THE EXPLODED BOOK

a disarticulation of visual knowledge systems within sites of natural history display

FRITHA LANGERMAN

Thesis submitted for the degree of Doctor of Philosophy
at the Michaelis School of Fine Art

University of Cape Town
August 2013

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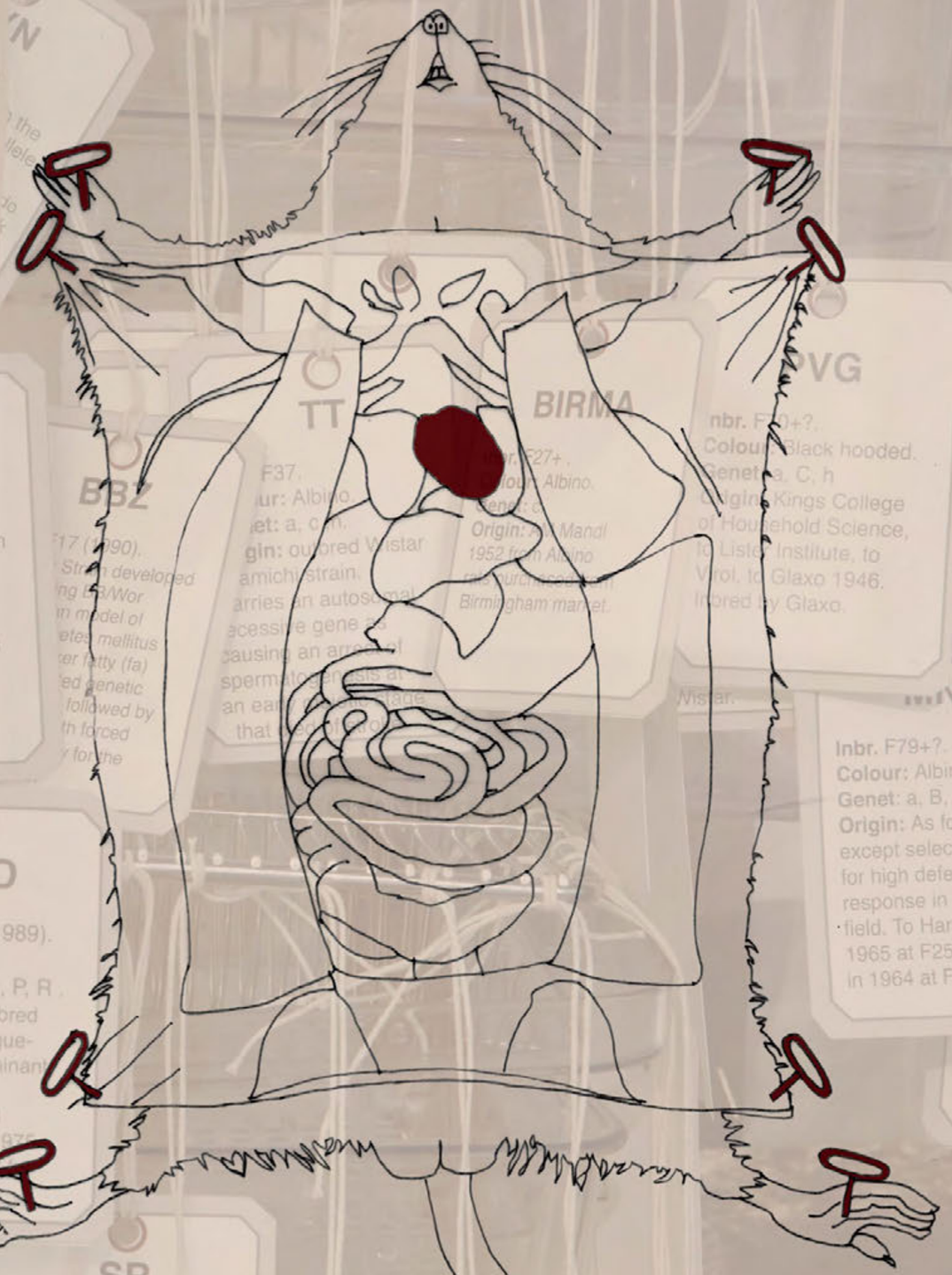

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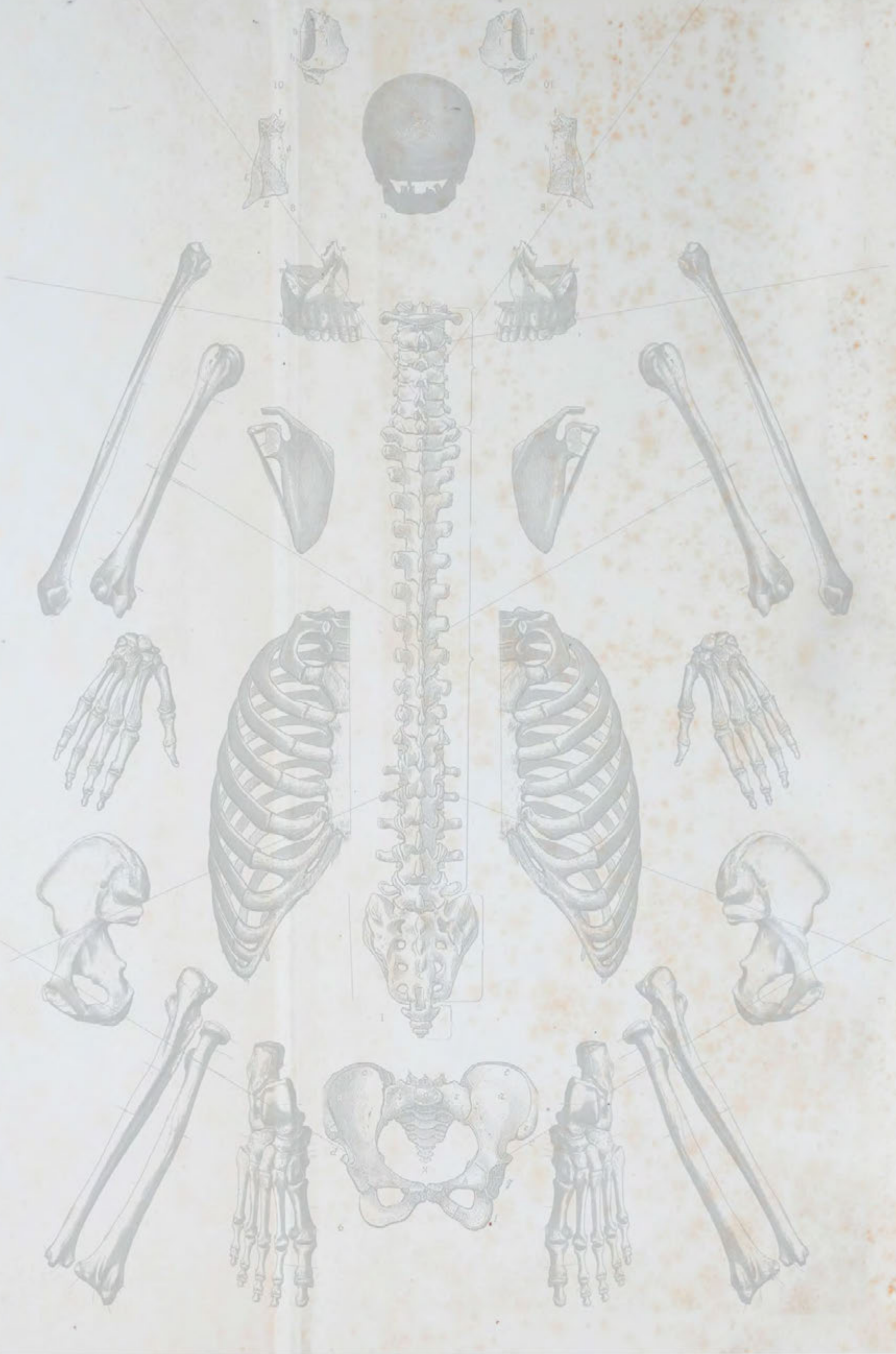

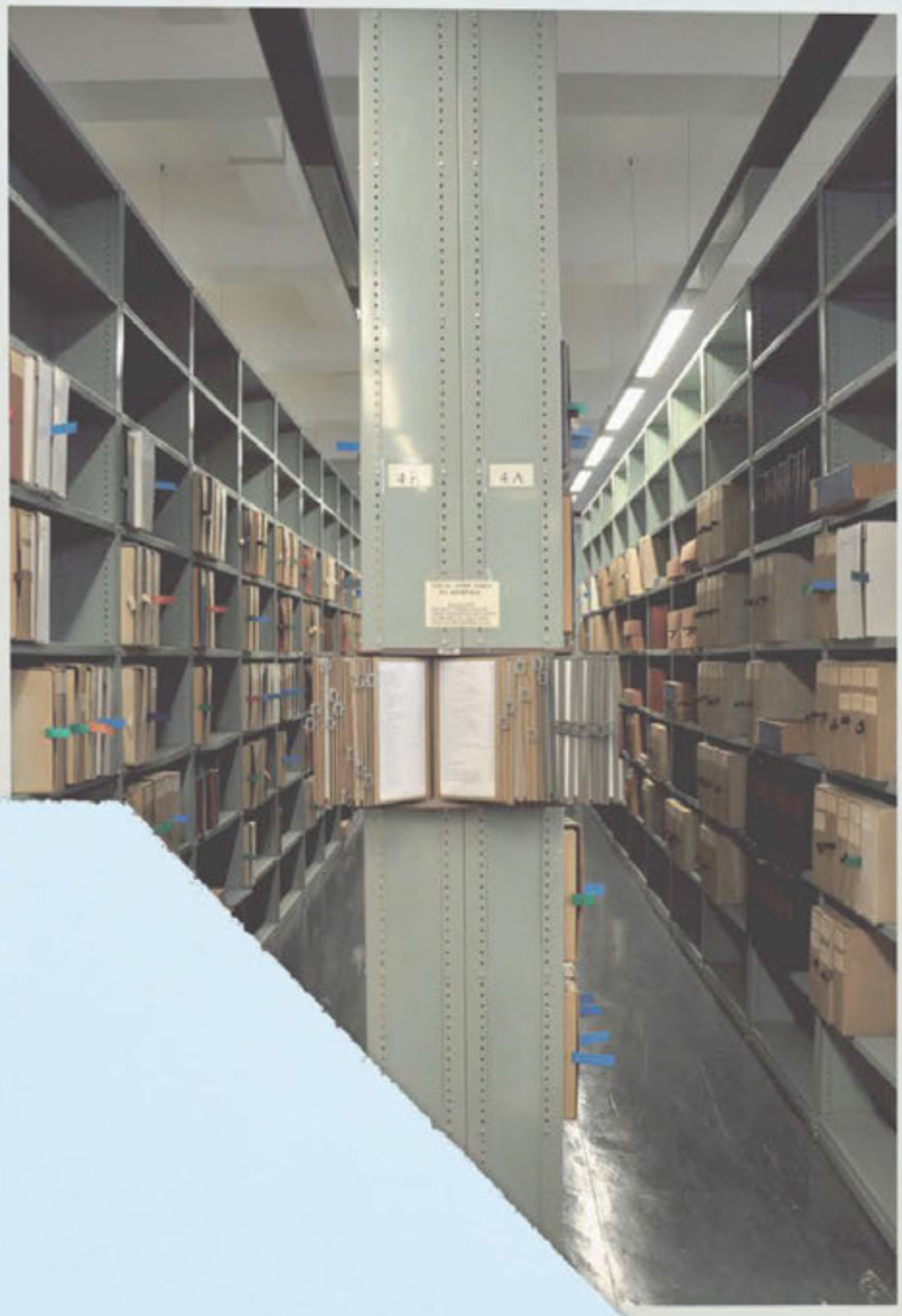

A first type of book is the root book. The tree is already the image of the world, or the root the image of the world tree … The book imitates the world. The law of the book is the law of reflection, the one that becomes two.

(Deleuze & Guattari, 1987:5)

Library, KwaZulu-Natal Museum

CONTENTS


of the past

ABSTRACT

This thesis examines the way display in museums of natural history is constrained by progressive, hierarchical systems. Despite alternative web-like iconographies that have been available for many years, the museum has remained captive to a representation of speciation informed by the 'tree of life'. This bifurcating organisation is discussed as representing a divisive understanding of species.

The thesis argues that these hierarchies within museum display have been shaped by the form of the book and the Christian legacy of both the codex and of Genesis narratives – the garden and the wilderness. It suggests that the tree has been such a persuasive icon of genealogy that its adoption by Darwin as the dominant visual systematic of evolution was inevitable and that this choice and uptake is inseparable from its strength as a Christian symbol, in turn related to the sequential form of the book. Furthermore, it is argued that the Christian vocabulary within museums was strengthened by the physical conflation of the museum with the cathedral and the eighteenth and nineteenth-century view of taxonomy as an extension of God's work.

The study attempts to find ways to separate the dependence of the museum on the book and to 'explode' its linear form through a number of curatorial strategies. This is tested in the production and analysis of two exhibitions at the Iziko South African Museum, an institution that has not been able to respond to the crisis of representation of 'natural history' and that has struggled to find a way of displaying humans and animals together. The two exhibitions developed for this study, *Subtle thresholds* (2009–2010) and *R-A-T* (2012–2013) introduce overtly complex interconnections and organisation of visual material which interrupt the prevailing order of display. The argument is made that an insistently non-hierarchical representation of speciation resists the legacy of the Christian codex and, potentially, deflects and redirects the expectations of museum visitors.

Mammal gallery, Natural History Museum, London

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PREFACE

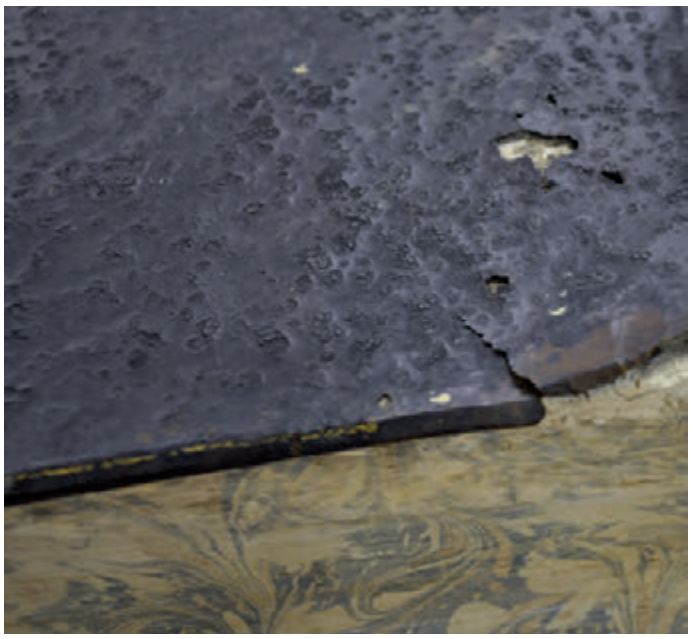
On the top shelf of the first aisle in the Hiddingh Hall Library at UCT, *The art of the book* [H002.09] nestles snugly against *Chaos theory* [H003.7]. The ineffable logic of Dewey Decimal Classification brings together bodies of knowledge in unexpected proximity, and in this instance the chance meeting of books with systems 'sensitive to initial conditions.' This sets the scene for this thesis, a study that identifies the form of the book and its Christian inheritance as a primary factor in the representation of speciation in museums as linear and hierarchical. Although my research over the past 20 years has been in the area of science and art, my scholarly interest in the representation of speciation (and its relationship to the book) started during the planning of my exhibition *Subtle thresholds* in 2009 – the year that celebrated both 200 years since Darwin's birth (12 February – a birth date shared with mine) and the 150-year-celebration of the publication of *On the origin of species*. Furthermore, my association with the Iziko South African Museum and its particular conflation of nature and culture inspired a project that looks at display as the meeting of these two paradigms.

Constructing this PhD in Fine Art, with its practical component, has not been without its challenges. Art is not a method of exactitudes and proofs, it is unpredictable and erratic. It follows threads, abandons them for new ones and finds points of intersection, weaving an irregular web of associations. The expectations of a PhD, containing hypothesis, methodology and conclusion, are not easy impositions. The initial proposal – to undermine the established iconography of the 'tree of life' within museum display by proposing a web-like method of curatorship – seemed achievable through practice. This has indeed been the case, but to discuss the work and its intentions as conclusive is antithetical to the process of making art. The visual relies on the sensory for affect – a place of subjectivity – and thus necessitates an open-endedness of interpretation and response that can only be determined over time. This subjectivity echoes Plato's assertion that truth cannot emerge through written form alone and that it is only through dialogue that texts become 'fertile' (Harrison, 2008:64). Thus the exhibitions set up the opportunity for discourse and the potential for new knowledge, but the latter can only be achieved through experience, by others, of the exhibitions themselves.

The title of this thesis – the exploded book – is intentionally ambiguous. On the one hand, the museum currently exists as the exploded book: a single form that is articulated and distributed in space like a Beauchene skull; and on the other, in terms of the arguments presented in this thesis, the constitution of the museum as a book is one that needs to be exploded, fragmented and forever separated from its parent form. The project proposes the representation of speciation as a web of connectivity, and ultimately the thesis too has absorbed this structure. Visual practice is associative and analogous: the text follows the logic of the exhibitions, and is neither entirely linear nor narrative. Connections are made rather in the manner of Renaissance curiosity cabinets: ideas brought into close proximity, demonstrating consiliences and similitudes. The chapters on the book, tree and garden are introductory, fragmented and dense, setting up nodes of connections throughout the document.

In looking at a presentation method that encourages entangled, web-like apprehension of information, the obvious approach would be to work within the digital realm. In both the document and the exhibitions, I have chosen to adopt the traditional forms associated with the book and display case and have sought subtle variants that require physical engagement: with pages, objects and the physical space of the museum. I have resisted the inclination to explode this thesis, to present its shards or to relocate the text onto another receptive form. The thesis is presented as a book. It is a narrative, constrained by the codex form and there has been no compulsion to disarticulate this. Any disarticulation is reserved for the exhibitions and the museum, where 'webness' has consequences for display. I have thus privileged the text here for two reasons. The one is in order to call into the presence of this project Conrad Gesner's Renaissance compendium, *Historiae animalium*, following its size, scale and layout, and the other is to recognise that threads of ideas are connected through a certain degree of sequential organisation. As with the reading of medieval manuscripts that allow for reflection, I am opening in the margins a space for the responsive reader.

left: Biodiversity Gallery, American Museum of Natural History, New York



INTRODUCTION

Shrouded in subfusc tones and interrupted by channels of light, the natural history museum is staged as a solemn performance – a tragedy in which characters are timelessly cast, performing their roles as generic species. This is a play with limited dialogue. Bound not only by their glass tombs, but also by their choreographed arrangement that best depicts the taxonomy of species, exhibits rarely extend beyond their limited conceptual frame. This view of the natural world is one of tidy containment in which everything has its place and exhibits tend to meet constituent expectation by reinforcing a sequential, progressive view of evolutionary development, as well as presenting species as distinct, defined entities.

It is possibly for this reason that most museums of natural history still rely on a mode of display that has remained largely unchanged for the last 150 years. Deferring to a system based on Linnaean taxonomy and an iconography based on the Darwinian tree schema of evolution, the experiential space of the museum is one of order, reliability, authority and discipline that has, in many ways, denied public participation in active learning. I would argue that this experience, particularly in South African museums, reinforces a linear reading of nature and that while physically traversing between cabinets, the viewer becomes complicit within a sequential articulation of speciation. Furthermore, this successive, serialised ordering of specimens evokes the reading of a book, a narrative revealed over time and constrained by the format of the page.

This is where this study begins. Museums of natural history[1] have become anachronisms, confounded within their own terms. 'Natural history' is both a practice and a concept: that of labelling, collecting, naming and, within that, an implied dominion over nature. The term is fraught as it signals a progression in time – a linearity or naturalisation of the past. There is a deep contradiction in these terms: rather than the study of nature being an empirical, objective endeavour, the very idea of nature is historicised and absorbed into a cultural discourse. While social history museums have, on the whole, responded to challenges of representation, museums of natural history have remained obdurate in their presentation of nature as untainted by cultural and ideological agendas. The gallery destined for my exhibition *Subtle thresholds* in 2009 was situated between the social history and natural history displays within the Iziko South African Museum, (ISAM), and as such seemed to draw attention to the uncomfortable relationship between these two areas within this institution. The taxonomies of display that divided collections in Cape Town, as with many museums around the world, between museums of natural history (animals and indigenous culture) and cultural history (European artefacts) were a painful controversy for many years: the collation of animals and indigenous peoples as the 'others' of dominant culture (Bal, 1992: 561). Although the social history collection is no longer housed within the ISAM and the old Cultural History Museum has been reshaped as the Slave Lodge presenting human rights exhibitions, the African cultures gallery remains largely unchanged since its opening in the 1970s. This gallery used to flow seamlessly into the world of water area until the bridging palaeontology displays were removed in 2003, creating a symbolically troubled and transitional space between two precincts of study. The whale well, installed in 1987 and the rock art display installed in 2003 both appeal to beauty and wonder in their methods of display, and in this way link nature and culture through aesthetics and artifice. Interestingly, the ISAM has used the empty gallery primarily for art and curated displays, starting with the *What is life? Art and the genome* competition in 2003, and including exhibitions of political t-shirts, photography and curated projects by Pippa Skotnes and myself. Possibly in this way they have identified the value of the mediating and interpretive role of art in reconciling these two distinct collections. Although controversy has surrounded the now closed San diorama and the representation of human remains, it struck me that the representation and politics of animal display has, in this museum, remained fairly uncontroversial – at least until the recent acceptance of the Peter Flack hunting trophy collection, discussed in Chapter 5. Extensive ethical regulations have been developed for the display of human materials, whereas similar policies for the representation of animals are limited to those of conservation. Perhaps this is because most museum literature has focused on the display of objects of culture, ignoring that taxidermied specimens are artefacts, representing particular histories and ideals. Thus, as the display of animal remains is as much a display of dominant cultural values as any other, I have elected to look at why the inheritance of linear and hierarchical Linnaean and Darwinian analogical systems have endured within contemporary museums, and ISAM particularly. I have decided not to focus on the politics of the display of social history in this museum, which has already received much attention (Davison, 1991; Skotnes, 2001; Legassick & Rassool, 2000; Goodnow, 2006), but rather to consider the natural history collection, which, in presenting species as discrete and passive, reveals a speciesist bias and anticipates a racialised taxonomy.

