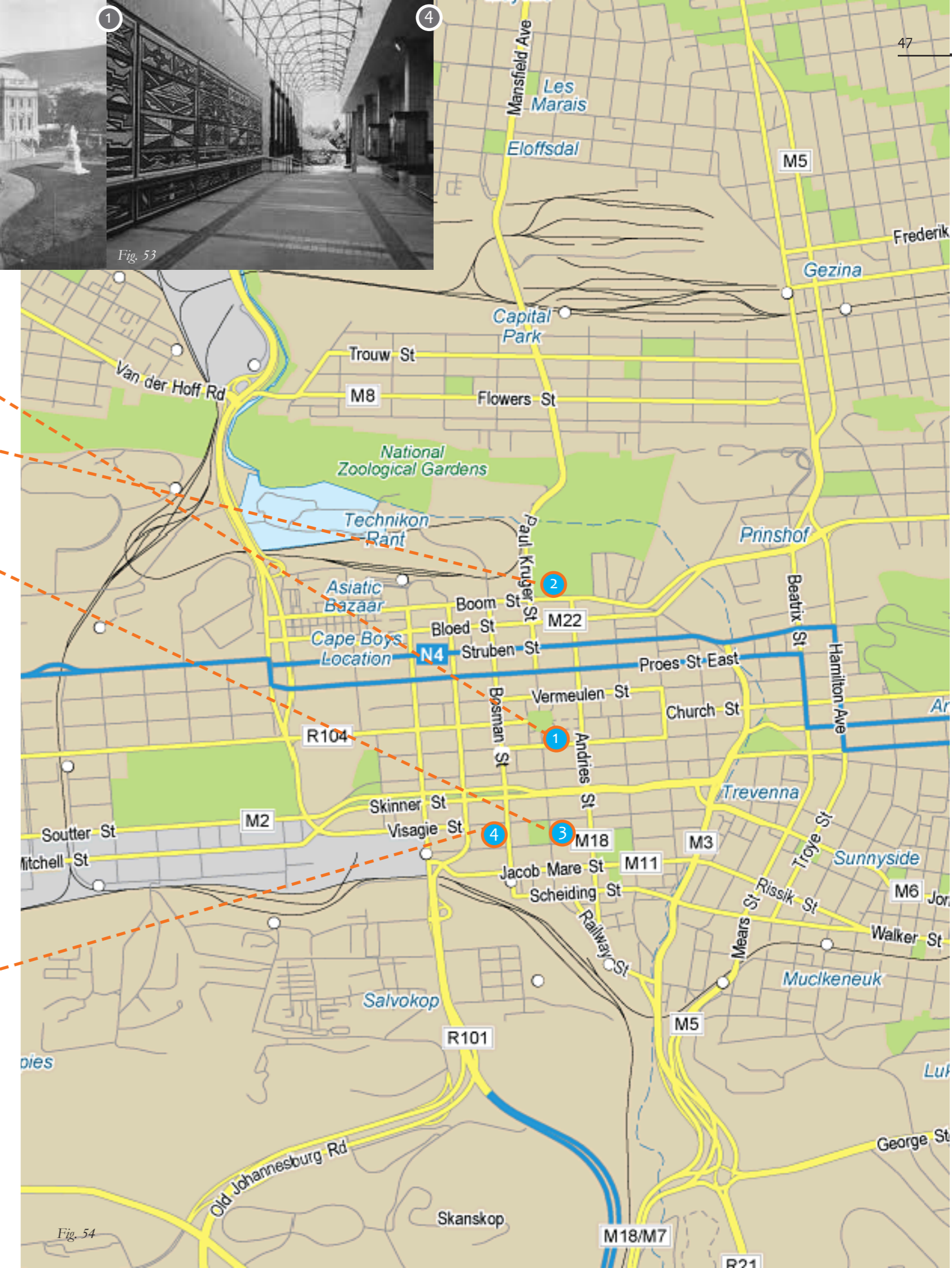
Emotions are more effectively triggered by powerful imagery than by scientific prose: giving the general public a "spectacle" creates a sense of wonder and edification that leads to the pursuit of understanding. The spectacle itself becomes the commodity of the museum (Asma 2001: 35-37).

Curators began to understand that the intellectual benefits of collecting and displaying was created by the theoretical arrangements or organisation of items, not just by the sight of the items themselves. The exhibition seals every object in its logically rightful place with



TIMELINE 4: Ditsong Museum

- 1892 Staatsmuseum founded at the Ou Raadsaal Parlaiment building
- 1904 Moves to Old Museum Building in Bloed Street on periphery of current zoological gardens
- 1912 National Cultural History Museum remains in Old Museum
Natural history and geology collection moves part of exhibition to Market Street - now Paul Kruger Street opposite the Pretoria City Hall
- 1964 Collections divided into Transvaal Museum of Natural History and National Cultural History Museum made autonomous
- 1990 Museum flooded and evacuated
- 1992 Museum completely evacuated after a second flood
- 1999 Reorganisation of National Cultural History Museum, the Transvaal Museum and the South African National Museum of Military History into the Northern Flagship institution
- 2002 National Cultural History Museum moved to the rebuilt Mint Building in Visagie Street
- 2010 Officially renamed Ditsong Museums of South Africa





Examples of museum dioramas: fig. 55: Rhino | fig. 56: wild cats | fig. 57: warthog | fig. 58: reindeer

an impervious layer between voyeur and display. Organization of specimens became preparatory work for further scientific inquiry (Asma 2001). To follow the development of modern museum collecting is to follow the evolution of European classification. The science of arranging and classifying, otherwise known as taxonomy, became a paramount aspect of museology.

Anthropologists, psychologists, and philosophers have long puzzled about how the human mind creates its 'conceptual filing cabinet of the world' (Asma 2001: 84). The vast majority of the ways in which we carve up nature involve rather arbitrary, though culture-bound, choices (Durkheim: 1963).