While some attention has been paid to the display of natural history, notably by Donna Haraway (1984) in her essay on the dioramas in the American Museum of Natural History and Mieke Bal (1992) in her analysis of the same space, museum studies have been biased towards cultural display. While it may be axiomatic that ordering and display result in a construction of meaning (Baxandall, 1991:34), this is made opaque, and somewhat occluded within discussion of natural history museums. Ivan Karp (1991:23) writes that the display of natural history is that which is not made by human intervention, and that it is only when human artefacts are introduced into these museums and nature is substituted for culture, that representational problems arise. My contention is

that objects from nature presented in museums cannot be disaggregated from the politics of presentation. It is a given that the history of museum display is a mirror of the ideological positions of particular moments or periods in time (Bennett, 1995; Pearce, 1996; Vergo, 1989; Hooper-Greenhill, 1992, 1995), and all periods of history are informed by epistemic or underlying conditions of truth particular to that period (Foucault, 2002). In the way that both Renaissance curiosity collections and colonial museums were a means of actualising power through object wealth and licensing the domination of the viewer over the object (Bennett, 1995 & 2004; Foucault, 2002; Hooper-Greenhill, 1992), the display of natural history cannot be separated from the ideological imperatives that drove and continue to drive collection and organisation of nature – and the place of humans within it. Museums of science and nature valorise authoritative classification and forms of knowledge that promote progress and mastery over the environment (Jardine et al., 1997; Jordanova, 1989a). In communicating this unstated agenda they make appeal to the senses of beauty, wonder, discovery and realism; what Mieke Bal (1992: 568) refers to as the powerful claim of realism to truth and what Donna Haraway identifies as a "rhetorical achievement crucial to the foundations of western science" (Haraway, 1984:36). The constructed narrative of exhibits is disguised and deflected by realism and beauty, providing a mediated illusion of authenticity. Through this the viewer is persuaded by the underlying denotation of human supremacy. While many international museums have over the past few decades begun to question their colonial inheritance and look at new ways of representing and displaying their collections, nowhere is the spectre of racialised display as strong as in South African museums. It is thus fitting and necessary that this study locates itself within ISAM, where the systematic categorisation of race has deep resonances. Racial discrimination and speciational hierarchy form part of a single continuum.

The role of museums in the formation of public knowledge and in the formation of its public has dominated much of the discipline of museum studies. Tony Bennett's (1995) "exhibitionary complex" introduced the creation of an audience constituted and managed by civic institutions, and the influence of evolutionary thought on practices of museums in the nineteenth century that chose to represent "all things and all peoples in their interactions through time" (Bennett, 2006:48). Building on Foucauldian ideas, and later added to by Eileen Hooper-Greenhill (1992), Bennett's disciplinary museum was able to position, direct and control its audience and their understanding of exhibits. Duncan Cameron, in 1972, identified the museum as occupying two distinct roles: the authoritative temple and the discursive and conversational forum. This typifies what I understand as the tension in museums between production and reception; between authority and subjectivity. The museum operates simultaneously as a disciplinary, ideological space and as a discursive space, where the participation of visitors within the spatial reading of museums activates them as viewers (Kirshenblatt-Gimblett, 1998). While I accept the role of the institution in the construction of an ideological position and the role of site in informing that construction,

Bird gallery, Kwazulu-Natal Museum


Primate skeletons, Horniman Museum, London

at the same time I assert that artists and visual art have a role to play in interrupting expectation within these contexts, and reshaping the often-passive interaction of the viewer within the museum. This passivity is often shaped by the authoritative voice and the illusion of objectivity conferred by the anonymous museum curator. In contrast, creative projects acknowledge the individual and in doing so, the legitimacy of subjectivity.

The intention behind this study has been to understand the formal and analogical references that construct the image of speciation within museums of natural history. The current 'crisis of representation' within museums has arisen precisely because the strong visual tropes which drove previous curatorial and display decisions can no longer interpret current theory. In a contemporary world filled with digital forms that are hypertextual and metatextual, fuelled by networks, hybridisation, complexity and systems theory, a need for a more appropriate analogy of speciation is inevitable and essential. That most museums have remained visually unreflective was emphasised for me by the slew of discussion around the 'tree of life' that surrounded the 2009 Year of Darwin. W. Ford Doolittle's article "Uprooting the tree of life" in *Scientific American* (2000) brought into the public domain the debate over the iconography of evolutionary schemas and suggested an alternative schema. Research in bio-informatics, which allows for the most intricate analysis of genomes, has resulted in the questioning of previous evolutionary, phylogenetic models, particularly the iconography of the Darwinian tree (Dagan & Martin, 2006:118). Lateral or horizontal gene transfer (LGT/HGT), observed particularly in microbes, suggests that species transfer genetic material between each other fairly regularly and that this is a fundamentally non-branching process, undermining the vertical de-/ascent, imagined by Darwin. HGT allows organisms to carry simultaneous attributions: a partial snake genome has been located within the cow genome, presumably transferred by the action of viruses (Lawton 2009:38). Although the phenotypical expression and cultural understanding of an individual species clearly remain intact, its chimerical genotype undermines the belief that species evolve determinately from a single point. What this does is dislodge the sanctity of coherent, independent entities, collapsing hierarchies and tipping humans from the apex of the 'tree'. A further challenge to human supremacy came from the Neanderthal Genome Project (2006), the findings of which suggest that the categorical line between brutish Neanderthal and thinking *Homo sapiens* may not be as defined as previously imagined.[2] In addition, the oppositional nature of taxonomy, built on similarities and difference is currently held to be contrary to speciation, which is both relational and contingent on space and time (Zimmer, 2008). This is a complex set of arguments that are part of a wide discourse. In popular science writing, this implied interconnectivity of life has been articulated by many authors, including Fritjof Capra and Richard Dawkins. Capra's book *The Web of Life* (1996) presents further evocations of his scholarship on systems theory and he sets up a stark contrast between Cartesian, reductive and mechanistic frameworks, and a web-like structure; the interconnectedness of which he applies to ecological, biological and social systems. Similarly, in contradicting a determinist conception of *Homo sapiens* as a privileged species, Dawkins draws attention to the "tyranny of the discontinuous mind"[3] emphasing that speciation is not neat or delineated, but is filled with intermediacy (Dawkins, 1993: 85). As Stephen Jay Gould did before him, he points to the dominance of the image of evolution as progressive and intentional, revealing the false delineation of the inevitability of the origin of 'man'. These debates are dealt with in more detail in Chapter 2 and 4.

The suggestion that a more appropriate visual model for evolution may be an interrelated network or web has implications for the interpretation of artefacts and visual knowledge bases. This study acknowledges that the field of biological science is embedded within cultural and political narratives and that the idea of what organisms and objects are emerges from a discursive process (Haraway, 2008; Latour, 1987, 1999). The culture of bio-medical and biological science is one of reading the visual. In communicating bodies of knowledge, science has often had to rely on images to carry complex ideas and it is these

visual analogies that hold persuasive power, occupying a central role in the formation of public perception of what things mean, as demonstrated by art historian Martin Kemp in his extensive writings on art, science and visualisation (Kemp, 2000; Kemp, 2012). Images are able to mask points of obscurity within theoretical explanation and provide a unified gloss – an image of integration and completion and an imagined synthesis. The 'tree of life' is one of the most pervasive analogies, representing both a linear view of species and one of implied ascendance. In arboreal iconography, each node divides irrevocably into finite objects, whereas in web or net iconography, objects are fluid, subject to reattribution and change. The reading of biomedical visual and material culture may be subjected to the same revisions. In doing so, strings of reference may be unravelled and objects and images become ambiguous and multi-referential.

My study has identified this potential shift as a fertile idea for rethinking methods of display within museums. Not only do commentators of science propose that the space between species may be permeable, but that evolution is a tangled, rather than strictly linear, chronological process. This of course echoes Darwin's description of the non-fixity of nature as a 'tangled bank' (Darwin, 1859:362), for while his thinking around visual analogies for evolution was complex, it is his 'tree of life' icon that found popular appeal and endurance. Much of my study has been to establish why this has been such an enduring icon and why, as I suggest, its uptake within museums has been so resolute. While it is commonly held that Darwin's theory of evolution closed the Cartesian separation between animals and humans and that the divisions between reason, intellect and carnal behaviour, became more closely aligned (Lippit, 2000), what I am suggesting in this thesis is that the chosen iconography of evolution, in its ascendant and binary form, does not acknowledge this continuity but accentuates divisions. My directed research into the history of the 'tree' as a symbol revealed that despite evolution challenging the foundations of Christian orthodoxy, the iconography of the tree is so deeply embedded within Christian mythology that the visualisation of speciation remains attached to previous established hierarchical divisions between species.

A central proposition of this thesis is that these hierarchies are compounded by what I argue is the dual presence of the book within museum display. What is considered the first book of 'natural history' was published in 1657, John Jonston's *Natural history of quadrupeds* and at this point there occurred what Foucault identifies as an epistemic shift (Foucault, 2002:140–141). Prior to this all books observing animals were 'histories' and included allegorical terms, whereas after this publication, 'history' became associated with 'natural'. In Jonston's book all animal semantics were removed and only anatomical and descriptive terms remained. The catalogue of the Tradescant curiosity collection, the *Musaeum Tradescantianum (*1656*),* commonly considered the first museum catalogue, was published contemporaneously and made distinctions between collections of *Naturall* and *Artificialls* items. However, although this collection (that was to become the Ashmolean Museum) was open to the public, it was more than a hundred years before both the first national museum – the British Museum – opened, and national museums began to develop methods of display of their collections. Many canonical natural history texts followed Jonston's book, including Comte de Buffon's *Histoire naturelle* (1749–1804) and Linnaeus' *Systemae naturae* (1735–1768) and all of these books suggested a structure for the natural world that could be ordered within the geometries of the page. What is argued within this thesis is that this binary format pre-empted the museum as a form of natural collection and that printed books provided a template, adopted by the museum, through which nature was classified and compared. It is suggested that this highly organised linearity has reinforced ideas of animals and humans as separate. This claim is made through systematic analyses of local and canonical museums of natural history where the reliance on the book is evident in its chronology, progressive narrative, sequential cases and discrete units of information: all modelled on a structure made available by the codex. The codex book was an early Christian development and its structure not only functional, but symbolic (see Chapter 1). This is one of many Christian inheritances in the visual appearance of the museum – the cathedral of nature.

The research is specifically concerned with why, despite the existence of alternative models, museums remain dependent on linear and hierarchical systems of

Hummingbird case, NHM London
overleaf: Mammal gallery, NHM, London

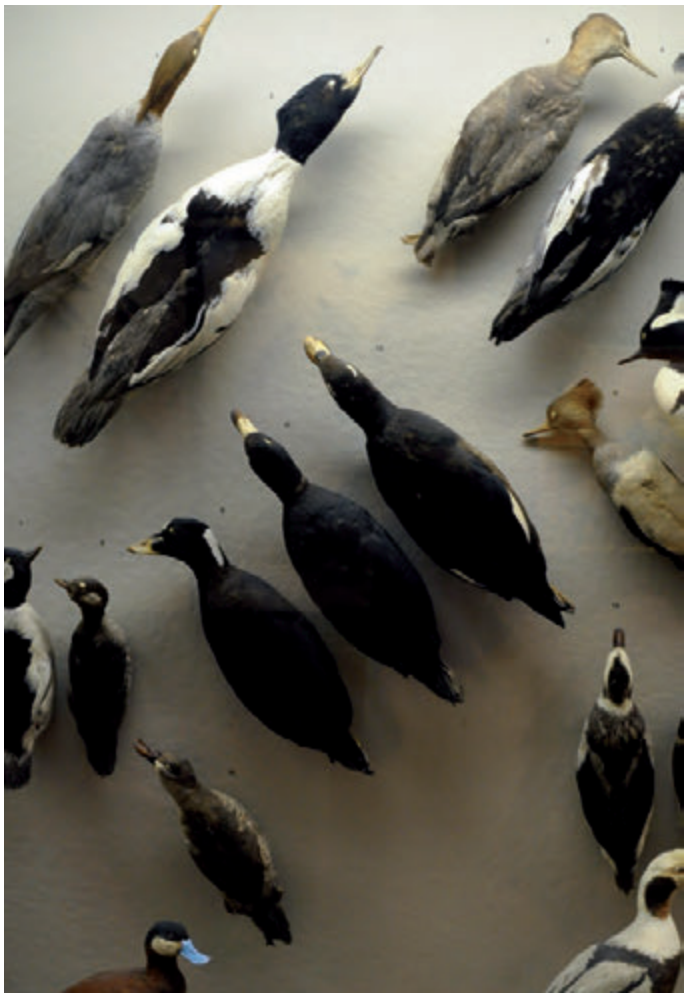
display. Initial lines of inquiry that I pursued were: what are the analogical models of speciation; how have they been circulated; how have they impacted on the display of natural history; how may new analogies provide for alternative methods of the display of visual material within museums; and lastly, how can visual art intersect and disarticulate existing visual analogies? During my research it emerged that if the legacy of the codex book is accountable for perpetuating a certain way of ordering the museum, then the visual practice needed to focus on a restructuring of the 'book-museum' – a disassembly of form. In accepting this direction, the thesis then asks, how can curatorial acts intersect and interrupt this linearity of the book – what I have termed the exploded book – and provide enmeshed, web-like ways of understanding information and speciation. The thesis concludes with the presentation of two exhibitions produced for this submission, *Subtle thresholds* (2009) and *R-A-T* (2012) which ask how the experiential and sensorial nature of creative practice can facilitate different kinds of understanding within a museum context and how acts of curatorship can be used to explain or reveal the cultural nature of systems of organisation that underpin natural history display. This is answered through practice rather than through textual analysis. Following Greenblatt (1991), I understand curatorship to be a discipline whereby images, objects and texts from several or disparate sources are assembled in a new space in such a way as to divert attention away from them as objects and images and onto both the cultural practices and biological phenomena that gave rise to them. Yet, paradoxically, I intend to draw individual attention to specimens within the museum and elevate them from the generic to the particular through the visual suggestion of life histories and cultural significance. Through the exploitation of the symbolic and narrative power of individual objects, images and collections, and the creation of visual disjunctures, an imaginative space is created that allows for new ways of understanding the world. Visual practice is reflexive and accommodates referencing, citation and quotation and my intention has been to use the visual as the primary discursive vehicle, to use the act of curatorship simultaneously to absorb and interrupt the patterns of display and reception of information within a museum context. This relies on working within established conventions of display, using particular visual keys, yet subtly shifting the manner in which the work is approached and how reading is enabled.

The acceptance of the PhD in Fine Art suggests, in its standard formulation, that new knowledge and insight can be gained through the visual and that through both the construction and interpretation of images and objects, new understanding can be produced. While I appreciate that the production of artefacts does not in any direct way correlate with what is understood by ‘new knowledge', what this particular study relies on is that images are persuasive and that complex and enduring ideas are dependent upon visual analogies or schematics. It accepts that the visual is able to represent and manipulate knowledges, and this being given, attempts to redirect those established systems in the presence of sensory experience through acts of curatorship.

The nature of this thesis (and much creative production) is that it employs a funnelling of information. By drawing on the insights of many disciplines, philosophies, theories and studies, it creates overlap and closes gaps while keeping the interpretation of these interactions mobile. Art practice involves an immersion in a body of knowledge and its literature, from which ideas are often intuitively selected in ways that best service the practical production. In this way insights are gained through a diverse range of sources, and readings are in turn refracted through an absorbed visual engagement. My interest in the book informs some of the strategic choices made in the construction of the exhibitions (the dispersed text and the interrupted narrative) and simultaneously these choices in the exhibitions have informed the way in which my writing about the book and museums has manifested itself. Collage and assemblage form a critical method in my practice and in many ways this is echoed in the approach to the text and sources – as evidenced in the eclectic bibliography. Assemblage in the Deleuzian sense is sympathetic in that it sets up objects and texts in relationships that shift their independent meanings – where ideas rely on contagion (Deleuze & Guattari, 1987). This approach to scholarship is, for me, an authentic position from which the creative practitioner can operate. Thus the reader and viewer of this thesis should anticipate finding answers that are not necessarily asked in the research questions: the practice escapes the proposal.

After 14 years of teaching at an art school, it is my contention that a PhD in Fine Art, if it is to reflect or value practice, has to adopt, by necessity, an alternative form of writing that is synchronous with practice: writing as visual form, and visual form as an extension of writing. The subject of the PhD in Fine Art has generated numerous books over the past ten years, including Sullivan (2005) and Daichendt (2012). James Elkins in his sustained intervention in the discussion of this Ph.D, writes of the administrative language “research” and “new knowledge” that has permeated the discussion of academic art practice. He writes that that the art object itself cannot easily produce new knowledge independently of text, and if this is to be made as a claim, more work needs to be done to understand its “radical” nature (Elkins, 2009:124–125). I have not attempted to do this. Curatorship is different from the making of autonomous objects and my curated exhibitions do not stand as new knowledge in themselves, but as deflections – charged with working against the established language of the museum and in doing so, redistributing and realigning sets of objects and images in ways that draw attention to alternative means of imagining speciation. Thus new understandings can only be tested as part of viewer engagement and the affect and effect of the exhibitions is something that can


Spanish ibex
Capra pyrenaica



Duck study skins, AMNH, New York
right: Peter Flack collection, ISAM, Cape Town

has been imagined in both the popular imagination and medical literature, presenting a complex visual network of the inter-relationships between zoological, human and microbial worlds. Primarily concerned with how the constructions of 'difference' and 'analogy' have been used to mediate the cultural understanding of pathology, it aimed to draw attention to some of the mythologies that have contributed to the location of disease as a state of otherness and separation: both physical and psychological. It worked specifically with binary oppositions common in the representational language of pathology: clean/ unclean, known/ alien, beautiful/ ugly and sought ways of neutralising these oppositions. The choice of infectious disease as subject matter for this project was significant as it offers a meeting point between species. Disease is not something discrete and of itself, but dependent on a relationship between a host and an organism in order to exist. It defies discrete boundaries between species undermining structural hierarchies. While animals can be subjugated, their diseases cannot.

R-A-T made the culture of natural history display within museums part of its subject. The rat, an urban creature abhorred within the anthropocentric city, has been excluded almost entirely from presentation in museums of natural history. This, despite the fact that rodents make up 40% of the total mammalian diversity, and that *Rattus* is the largest mammalian genus, consisting of more than 60 species. As an animal that is closely related to the development of human populations, the rat speaks as much to a cultural and social history as to a natural one. It is an icon of modernity: of disease, migration, stereotype, destruction, behavioural psychology, literature and pharmacology. The exhibition pointed to the schizophrenic human relationship with rats that is at once able to treasure the rat as a loved icon of children's literature and to allow extermination on a mass scale. Through this exhibition I arrived at the conclusion that it is not only the linear form (the 'book' and the 'tree') that traps museums in a Christian paradigm, but also the subject of the museum. The rat was selected as the theme for this exhibition because it is not the stuffed, immobile animal – the subject of study that translates to page-like exhibits – but a furtive skulker and scurrier that resists categorisation and fixity.

Artists are stereotypically understood to be poor commentators on their own work. I have deliberately chosen not be both the maker and the viewer of the exhibitions – situated on both sides of the discourse. Thus I have not provided detailed explanations of the exhibitions in this thesis (although the design of the 'catalogues' does stress a certain intention through the visual), but rather discussed strategies of display (Chapter 6) and presented the exhibitions as 'catalogues' at the end of this document. In this way, although the exhibitions cannot in themselves be seen as conclusive, I intend them to act as points of conclusion within the discussion, and to reflect upon and extend the arguments presented in textual form.

only be determined after the passage of time – sometimes after the exhibition has closed. The problem that I have identified as my research question is indeed a visual one and thus it is only fitting that it is addressed with a visual response. For me the problem with the PhD in Fine Art is not that practice is a form of inquiry or that the visual can be used to formulate an argument, but whether an argument made through the visual can ever be conclusive or verifiable. Art relies on a degree of incompletion. Elkins distinguishes between the making of and the studying of art and "the conceptual disjunction" that exists between the two (Elkins, 2009:129). If this is so, and I believe that it may well be, then practice can never be used as a measure of a hypothesis. My approach to this study has been to identify an area of concern, develop an attitude to that concern based on wide reading and looking and then to produce situated responses in the form of practice. This thesis makes its contribution in two forms: firstly it elucidates previously unrecognised relationships between the book and museum display; and secondly, in response, it makes two interventions into the museum that necessitate a renegotiation of that museum. The two exhibitions form bookends to this study. The first exhibition, *Subtle thresholds: the representational taxonomies of disease* (2009–2010), anticipated much of the reading for this thesis, whereas *R-A-T: an associative ordering* (2012–2013) was closely shaped by the particular concerns that emerged from the research. *Subtle thresholds* took as its subject infectious disease and the manner in which it

The range of sources for this project was necessarily broad, covering the history of the book, diagrammatic analogies and iconographies of speciation, a broad history of museums and curation and of course the particular subject areas taken up in both exhibitions. Not only did the research project require engagement with the discourses surrounding museum practice, but, as a creative intervention, it also needed to reflect on the manner in which artists have interrupted the language of curation and display. It is thus appropriate to refer to other forms of publications that have influenced this study – exhibitions, including my own. Some of my previous exhibitions, including *Curiosity CLXXV* (2004), *The knowledge chambers* (2007–2008) and my curated exhibitions at ISAM are referenced in an appendix. This is critical, as past production forms the context for current practice as well as offering a body of data on which to draw and test assumptions.

Chapters 1–4 provide the historical and theoretical contexts for this thesis. I begin with a description of Conrad Gesner's 1551 *Historiae animalium*, which I see as setting up certain expectations for the study: the relationship between image and book, animals as cultural creations of natural history, and books of natural history as portable museums. This late Renaissance book presented a composite cultural and natural understanding of animals – animals in complex social and associative relationships. I see this 'paper museum' as a model for the contemporary institution and the notion of the cultural animal is also picked up in my last exhibition, illustrated at the end of the thesis. This chapter looks at the relationship between paper publications and museums, suggesting that the museum is as much a book as the book is a museum. It draws on David Freedberg's (2002) research into the images of Federico Cesi and the Linceans and his discussion of the visualisation of modern natural history. With reference to this and Barbara Maria Stafford's (1996, 1998, 1999) work, I suggest that illustrations in books escape organisation and categorisation. The chapter discusses the form and development of the codex book and I argue that its hierachical and progressive structure has not only had impact on the understanding of natural history but also on its display. In building a conceptual framework for the 'exploded book' I have drawn on a range of scholars who treat the book as subject, and who elucidate how the form and structure of the book impact on the interpretation of its content. Jerome Rothenberg and Steven Clay (2000), Peter Stoicheff and Andrew Taylor (2004), Albert Manguel (1997), Roger Chartier (1989, 1994), Guglielmo Cavallo & Roger Chartier (1999) and Robert Darnton (2009) have had significant influence upon my thinking about the relationship between form and the circulation of ideas.

The iconography of the 'tree of life' is a rich and increasingly popular area of research following the 2009 year-of-Darwin. Chapter 2 provides a broad overview of the prevalence of this icon as a genealogical and biological analogy, and here I relied on scholars as diverse

as anthropologist Tim Ingold (2007), historian Arthur Lovejoy (1936), biologist John Archibald (2008) and Roger Cook's (1974) visual mythologies. The chapter addresses the dominance of arboreal iconography and the role that it has played in the interpretation of evolution as progressive and hierarchical (Gould, 1989), attributing this to a Christian inheritance. This theme is developed in Chapter 3, where I expand upon the prevalence of the biblical myths of Eden and Noah within museum display. Both of these narratives are reliant on thresholds of binary interior/ exterior spaces and it is suggested that the museum echoes these differences within display. This is done with particular reference to the Durban Museum of Science and the Muséum National d'Histoire Naturelle, Paris. This museum is also referred to in the following chapter that looks as instances of linearity within museum display and draws on the canonical American Museum of Natural History, the Natural History Museum, London and particular local examples. In a discussion of 'web' iconography within museums the chapter refers to the Deleuzian framework of the rhizome and assemblage (Deleuze and Guattari, 1987) and makes a case for web-like display with reference to a number of artists who have engaged with the museum experience and who work with display, value, authenticity, power and taxonomy, including Peter Greenaway, Fred Wilson and Mark Dion.

Chapter 5 introduces the particular case study of this thesis, the Iziko South African Museum. In relation to this I present my own experience as a printmaker and curator, my relationship to the Iziko South African Museum and the relevance that this has for insights gained throughout the study. It also discusses how the ISAM has been confounded by its own history and remained dominated by the linear structures suggested by the book, and goes on in Chapter 6 to discuss audience expectation and the potential of 'the exploded book' for the museum. My various strategies for display and their use in the exhibitions are also presented: immersion, decentralisation, reflection, labelling, encyclopaedism, staging, and empathy.

Finally, I present the two exhibitions as a visual catalogues. I have chosen not to provide finite explanations, limiting the text to lists and descriptions and where more evocative text is present it takes on the form of a label or timeline. The catalogues are visually dense. The exhibitions are the outcome of a deep engagement with a subject and the catalogues are a means of emulating the immersive experience of the exhibitions themselves. The exhibitions act to deflect attention away from the expected: finding pleasure when presented with unpleasant subject matter and unexpected juxtapositions providing delight: a provocation of the emotions. The two projects had different intentions. The first exhibition, *Subtle thresholds: the representational taxonomies of disease* (2009–2010), was developed at the outset of the project and was located within a single space, whereas the second exhibition, *R-A-T: an associative ordering* (2012–2013), was produced towards the end of the study and accumulated many of the ideas in the thesis more directly, particularly in its dispersion throughout the museum. The exhibitions co-opt in much of the iconography of the first four chapters: the book, the tree, Eden and the web and in this way act not only as the bookends for the thesis, but as the thread that connects its exploded content.

1 In the late nineteenth century a division between natural history and the new zoology and botany was established. Universities' biological laboratories focused on morphology and embryology, while museums became autonomous entities and the home of systematics (Nyhart, 1997).

2 The Neanderthal Genome Project (2006) analysed 4 billion Neanderthal base pairs and concluded that there was gene mixing between Neanderthals and anatomically modern humans and that there may have been interbreeding between species 37, 000 years ago. The gene flow was largely found in modern humans in Eurasia (Green, Krause, Briggs, et al. 2010:710).

3 This apparent contradiction in terms is explained by his complaint that too often the lineal links between humans and their ancestors are forgotten. The extinction of intermediate species allows for an amnesia that would otherwise make continuity between species clear. The discontinuous mind draws a hard line between species and allows humans to consider themselves at the pinnacle of development.

right and overleaf: Conrad Gesner, *Historiae animalium*, 1551

below: Biodiversity gallery, AMNH, New York

CHAPTER I
COVER TO COVER

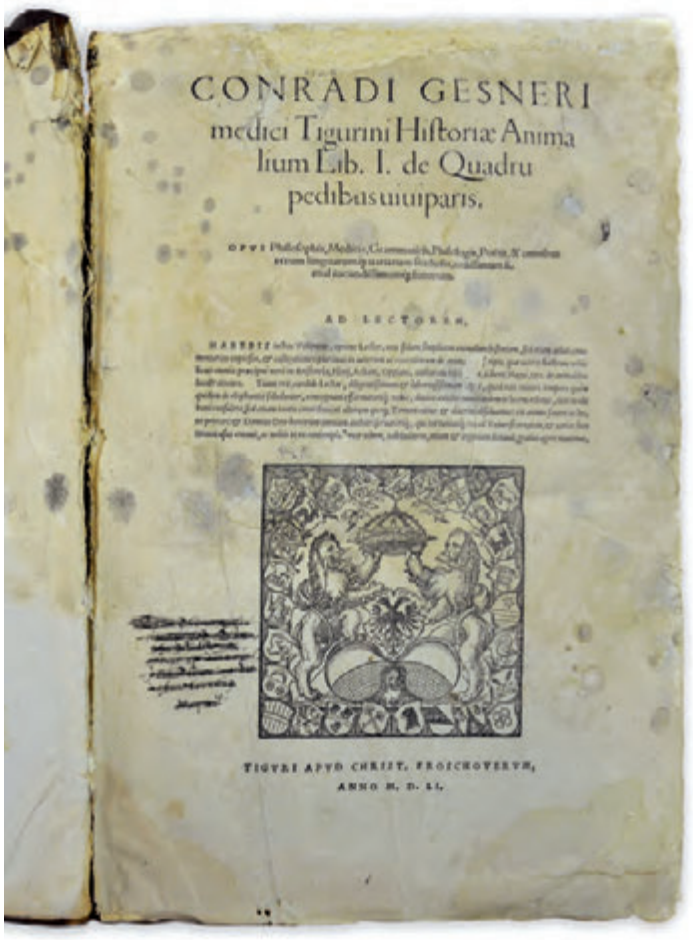
In this chapter I wish to focus on the impact of Christianity on the form of the book. I suggest that ancient notions of the hierarchy of being (the *scala naturae*) are resident within the structure of books of natural history and that the book has provided the instructive model on which display within museums has been based. This idea is complicated by the presence of images within books, resulting in questions of how the introduction of illustrated texts changed the reception of ideas that were previously presented solely as text, and the role of the form of the book in the transmission of scientific knowledge.

Isolated on a meranti library table, at rest on Perspex supports, is a book of 35 by 23 centimetres. Its full calfskin binding is giving way to age and, peeling from the spine, the ruptured, pockmarked skin exposes fragile leaves of paper. Five raised headbands gesture at an attempt to stitch and contain 20 years of study within more than 1,150 printed pages, which are now seeping from their fleshy receptacle. The gold tooling has been abraded and the marbling on the fore edge has faded with time. The open book reveals an emblematic frontispiece: two rampant, coward lions[1] support a crown and shield emblazoned with eagles, surrounded by further heraldry. Opposite this, on the endpaper, is pasted an *Ex Libris* bookplate of a classical male bust, which marks this as the property of Michael Scott. Below this is an auction entry for the book, "Lot 144. GESNER, [Conrad], *Historiae animalium Lib.I, de quadrupedibus viviparis.* £12."

Today, the book is the property of Stellenbosch University. Housed in the J.C. Gericke Library, it is a 1551 copy of Conrad Gesner's[2] widely read text on natural history, which was printed in Zurich, Switzerland, by the press of Christopher Froschauer. The two motifs of the bookplate and frontispiece introduce a Renaissance relationship between humans and animals. The classical male bust gazes at the heraldic lions, their codification signalling the value of symbolic meaning above the observational: species made visible by their proximity to culture. Gesner's book, published in four volumes – mammals, egg-laying animals, birds and marine animals – was the first encyclopaedic attempt to list and chronicle all known animals while at the same time include mythological creatures, such as the basilisk and monoceros (unicorn). It was also the first bibliography of natural history writing, Gesner having published the first independent bibliography, *Bibliotheca universalis*, in 1545, which alphabetically listed 1,800 authors with titles and content notes.[3]

Gesner's systematic vision is evident throughout the book, which contains an alphabetical index in Latin, Hebrew, Greek, Persian, Italian, Spanish, French, English, German and Albanian. It begins with an introduction that includes characteristic medieval marginalia on either side of the body text. On the verso pages, the printed headers, *Epistola* (letter), have been carefully restored with paper bandages on a number of pages. On the recto pages contact between paper and ink-charged metal has been compromised and the headers, *Nuncupatoria* (dedication), have slipped. The description of animals begins with *De Alce* – the elk – and makes its way through the quadrupeds, ending after page 1104 with *Additiones* and *Castigationes*. The book includes animals from the new world, exhibiting the first image of a guinea pig and possum in the latter *Paralipomena* section of the book, which is concerned with those things previously omitted. On page 829 is the first description of the brown rat, *Rattus norvegicus*, and the section on *mus* reads, "*de maiore domestic mure quem vulgo rattum vocant*" of a domestic mouse, which is commonly called *Rattus*.

The book is a hybrid of scholarship and imagination. Drawing on the tradition of classical texts by Pliny, Aristotle and Galen,[4] which approached natural history through descriptive text rather than illustrated observation, it also alludes to the symbolism of the medieval bestiary and includes the first naturalistic observations of animals, although the seemingly detailed observations are fairly generic and not particular to specific species. Gesner's texts on various animals are wide ranging, including myth, legend, epithets, metaphors, contemporary observations by naturalists and anecdotal notes.[5] The interwoven facts and fictions provide a rich cultural biography of each animal as almost a third of his studies are devoted to the literary and allegorical. This reinforces the significance of the symbolic in the Renaissance understanding of natural history, which is supported by the contemporaneous publications, *Adages*, Desiderius Erasmus's 1500 publication containing 4,000 proverbs, and Andrea


CONRADI GESNERI
medici Tigurini Hiſtoriæ Anima
lium Lib. I. de Quadru
pedibus uiuiparis.

AD LECTOREM.

TIGVRI APVD CHRIST. FROSCHOVERVM,
ANNO M. D. LI.

ram significat: uerum muribus istis nihil cum uipera commune esse, sed cum echino tantũ spinas acu
tas, Aristotelis & Plinij uerbis facile obtinetur. In Aegyto audio bipedes mures maxima magnitu
dine esse, & prioribus pedibus tanquam manibus uti, eosdemq; rectos duobus pedibus nitentes gra
di: cum autem insequentibus urgentur, salire, Aelianus ex Theophrasto. ¶ Sunt & alij in Aeg
gypto mures, qui in agros & messes grassantur: De quibus Aelianus, Primũ (inquit) ut in Aegypto
pluit, perparuulis guttis mures nasci solent, qui longe lateq; totis aruis uagantes, maxima calamitate
ex spicarum circumrosione & succisione segetes afficiunt, & manipulorum aceruos uastantes, ma
gnum Aegyptijs negotium exhibent: eo fit, ut ij insidias eis conentur muscipulis tendere, et sepimen
tis repellere, & fossis ac incensionibus arcere: sed mures ut minime ad muscipulas accedunt, sic cum
sint ad saliendum apti, & sepes transeendunt, & fossas transiliũt. Aegyptij uero de spe & conatu de
pulsi, omni machinatione insidiarum, tanquam parum efficaci relicta, se ad suppliciter deprecãdam
à Deo calamitatem uertunt. Mures diuinæ iræ metu, in montem quempiam aciei instructione ordi
nem quadrangulum conseruantes discedunt: horum omnium natu minimi primo in ordine consti
stunt, maximi uero extremum agmen ducunt, eos qui lassitudine deficiunt, urgent, ac seipsos segni
cogunt. Quod si ex itinere minimi natu laborantes subsistant, omnes quoq; consequentes, ut ei
more belli institutoq; positum, insistunt, & interquiescunt: Simulq; se, ut primi mouere cœperunt,
cæteri continuo omnes subsequuntur. Hoc idem qui Pontum incolunt mures illic agere dicuntur, Ar
ctenus Aelianus. Cæterum in Aegypto ex terra & imbre mures nasci, pluribus authorũ testimoniis
comprobatum est supra in historia murium agrestium.

¶ Africæ mures cum biberint moriuntur, Aristoteles: sed forte hoc uniuersale est omnibus mu
bus, ut legit Ephesius, Niphus. Vide supra in Mure E. ubi de uenenis ipsorum egimus. Pulmo
uitijs medentur & mures, maximè Africani, detracta cute in oleo & sale decocti, atq; in cibo sumpti.
Eadem res & purulentis uel cruentis excreationibus medetur, Plinius. Africæ murium dem
sunt genera: alij bipedes, alij duris erinaceorum pilis, alij lata facie ut mustelæ. Sed hos mures alij
renaicos uel Aegyptios uocant, ut superius retuli.

¶ Alpini muris historiam infra seperatim dabimus.

¶ In Arabia mures sunt multò soricibus (τ ἀρυραίων) auctiores, quibus crura priora uel palmi (τ
βαμῆς) mensura, posteriora ad primum digiti nodum habentur, (τὰ δ' ὀπίσθια ὅσον ἄχρι τ πρώτης τ
τ δακτύλων: intelligo tam breuia ut nihil eorum extra corpus emineat præterquam digiti cum
articulo, ut in auibus apodibus,) Aristoteles.

¶ Armeniorum uestem μυωπὴν fuisse dicunt, ex muribus contextam indigenis, aut eius animali
figura uariè ornatam, Cælius. Aggregator Plinium muris Armeni mentionem facere scribit li
29. mihi nihil tale apud Plinium occurrit: et forte murem Armenum alicubi pro mure araneo legit

¶ In Cappadocia genus muris nascitur, μυῆς appellatum, aliqui sciurum uocant, Varinus. Vi
in Glire A.

¶ De Caspijs muribus Aelianus scribens: Amyntas (inquit) in Mansionibus, quas sic inscripsit
Caspiam dicit infinitam murium multitudinem accedere, eosdemq; in perennibus fluuijs rapidos
cipitantibus intrepidè innatare, & caudas inter se mordicus tenentes (ut de lupis similiter fertur fa
mamentum habere, eoq; firmo uinculo fluuios transmittere. Cum autem in arationes transierint, f
getes succidunt, & in arbores ascendentes fructus edunt, & ramos frangunt: Quibus Caspij thora
sistere non queunt, hoc modo infestas eorum incursiones moliuntur ulcisci, ut nõ habentibus unq
natos ungues auibus quippiam noceant, quæ quidem ipsæ tantis gregibus ut nubes esse uideantur
eò aduolantes, mures sedibus pellunt, & suo proprio quodam naturæ munere à Caspijs famẽ depu
lunt, neq; magnitudine inferiores quàm Aegyptij ichneumones (intelligendum uidetur mures Ca
spios ichneumonum magnitudine esse:) Itemq; agrestes sunt & acerbi, & robore dentium non ulli
discerare ac deuorare possunt, quàm mures ferrum in Teredone Babyloniæ, quorum pelles mol
institores ad Persas uehunt, quibus uestes consuuntur, & corpus optime fouetur, Hæc Aelianus.

¶ Cyrenaici mures, uide superius in Aegyptijs.

¶ Indicus mus, uel mus Pharaonis, ut eruditi quidã recentiores scribũt, non alius est quàm ichneu
mo. Hospes quidam meus nuper Monaci in Bauaria se uidisse mihi narrabat murem peregrinũ,
quem Indicum appellarint qui demonstrabant, cauda oblonga & ore instar muris acuminato.

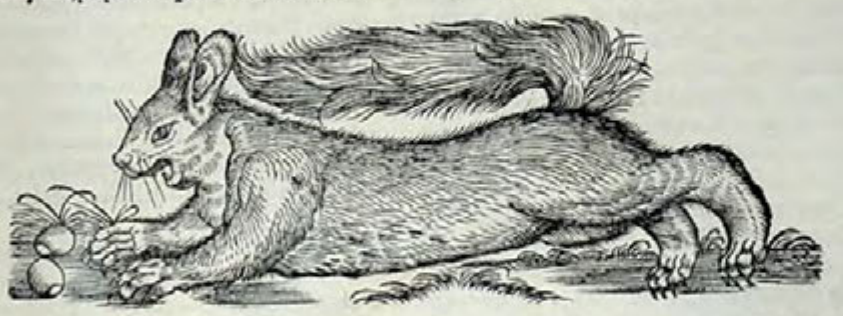
¶ De Norico mure id est citello, iam supra scripsi.

¶ Mures quosdã syluestres magnitudine muris & specie mustellina, colore ceu uirides, per ca
pos uagantes, & foramina subeuntes in Pannonia conspeximus, Fr. Massarius: à quo etiam Gic. Agr
cola mutuatus uidetur.

¶ De Ponticis & Venetis muribus in sequentibus priuatim tractabo.

DE PONTICO SEV VENETO MVRE, QVEM VVLGO VARIVM VOCANT.

Effigies huius muris à sciuro uulgari colore tantum differt. Apposuimus autem sciuri figuram communem, & hic & infrà in sciuro, propter illos qui colores forte adijcient: aliter enim semel posuisse satis erat.



Avs Ponticus Aristoteli & Plinio memoratus, nomen à Ponto habet, quòd à regionibus ad Septentrionem circa Pontum peteretur ad usum ornatumq; uestium. Græci quidem hodie uulgò etiam domesticum murem, ponticum ineptè uocant. Pontici mures (inquit Hermolaus in Corollario) alij unius coloris sunt, alij uarij. Ex hoc genere creduntur esse pelles, quibus muniri uestes contra frigora cœpere; candidos eorum armillinos, sordidum uulgus nominat: nam uarij parte tantum prona candicant. Venetis in dorso color, à quo dossuariæ pelles uocantur: quandoq; ferrugineus deterior priore, Hæc Hermolaus. Varios Isidorus & Albert. hoc genus murium à colore uocant, ut paulò post recitabo: Itali quidem etiamnum uulgò sic nominant, uare. Nostri **feeh** uel **veeh**, quasi Fennicum aut Venetum, à regionibus unde adferuntur; aliqui **Wereck**, quod nomẽ à uario formatum uideri potest. alij expresso etiam coloris nomine **grauwereck**, id est uarios canos uel cinereos: alij **pundten** uel **pundtmüß**, tanquam Ponticos mures; uel potius quoniam in fasciculos (quos nostri **bündt** uocant) colligati uenduntur: in singulos quinquaginta. pretium ferè drachmæ uiginti. Hermolaus in uerbis iam recitatis Venetum murem à uario, colore saltem distinguere uidetur: ego discrimen nescio: sed ita Venetus, aut (ut Ge. Agricola uocat) Fennicus hodie dici uidetur, ut olim Ponticus, nempe à regione cuiuscunq; coloris afferretur. Varius tamen, si totus sit albus, (uenter enim omnibus albicat) dici non potest. Venetos olim ad Vistulam sedisse, & Borussiæ gentem fuisse legimus: inde profectos Danubio traiecto occupasse Illyriam, &c. sunt qui eos nunc Sclauos seu Vinthos & Vinthones, **Wenden** dici uelint: ad sinum Venedicum habitant. Fennos Ptolemæus 3. 5. Sarmatiæ gentes dicit, sub Venedis habitantes. Volaterranus hos esse putat qui hodie Prutheni aut Lituani dicuntur. Mures Pontici albi sunt, & hyeme conduntur: hos ego existimauerim quos uulgò armellinos uocant, Volaterranus: Eiusdem sententiæ Ge. Agricola est. Distinctius Hermolaus, non enim simpliciter ut illi Ponticum murem armillinum interpretatur, sed album duntaxat. armillini enim dicti semper toti sunt albi, extrema tantum cauda excepta quæ nigra est. Sed hic etiam ad muris Pontici genus referendus mihi non uidetur: quum non aliud sit quàm mustela alba, quæ apud nos etiam hyeme albescit, & **hermelin** appellatur. Atqui mus Ponticus non mustelarum, sed murium generis est: imo sciurorum, uel ipse potius sciurus, nisi colore differret, ut ex sequentibus apparebit. Nec refert quod hyeme condi & dormire dicuntur Pontici mures, quod hermelini etiam nostri faciunt. Verisimile est enim non istos tantum mures, sed alia etiam murium genera, & similia parua animalia, ubi ingens frigus & perpetuæ illo tempore profundæq; niues uagari impediunt, latere propemodum omnia. Aut igitur mus Ponticus albus colore tantũ à cæteris differt, ut sit idem sciurus albus, etsi talem reperiri nondum audiuerim: aut si hermelinus noster est (uel ut Itali proferunt armellinus) ueterum & recentiorum ferè inscitia proditur, qui mustelam murem Ponticum fecerunt. Quoniam ut lepores alpini albescunt hyeme, æstate ad suum colorem redeunt: sic & mustelæ in regionibus montanis aut frigidis. Armillini uocantur mures alpium & Septentrionis, Hermolaus in Plinium. Plura uide in mustela B. Mus uarius, quem quidam glirem uocant, Albertus. Et alibi, Glis colore uarius est, in dorso griseus, in uentre albus: breuioris pili & tenerioris corij quàm animal quod uerè uarium uocatur. Sentit autem murem Ponticum uerè uarium uocari. Varius est bestiola de genere piroli (id est sciuri) paulò amplior quàm mustela: in arboribus habitat, & fœtificat. A re nomen habet, in uentre nanq; candidus est, in dorso colorem habet cinereum, elegantem atq; spectabilem, Isidorus & Albertus. Sciurus Fennicus non cauda, non figura & lineamentis totius corporis, non magnitudine, non moribus, sed solo colore differt à nostrate sciuro: nam in candido cinereus est, cum nostras aut rutilus sit aut niger: attamen in ea Sarmatiæ parte, quam hodie Poloniam uocamus, inuenitur cui rutilus color mistus cinereo. Vtriq; (hoc est tam Fennico quàm nostrati) duo inferiores dentes sunt lõgi: uterq; cum graditur, demissam caudam

Alciato's *Emblemata*, the first book of its kind combining mottos, images and epigrammatic poems (Ashworth, 1997:22). It is this culturally complex understanding of species with which I attempt to invigorate one of the exhibitions that make up this thesis submission, *R-A-T*.