"Modern European culture classifies a bald eagle by categorizing its species in the genus *Haliaeetus*, (Asma 2001: 6) in the family Accipitridae, but the Navaho categorize their animals by linking them to corresponding elements. The Navaho, always conceptualized the eagle in relation to the mountain, and in a similar fashion, the crane corresponds with the sky, the heron with water, and so forth. The pre-Renaissance habit of organizing animals and plants was according to their common uses. Consequently, the table of taxonomic relations reflected only the usefulness of organisms to human beings. Today this anthropocentric taxonomy seems naïve".

TAXIDERMY

The stuffed animal of modern culture can be justified as a bourgeois attempt to partake in the majesty of royal menageries. If one cannot afford living exotica, stuffed exotica are the next best thing (Asma 2001). Jean Baudrillard (Elsner: 1994) suggests a common psychological thread running through our instinct to collect, arrange, and display objects: "Surrounded by the objects he possesses, the collector is pre-eminently the sultan of a secret seraglio." He claims that collecting and arranging is itself an exertion of power or dominance, one that is remarkably successful when compared to our attempts to dominate and control living things.

Taxidermy becomes the process of recreating the unmanageable living creature into the manageable, inanimate trophy (Barker: 1996). The ossified object becomes a reminder of mastery in a power game. The implications of preservation are not only dictated by dominance, but arguably rather an attempt to sustain wonder as an emotional encounter. As Rachel Poliquin (2006) describes, wonders are notoriously fleeting: they die, and decompose, disappearing from the capacity of human encounter. Taxidermy is an attempt to postpone this natural decay.

One of the values of taxidermy, (at least originally) was its power to slow down, and essentially freeze, the creature long enough for our perceptual equipment to register the details. Many things in nature either move more slowly or more quickly than the we can properly track, so their movements are practically speaking invisible to the human eye and mind (Love: 1997). Transient processes of degeneration and regeneration go on interminably around us but are rarely perceived. It is precisely this immobilized quality that makes all taxidermy morbid (Asma 2001: 46). Not only are the cubicle-bound creatures alienated from their real environment, but also alienated from the distinguishing property of life itself, which is motion. "Only in death do most animals pause long enough for our analytical minds to torture some truths out of them" (Asma 2001: 27).

Taxidermy is both, yet neither art and nature: while the artist attempts to reconstruct the animal remains as naturally as possible there is an undeniable synapse between the artist and his audience? But the product is undeniably animal and prop.

DIORAMA

Specimens mean little in isolation; they need to be understood in systems. Specimens are decontextualised and meaning is merely projected onto them depending on the role of their context, use,

and associations. Once a work becomes abstracted from its original context it is decontextualised, once it is treated in another manner, it is recontextualised with another meaning. The same specimen could serve several different purposes, from medicinal, to natural history, anatomy, physiology, evolution, or even religion. As Asma declares: "Perception alone without intellectual references and connections, is relatively blind" (Asma 2001: 77).

There is a definite zone of ambiguity between the scientist's objective and the child's subjective imagination when viewing the dislocated object. The artist Suzanne Anker in her Glass Veil exhibition asks: "What emotions, fleeting or otherwise, are invoked by gazing at preserved flesh?" She answers her question of the viewer's somatic gaze, by defining the ciliary function involved in interpreting a displaced object, as going behind a veil to transgress a hidden boundary. She goes on to interpret the veil as a mirror of the viewer's self.

Contemporary artist, Hiroshi Sugimoto in (Brenner, Burroughs and Nel 2011), has observed that fossils are 'the earliest photographs', reproductions of an original moment in distance time. The original bone of the fossil is long since displaced, and is thus a representation of the original. Through contemporary engagement with the past, the past itself is in constant flux, and never static.



Fig. 59: Drawers containing organisms ready for sorting

One is most aware of the implications of context when viewing a wet specimen: pickled in ethanol and enclosed in glass cylindrical jars, the object on display is usually unfamiliar, and often displaced from a system on which it relies (whether it be a foetus within a new inorganic womb, or a headless abdomen in an aquatic habitat). Enclosed in impermeable layers of glass, space, and ethanol, the specimen floats interminably in its own vacuum. There is a three-fold distortion of reality: firstly in context, and then in form: the ethanol distorts the proportions of the spectacle, and the glass membrane replaces the objects silhouette in space.

The aesthetic choice to include the environment in the diorama was not just as an insignificant backdrop for animal drama, nor simply art for art's sake. It was a conscious decision to render the ecological relationships between plants and animals visible. (Asma 2001: 42) Wallace and Darwin identified that organisms are perfectly adapted to their environments; searching through similar geographical environments should uncover similar organic bodies, similar physiologies, and similar behaviours.

The museum diorama is not unlike the zoological enclosure. Many animals born into enclosure habitats are simply translocated into cleaner glass cases once they are deceased, then disembowelled and reconstructed. The museum window is equally impenetrable for the voyeur and in most instances, the marginal expression of the specimen is maintained in their taxidermy, and is equally difficult to centralise. Sometimes the taxidermist manipulates the mounts expression into a permanent frown or yawn, so that its range of expression is more theatrical than it had been during its contained life. Successful taxidermy is defined by this apparent state of inertia: it entertains in the imagined event of the specimen leaping off its perch. We therefore observe living objects as if they were dead and dead objects as if they were alive.

The deceased specimen assumes their new context as superficially as they had done alive. If we compare the enclosure to the diorama, our deductions are formidable. They emulate how impossible it is for man to reproduce an exact Eden: no matter how closely we emulate the commonplace semiotics of given habitats; the results are always diluted homes.