Gesner's book is a marker of an attitude to natural history borrowed from antiquity. This perception of natural history as a study of human understanding, interaction and broad interpretation of the natural world, based on Pliny the Elder's *Naturalis historia* (77–79 AD), dominated as a genre for the next 100 years, with more observational and empirical publications not receiving as much attention (Ashworth, 1997:30). It was only in the Enlightenment that the now more familiar form of published natural history – description and anatomy, propelled by a development in optics – was to gain momentum. As natural history became more specialised as a discipline of collection, observation and classification it started to move outside literary and historical reference. A comparison can be made here with the shift from the similitudes and the rich cross-referencing of the Renaissance *wunderkammer* to the disciplined displays of the Enlightenment collections.[6] The encyclopaedic enterprises of the eighteenth century demanded a classificatory system that forsook the visual in favour of a geometric system that looked to difference and identity as ordering principles. Linnaeus's interest was in textual ordering and his binomial nomenclature in combination with the table *Regnum animale,* published in *Systema naturae* (1735), presented an enduring image of the animal kingdom divided textually into classes of progressive complexity.

While the museum of natural history has been both the public front and the repository of collections, the natural history book has been the interface at which collections have been anatomised, ordered and translated. From the initial Renaissance collections to the contemporary museum, the relationship between objects and paper publications has been closely connected.[7] Careful analysis and observation of study collections resulted in companion 'paper museums'[8] of books and folios. In some instances the book becomes the archive of the physical collection. With its portability it stands for the material archive, overriding the significance of the collection itself.[9] Illustrations become definitive, while the collection often remains impenetrable and inaccessible to the public beyond the boundaries of accession and interpretation by those initiated illustrators.

Georges Cuvier's *Le règne animal distribué d'après son organisation* (1817) provides an example of this. Based on specimens from the Muséum National d'Histoire Naturelle, Paris, it is valued for its taxonomic organisation of species and for its exacting illustrations. The specimens themselves are forgotten and the collection becomes paper-based. Indeed, Foucault identifies Cuvier as being responsible for transforming collections into textual readings and substituting anatomy with classification (Foucault, 2002:150). This is evident too in the display in the Roberts' Bird Gallery in the Ditsong National Museum of Natural History in Pretoria (previously the Transvaal Museum). Here ornithological specimens from the 50, 535-strong collection, used as reference for the Austin Roberts book, *Roberts' Birds of Southern Africa* (1940), are presented. The images themselves have become so pervasive that the collection itself becomes less potent. This is not dissimilar to the effect of the internet on access to content. Objects of reference become secondary to a mediated, dislocated image, constantly subject to reattribution and redistribution in the digital domain.

The form of the printed book changed attitudes to its content. The advent of printing and the development of movable type in the 1450s presented an unknown territory with endless possibilities of form. The conventions of the printed page and the composition of the text and images were initially inherited from the richness of medieval manuscripts, but as cost and efficiency began to be factored into production, new standard relations of print began to limit the possibilities of the book and introduce expectations as to the presentation of information. The book fixed images into a progressive, ordered hierarchy, and while this became the standard presentation of natural history, the large-scale atlas or folio print was also developed – individual, unbound annotated illustrations – and presented natural history in a more fluid, multilinear way. In contrast to the book, prints could be viewed independently and in any order, yet these were to remain exceptions to the way in which natural history was represented.

PAPER CABINETS[10]

The representation of nature in visual form is never neutral and can, to some extent, be explained by the metaphorical apprehension of nature as simultaneously a book (a text to be read) and a territory (a place to be conquered). As a book, nature is finite and can be organised, while as a territory, it is unknown. The extent of this mastery of nature through the visual was, for centuries, complicated by the relationship to divinity – ultimate mastery and creation – and the morality of reproducing nature. The inclusion of illustrations within books of natural history was a feature of the late Renaissance, which was co-incident with the reduced control of the church. Many of the classical texts that saw a revival as illuminated manuscripts in the thirteenth century were purely textual, and included Aristotle's *Historia animalium* (350 BC),[11] Isidore of Seville's seventh-century encyclopaedia *Etymologiae,*[12] Theophrastus's *Enquiry into plants* and *On the causes of plants* (c300 BC) and Pliny's *Naturalis historia* (AD 77) (one of the first classical manuscripts to be printed, in 1469). Illustrations here were limited to simple diagrams and the illuminations were incidental to the text and did not extend arguments or findings in visual form. In 1543 three significant scientific works that used observational illustration to support theory were published: Fuchs's *De historia stirpium commentarii insignes*, Copernicus's *De revolutionibus orbium coelestium* and Versalius's,

Lithograph of the Abyssinian hare in Théophile Lefebvre's *Voyage en Abyssinie*, 1839–1840

Woodcut of the black rat in Conrad Gesner's *Historiae animalium*, 1551

De fabrica. There remained, however, few examples of pictures of animals in books. Medieval bestiaries, which provided a compendium of the symbolic, largely Christian significance of animals, were, prior to Gesner's book, the only instances. The struggle between the textual and the visual for primacy of knowledge dissemination came to the fore during the sixteenth century. In his *The eye of the lynx* (2002), a study of the natural history drawings by Federico Cesi and his Lincean Academy, David Freedberg discusses this late Renaissance contribution to scholarship and the debate surrounding the usefulness of illustrations. The study and interpretation of classical texts was, at this time, seen as one way of studying nature that, in deferring to Galen's terms, was not distracted by images. This recalls Plato's objection to mimesis in the *Republic* books VII and X, in his claim that forms hold an ideal truth and that artists are mere imitators of that created by the gods: their work is based on appearance, not virtue. In the Renaissance understanding of natural forms, and working towards a method of ordering them, it was believed that, in accordance with Aristotle, forms should simultaneously reveal their similarity and difference. Illustrations were unable to perform this at once and were consequently believed insufficient and limited in their ability to translate complex ideas and systems. Additionally, it was believed that, as images presented singular views of objects, they were unable to reveal the 'essence' of what was depicted. Linnaeus disputed the value of images in the expression of biological systems. He believed images to distort and camouflage, and thus advocated a reduction to geometric essentials based on textual description – that by limiting the visual, structure would reveal true relationships.[13] However, his system of taxonomy based on defining characteristics – either present or not – while seemingly unforgiving, would result in ambiguous, partial and betwixt categories when put into practice (Foucault, 2002:147).

The Enlightenment's emphasis on the ordering of specimens championed the philosophy of 'truth-to-nature'. This was the manual elimination of the variability of nature and the anomalies of the specimen in favour of generality and fidelity to type. The inclusion of irrelevant details ran the risk of misclassification. This was challenged by nineteenth-century objectivity and the mechanised photographic image that reduced human intervention in documenting specimens (Daston & Galison, 2007). Although its veracity was not easily disputed, the photographic image was also a seemingly unmediated illustration of specimens.[14] This conflict between truth and objectivity remains a central issue in the history of representation in science. This points to the persistent problem in scientific illustration: the general over the particular – how individuality and the variability of nature is sacrificed in favour of the ideal form or typical specimen. In more contemporary terms, this pertains to the depiction of speciation within natural history museums: in order to satisfy the idea of a species occupying a specific unit of the 'tree of life'[15] the idealised

exemplar needs to be identified, both within the printed book and within the museum cabinet.

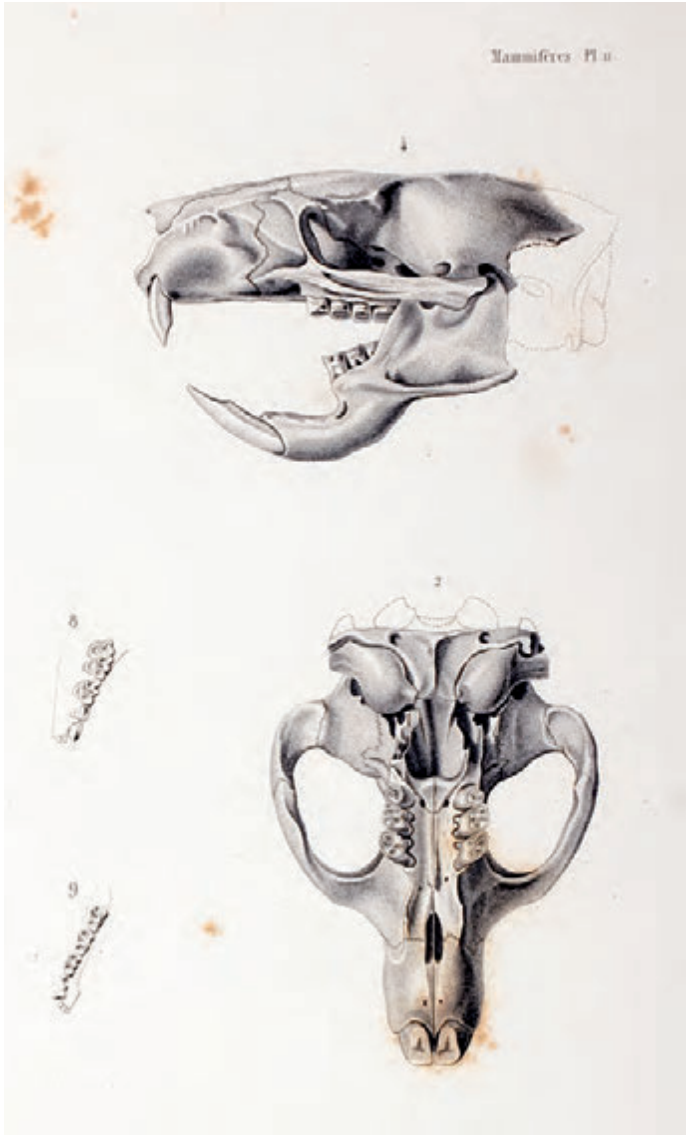
The drawings and paintings produced by the Linceans in the late 1500s, demonstrate a remarkable attempt at veracity and accurate representation of individual form. Produced only some 50 years after Gesner's publication, watercolours by Vincenzo Leonardi show detailed and particular anatomical renderings of plants and animals. All emblematic reference has been lost and the project is unapologetic in its aim to classify and order all human knowledge and catalogue all living things with as close a fidelity to nature as possible. The understanding of texture, colour, shape and animation is extraordinary in these works and, in many instances the cropped, organic compositions set them in a contemporary mould.[16] In his book, Freedberg presents these images in contrast to Mattioli's woodcuts from 1585 (Freedberg, 2002:211–215), where the formalised, rigid and diagrammatic representations sit in stark contrast to the watercolours that are not constrained by the format of the page. Perhaps this comparison has much to do with the difference between painting and printmaking and the inevitable codification that comes with translation from the former to the latter; however, it is apparent that the Lincean images emerged from a different set of intentions. Cesi contrived to collect and observe a full record of the natural world before drawing any theoretical conclusion, particularly fossils, fungi and plants not previously mentioned by Aristotle or his followers. This, according to Freedberg, resulted in a primary need to find an appropriate visual form to represent those specimens not found in antiquity.

Cesi and his group were the first to use a microscope (Galileo's) to observe specimens, decades before the publication of Robert Hooke's *Micrographia* of 1665, and were thus able to see detail previously undetected. However, this close observation was to present a new set of problems. On close inspection, specimens started to reveal structural internal patterns that made unexpected connections between species. Interiors were more similar than exteriors suggested, hinting at an organisation that challenged previous classificatory systems. There were also discrepancies between observed and known forms, as specimens displayed both particular and anomalous features. Presented with the dilemma of occluding or exaggerating characteristics, Cesi was to conclude that the image was doomed to failure. "Picture making, they began to understand, was fundamentally descriptive and synthetic; it stood at odds with order and analysis" (Freedberg, 2002:5).

The vain attempt to reproduce faithfully what was observed resulted in a categorisation of specimens that is of pertinence to my study. Although Cesi searched for a unique marker that would identify species as distinct and make for an easier classificatory system, close inspection produced less rather than more clarity. In his incomplete *Mirror of reason* he had a category for "things of doubtful nature, or doubtful species, or ambiguous things ... Two different natures joined in a single species ... species participating in two natures" (in Freedberg, 2002:183).[17] Barbara Stafford describes the eighteenth-century conundrum, for those wishing to classify, which followed the invention of the microscope. In minute examination organisms revealed similarities and differences as before unseen and some seemed to fall into "betwixt and between" categories. This assisted in breaking down what she terms the "hegemony that the integral human body held in the West and loosened the grip of anthropocentrism" (Stafford, 1998:230). Animalcules and infusoria became part of a "rococo vocabulary of decorative hybrids" (Stafford, 1998:233). This indeterminacy of species – the hybrid, partial, hermaphrodite – that does not easily conform to set classificatory systems can perhaps be extrapolated as a metaphor in approaching 'the web of life' as an icon. I wish to argue that uncertainty is a necessary position in order to redefine evolutionary iconography. Although species may be morphologically distinct, their phylogeny is more porous and less willing to conform to distinct boundaries, this in turn allowing for links to be made between species. Although this is largely at a genetic level, I believe that this 'fuzzy-edgedness' opens a space for a more complex understanding of species that is less confined by a narrow biological determination. Although this may appear tangential, I would suggest that Gesner's *Historiae animalium* operates within the iconography of 'webness' too, in that although animals are described discretely, their enmeshment within a cultural landscape opens their definition to a fluid interpretation of species. This will be expanded on in later chapters with references to my curated exhibitions.

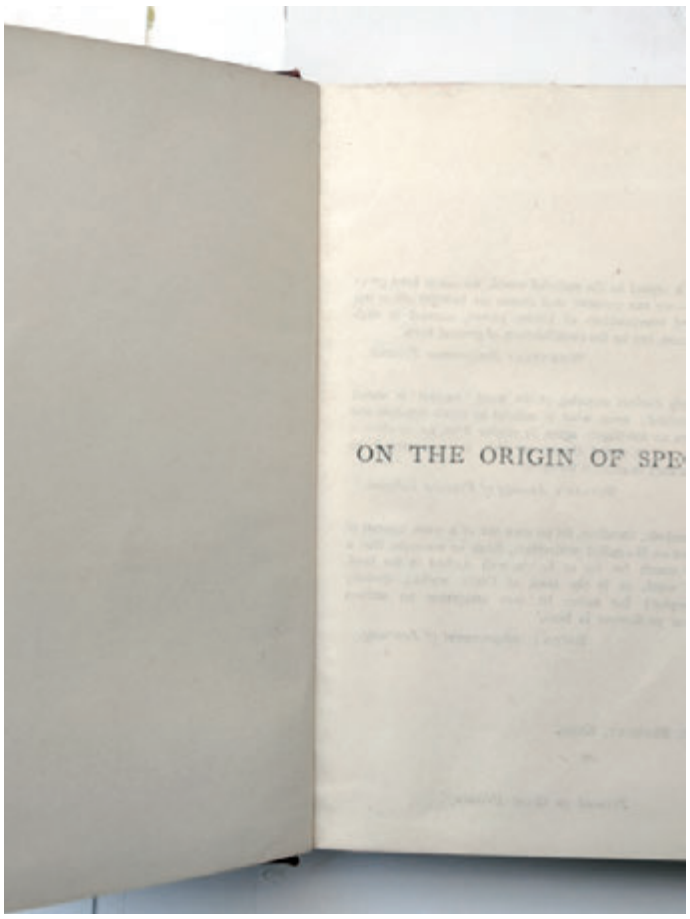
STRUCTURED PAGES

The fifteenth and sixteenth centuries saw a radical shift in the understanding of the world. Copernicus and Columbus enabled the notion of a constantly expanding terrain – one that brought finite systems into doubt and interrogated the foundations of what it meant to be human. At the moment when the social and natural world became symbolic territory to be divided and ordered, the printing of books was invented, becoming a complicit agent in the generation of a particular worldview. Print, as a medium, is always bound to an 'other' – recalling a state outside of itself, an output independent from the site of generation. It is a medium of oppositions: matrix and impression, original and reproduction, negative and positive, oil and water, depth and surface, and so, as a practice, exhibits a binary taxonomy that echoes Enlightenment symmetrical classificatory order – a system that recognised the symmetry of nature as evidence of God's power. As an innovation, print suggests a network of relationships between object and text, object and image, and image and text that are more nuanced than a binary relationship. The printed image is one of a chain of events: a multiple of a reproduction of an illustration of an interpretation of a specimen. This recalls Derrida's claim that "there is no



Lithograph of skull bones of the *Nyctoclepte dekan* (bamboo rat). Plate 11 from Auguste Valliant's *Voyage autour du monde: La Bonita,* (Mammiféres), 1836–1841

Personal copy of Darwin's *On the origin of species,* 1859, reprinted 1880



outside-text" (1976:158) in that the world is structured through texts and the only means of referring to this is through representations. That the object cannot escape its rendering, and is always constituted by deferral, is a contemporary consciousness that acknowledges that any object in a museum is only understood in relation to a host of previous images in books and other media.

The printed book divided the known world into sections of text and units of consecutive visual information – a conceptual shift that was largely driven by technological innovation. Technology is the means through which the knowledge of natural science is disseminated, and technology also impacts on its visualisation and articulation. It is in the translation of images to print, reproduced and standardised within sequential structures, that an understanding of nature is built and maintained. Nature is, by implication, produced by its visualisation through print technology.[18] The print in book form has been a determining feature in the perpetuation of linear models of knowing the world. Not only were ideas of classification, taxonomy and evolution communicated through the book, forming part of the reproduction and replication of those systems, but underlying linearities were supported by the codex structure, presenting a constrained and hierarchical ordering of material, not least of all linked to its origins in the church.

The development of the book as a material object, and the manner in which that object is received, is critical to any argument that suggests that form impacts on meaning. This point is made by Roger Chartier who notes that when writing becomes a book, attention needs to be paid to the role of the physicality of the object in its transmission. Text is written independently of the conception of the book as object, resulting in a space between text and object – the space in which meaning may be generated (Chartier, 1994:10). Chartier suggests that the aesthetics of reception have been overlooked and that the historicisation of the 'reader experience' has been based on literary conventions rather than the interrogation of objects.[19] If the form of the book is seen to constitute its readership and reception, it is fairly apparent that the relationship between the book and scientific authority is constructed through its design, organisation and illustrations, in proportion to the values of the time.

The codex book is both binary and sequential in its form, centrally stitched and held between two equal covers. The symmetry of the open book means that pages are viewed in relation to each other, while the inclusion of the frontispiece and colophon in more traditional books, literally sandwich the contents of the book between a visual explanatory narrative and a textual reflection. The conventions of the structure and divisions of the book imbue the book with a temporality, as, through a slow process of disclosure, its contents are revealed over time. Stoicheff and Taylor describe the book as a complex instrument that is "never fully

encountered except as an expectation or recollection or closed volume" able to "hold meaning in suspense" (Stoicheff & Taylor, 2004:3; Manguel, 2004:29). They draw attention to the significance of layout and orientation of the page in that its conventional verticality encourages a hierarchical arrangement of ideas, reinforcing a particular worldview. The vertical page and sequential organisation of information was to mirror a view of natural history that arranged species in groups of varying and increasing complexity and differentiated animals from humans.

While the production of books was under the control of the church, the institution exercised control over the hierarchy of information. A soon as the book was liberated from the confines of the church, the structure of the book had to provide the hierarchical structure for that information. The consecutive page, the structure of the block of text within margins and text that runs from line to line creates an expectation – a sense of development or evolution of a text or narrative. The continuity of lines of text, running along horizontal axes and broken only by pagination also recall an imagined transcription of a spoken language and reflects the orality of text. In this there is a sense of divine intervention – the spoken word of God transcribed. Natural history from the sixteenth to eighteenth centuries capitalised on this association – the role of natural history being to reflect God's work and creation – based on St Augustine's description of the two books of God: scripture and nature. While the link between the medieval symbolic world of nature became tenuous after the Reformation, taxonomy was seen as a non-symbolic way to reveal the order of God (Harrison, 2009:883). Printed books were to be the conduits of this order and the form of the text was thus critical in establishing the authority of science, linking it to the ultimate authority.

Early books written on vellum were individually unique as each sheet was separately pared, dried and treated for inscription. With the advent of printing, however, the production of paper began to be standardised. As natural history developed as a discipline, so did the format in which it was presented. Endless sheets of paper as part of a production schedule necessitated a standardised format that mirrored the form of production. The formal layout of a textual page is instrumental in communicating intellectual content and directing the act of reading. This has changed enormously throughout different periods and, interestingly, some parallels between medieval and contemporary design frameworks emerge.[20] The medieval manuscript constructed page layout as an organic form that in many ways reflects current layout or web design. There was logic to various sections of the text that were produced in different scales and scripts. The central text would be surrounded by commentary in margins with further commentary by scribes beyond that, leaving additional space for the reader to add marginalia (Manguel, 2004:30).[21] The text was thus increasingly fluid, self-reflexive and self-referential. The creation of the blank space in the text became a place of insertion of the reader – a space in which the reader could make connections and determine, to an extent, the interpretation of the book. Open layout allowed for open interpretation and this is revisited in the contemporary digital space of hypertext. Interestingly, as the discipline of natural history developed at the same time as print technology, it is framed between the medieval and the contemporary – the space of the non-responsive reader.

In the medieval manuscript, the margins were the place to establish a relationship between the reader and the text: the text was a territory to invade or to exclude. The margin was the space of the reader's authority, reversing centre and periphery. With standardised printing, the margin and open space had a different use. Chartier speaks of the "triumph of white over black" introduced by new spacing in eighteenth-century printing (Chartier, 1994:11). This allowed for increased white gaps on the page and the use of paragraphs to clarify arguments in a manner that discouraged the reader from adding comments, returning authority to the text or image itself. While in the early years of printing, piracy and plagiarism were rife within the reprinting of texts, and texts were not reliable,[22] by the eighteenth century printing came to be associated with the visual articulation of fixed ideas (Johns, 1998). The development of the printed book expanded access to texts and readership, yet it created a passive reader: a recipient of knowledge who deferred to the printed text as active authority.

Printing not only introduced a new formal language to the book, but its affordability resulted in a proliferation of printed material that accentuated a problem that arose during the production of medieval manuscripts. Books of natural philosophy were increasingly revised, annotated and reproduced and the response by printers

was to use internal referencing systems to formalise the selection and access within books themselves.[23] Medieval scholars were encouraged to keep a 'commonplace book' – a notebook with selected quotes and texts of personal significance[24] (Cavallo & Chartier, 1999:55) and the increased availability of books in the Renaissance made this an essential part of scholarly practice. The recognition of a need to develop a system to order and classify information resulted in the bibliography and here Gesner's work in bibliographies is again of significance. In addition, the design of the index, footnotes and contents pages within books became increasingly important and came to stand for the commonplace – the mnemonic that provided access to the dense text. Printing had introduced the need for a chronology of knowledge and a linearity of content and from this point the predictability of the structure of the progressive book could be said to determine the manner in which the contents were understood. The contents' structure became increasingly considered, culminating in examples such as French Enlightenment philosophers Denis Diderot and Jean le rond d'Alembert's tree-like organogram, the "System of human knowledge" used in their *Encyclopédie* (1751–1766). This divided knowledge into three branches: Memory (history), Reason (philosophy) and Imagination (poetry), and had as its reference the system of knowledge structured by Francis Bacon in the shape of a tree. D'Alembert was, however, aware that a better organisational system for the encyclopaedia would be in the form of a multidimensional map (Eco, 1984). Similarly, English encyclopaedist, Ephraim Chambers's contents in his *Cyclopaedia* (1728) made use of a schema based on a horizontally orientated Porphyrian tree. Classificatory systems devised for books thus developed in tandem with ideas for the classification of natural systems. Chambers explained in an advertisement for *Cyclopaedia* that, "The Character of this Work is to be a DICTIONARY, and a SYSTEM at the same time. It consists of an infinite Number of Articles, which may either be consider'd separately, as so many distinct *Parts* of Knowledge; or collectively, as constituting a *Body* thereof" (cited in Yeo, 2000:215).

Encyclopaedias (the word is derived from 'circle of knowledge') stressed connections between ideas over dominant structure and aimed to reveal the connection between subjects, again anticipating the hypertextual. Yet this was thwarted by alphabetisation – an arbitrary system of order that was seen to disrupt a 'natural' order to knowledge. The dictionary and encyclopaedia were to stand in place of a library for many in response to what was seen in the seventeenth and eighteenth centuries as a proliferation of books, which Chambers called a "reduction of the vast bulk of universal knowledge into a lesser compass" (cited by Yeo, 2000:212). The scope of the encyclopaedic project allowed for infinite complexity and philosophical reasoning, while the structure of the book form allowed for cross-referencing. For the first time, different sets of ideas could be viewed comparatively in a single form.

THE CHRISTIAN CODEX

The understanding of the book as an object that serves knowledge is given, yet a close reading of its etymological roots hint at a more complex relationship between knowledges. These roots are the Greek *biblia* – the plural of *biblion* – that became the 'book' of books and of sacred scriptures (*biblia sacra*), and *biblos* (the inner bark of papyrus), which became *bibliothêke* (house of papyrus), meaning wisdom of knowledge. The book was thus always positioned as an object straddling religion and learning.

The experience, and thus associative understanding, of early scroll books is vastly different from the codex. The early scroll presented what may appear as the ultimate in linear form: a continuous passage from one end to another, bound between rollers. In a scroll, only portions of the book are revealed at a time, promoting sequential access, with no imposed unit of text. The form of the rolled book meant that the content did not always coincide with the form, and sections of books frequently resided on different rolls in autonomous sections. The codex form (*caudex* is Latin for 'trunk of tree' or 'block of wood') is understood as a Roman invention developing from *lintei* (linen books)[25] and wooden tablets, which became the dominant form of book by the fourth century (Cavallo, 1999:85) . The codex form includes stitched and folded sheets of vellum or paper within a bound cover. In contrast to the scroll, which physically and conceptually separated textual units, the codex brought disparate units together, providing a uniformity and sense of the whole. The codex thus started to shape knowledge as a singular body of ideas rather than fragmentary and independent. In addition, the rectilinear page is a framing device that contains a single spatial unit and the structure of recto–verso pages of the codex sets up a binary opposition between pages.

Christianity quickly absorbed the form, particularly for the transcription of the New Testament. It serviced the poor Christian community as a more affordable method of book production as it required smaller sheets and both sides of the papyrus could be used. Biblical books are not strictly sequential and the codex form allowed for easy reference between books of the Bible (De Hamel, 2001:49). The conversion of Rome to Christianity solidified the book as the dominant vehicle of knowledge and the growth in the popularity of the codex coincided with the growth of Christianity.

The classical philosophy of Socrates and Plato held knowledge to reside in the psyche and promoted the orality of knowledge. Christianity, however, referenced a form of authority outside of the self and embedded knowledge within graphic representations and the form of the book. The book replaced the individual as the source of information and, at the same time, within a set of complex symbolism, the book became the ultimate authority – that of the Word of God. Mignolo makes the

significant point that when the word detached from the orator (physical body) it became attached to the silent voice of God (invisible body) (Mignolo 2000:362).

The idea of the book and the Word of God are highly interchangeable throughout the Bible.[26] Here two tropes relevant to my study come together – book and tree: the 'book of God', the 'book of life', the 'tree of life' and the 'tree of knowledge'. Although the transcription of the Word of God has Judaic origins, the integrated symbol of God as a book and as the Word emerges strongly in the New Testament where Jesus is conflated with the Word of God. In the Gospel of St John we read:

> In the beginning was the Word, and the Word was with God, and the Word was God. He was with God in the beginning. Through him all things were made; without him nothing was made that has been made. In him was life, and that life was the light of men . . . The Word became flesh and made his dwelling among us. (John 1:1–4, 14, KJV)

The Word of God is what creates and is spoken, but is also the written Word as presented in the Bible. God's Word becomes flesh in Jesus and the book – a conduit of both *logos* and *rhema*: the written and the spoken word. Jesus is present at the origin of the world with the Word – and is both the text and the book. To misquote Derrida, nothing exists outside the text.

At the conclusion to the Christian Bible, in Revelation 10:9–10, the book appears again:

> And I went unto the angel, and said unto him, 'Give me the little book.' And he said unto me, 'Take it, and eat it up; and it shall make thy belly bitter, but it shall be in thy mouth sweet as honey.'[27] And I took the little book out of the angel's hand, and ate it up; and it was in my mouth sweet as honey: and as soon as I had eaten it, my belly was bitter.(KJV)

In this act of eating, John assimilates the Word of God. It is also a physical act – dysphagia, or the inability to swallow.[28] The book is present at the beginning of time in Genesis and at the end of time in the book of Revelation. This suggests a binary, a finite event – human life as pages between two covers – between two points in the history of the world.

Christ is the Word made flesh – the physical manifest as a book. Skotnes (2005:6) reminds us of Christ as a book on a cross: "his back hung against the spine of the cross, his arms and legs the splayed pages on which the story of sacrifice and redemption is written in the blood of his wounds." Here the simultaneous symbolism of the book and of the 'tree is life' is recalled. Bibles and holy texts were literally the Word made flesh as the Torah is said to be copied by Moses onto a scroll made from the skin of a kosher calf and early Bibles etched text with caustic ink onto vellum made from calf, sheep or goatskin.[29]

Alejo Venegas, a professor of rhetoric in Spain in the 1540s, defined the book as "an ark of deposit in which, by means of essential information or things of figures, those things which belong to the information and clarity of understanding (*entendimiento*) are deposited." As arks books kept treasuries of knowledge – much of it spiritually sanctioned. Venegas also wrote of the 'Archetype Book' – the exemplar only to be read by angels, and the 'Metagraph Book' – to be read by humans. He continued the popular view that the book was the "expression of the divine world and container of all knowledge … God has expressed truth in book of nature and holy book – these are translated to characters which allow human books to communicate with God" (in Mignolo, 2000:351). This is the legacy of the Christian book – an intercession between spiritual and human realms, interpreting God's work.

The Bible was a transcription of God's Word and similarly the museum represented an evocation of God's work. The entirety of collections was extremely significant, both within books of natural history, the taxonomic systematics of Linnaeus and the museum. In order to be true to God's creation, the museum needed to show all species that God had created, and the best exemplars of each specimen. Nature was seen as the book written by God and to know nature was to know God. As such, the form of the book – sequential and binary – was to conform to a divinely sanctioned construction of nature, which was progressive and defined by difference.

Prior to the availability of books, Cathedrals and churches stood as Bibles, telling the story to the illiterate through their masonry and windows. As printing developed, emphasis lay in the authority of texts. In a reversal of this, printed texts of natural history existed long before museums – the cathedrals of nature. The physical space of the museum was thus responsive to an existing textual directive. This is a significant point as conceptual cues for display were provided either by existing church design or the structure of information in book form. This will be amplified in Chapter 4. As I have discussed, the development of the codex as a binary form – recto and verso – coincided with the age of Christianity, and so within museums various projects of design, collection and display were collapsed. The contemporary book, pervasively available in digital form, has reverted to the scroll, where sections of text are viewed independently, but are part of a continuum, and can randomly connect with other bodies of disconnected text. In this format there is no expectation of pairing, binary or linearity. Perhaps, in this way, the return to the book as a scroll may be more closely related to the fluidity of speciation and the imagining of the iconography of evolution as a rhizomatic web, and the decline of the dominant codex and its rectilinear format may free the museum from the stranglehold that information in sequential, hierarchical form has had on it and introduce the post-Christian age.

1 Rampant and coward lions are heraldry conventions: the former depicts the animal standing on two legs with paws raised and the latter depicts the tail between the legs.

2 This image of the black rat was a portent. Conrad Gesner reportedly died of Bubonic plague in 1565.

3 Gesner's Protestant beliefs were believed to infiltrate his writing and this publication, together with the *Historiae animalium* was placed on the *Index librorum prohibitorum* in 1559, the list of books prohibited by the Catholic Church.

4 Aristotle's *Historia animalium* (350 BC) was entirely textual and Galen was known to distrust illustration as a distraction from the truth and clarity of text.

5 Although I have examined this book closely as an object, the Latin text renders it fairly impenetrable to me. For this I am reliant on the essay by William Ashworth, "Emblematic Natural History and the Renaissance" (in Jardine et al. 1997).

6 Foucault expands the theory of resemblance and its significance to the Renaissance in *The order of things* (2002) as does Hooper-Greenhill (1992).

7 Interestingly, the popularity of curiosity cabinets coincided with the development of the printed book; in some ways setting up an opposition between uniqueness and reproduction.

8 This term is used by David Freedberg with reference to the drawing collection of Cassiano dal Pozzo, his "museo cartaceo" (Freedberg 2002:15–16).

9 The paradox of this relationship is that the mobile book brings knowledge to the people, while the fixed museum brings the people to the site of knowledge.

10 This is a term used by Pippa Skotnes in the introduction to *Curiosity CLXXV* (2004).

11 Seen as the progenitor of natural history writing and popularised to the modern audience by the D'Arcy Wentworth Thompson translation of 1910.

12 This compendium of 20 books quoted from more than 150 classical authors and included topics from grammar to ships. It contained diagrams and illuminations, but not illustrations. Its structure is not dissimilar to Diderot's eighteenth-century *Encyclopédie*.

13 Foucault (2002) writes of this extensively in his chapter "Classifying" in *The order of things*. He describes how, through description of structure, plant taxonomy was reduced to language systems where the visual became redundant.

14 Of course photographers did use focus, cropping and angles in ways that revealed a subjective eye. Karl Blossfeldt's highly aesthetic plant photographs from the early twentieth century and Edward Weston's erotic natural studies from the 1930s are evidence of this.

15 The 'tree of life' as a complex symbol of science and Christianity. I refer to this more extensively in Chapter 2.

16 This sense of composition is matched by the plant drawings of Albrecht Dürer, most notably his Iris of c1503. However, books and folios of the time tended to revert to more formulaic renderings of natural form as is evident in Otto Brunfels's bestselling *Herbarium vivae eicones* (1530), with woodcuts by Dürer's pupil Hans Weiditz (Pavord, 2005:17).

17 Freedberg makes the point that only after evolution was acknowledged could an understanding of a gradual change between species, rather than radical categories, be accepted (2002:376).

18 Martin Heidegger (1977) is of reference here. He inverts the commonly held notion that science produces technology by suggesting that technology is in fact instrumental in the production of both truth and science. Heidegger is concerned with ontological presence and the manner in which phenomena are revealed or, as he describes them, "come into being" or "bringing-forth". Technology defines itself in this process of presencing. The essence of becoming can only be realised through technologies as they provide access that would otherwise not exist. It is in this revealing that technology becomes conflated with truth, and here he draws a parallel between the role of the artist and that of technology in performing this role of revealing or 'bringing the body into being' (technē deriving both from craft and fine art and from knowing).

19 This was part of a movement in the late 1980s towards a theory of the book that included literary theory, the history of the book, its production and its reception – how it is understood as an object and how that differentiates meaning – which includes writers Don McKenzie, Roger Chartier and Robert Darnton.

20 Disciplined typographic layout with pages of continuous text was to dominate printed books from the sixteenth century. This was only disrupted by the typographical revolution by the Dadaists, Futurists, Cubists, and Constructivists at the beginning of the twentieth century.

21 Manguel (2004:30) notes the evolution of the medieval page of text as a complex set of cross-references or acrostics and provides the example of a version of Aristotle's thirteenth-century manuscript of *Parra naturalia.*

22 Adrian Johns writes extensively of the non-fixity of print in *The nature of the book* (1998). Here he proposes that early print was not reliable or repeatable, contrary to the conventional view of 'print culture' as espoused by Elizabeth Eisenstein in her canonical *The printing press as an agent of change* (1979). Unscrupulous printers disregarded the integrity of the author's text in the interests of expediency and efficiency.

23 Ann Blair (2000) writes extensively about the anxiety created by the volume of texts and the responses to this.

24 Parry notes that prior to digital catalogues, museum curators would carry small 'commonplace' books with them to collect thoughts, and record notes and events (Parry, 2007:103).

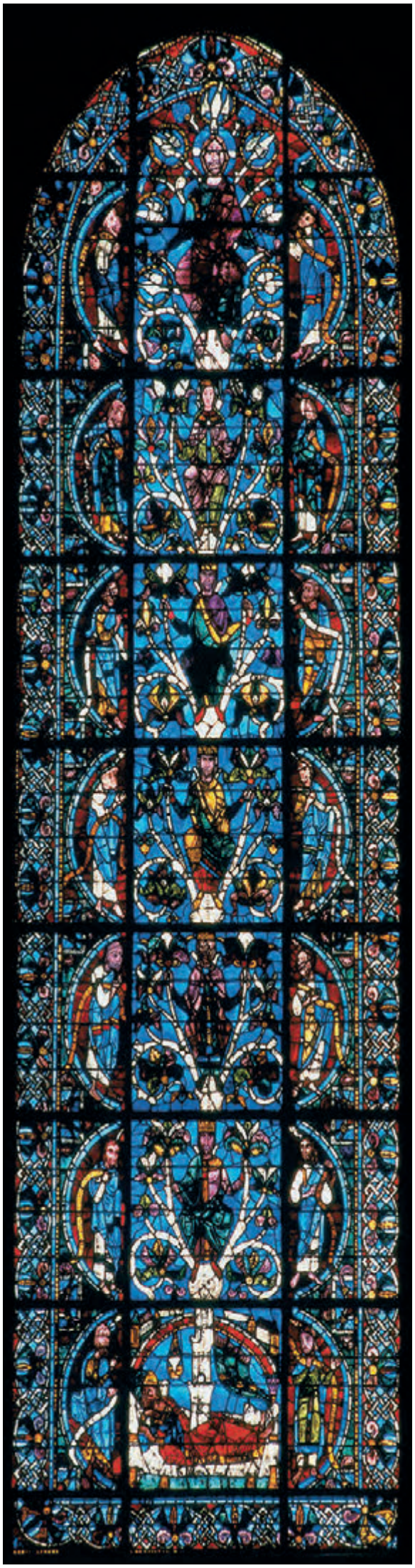
25 The papyrus scroll was introduced to Rome from Greece in 180 BC along with entire libraries brought as war treasures. This promoted the rise of the rolled book, the rotulus, which was held between two sticks, held above with the right hand and unrolled with the left.

26 The Bible is the book of books. Etymologically it derives most recently from the Anglo-Latin *biblia* (fourteenth century), which derives from the Greek *biblion*, meaning paper, scroll or used as the commonplace term for book. The Christian scripture was referred to as *Ta Biblia* in Greek in the third century (Online Etymology Dictionary).

27 The King James Version refers to a 'book,' but 'scroll' is more common in other versions, and consistent with a first-century manifestation of a book.

28 Chartier (1994:5) recalls this act when he speaks of the mystical relationship with the book as one in which discrete moments of reading are sequential and the physical book becomes an externalised form of a highly personal, subjective experience. The act is pleasurable and joyful, and the physical reaction to the 'manducation' of the text leaves its mark on the body.

29 Vellum was produced by soaking skins in lime to loosen the fat and fur, then scraped or pared over a frame to ultimate thinness. The skins were punctured to give guidelines for ruling and occasionally rubbed with chalk.



Tree of Jesse. Chartes Cathedral, 1145

The spine of Charles Darwin's first edition of *On the origin of species,* 1859

CHAPTER 2
BRANCHES AND BUSHES

From a potent seed radicles emerge, protrude, take hold and imbibe water. Plumules advance upwards, pressing through yielding soil, leaves unfurl and absorb light. With this the tree reveals its inheritance – vertical, rooted, bifurcating, ascendant. The tree is one of the most common analogies used to describe life. Imagined as cyclical, renewing, developing, and extending past a human life span, it is a malleable icon that has been used from the Garden of Eden to evolutionary theory to fix these points of origin, creation and hierarchy. In the contemporary context, the 'tree of life' is most commonly associated with Darwin, but this discussion will reveal that the previous cultural significance of this icon within many facets of knowledge production was what resulted in its being so easily adopted as the image of evolution. The rhetoric of tree iconography raises two related issues that pertain to this study, and I shall attempt to address them separately. The first is why the tree became such a dominant and enduring image of evolution, when other icons were suggested, and the second is how the lineage of tree iconography and a chain of being contributes to the misunderstanding of evolution – what Gould refers to as a "false iconography" (1989:23–52).

THE TREE AS AN IMAGE OF EVOLUTION

In the introduction to the London Natural History Museum's publication *99% APE: how evolution adds up*, it is stated: "the tree of life is no longer a metaphor, but a genealogy of all living things that even now is being built from clues to ancestry hidden in the genetic code of every living thing" (Silvertown, 2008:4). This is derived from the false logic that the genealogical imperative exempts metaphorical content, but more significantly, as with the children's story of the velveteen rabbit[1], the imagined has become REAL. The iconography of the tree has finally, it is suggested, grown to reach its true destiny.

This hint at the preordained destiny of the icon is curiously echoed by science philosopher Ian Hacking who makes the point that rather than presenting a literal tree, the Edenic 'tree of life' should be read as a portent of future understanding. He expresses his amazement that this icon, which has proved so apposite, emerged so early in human codification of the world (Hacking, 2007). Yet it is precisely because of this early emergence that the tree has become the favoured icon of evolution. The discussion will show that networks or webs were at one point an equally strong visual schematic for demonstrating classification or evolutionary links, and that Darwin was also ambivalent as to his choice of iconography, seeing evolution as an entanglement. However, the deep cultural and historical trajectories of the tree within western and Christian thought as well as its ascendant orientation resulted in its becoming the form of choice. Resonance with previous models provided a familiarity and reassurance.

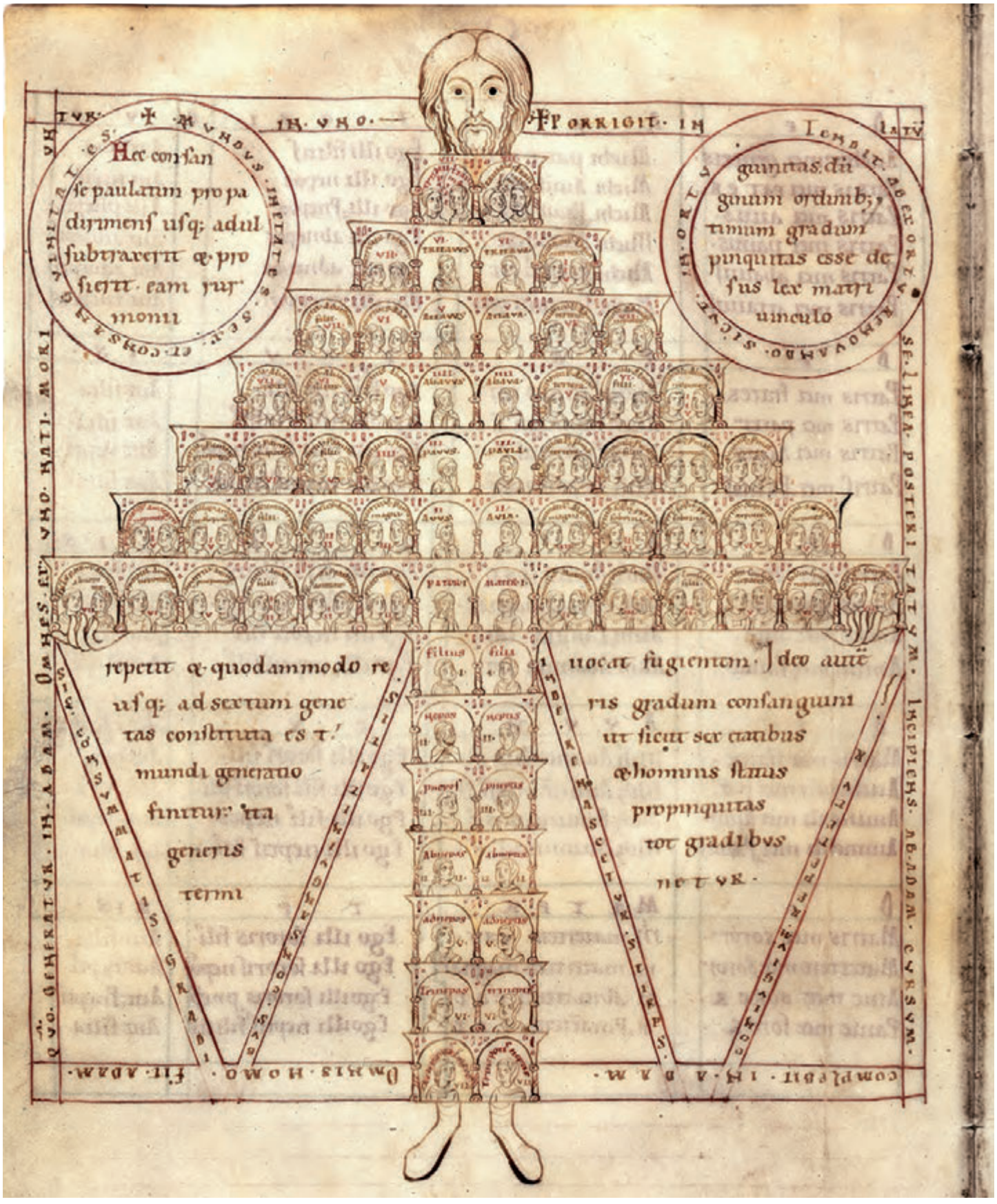
The popularity of the tree as an analogue spans cultures, religions and time, saturating mythology (Cook, 1974; Lovejoy, 1936), genealogy (Bouquet, 1996; Ingold, 2007) and science (Hacking, 2007; Gould, 1989; Ragan, 2009; Gontier, 2011). It is traced most obviously to its biblical antecedent as both the Edenic 'tree of life' (lignum vitae) and 'tree of knowledge' (lignum scientiae) at the centre of the Garden of Eden (Genesis 2:9). This dual analogy introduces both genealogical kinship and epistemology, as by enjoying the fruit of knowledge, immortality was sacrificed and through biological propagation the first tree of association begun (Weigel, n.d.). This first tree is situated at the 'beginning of time' and reappears at the 'end of time' on the banks of the river at the heavenly city of Jerusalem.