Fig. 60: Dissection of a wet specimen in space

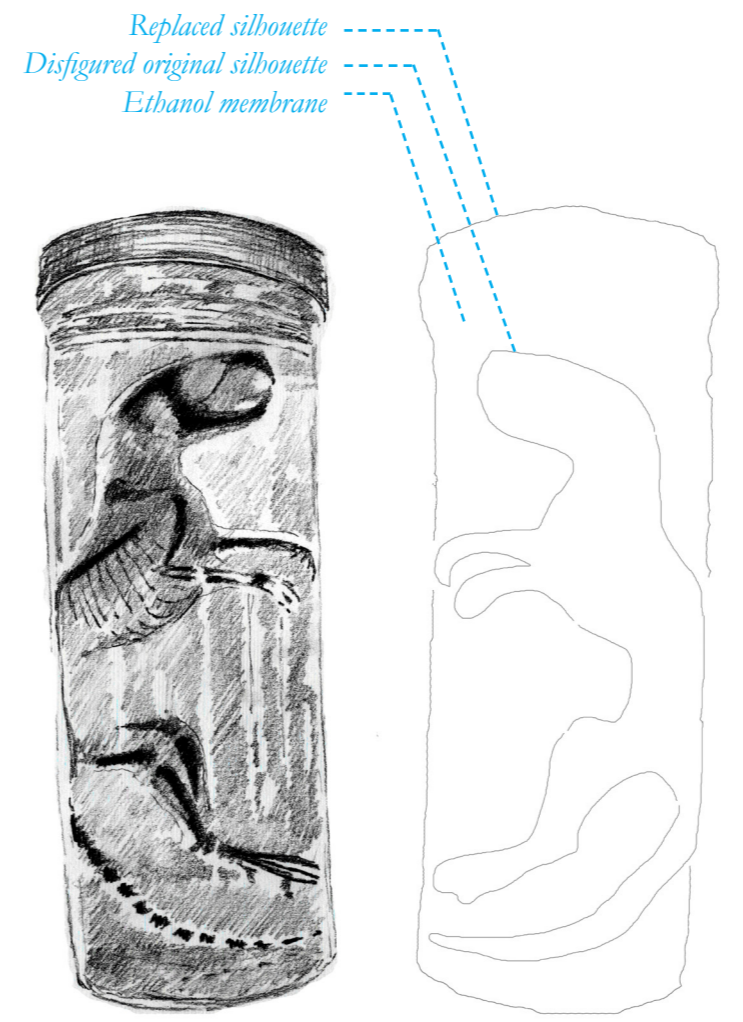


Fig. 61: Wet specimen display at the Berlin Museum of Natural History

TISSUE BANK

The disappearance of naturally occurring organisms, their extinction, and their reinterpretation through science, reinvents the ancient allegory of Plato's cave. The story is a scenario in which reality and illusion are confused:

Socrates asks Glaucon to imagine a cave inhabited by prisoners who have been chained and held immobile since childhood: not only are their arms and legs held in place, but their heads are also fixed, compelled to gaze at a wall in front of them. Behind the prisoners is an enormous fire, and between the fire and the prisoners is a raised walkway, along which people walk carrying objects on their heads. The prisoners watch the shadows cast by the men, and hear their echoes, not knowing that they are shadows, and reflections.

Socrates suggests that the prisoners would take the shadows and echoes to be reality, not just reflections of reality, since they are all they knew, and the whole of their society would depend on the shadows on the wall.

We are currently confronted with a similar conundrum where information can be misconstrued as both reality and myth. DNA renders specimens that are projected from reality. In this way, cloned organisms are the shadows of the organisms that cast them. Will these clones be real? Do they contain the same instincts, social habits and intrinsic behaviour patterns as their source?

The contemporary reaction to preservation of species is to go beyond making artificial landscapes for the protection of animals, to the construction of animals themselves. Man is now able, through innovation, to extrapolate store and manipulate flesh data, to create more than just the environment: engineering the organisms within it through transgenics. If man could only look forward to shadows, and society was only left with cast-off reality, perception and imagination would be unconditionally limited.