> And he shewed me a pure river of water of life, clear as crystal, proceeding out of the throne of God and of the Lamb. In the midst of the street of it, and on either side of the river, [was there] the tree of life, which bear twelve [manner of] fruits, [and] yielded her fruit every month: and the leaves of the tree [were] for the healing of the nations. (Revelation 22:1–2, KJV)[2]

In Genesis 2:10 we read "And a river went out of Eden to water the garden; and from thence it was parted, and became into four heads" (KJV). This brings together what anthropologist Tim Ingold refers to as a struggle in western iconography between arboreal and hydraulic metaphors to describe genealogy (2007:117). Although both ramose structures, the tree tends to dominate schematic representations.

Yet, in mythology, the cosmic tree of life is usually associated with a spring or river. The tree draws sustenance through its roots, transforming water into sap, and thus as an icon of creation, the tree is predictably male. Its verticality, self-generation from seed and flow of internal fluid make it an embodiment of masculine procreative power (Bouquet, 1996:59–60).[3] Symbolically, the motif of the cosmic tree is situated in the centre of the world, having roots in the underworld, branches in the heavens, and the trunk uniting earth with these two other zones. The tree is a bridging symbol, providing orientation, and thus the appropriate form to connect two points in time or space.[4] The multicultural use of the tree form became essentialised, particularly in eastern cultures – stripped of its foliage to a pole or column. Known as the *axis mundi*, the tree became the absolute symbolic centre and the site of origin, and the spatial organisation of communities around a central temple or altar replicates this mythological structure of the universe (Cook, 1974).

Orientation is of interest in the inverted schematic trees found in India, Australia, Lapland and within the Kabbala (Cook, 1974). With roots above and branches below, creation is seen as descending rather than ascending, in opposition to commonly held Christian values which associate ascension with verticality.



Version of Isadore de Seville's *Etymologiae*, 1100s

Kabbalistic philosophy also tightly collapses tree and creation: the tree contains the seed and the seed contains the tree – just as God contains creation and creation the hidden Word of God. The two concepts are seen as inseparable. The thirteenth-century *Book of Zohar* depicts the tree in diagrammatic form, extending downwards in ten eminations or *sefirot*, from *keter*, the supreme crown, at the top, to *malkhut*, or kingdom, below. This tree, an *arbor inversa*, links God, the Universe and humans and its upright form is repeated in the Jewish menorah, also referred to as the tree of life.

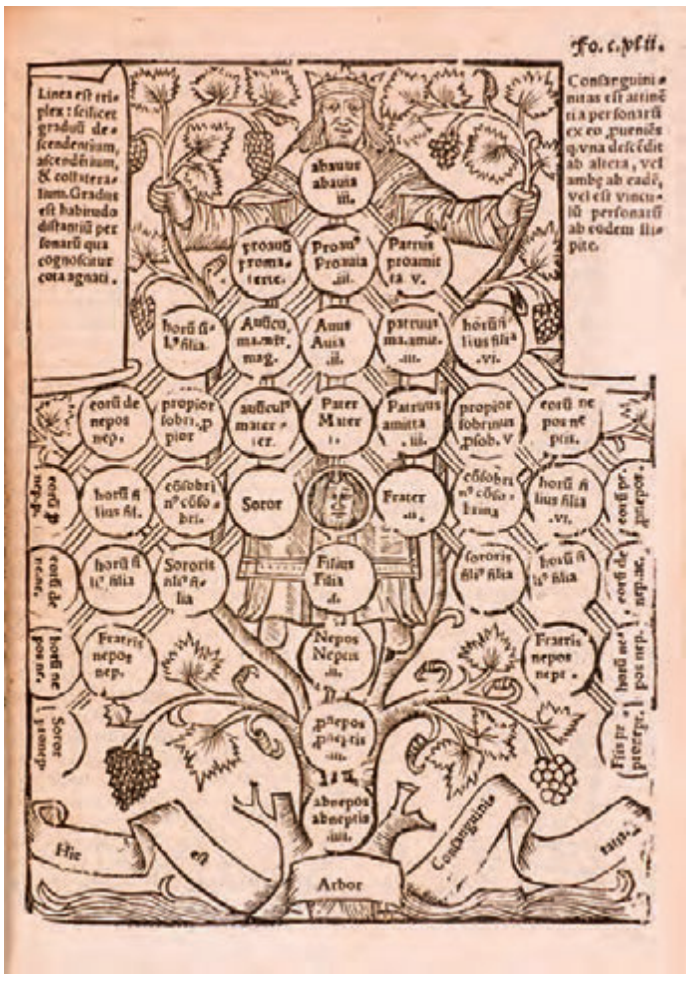
The Bible is filled with tree references. There is the appearance of God as a burning bush – fire and growth as one, the parable of the fig tree, the grafting of a wild olive, the palm tree, tamarisk, pomegranate, cypress, cedar, juniper, oak, almond, fir, apple, willow, vine, pine. Trees permeate the text, and all point to that central tree, framed by the trees at beginning and end of time, the tree that is Christ. Christ, exemplifying eternal life, stands for something renewable and cyclical. He is the central point of salvation and John's[5] tree in the book of Revelation is often interpreted as being Christ, whose

"leaves are for the healing of nations" (Revelation 22:1–2, KJV). The cross is a version of the redemptive tree: dead wood transmuted to the form of eternal life. The form of the cross clearly resembles a tree, although it is possible that this form is a later design, popularised by Emperor Constantine's use of it in battle in 312 AD (Kemp, 2012:48) and that early crucifixes were more pole-like.[6]

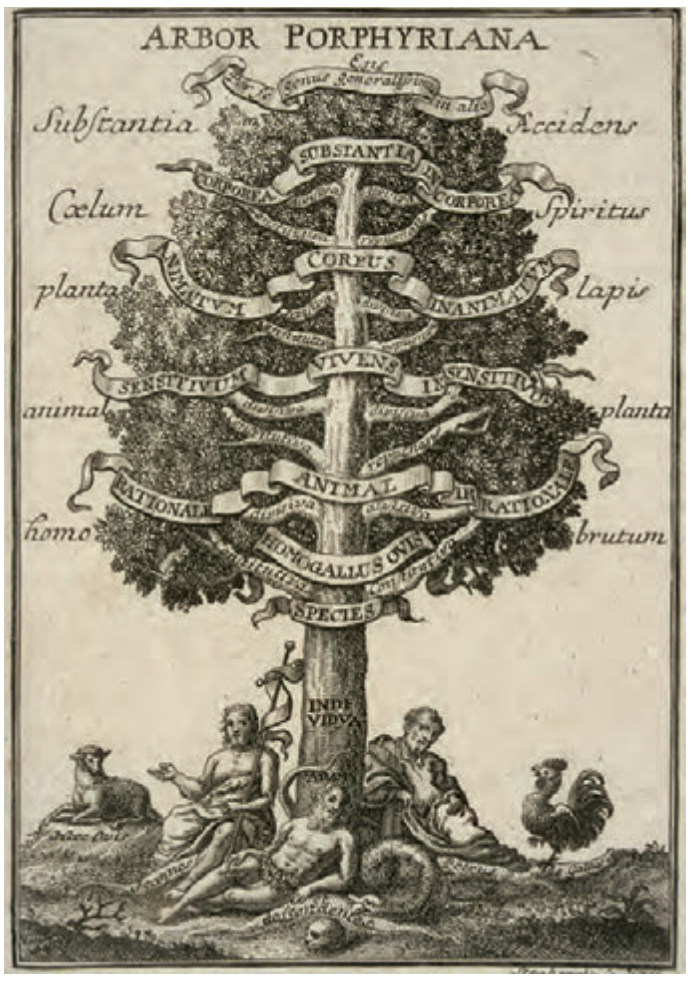
Genealogy is encapsulated by the tree schema as it provides a clear system for recording both succession and relationships over time. Religious thought provided a foundation for a patriarchal genealogical method, searching for pedigrees that linked men and Christ. In diagrams reminiscent of trees, degrees of consanguinity were represented in the form of a crucifix as early as the eighth century in Isidore de Seville's manuscript *Etymologiae*, an encyclopaedic collection of knowledge from antiquity (Bouquet, 1996:47). In an image from a twelfth-century version of this, Christ appears as a tree, his legs and body comprised of individuals and couples within arched colonnades – a 'living' columbarium. This formal schema is picked up in medieval images depicting the Tree of Jesse.[7] Popularised in Medieval cathedrals, this iconography responded to a desire to trace a lineage from Jesse, father of David, to Christ. Isaiah (11:1, KJV) prophesied, "There shall come forth a rod out of the stem of Jesse, and a Branch shall grow out of his roots," here referring to the Virgin and Christ. Jesse is often depicted as recumbent and from his side springs the vine, on whose branches various ancestors reside, Christ being at the apex.[8] The tree of Jesse was also later conflated with the lineage of the first man – Adam – to Christ. It was believed that Adamic language was the language of God, the language used to name the animals in the Garden of Eden. "The whole earth was of one language, and of one speech" (Genesis 11:1, KJV) before the confusion of tongues at Babel, and that by tracing Adam's descendants, the language of God would become apparent (Gontier, 2011; Bouquet, 1996).[9] Herein the metaphor of the tree became synonymous with genealogy, and privilege with divinity.

Feudal nobility who wished to emphasise privilege, inheritance and succession found genealogical diagrams that read from the top more persuasive of lineage, however this depiction presented a conflict or paradox. The inverted tree that spreads at its base, does not conform to ideas of ascendancy – as epitomised by the Tree of Jesse. This conflict in direction between material and spiritual objectives was resolved by the sixteenth-century *arbor consanguinitatis* that presented the individual at the centre of the stem, with the ancestor at the top, patrilineal family to the left, matrilineal to the right and lineal descendants below (Ingold, 2007:107). However, the genealogical tree could not be made to grow upright until it was accepted that future generations could reach a higher state of living than their ancestors which, as Ingold writes "combined a declaration of ancestry with a statement of ambition" and "at the dawn of the modern era the tree became an icon of progress" (2007:107). This is particularly important when looking at the use of the tree in biological terms. Although initially

Jean Boutilliers. *Arbor consanguinitatis*, La Grant somme rural, 1539



Arbor Porphyriana, 1700s



used as a practical means of organising taxonomies, the iconography became increasingly conceptual as a measure of time and relationships, and ultimately what Gould refers to as the "iconography of expectation" (1989:23–52).

German literature scholar Sigrid Weigel believes that the shift in the 1800s from a classificatory system (tableau and listing) to a genealogical one (genealogy and tree distribution) presents a tension between systematic and temporal ordering modes. She argues that while classification relies on the constancy of species (determined by difference), evolutionary genealogy relies on variation that allows for change (determined over time) and these two systems are incompatible (Weigel, n.d.). However, Linnaean taxonomy, while not temporal, presents a tree-like schematic hierarchy of species that is implicitly developmental. Both of these systems rely explicitly on a structure of difference, and within that structure is a predictable binary symmetry that creates vivid distinctions between species. I believe that it is precisely this predictability with its balance and order that has made the tree such an enduring icon. These ideas are amplified at a later stage in this chapter.

The inextricable connection between the 'tree of life' and evolution has led to the common perception that Darwin's diagram of a tree was one of the first biological uses of this icon.[10] There are, however, multiple prior examples of tree diagrams to describe relationships between species, although not all evolutionary in emphasis, and often complicated by the idea of the 'creator' as a mechanism of change. Aristotle's hierarchical *scala naturae* found favour in medieval thought and was an influential ordering principle in early Enlightenment taxonomic study. It was a fairly inflexible structure, whereas the analogy of the tree allowed for more complexity. Although not overtly referring to the tree, Cesi's ten *Tabulae phytosophicae* Tables in his *Tesoro messicano* (1628) are constructed from hierarchical brackets, porphyrian in form. The tables move from the infinite (God) at the top to the finite – *bruta* (animals) at the bottom. The bruta are divided into those of greater and lesser perfection and categories are further divided to accommodate overlaps between species: *phytozoa* (animals that retain the characteristics of plants); *zoophyta* (a further plant-animal hybrid) and *zoolithophyta.*[11] Eighteenth-century German naturalist, Peter Simon Pallas, was one of the first to suggest the image of a tree as a way to organise all life forms. Although he did not provide a visual diagram in his *Elenchus zoophytorum* (1766), Pallas described various phyla and classes as branching from the base of a tree trunk:

> The system of organic bodies is best of all represented by an image of a tree which immediately from the root would lead forth out of the most simple plants and animals a double, variously contiguous animal and vegetable trunk; the first of which would proceed from mollusks to fishes, with a large side branch of insects … and at the farthest tip it would sustain the quadrupeds. (Pallas in Archibald, 2009:563)

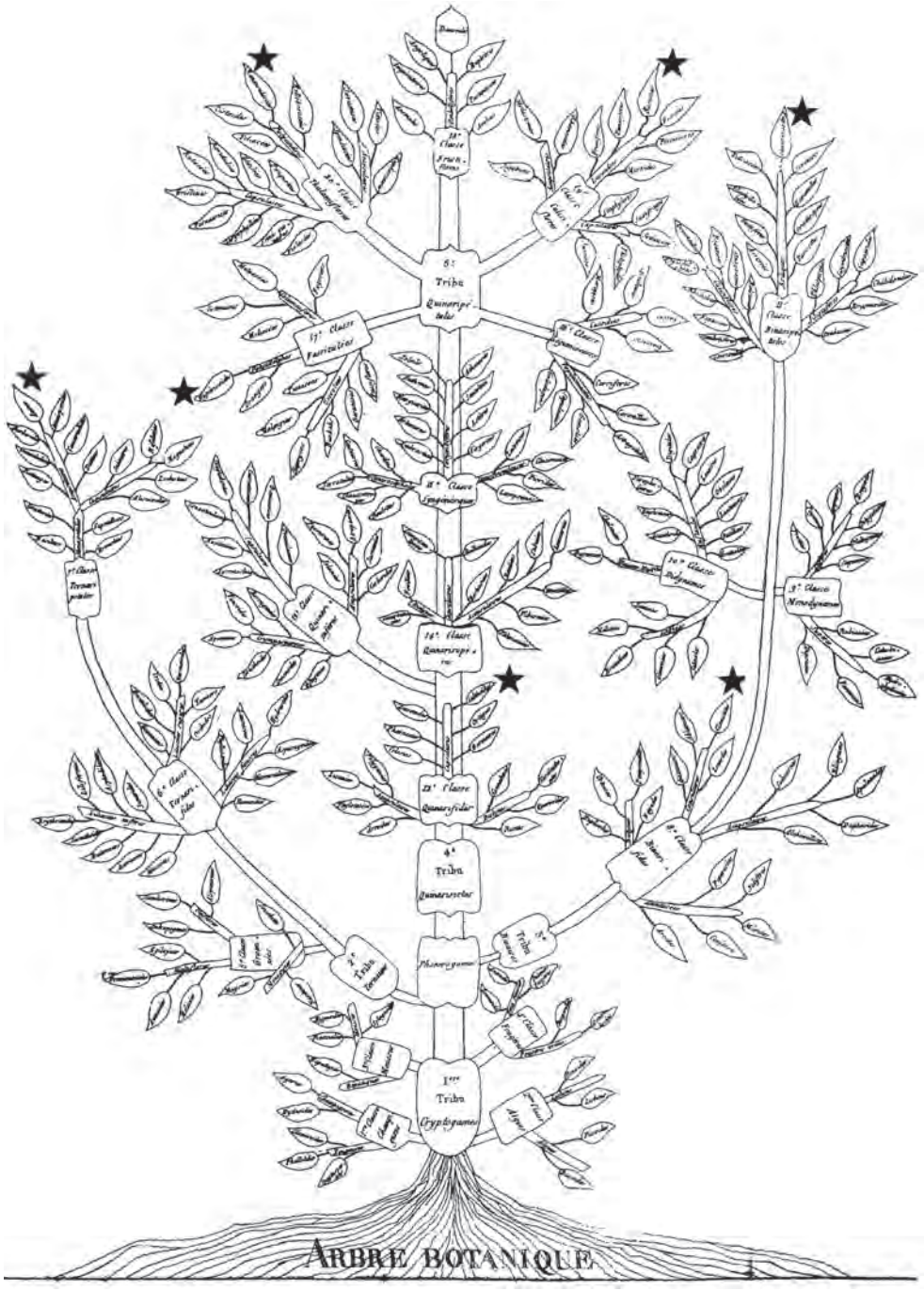
Within this bifurcating form is embedded the bias inherited from the *scala naturae* that organisation moves toward perfection, from simple to complex forms. His tree presents an ordering system, but does not describe relationships between species. Stevens (1983) suggests that French botanist Augustin Augier's 1801 diagram of a tree in his *Arbre botanique* was one of the first attempts to do this. Using the botanical tree as a model to distinguish between what is now termed homology (proximity in his terms) and analogy, he anticipated a model that was to revolutionise nineteenth-century systematics. His foliate tree distributed families within leaves and classes and orders along branches. Yet while taxa are clearly relationally arranged, the arrangement is still influenced by the *scala naturae*: the form and construction built on ascendant, continuous layers, working towards perfection. Augiers writes: "This method starts with the least perfect plants and by gradation leads to the more perfect, as one can convince oneself when reading the exposition of the method and the explanation of the botanic tree" … "nature never makes jumps,[12] and she passes from one being to another by insensible graduations" (cited in Stevens, 1983:205). In conflating perfection with perceived complexity, Augier's tree anticipates a form of evolutionary diagram in which humans are seen at the apex.

In contrast, Jean-Baptiste Lamarck's sketchy tree in his *Philosophie zoologique* (1809) is an attempt to show an evolution of classes along an upside down tree, recalling the genealogical *arbour inversa*. His diagram, used to argue for his theory of the inheritance of acquired characteristics, is tentative: classes dividing along dotted lines that start with polyps at the top and culminate in various mammal orders below. This is commonly acknowledged as the first use of a tree diagram to argue changes in species, demonstrating both changes in time and natural affinities (Gontier, 2011; Ragan, 2009).

Biologist J. David Archibald points to the work of geologist, Edward Hitchcock as being one of the first instances of the use of a branching tree-like diagram to describe the relationships of the natural kingdoms – animal and plant – within the context of geological time, including the fossil record. Although an opponent of evolution, his *Elementary geology,* published in 31 editions between 1840 and 1859, revealed an acknowledgement of progression in the fossil record.

> It appears that every successive general change, that has taken place on the earth's surface, has been an improvement of its condition. Animals and plants of a higher organisation have been multiplied with every change, until at last the earth was prepared for the existing races; the most generally perfect of all with man at their head. (Hitchcock cited in Archibald, 2008:573)

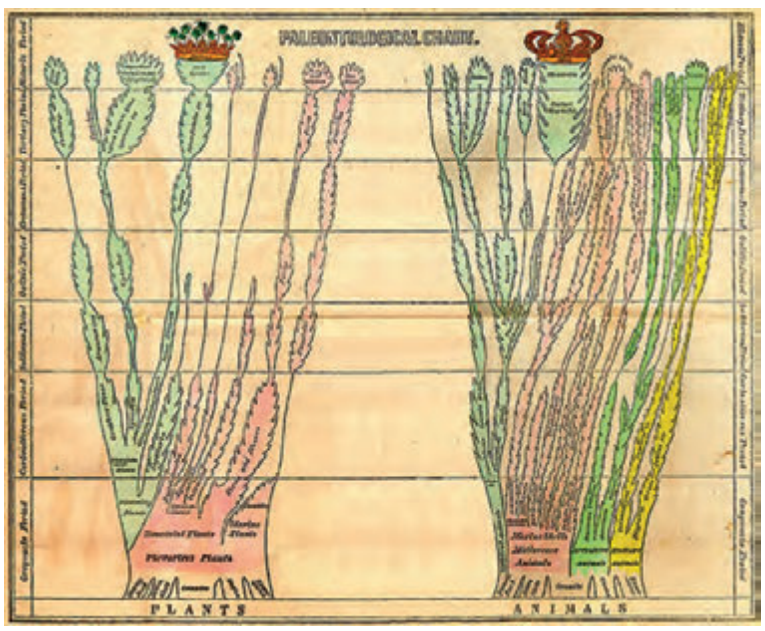
This reveals a sense of destiny and a development towards perfection. His diagrams more closely resemble kelp than



above: Augustin Augier. *Arbre botanique,* 1801

right: Charles Bonnet. *Idea of a natural chain of being,* 1745

below: Edward Hitchcock. Diagram in *Elementary geology*, 1831



Charles Darwin, Notebooks, 1837

trees as they radiate from the base, rather than dividing, and culminate in a crown – the palm being the pinnacle of the plant and man the pinnacle of the animal kingdom. His tree form is consistent with non-evolutionary thinking that all groups are present at the start of life, some die off and others become more prevalent. Similarly, Louis Agassiz presented a tree-like depiction of fossil fish in the first volume of his *Recherches sur les poisons fossiles in* 1844. Lines of varying widths are arranged along a vertical axis, converging but not touching at any point. Agassiz wrote:

> I however did not bind the side branches to the principal trunks because I have the conviction that they do not descend the ones from the others by way of direct procreation or successive transformation, but that they are materially independent one from the other, though forming integral part of a systematic unit, whose connection can be sought only in the creative intelligence of its author. (cited in Archibald, 2008:586)

Ironically, only once God was removed as a causal agent of change within species and was replaced by transmutation, could the tree diagram come into being in a true form that started at a single basal point.

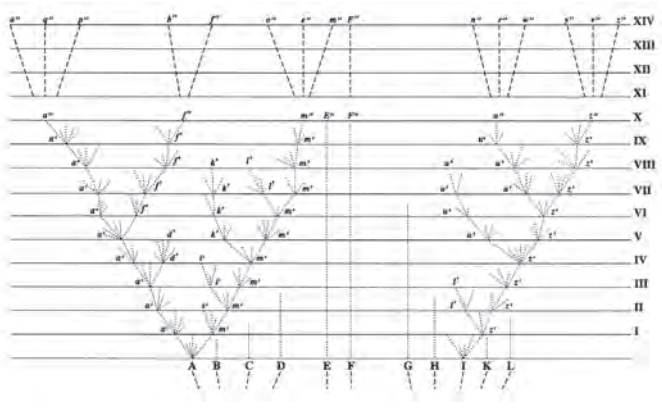
Alfred Russel Wallace, in looking for evidence of a transmutation of species, pre-empted Darwin's use of the analogy of the tree. In his 1855 *On the law which has regulated the introduction of new species* he referred to "branching of the lines of affinity, as intricate as the twigs of a gnarled oak or the vascular system of the human body" and "the stem and main branches represented by extinct species" as well as extant diversity, "a vast mass of limbs and boughs and minute twigs and scattered leaves" (1855:187). His imagined tree is akin to the modern phylogenetic tree, showing extant taxa at the branch tips and short branches and gaps where taxa are extinct (Ragan, 2009:14). Taxa commonly joined together are implied to have descended from a common ancestor, while varying lengths of branches connote time periods.

Darwin's rough stick diagram that appears in his 1837 Notebook B23 (commonly recognised as "I think")[13] has become iconic as the image that spawned evolutionary theory.[14] This diagram developed into his 'tree of life' diagram published in 1859, and the prevalence of this image has occluded all others contained in his early notebooks, again supporting the dominance of the iconography of the tree. Less well known is that his 1837 notebook contained three other tree-like diagrams, the first to demonstrate adaptations to air and water, the second to explain gaps in the fossil record, and the last (the drawing notated with "I think"), extinction. This second diagram appealed to coral[15] as an analogy, dead lineages depicted with dotted lines at the base and living lineages in solid ones. About this he writes "the tree of life should perhaps be called the coral of life, base of branches dead; so that passages cannot be seen" (cited in Archibald 2008:568). This implies, as Archibald suggests, that Darwin considered the tree to be a less adequate analogy, but that the familiarity of tree iconography would make it more readily accepted in popular imagination as an icon. Some coral reefs are aged at 790,000-years-old and thus this metaphor may better have encapsulated deep time and accretion – parts of the colony dying off yet leaving their residual structure, while new parts develop. This is set in contrast to trees, where the oldest tree, a Bristlecone Pine in California, is said to be the oldest tree at a mere 4,842 years.

In *Endless forms: Charles Darwin, natural science and the visual arts*, Diana Donald notes that Darwin was a notoriously poor draftsperson, resorting to gesture when describing his observations and that this resulted in an uneasy translation of his ideas by artists throughout his publications (Donald, 2008:10). Darwin describes the inadequacy of diagrammatic form to capture the complexity of evolution:

> This natural arrangement is shown, as far as is possible on paper, in the diagram, but in much too simple a manner. If a branching diagram had not been used, and only the names of the groups had been written in a linear series, it would have been still less possible to have given a natural arrangement; and it is notoriously not possible to represent in a series, on a flat surface … .(Darwin, 1859:422)

However, he had a deep interest in aesthetics and philosophical notions of beauty and his notebooks contain many references to David Hume's *Of the standard of taste* (1757), Archibald Alison's *Essay on the nature and principles of taste* (1811) and Joshua Reynolds's *Discourses* (1776) (Donald, 2008:17). While these ideas informed and complicated his thoughts around beauty, breeding and selection, I would suggest the possibility that his consciousness of an aesthetic imperative in some way guided his choice of visual metaphor – a tree being a sturdier and more appealing icon of evolution than friable coral. His discussion of evolution in *On the origin of species* is full of arboreal metaphors: "green and budding twigs", "produced during each former year", "period of growth", "twigs", "branch out", "limbs divided into great



Charles Darwin, Tree/ divergence diagram, 1859

branches", "ramifying branches" (Darwin, 1859). This is a positive image, an abundant, fertile tree that may have made unconscious appeal to Ruskin's naturalism, which extoled the virtues of nature, nature as subject of art and argued that truth, beauty and the divine were inextricably linked.

Darwin's tree is one superficially based on previous schema of genealogical inheritance. He placed extant taxa at the tips of his tree, not at the internal nodes or along the branches, and the value of the diagram lies in the textual extrapolation that suggests that species may share a common descent because of transmutations and natural selection.

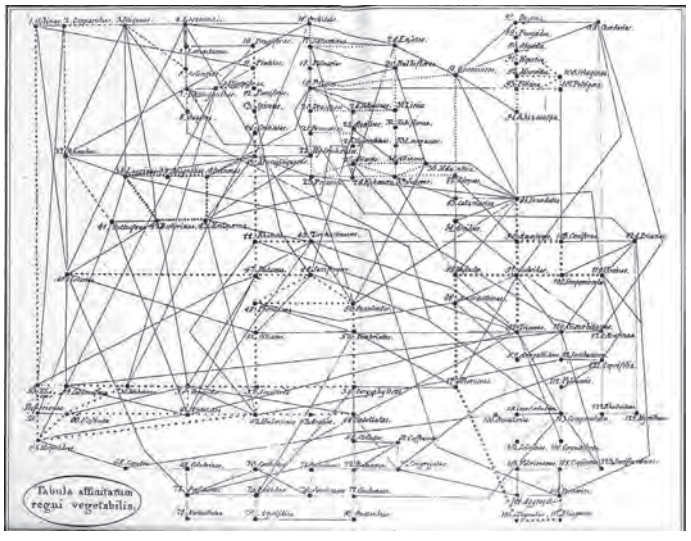
> … on the view that the natural system is founded on descent with modification; that the characters which naturalists consider as showing true affinity … are those which have been inherited from a common parent, and, in so far, all true classification is genealogical; that community of descent is the hidden bond which naturalists have been unconsciously seeking, and not some unknown plan of creation, or the enunciation of general propositions, and the mere putting together and separating objects more or less alike. (Darwin 1859:365)

Each horizontal line indicates 1000 generations, but may indicate "a million or more generations; it may also represent a section of the successive strata of the earth's crust including extinct remains" (Darwin, 1859:89). The dotted lines indicate species that die off, whereas letters a1 to m1 indicate species that are common enough to be known. This applies the principle of divergence in that the further removed the line, the greater the difference in variety. He does, however, write that the progress may be irregular, contrary to what the uniformity of the diagram suggests.

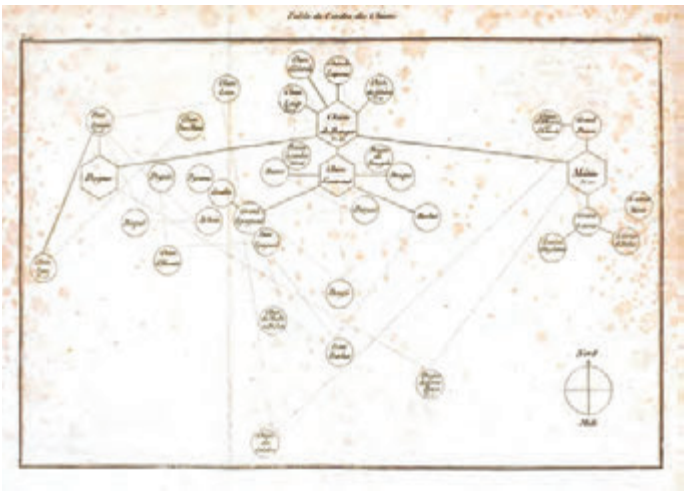
Darwin's 1859 diagram is vertical in orientation – near time being represented at the top. Bedell suggests that this orientation is not as much a feature of progress as it is an inheritance of his geological background: vertical stratigraphy represents periods of time reflected in rock formations. He was deeply influenced by Charles Lyell's *Principles of geology* (1830–1833), which he read on the *Beagle* voyage, which argued that geological change takes place incrementally over long periods of time. This insight allowed him to develop an evolutionary theory wherein change happens accumulatively and slowly (Bedell, 2009:49). Geology provided a model of a deep-time scale necessary to argue the slow passage of evolution. He was to write: "I find geology a never-failing interest. It creates the same grand ideas respecting this world, which Astronomy does for the universe" (in Bedell, 2009:49). Geology provided a visible landscape in which the passage of time could be seen – strata showed a clear, tangible relationship between distance or height and time.[16] While this was easily translated into the diagrammatic, it also provided a new conceptual framework for nature. By reading the landscape and interpreting its visual clues, processes that shaped its past could be revealed and interpreted. The present held the residue of the past, just as extant species retained certain residual characteristics of their ancestors. Changes in species were not observable in the same manner as sedimentary layers were, and so the tree became a critical visual framework that, in addition to layering, suggested divergence.

This study is partly concerned with the impact (or lack thereof) of contemporary evolutionary iconography – that of the 'web of life' – on museum display. In examining discussions surrounding this analogy the implication is that the tree and web are both dichotomous and chronological: first the tree, then the contemporary web. Perhaps it is imagined that the web has emerged in response to other contemporary ideas – the world-wide-web, complexity theory and social networking. However, many examples of biological web diagrams existed prior to Darwin. Stephen Greenblatt identifies Lucretius (99–55 BC) as one of the earliest proponents of life as an integrated system, where the world was made of randomly colliding 'atoms' with no divine architect in command (Greenblatt, 2011:6). Within this system, Lucretius suggested, humans did not occupy a rarefied hierarchical position, but formed part of a transitory moment on earth: value in life was to be experienced through pleasure and beauty. The rediscovery of his epic poem, *On the nature of things,* during the Renaissance, was, according to Greenblatt, to have a profound effect on these times, and while no iconic visual analogy was presented by Lucretius, his description of randomness of particle motion, 'swerves' and the unscripted, unpredictable development of life is something of a portent for contemporary understanding of complex systems.

Systems of affiliation continued to be depicted along the lines of trees, yet by the eighteenth century some naturalists arrived at solutions to describe relationships between species that were horizontal in orientation. They also saw the natural world as maps, circles, webs or nets (Stephens, 2009:209). Comte de Buffon's diagram of 1755 demonstrated the relationships of dog breeds in a web-like, cross-linked genealogy, while Vitaliano Donati in his 1750 publication, *Della storia naturale marina dell' Adriatico* used the idea of a net to explain the numerous



Johann Batsch, *Tabula affinitatum regni vegetabilis*, 1802

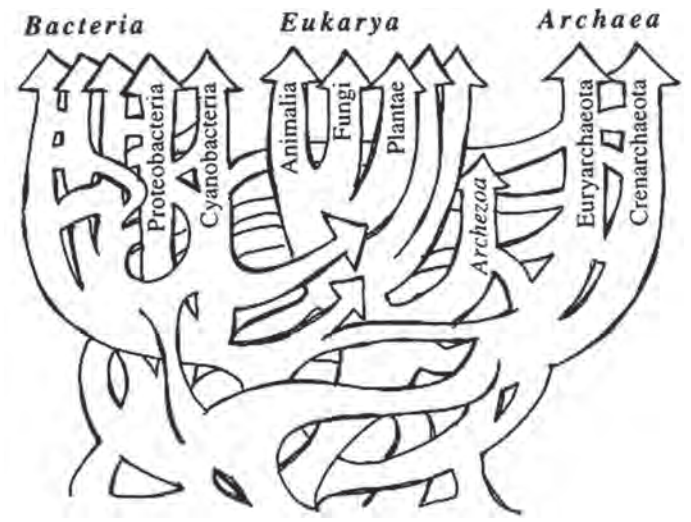


Comte de Buffon, *Diagram of dog breeds*, 1775

and connected links between animals – in this case Adriatic fish (Ragan, 2009; Stevens, 2009). August Johann Georg Carl Batsch's network of affinities within the vegetable kingdom, from the *Tabula affinitatum regni vegetabilis* (1802) presents a web-like schematic highly reminiscent of contemporary network diagrams and Georg Klebs's 1893 diagram of relationships between algae and protozoa also depicts a similar network. Possibly he anticipated the prompt that was to revolutionise phylogenetics in the mid-twentieth century – that bacterial, archaea and plants do not conform as easily to structure of the branching tree and exhibit a more web-like pattern of evolutionary development (Dagan & Martin, 2006; Doolittle, 2000; Gould, 1989).

When Carl Woese introduced Archaea[17] as a new domain in 1977, the 'tree of life' was entirely restructured. Woese's early work with ribosomal RNA suggested that the tree be based on genetic rather than morphological similarities, at which point microbes became increasingly significant. The enormous number of microbes and the inclusion of a new domain meant that vertebrates, and consequentially humans, occupied an ever-narrowing twig at the far end of the tree. Another factor to shake the sanctity of the tree was the simultaneous development of genetic engineering or synthetic transfer. The first transgenic organism was created by Herbert Boyer and Stanley Cohen in 1973 when they injected antibiotic resistant genes into the plasmid of an *E. coli* bacterium, and the first transgenic mammal produced in 1974, when foreign DNA was injected into a mouse embryo. To add to this, Lynn Margulis's 1967 theory of Serial Endosymbiosis proposed that mitochondria had once been free-living microbes and that their RNA resembled that in other microbes more closely than the RNA in the nucleus of particular organisms. She produced evidence that suggested that mitochondria did not evolve as they retain ancient lineages, and were most likely engulfed by an ancestral archaeal cell.[18] It was becoming clear that the boundaries between species were blurred and the precise articulation of the tree as an icon seemed increasingly inappropriate.[19] Doolittle's article "Uprooting the tree of life" in *Scientific American* (2000) brought the debate of the analogical tree of life into the public arena. He argued that micro-organisms, which were the main inhabitants for at least two thirds of the planet's history, provide little information for defining relationships between species and constructing a clear family tree. In addition, lateral or horizontal gene transfer allows for the exchange of significant genes or suites of genes between micro-organisms; and this fundamentally shifts our understanding of linear, vertical inheritance. Dagan and Martin (2006) added to this in their seminal article "Tree of one percent", which also argued that two fundamental evolutionary processes, HGT and endosymbiotic gene transfer, must be taken into account when visualising the form of evolution. Their key point was that the relative number of microbes to eukaryotes is so vast, that if a 'tree of life' can be spoken of, it would only account for one percent of life. Clearly, this one percent includes most of the animal kingdom of interest to displays of natural history, however, it disrupts a viewpoint, inherited from Aristotle and sustained by Darwin, that a clear lineage can be traced from base species or a common ancestor, to modern day life.

Ford Doolittle's visualisation of a web of evolution, 2000



FALSE ICONOGRAPHIES

The 'tree of life' stands outside of the forest. It does not form part of a dense, integrated and enmeshed system, but is a singularity, an individuated specimen with a particular morphology. Perhaps this is the predicament of the tree analogy in that rather than allowing for the fluidity of complexity, its specificity has directed discussion as to the shape of its foliage and growth rather than its habitat. As a contemporary biological analogy, the tree is supported on either side by its companions, the ladder and the book, both of which have long histories but have recently been used to describe the genome[20] and emphasise linearity and genealogical descent.

The ladder pre-empts the tree as an ordering system for the natural world. The Chain of Being developed in the writings of Aristotle and taken up in medieval Europe, hierarchically classified the known world from inanimate to animate matter, and is a system that has permeated thinking about the natural world ever since.

> Nature proceeds little by little from things lifeless to animal life in such a way that it is impossible to determine the exact line of demarcation, nor on which side thereof an intermediate form should lie. Thus, next after lifeless things in the upward scale comes the plant, and of plants one will differ from another as to its amount of apparent vitality; and, in a word, the whole genus of plants, whilst it is devoid of life as compared with an animal, is endowed with life as compared with other corporeal entities. Indeed, as we have just remarked, there is observed in plants a continuous scale of ascent toward the animal. (Aristotle in Wentworth Thompson, 1910:588b)

This scale – *scala naturae* – imagined a vertical ascent based on the level of consciousness of beings and the development of their soul, and so inevitably moved from simple organisms toward more complex ones. Later, the ascendency of the ladder form corresponded with the rising of the soul to heaven and was consistent with medieval cosmological views. Lovejoy has characterised three features of the Chain of Being: plenitude (God demonstrating his goodness through diversity of species – both real and imagined), continuity (each form shares at least one attribute with its neighbour and with no gaps between species, one seamlessly becomes another), and gradation (geometry of the natural world as a straight line from simple to higher beings, including deities) (Lovejoy, 1936:24-66). The *scala naturae* was a means to map all the known elements of the universe and the relative place that these have in creation.

Examples of the ladder are found well into the Enlightenment. Swiss naturalist Charles Bonnet's 1745 idea of a natural Chain of Being presents a literal vertical ladder, starting with the elements (water) and culminating with 'man.' Although the scale does not include deities, the ordering system relies on an assumed hierarchy of perfection of the soul and the chain is presented as fixed, with no gaps between categories. Significantly the chain was seamless and unbroken. Species morphed into one another in a manner that suggested a divine design. There is a paradox contained within this structure, as at each level species were fixed, yet the continuum of movement suggested by the visual form allows for a sense of fluidity. Implicit within this worldview is an iconography of progress, based on differentiation and 'perfection' of species. It was this legacy that was to drive racist schematic, scientific classifications from the eighteenth century onwards. Interestingly, Darwin reveals some of this bias in the concluding paragraphs in his *On the origin of species* text:

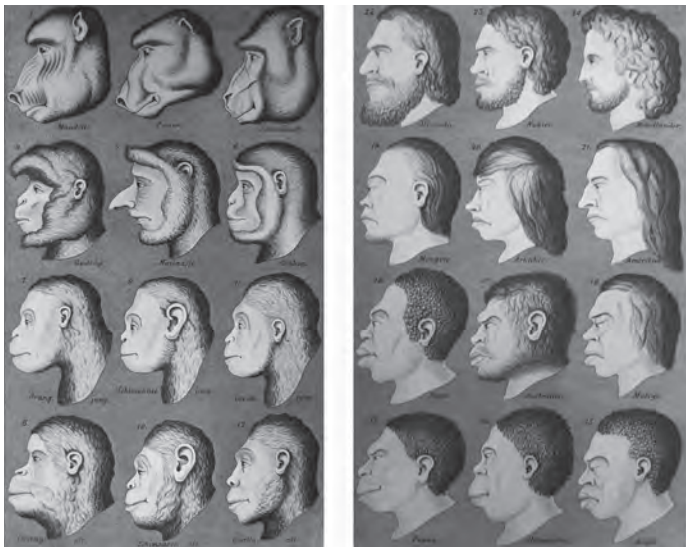
> As all the living forms of life are the lineal descendants of those which lived long before the Cambrian epoch, we may feel certain that the ordinary succession by generation has never once been broken … As natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress toward perfection. (Darwin, 1859:362)

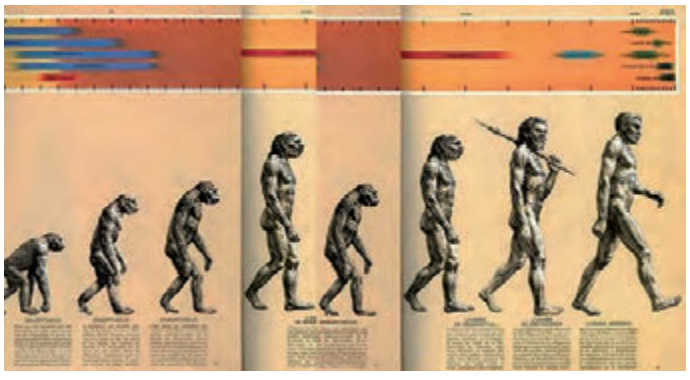
In his *Historia animalium* (4 BC), Aristotle introduced the terms genus and species to the study of nature, using a dichotomous system based on similarity and difference – this system was to influence future classification systems deeply. The Greek scholar, Porphyry, was to give visual form to these ideas in an introduction to Aristotle's *Categores* in the third century. In this he presented a tree-like system of logic, with a central trunk (genus) containing differentiating or dichotomous branches (species) (Gontier, 2011; Ragan, 2009). This Porphyrian tree or *scala praedicamentalis* set in place a visual taxonomy with an oppositional construction, based on divergence and difference. This presented an early binary system wherein belief was built on the oppositional states of order and chaos; heaven and hell; human and animal. My contention is that although the tree has been interpreted as at variance with the ladder, Aristotle's tree-like dichotomous structure linked a bifurcating form with nodes of differentiation. In this way the tree is fundamentally based on principles of diversion and points of separation. The tree's divergent form is not as obviously hierarchical as the ladder, however, its vertical orientation still pairs ascendency with complexity. It is only in the form of the circular phylogenetic tree that does not privilege any particular species, that verticality is counteracted.