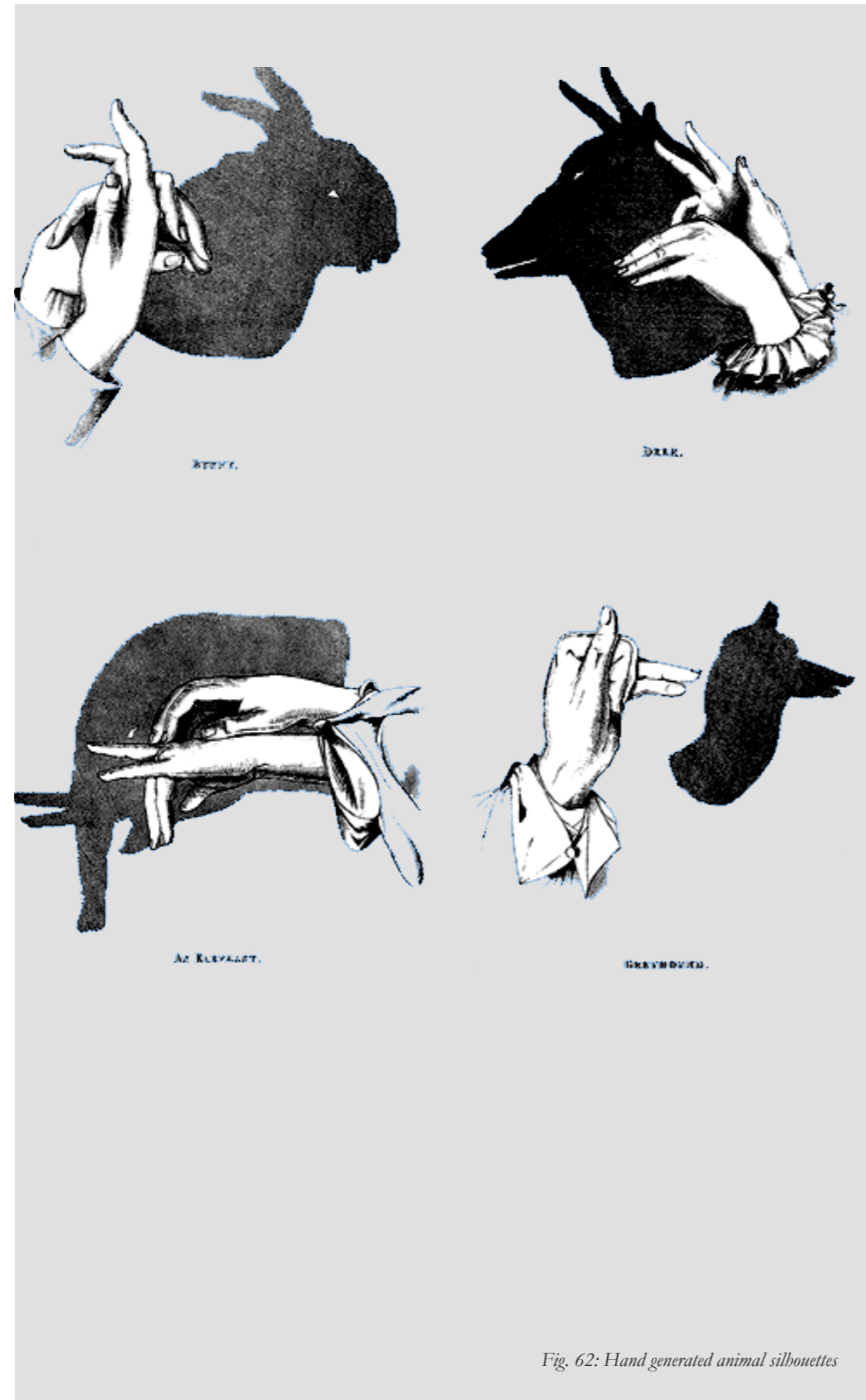


Fig. 62: Hand generated animal silhouettes



Fig. 63: Aerial photograph of zebra herd

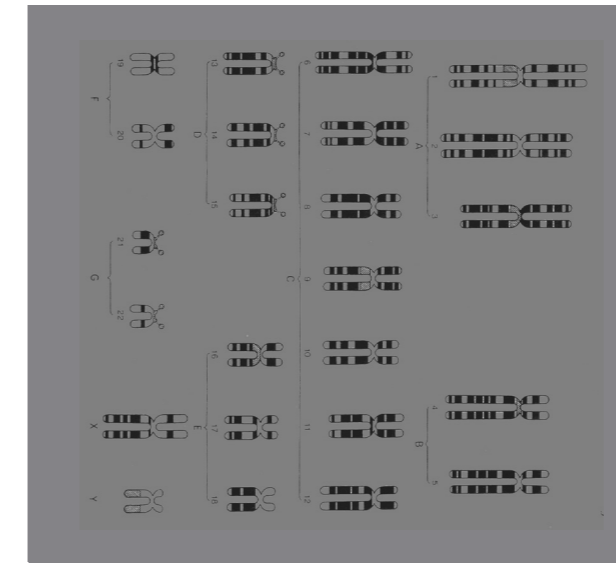
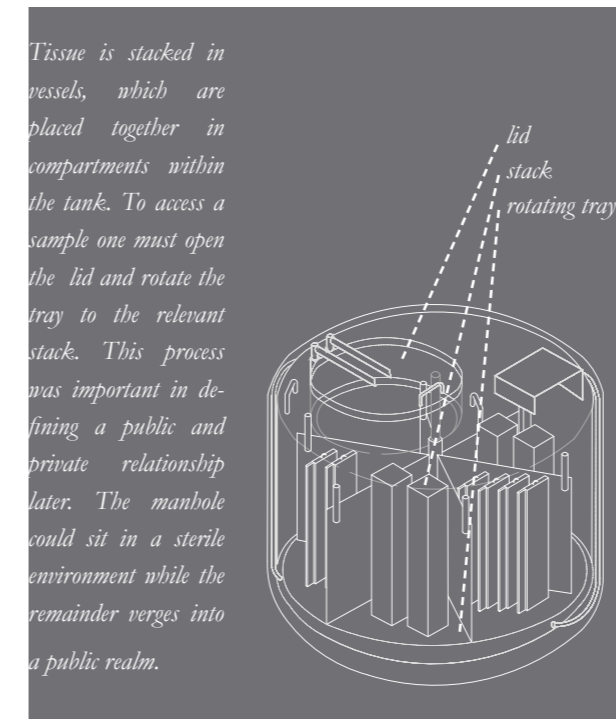


Fig. 64: Classification of the human chromosome, an illustration of structure



Tissue is stacked in vessels, which are placed together in compartments within the tank. To access a sample one must open the lid and rotate the tray to the relevant stack. This process was important in defining a public and private relationship later. The manhole could sit in a sterile environment while the remainder verges into a public realm.

Fig. 65: Diagrammatic section through a nitrogen storage tank

Notes from a series of interviews with Prof. Paul Bartels a Reproductive Biologist at the Pretoria National Zoological Gardens and a key figure in the tissue bank at Pelindaba:

Meeting 1: At the Vulture Feeding Restaurant
9 April 2011
10:00-11:00

The tissue bank at Pelindaba is the most extensive in the world. It is the only tissue bank to store in a variety of ways: containing living, frozen, blood, and forensic and field trip samples.

Bartels agrees that there is certainly a need for a public interface to the bank, naming existing banked examples that already actively engage with the public: for example the Darwin Centre in London (which houses an attempt at a manmade cocoon); and the UK Seed Cathedral Pavilion in Shanghai. He does mention that there are issues with a public façade; there is the risk of contaminating the sample, but this can be addressed with measures like glass. He mentions that the tissue bank is intended to move to the Pretoria Zoo. He feels that it would be interesting to watch biologists and researchers as well as animals at the zoo.

Meeting 2: At the Pretoria National Zoo
July 2011
14:00-17:00

Tissue is extracted from animals in the Kruger National Park (the custodians of animals on behalf of South Africa) or other nature reserves and zoos. Where as before animals were freely transported to European and American parks, zoos, and museums; today, living tissue is exclusively owned and distributed by the custodians of the living animal. South Africa's grivada of live tissue cells, on which the future of biodiversity relies, is therefore massive in comparison to most nations and an asset worth amassing.

Tissue banking is paramount in the management of animals and wilderness through biodiversity and biotechnology. The battery of tissue data forms (living, blood, frozen, field trip etc.) work together so that living tissue is not wasted where it is not necessary.

Bartels feels that the tissue bank is too often treated as an appendage to the zoo, he feels that the future of zoos will be heavily influenced by the progress of tissue banking, and that tissue banking in the future might replace zoos, at least as urban breeding grounds for animals. "We must take away the mindset of the tissue bank as a small room - the bank is knowledge."

Liquid nitrogen tank:

The longevity of living tissue stored in liquid nitrogen tanks is relative to the nature of decay of the metal container; it is estimated that the samples kept frozen will last for thousands of years. Tissue stored for years is thawed out when needed, rendering it active from a completely dormant state.

DNA

The discovery of deoxyribonucleic acid (DNA) as the substrate of chromosomes led to the discovery of the question of coding: the problem of life became a problem of information transfer and of cracking the genetic code. Organisms and molecules were therefore described as “information transfer systems”. “A term and approach that began as a solution to technical problems of telephone systems had become a powerful controlling metaphor for understanding the nature and generation of life itself.” (Mitchell and Thurtle 2004: 7-8)

Our attempt at comprehending how exactly genes work has amounted in dealing with DNA as a text structure with the use of pauses, commas, periods, and paragraphs as organizational devices. Genetic code (chosen for familiarity as symbols) shares structural features of language by using only a four-letter chemical alphabet (ACGT) to code for the endless diversity of life forms on earth by means of written linguistic arrangements in three-dimensional space (Sebeok 1991: 16).

Before writing, there was only sound, the first letters resembled string. The word ‘texere’ means to weave; ‘textile’, woven; texture, also woven. Text therefore means cloth (Willem Boshoff: 2010). As such, DNA banks can be considered as living looms.

The protein chain consists of a linear sequence of hundreds or thousands of amino acids forming a three-dimensional structure comparable to a tangled thread. The logic is that in the future it might be possible to edit genetic texts as we do verbal texts by erasing, splicing, adding words, and rearranging entire sections and paragraphs, so that we recode disease texts with texts coding for health. With the complete sequence of an organism’s DNA (Hoffmeyer in Sebeok 1991: 106), it could be possible, in principle, to compute that organism into existence.

“I think computer viruses should count as life. I think it says something about human nature that the only form of life we have created so far is purely destructive. We’ve created life in our own image.”

— Stephan Hawking [Sa.] in (Ley [Sa.]



Fig. 66: Magnified photograph of a dust mite

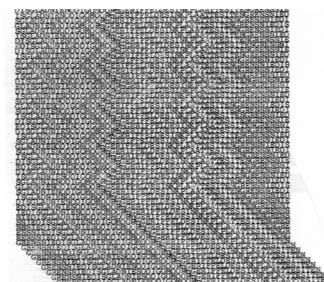


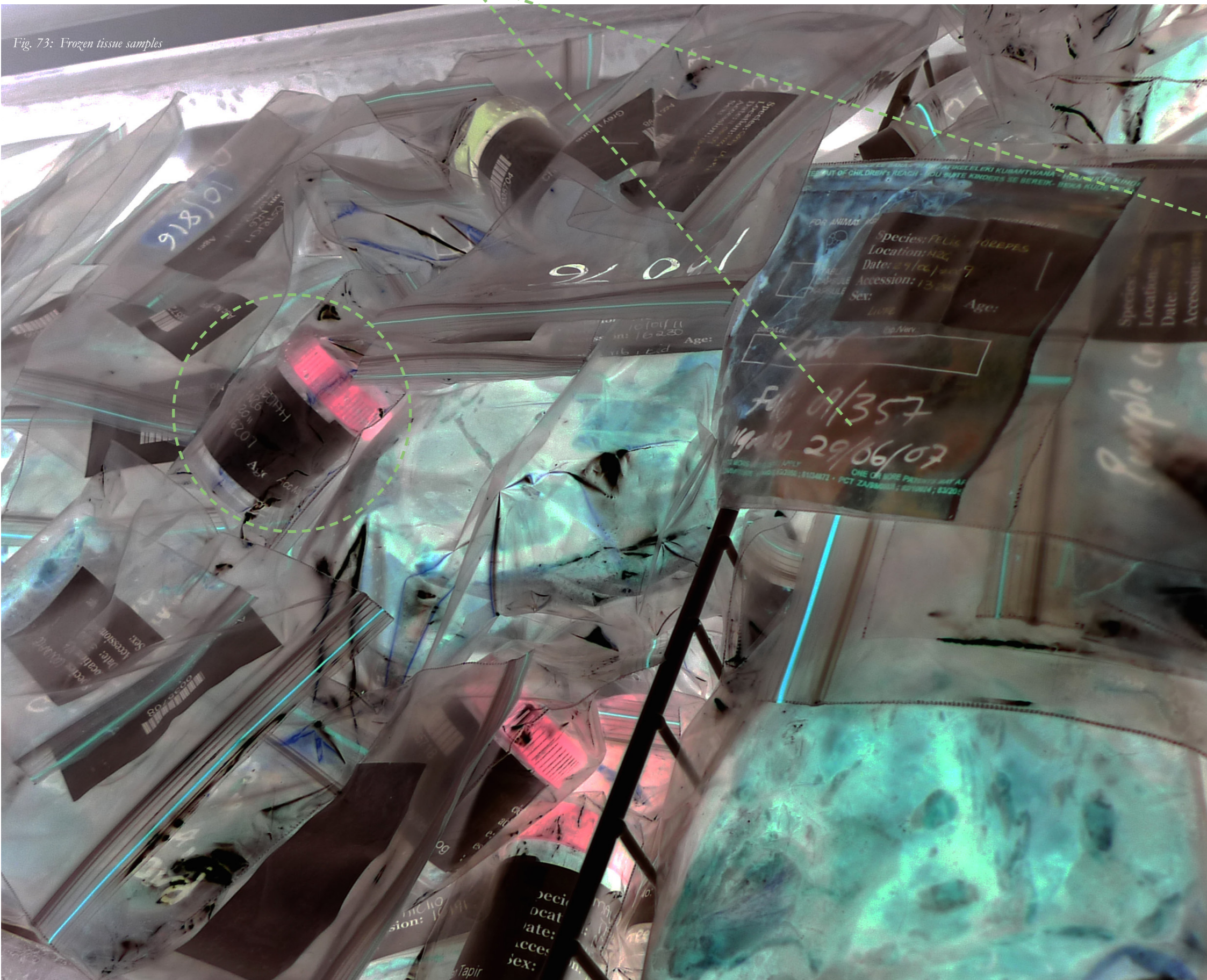
Fig. 67: 'Texere': a visual poem by Willem Boshoff



Fig. 68: **WORLD-WIDE ZOO NETWORK**

Samples are carefully labelled and barcoded into an archive, there is a definite order (other than in the overflowing freezers).

The DNA of specimens kept at room temperature is still usable if not stored in ethanol as it has been in the past.



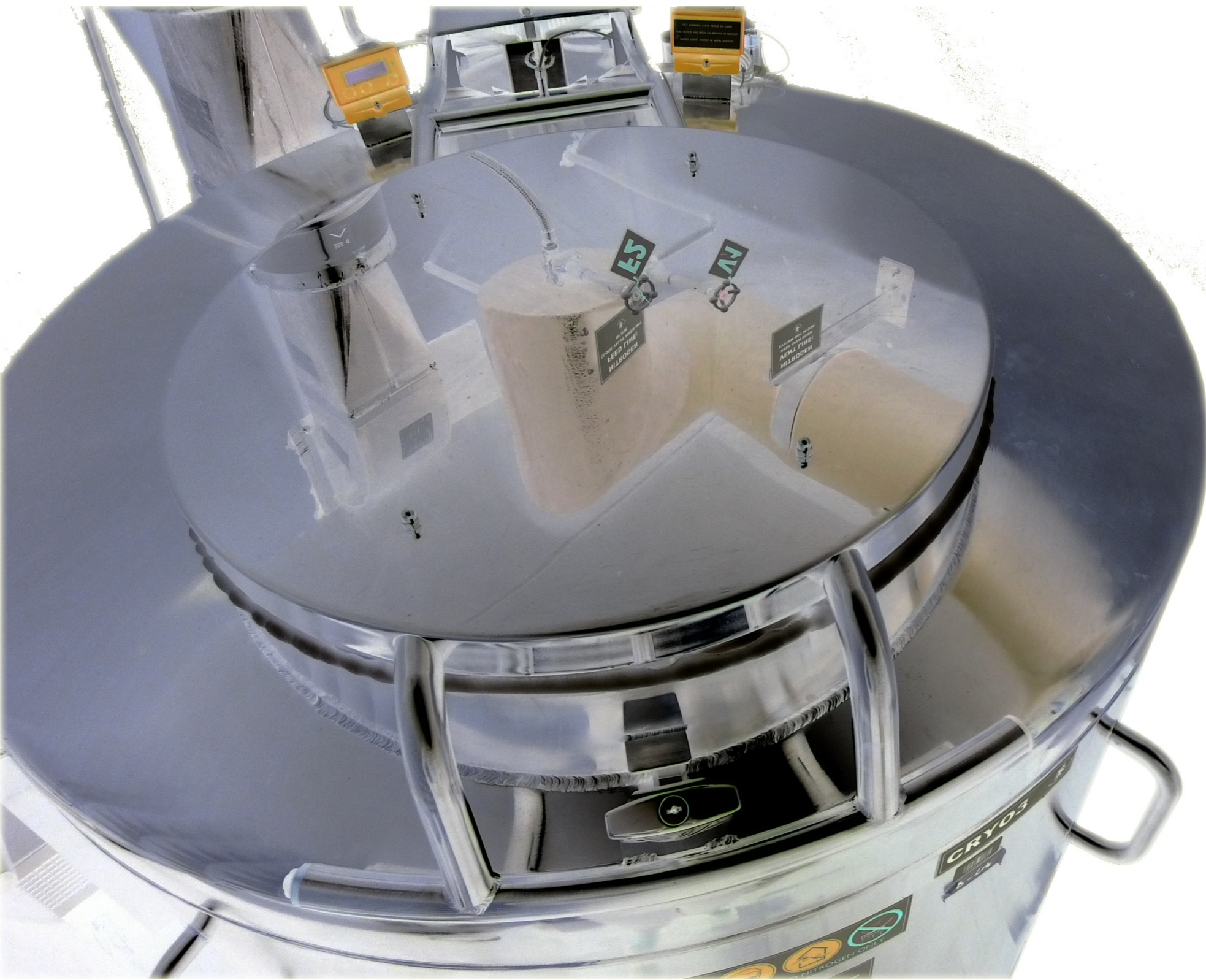
Frozen tissue samples are kept in sealed packages and amassed into freezers to be thawed out for investigations later.

Specimens stored in dmsol (solvent-derived metal oxides) salt solution retain their DNA composition by absorbing the preservative- this accounts for a distortion in anatomy.

Fig. 73: Frozen tissue samples

Fig. 74: Field - trip (room temperature storage) wet samples

Fig. 75: Nitrogen Storage tank for living tissue samples



ZEOTROPE

Tissue banking is currently stored exclusively for research and breeding although there is the opportunity for public display. The limitations preventing public accessibility are that the temperatures, which are mostly below freezing, are kept constant. The samples must be maintained sterile, and are often not legible to the naked eye due to scale and in the case of stem cells, due to the required stainless steel storage tanks. These limitations can be resolved into exhibition opportunities.

Confusion of what fits together, and clutching at straws is inevitable when looking at animals on macroscopic and microscopic scales.

The problem of reality and reflection, as defined by Plato in his allegorical cave, is re-established when we consider the visual obstacles of tissue bank specimens. One could use the stainless steel storage tank as a reflection device, thereby creating a zoetrope for anamorphic projection. The audience views two different images of the same subject in the same field of view: the image projected on the table (the original 'real' image, but distorted and therefore 'false') and the image corrected by the cylindrical mirror (the undistorted 'true' image, but actually a reflected optical illusion and therefore 'false'). The viewer must comprehend and centralize the pair of images of inverted meaning to construct a comprehensible imagined image.

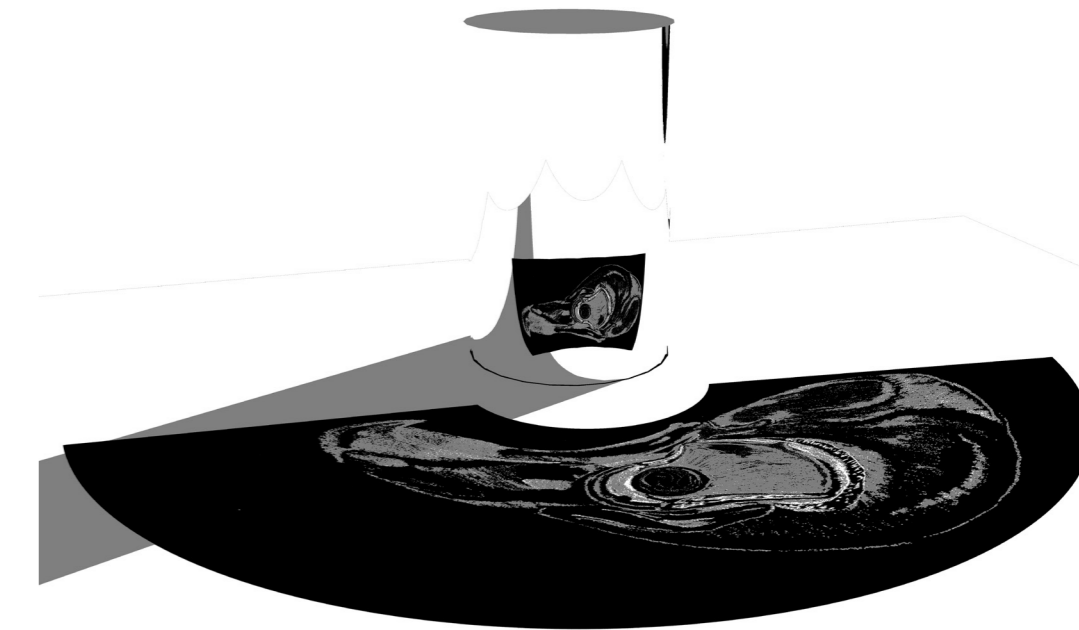


Fig. 76: Zoetrope Experiment

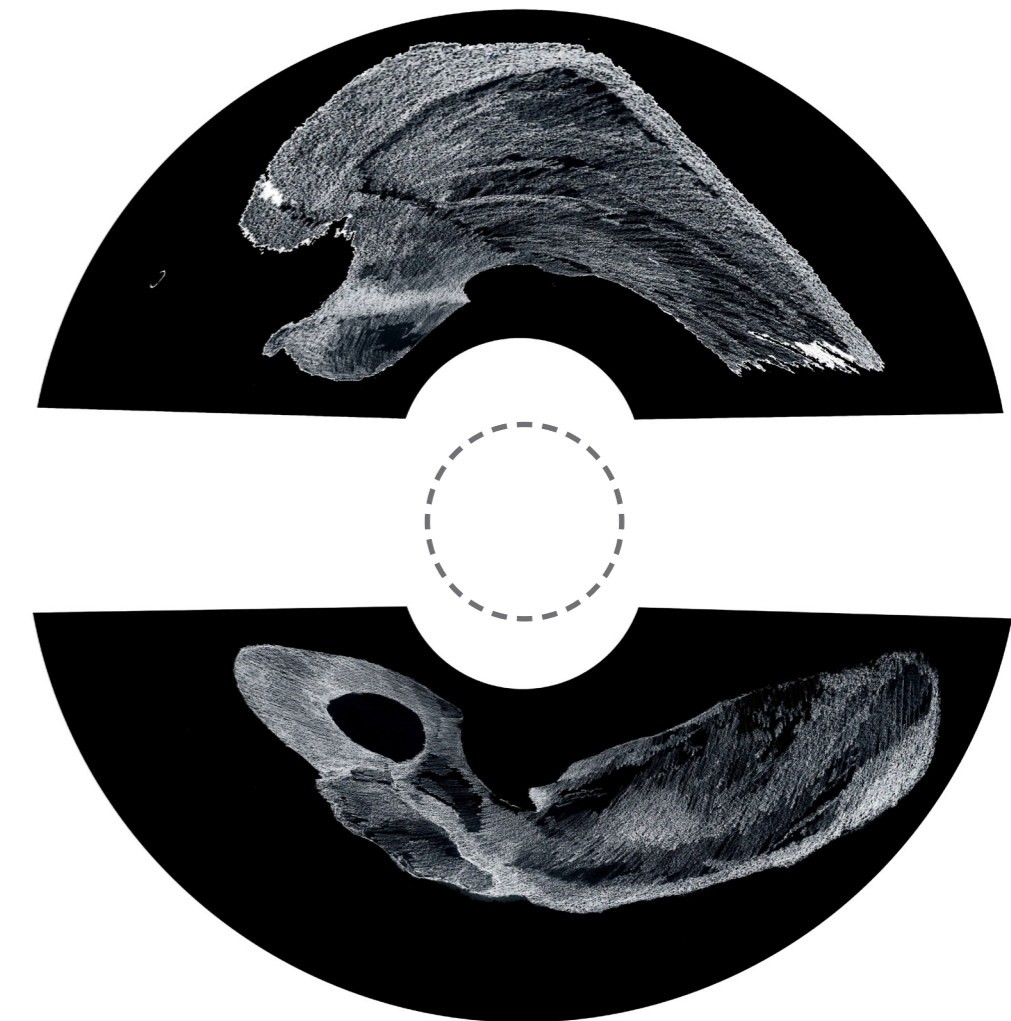


Fig. 77: Zoetrope experiment using hip bone sketch- place a reflective cylinder in the centre to generate a proportionate rendering

CONCLUSION

The manmade constructs of diorama, zoo, and nature reserve organise nature in an attempt to get closer to understanding it. The dwindling numbers of individuals and whole species of animals and plants is evidence that these current attempts are inadequate. It appears that nature abhors the straight lines into which we attempt to rationalise landscape and species. Our disconnection from nature is therefore constantly reinstated not only symbolically, but also visually. Through assessing the outcomes of the systems currently employed to preserve and interact with animals, I feel that there are issues that need resolving in all three typologies.

It is unavoidable that the growing human population will collide with nature. Since nature is always mobile, no static or rigid construct is the solution. Instead, human logic must find a way of reacting to and working with the ebb and flow of the natural order.

The removal of the 120km fence between Mozambique and the Kruger National Park has begun. This reopens the ancient elephant and other animal migration routes and is undeniably a step forward in relieving the plight of species' extinction. The formation of the Great Limpopo Transfontier Park will hopefully, eventually connect nature reserves of South Africa, Mozambique and Zimbabwe into a 35 000 sq kilometre area. However, the spatial requirements necessary to support migration may be problematic in the future. The urban typologies of zoological gardens and natural history museums are unavoidably bound and isolated spatially. Relocating these constructs into the natural order is therefore bound to their close integration with nature reserves and with one another as a transfer network of animal information.

While it is necessary to optimise current constructs as monuments to already extinct and vulnerable species, it is also essential that humans create a backup system: a cloned catalogue that will enable the undoing of the disappearance of species.

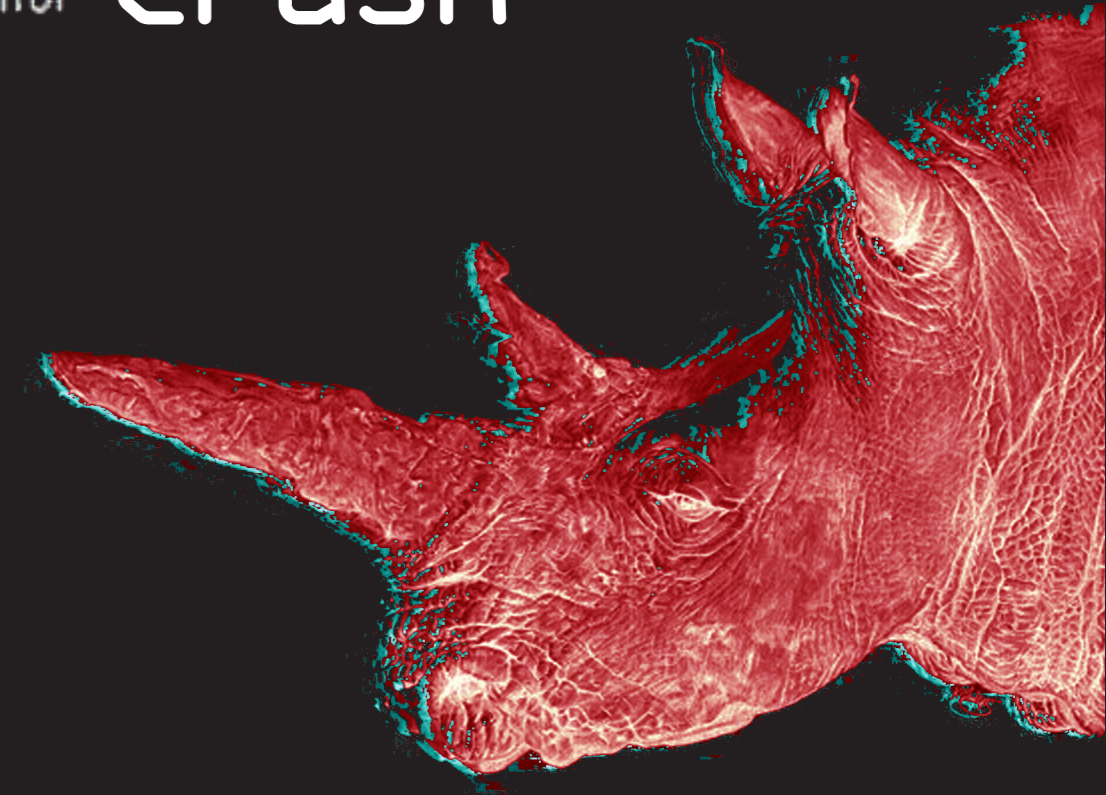


Fig. 78: Backup system