The ladder and the continuous chain of life were contested once 'voyages of discovery' to the new world revealed unclassified plants and animal species that did not easily fit into simple, predetermined categories. New forms unsettled the continuity between species, and it became increasingly hard to argue for a seamless link between high plants and simple animals. In addition, absolute linearity could not accommodate the extinction of species – something that the fossil record was

increasingly illuminating. A shift in geometry seemed necessary to accommodate new ideas about the world, and it was at this point that the tree analogy became more popular.[21]

Gould (1987, 1989) has been pivotal in drawing attention to the flawed relationship between notions of progress and understandings of evolution. He refers to an "iconography of expectation" and argues that all visualisations of evolution reinforce a "march of progress" and serve to reinforce a "comfortable view of inevitability and superiority" (Gould 1989:28). With reference to popular media, he reveals that the term evolution has become synonymous with progress and that the western emphasis on progress has foregrounded directionality. He identifies dichotomies of thought about the construction of time and history – the arrow (directional history) and the cycle. The arrow is based on biblical, Judaic thought, founded on the belief that a number of consecutive events followed the creation of the world. It is embedded within western ideas of progress, irreversibility and the new, whereas the cycle recognises natural rhythms and repetition (1987:13). He concludes that both and neither metaphors are correct and that it is the union of the dichotomous view that best represents time:

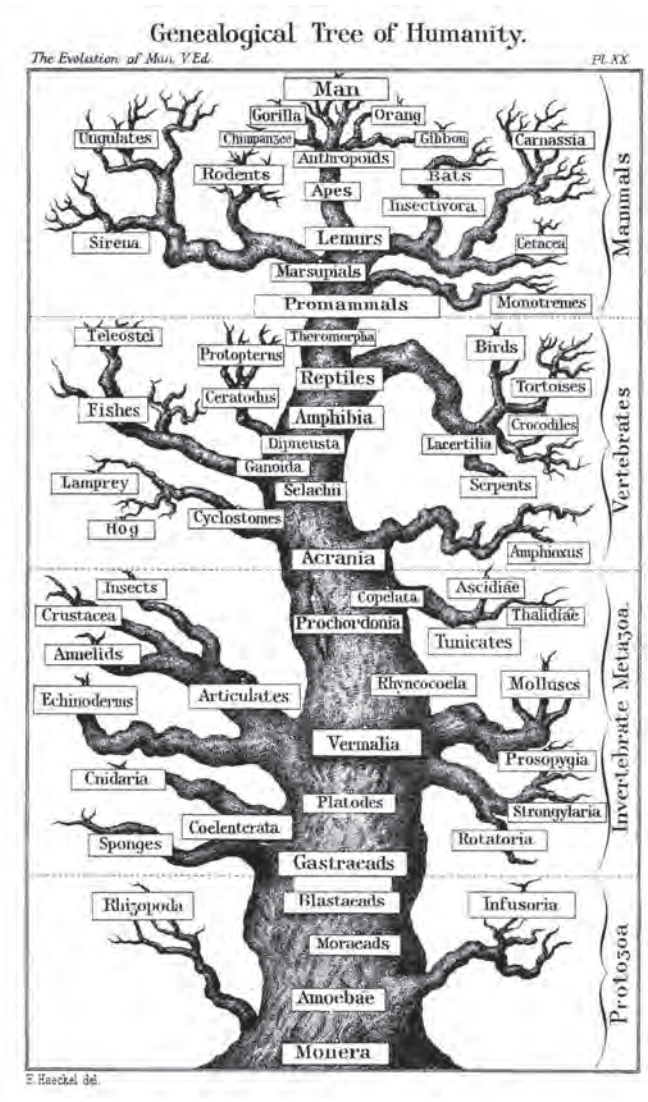




right above: Ernst Haeckel, *Natürliche Schöpfungsgeschichte,* frontispiece, 1868

right below: Rudolf Zallinger, *March of progress,* 1965

below: Ernst Haeckel, *Tree of man,* 1876



timeless laws versus contingent moments on historical pathways. According to him evolutionary biologists have acknowledged both these metaphors in homology, the retention of shared features of common ancestry (arrow); and analogy, the active evolution of similar forms in separate lineages (cycle) (1987:198). He argues that the revelations of geology and palaeontology (that humankind occupies only a few microseconds in the history of life on earth), made progress a necessary cultural virtue, as progress could account for the seemingly natural, directional movement towards human development, thereby justifying human superiority (Gould, 1987:192). In relation to the codex book and its impact on understanding, this same progressive directionality can be seen and is reinforced by its form that moves from left to right and from a point of introduction at one end to one of conclusion at the other.

One of the most damaging images contributing to the public misconception of evolution has been Rudolf Zallinger's illustration for F. Clark Howell's 1965 book, *Early man.*[22] Here the linear movement from left to right, from crouching ape to ascendant white male is typified and has informed the public understanding of evolution ever since. The image is, however, drawn from a vast lineage of this form of representation, originating in the *scala naturae* and using physiological measurements to sustain an idea of development and progress. Pieter Camper, the eighteenth-century Dutch biologist developed a comparative hierarchy of skull types based on the angle of prognathism[23] in the profile. Published in 1794, his illustrations present a chain of being that begins

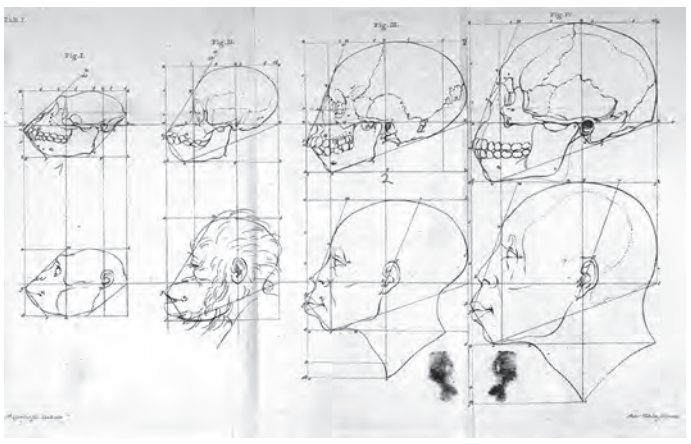
with apes at one end and moves through African, Kalmuck and European to the height of classical perfection – the Apollo Belvedere – at the other. Similarly, Charles White's drawings of skulls, published in *An account of the regular gradation in man, and in different animals and vegetables* (1799) recalls a developmental Chain of Being from birds, reptiles, dogs and monkeys to humans.[24] Thomas Huxley's frontispiece in his *Evidence as to man's place in nature* (1863) features an image by Waterhouse Hawkins drawn from specimens in the Royal College of Surgeons. Here skeletal modern man, at the right of the composition, leads a procession of gorilla, chimpanzee, orangutan and gibbon. Ernst Haeckel's[25] frontispiece from his 1868 *Natürliche Schöpfungsgeschichte* (Natural Genesis) depicts the skulls of primates, and moves from classical man (Indo-Germanic) at the top left to baboons at the bottom right, with African and Aborigines forming the link between ape and human. Although an ardent Darwinist, Haeckel's various tree schemas produced between 1866 and 1879 contained much of this bias. Referring to them as *stammbäume* (genealogical trees or pedigrees), many were depicted as naturalistic botanical trees to which he assigned 2627 extant biological taxa, and positioned more complex species at the most vertical and extreme branches. His tree of 1876 traces a deliberate route from *monera* at the roots to *menschen* at the uppermost tips of the tree, while his mammal tree (1866) demonstrates the same bias, as primates and carnivores occupy the uppermost layers, leaving little space for the more diverse groups such as rodents.

The dominance of the arrow in popular thinking has certain roots in genealogy. The term 'pedigree' is derived from the Latin *pes* (foot) and *grus* (crane) in that the crane's foot is in the form of an arrow (Ingold, 2007:109). The arrow is used to show the direction of a lineage or direct blood relations in a single direction rather than divergent ones. It emphasises flow rather than growth – the hydraulic analogy of the river rather than the arboreal tree. Ingold points to the difference between trace of pedigree (thread line) and point to point connectors (dotted line). He argues that Darwin's 1859 diagram presents a dotted tree that "reconstituted continuity of discrete individuals in genealogical sequence" (Ingold, 2007:114). Darwin's theory of evolution shifted the thinking around classification. No longer was a species ordered at one moment in time, but rather contingently in time – in relation to shifts and changes in the development of other species. The diagram is ghostly and life is contained within each dot as an instant. In sympathy with current metaphors, Ingold suggests that lines of ancestry are more accurately depicted as woven in that this metaphor accommodates lineage as both lived and spoken, an interweaving of both past and present experience (2007:117).

The topology[26] of the tree provides a stability and comfort. The character of organisms (objects) as singular, reliable entities means that they may be compared and organised with predictable outcomes. Gould's problem is not as much with the analogy of the tree as with its morphology (1989:38). He identifies each evolutionary tree as having two distinct morphological features: monophyly, in that each has a unique basal trunk; and divergence, in that all branches either die or divide further. He states that despite the multiple forms that a tree may take, the false iconography of the typical cone-like tree of increasing diversity conflates placement in time with complexity and development in a judgement of worth. In echoing Darwin's description of life in *On the origin of species* as an "entangled bank", Gould suggests that the complexity of the tree is possibly captured better by a "complex bush" (1989:36).

It is interesting to contemplate a tangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so

right: Tania Kovats, *TREE.* NHM, London, 2009
below: Peter Camper, 1794
overleaf: Galerie de Paléontologie et d'Anatomie Comparée, Paris



> different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting among us … there is grandeur in this view of life … having been originally breathed by the Creator into a few forms, or into one … from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved. (Darwin, 1859:362)

Many recent evolutionary tree diagrams employ a circular or radial format that draws on a cross-section. Here time is suggested by the outer rings of the tree and development is lateral rather than vertical. The association of the image of trees with time is reinforced by the frequent display of sections of large, fossilised trees at critical points within museums of natural history – at stairwells and resting points. The Natural History Museum in London provides a vivid example of the symbolic use of trees in relation to evolution. In the Central Hall a 1,300-year-old giant sequoia tree, "the largest living thing", is positioned across from a statue of Darwin on the main stairway.[27] The return of the statue from the wings of the museum to this central location in 2008 placed Darwin and evolution at the centre of the museum, punctuating the museum with reminders of scale and deep time. In 2009, in celebration of the 200th anniversary of Darwin's birth, an artwork by Tania Kovats, *TREE*, was installed in the NHM, further cementing the relationship between the branching tree and evolution. The work embeds a thin, longitudinal section of a 200-year-old oak, including roots, trunk and branches within the ceiling of what has been termed "Darwin's Canopy" on the second floor of the museum. Formally it invokes the format of the genealogical Tree of Jesse, represented on numerous cathedral ceilings including those of Canterbury and Worcester. Significant to this discussion, is that this work makes a self-conscious reference to both the tree as an enduring icon and to the association between museums and cathedrals. A reminder that the spirit in which museums of natural history were developed – as temples of God's creation – remains powerfully present.

1 This children's book by Margery Williams, first published in 1922, exemplifies anthropomorphism. The toy rabbit, feeling all the emotions of a human, wishes to become real. Eventually through the love of its owner it is able to evolve to a live 'real' rabbit.

2 In a diagram that unites both trees with the life of Christ, thirteenth-century scholar, St. Bonaventure's *Lignum vitae* has twelve branches and twelve fruits, each presenting a different mystery. A text from the book of Revelation is at the root.

3 Bouquet makes a comparison between three images in this argument. In Bendorp's tree of Adam, Haeckel's trees of life and the family tree of Gerard Schaap, she notes that the earth below the trees is symbolically turned to blood, the blood to sap, the sap to semen and finally into seed by the tree (1996:60).

4 Evidence of tree symbolism can be seen in the architectural forms of the pagoda and Buddhist stupa.

5 This story is usually interpreted with Jesus as the vine, God the Father as the vine grower, and the Christians as the branches: "I am the true vine, and my Father is the gardener. He cuts off every branch in me that bears no fruit, while every branch that does bear fruit he prunes so that it will be even more fruitful. You are already clean because of the word I have spoken to you. Remain in me, as I also remain in you. No branch can bear fruit by itself; it must remain in the vine. Neither can you bear fruit unless you remain in me" (John 15:1–4, NIV).

6 Deriving from the Greek word 'stauros' for stake, it is believed, particularly by Jehovah's Witnesses, that it may have been a single, upright pole and that the symbolic arms (*crux immissa* form) were added later (Cook 1974:20). Others believe it more likely that it was the *crux commissa* or T form. The cross bar was attached to the victim and this was hung upon the upright pole (Keyser, n.d.).

7 The oldest example of this is in Chartres Cathedral (1140-1150) where the tree rises from Jesse, father of King David, making its way in various rings to Christ.

8 Starting with the first man of the earth and ascending towards Christ, this has parallels with Haeckel's tree, growing from *monera* at the base to *menschen* at the pinnacle.

9 Genesis 5:1 begins: "This is the book of the generations of Adam" and continues to set out Adam's lineage from Adam to Noah.

10 Darwin acknowledges this in *On the origin of species*: "The affinities of all the beings of the same class have sometimes been represented by a great tree. I believe this simile largely speaks the truth" (Darwin,1859:129).

11 For more on this see Freedberg, 2002.

12 Here Augier quotes Linnaeus, C. 1751. *Philosophia botanica in qua explicantur fundamenta botanica cum definitionibus partium, exemplis terminorum, observationibus rariorum, adjectus figuris aeneis.* Kiesewetter: Stockholmiae [Stockholm].

13 See the Complete Work of Charles Darwin [online].

14 He writes as accompaniment: "Organised beings represent a tree, irregularly branched. Some branches far more branched. – Hence Genera – as many terminal buds dying, as new ones generated."

15 His idea may have been drawn from research published in his first monograph, *The structure and distribution of coral reefs* (1842).

16 Adam Sedgwick was Professor of Geology at Cambridge and a minister in the Church of England. He was responsible for instructing Darwin in geology prior to his departure on the Beagle. Similar to many others at the time, Sedgwick was looking for geological evidence to support the Creation and the Flood (Bedell, 2009:52).

17 He discovered that Archaea are distinct from eukaryotes and bacteria, warranting their own domain. Although structurally similar to bacteria, their sugars, proteins and fats are entirely different in composition and they are more resistant to extreme climates (Doolittle, 2000).

18 Mitochondrial DNA, inherited maternally, has subsequently been used as the key to tracking human origins and fuels the notion of an 'African Eve'.

19 Ian Hacking (2007) argues that rather than something static and definitive, the tree represents something growing, alive and changing, and that evolutionary theory should be characterised in the same way.

20 The metaphors surrounding the genome are complicated by those of language, mapping and coding. Models of molecular structures also evoke trees – bonds are twig-like, with uniting nodes.

21 However, the legacy of the linear ladder persists in contemporary interpretations of evolutionary history. Anagenesis is a branch of evolutionary representation that looks specifically at the evolutionary history of a single species and is used most commonly in palaeontology; a common example being the evolution of the horse from the Eocene *hyracotherium* to modern *equus* (Gould, 1989:36). This has often been misattributed and misunderstood. Although a direct path can be traced over time, this is to the exclusion of all other routes and extinct side branches that may have occurred and usually these are discrete species in which change happens over a relatively short period (Gould 1989). A ladder schematic is absolutely chronological, whereas a branching schematic allows for changes simultaneously and at different points in time. The development of the horse remains one of the most common examples of evolution used in museums of natural history today, and a display was present in most museums that I have visited for this study. As Gould indicates, this is a conscious decision that best illustrates a ladder-like development, as opposed to the rather messy thicket of rodent evolution.

22 The illustration, which has popularly been termed, "the march of progress" presents a compression of 22 million years of human evolution with fifteen human ancestors from *Pliopithecus* to modern man.

23 This is the projection of the mandible or maxillae beyond an imagined line in relation to the coronal plane of the skull.

24 Evidence for this theory was provided by intense comparative measuring of various skeletons. White was a polygenist, believing that all races were created independently for each geographical region, that they were fixed in form and that there was no common origin. Hybridisation was used to argue any mixing of species (White, 1799).

25 He is best known for his claim that "ontogeny recapitulates phylogeny" (*General morphology of organisms*, 1866) in that the developing embryo and juvenile animal goes through morphological stages that resemble those of its evolutionary ancestors.

26 I use this term in relation to 'network topology' that shows the layout of computer or biological networks. The structure of the network demonstrates nodes of convergence and the map of connections between physical or logical points. Most often this structure resembles the branching of a tree.

27 The Darwin statue was returned to this site, displacing that of Richard Owen, the museum's founder, which moved to a side, darkened corridor. The Darwin statue was initially installed on the stairway in 1885 and was replaced by the Owen one in 1927.

CHAPTER 3
OF WOOD AND TREES

On a mountain ledge high in the Drakensberg a family of leopards is awakening. Flecked markings and dappled sunlight converge as, framed between rocks and agapanthus blooms, cubs and parents are captured in a nurturing moment. Far-off hills reflect the early morning sun, dissolving into a perfectly clear sky. This Arcadian scene is one of 14 habitat dioramas installed at the Durban Museum of Science, which were painted by Nils Anderson in the 1950s.[1] In another scene, a wild dog mother lies recumbent, nursing her cubs while the father stands protectively guarding his family. Set in the late afternoon amidst languid hills, peppered with colourful foliage and darting birds, this is an idyllic moment – a view of Eden. On a recent visit to Durban I was privileged to catch the Campbell Gallery under refurbishment while the dioramas were being upgraded with custom LED spotlights to enhance the time specificity of the geographically particular scenes. The open cabinets had two effects: to draw attention to the artificiality of the constructed scenes and literally to expose the constructions to the viewer.

To be a viewer in a museum of natural history is, more often than not, to assume the role of observer, witnessing either a distant past or an arrested collection of specimens. It is to position oneself as outside of the cabinet, outside of the taxonomic boundaries of glass and, as such, distanced from a continuum of speciation. This separation is one that is heralded by the appellation 'nature/ natural', a highly contested term, and famously said by Raymond Williams to be “the most complex word in the language” (Williams, 1983:219). An abstraction that distances humans from something else – something archaic and pristine. Without agency, nature is, in one sense of the word, something that can be dominated, ordered, labelled, named and governed. Nature is often set in opposition to culture, yet there is no nature without culture: as a concept it is born of an understanding of human endeavour – and museums of natural history are as much museums of cultural history, constructed around human enterprise and burdened by colonialism, imperialism and patriarchy. Natural history is thus both a practice and a concept and the manner in which objects of its study are presented are clearly determined by cultural conventions and by entrenched narratives and mythologies.[2] In this chapter I examine how Genesis narratives are strongly located within the display of natural history and what these indicate about an attitude to speciation. In this discussion the impact of the book on museum display is that of the book of books – the Bible – and how it establishes a language of dominance and hierarchy.

It is perhaps not surprising that in spaces concerned with origins and lineage, various mythical narratives should be collapsed. The display of animal specimens in museums of natural history tends to rely on either dioramas or processional devices that evoke the creationist myths of Eden and Noah’s Ark respectively, both narratives deeply reliant on lineage and tree (genealogy) iconography,[3] and in both cases providing a male figure as the ‘first known ancestor’ in the development of a people. Adam and Noah

Panthera pardus, Campbell Gallery, Durban Museum of Science

mark the bookends of the antediluvian period – between two points of sin – spanning 1,656 years. And, while the appeal of dioramas to discrete, Edenic spaces may appear somewhat obvious,[4] the co-presence of both Eden and the Ark and their relationship to the iconography of evolution, has not been fully unravelled.[5]

Eden is an ancestral space, a site of purity and of grace, but significantly also one of ignorance or forbidden, divine knowledge. Despite knowledge being withheld, it is also a site of knowledge generation as the first instance of nomenclature – the proto-Linnaean naming of species by Adam. Genesis 2:19 tells us: "And out of the ground the lord God formed every beast of the field, and every fowl of the air; and brought them unto Adam to see what he would call them; and whatsoever Adam called every living creature, that was the name thereof" (KJV). Adam symbolises the taxonomist, identifying individual species, whereas Noah is the curator – custodian and preserver, organising species into groups and taking responsibility for their destinies. He performs the multiple actions of the curator: selecting, labelling, rearranging, storing, recontextualising, realigning, relocating, pairing and archiving. As custodian, his collection is taken out of the store and decommissioned before being released back onto land at God's command: "Bring forth with thee every living thing that is with thee, of all flesh, both of fowl, and of cattle, and of every creeping thing that creepeth upon the earth; that they may breed abundantly in the earth, and be fruitful, and multiply upon the earth" (Genesis 8:17, KJV). This recalls the directive to Adam earlier in Genesis: "And God blessed them, and God said unto them, 'Be fruitful, and multiply, and replenish the earth, and subdue it, and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth'" (Genesis 1:28, KJV). Scholar of science and religion, Peter Harrison, notes the change in the early modern interpretation of Genesis from a medieval symbolic interpretation of animals to a literal one. He quotes Francis Bacon "the first acts which man performed in Paradise consisted of the two summary parts of knowledge; the view of the creatures, and the imposition of names" and in this way taxonomy was seen as the first vocation, and nature as the first religion (Harrison, 2009:885–887). Naturalists were perceived as producing knowledge about the world and in this way, exercising dominion over it, and it is this spirit of mastery and patriarchy that was to find an analogue in the imperialist museums of the eighteenth and nineteenth centuries.[6]

It is curious that the modern museum should, despite a seemingly oppositional agenda, make appeal to the iconography of Genesis. Carla Yanni, in her book that examines the impact of architecture on the reception of natural history, notes that evolution and religion were reconciled in the Victorian museum by natural theology. As an extension of the Enlightenment philosophy that saw the massing of collections as evidence of God's power, evolution and slow changes in species were seen as testimony to God's continual involvement in creation, and the variety as evidence of his creative omnipotence (Yanni, 1999:14). Museums became symbolic cathedrals in which to worship God's work. The appeal to religious symbolism predates the Enlightenment. Early modern scholar, Paula Findlen, makes the point that late Renaissance naturalists "framed their collecting of nature within messages of redemption and salvation" and that within a renewed "encyclopedic optimism," botanical gardens were seen as reconstructions of Eden and museum collections as Noachian projects that ultimately surpassed that of Noah (Findlen, 1994:92). Athanasius Kircher (1675) described Noah's Ark as the first museum of natural history, and saw his own collector's impulse as inspired by Noah, ultimately culminating in his Musaeum Kircherianum in Rome. The conceptualisation of the natural history museum as an ark, concerned with conservation and preservation, has been closely aligned to its development.

It could be argued that popular Christian tropes for understanding taxonomy and lineage were established in pre-evolutionary proto-museums, and that contemporary display defers to these. However, although Linnaeus was motivated by a sense of a divine taxonomy and was referred to as the second Adam (Harrison, 2009:878), the conceptual approach to collections during the Enlightenment manifest in a dense layering and massing of specimens that made little obvious visual reference to the language of the Bible. It is only with the advent of the diorama in museums that the appeal to Eden became an overt, embedded, modern reference. Interestingly this roughly coincides with two groundbreaking publications of the nineteenth century: Charles Lyell's *Principles of geology* (1833) and Darwin's *On the origin of species* (1859). While both of these publications were to challenge the foundations of belief in divine creation, creative responses to them drew on the drama of natural form and light in ways that were reminiscent of earlier Romantic paintings. Artworks by Alfred William Hunt, John Brett, Frederic Church and even John Ruskin, executed between 1855 and 1857, demonstrate a fascination with geology and dramatic lighting effects.[7]

Dioramas, invented by Louis Daguerre in 1822, and popularised in the early nineteenth century, were initially theatrical devices that relied on the complex manipulation of light to transform a constructed landscape. The lure of this device was its ability to seduce and deceive the viewer into believing the veracity of the observed scene. The parallel development of the diorama and photography was evident in early diorama construction, which co-opted various depths of field and singular viewpoints, while more recent dioramas use tilted perspective and an infinity curve with the inclusion of real objects to present the illusion of recessive space. While the spectacle of the diorama was short lived as a purely theatrical device, it was to reappear within natural history museums towards the end of the nineteenth century. The word derives from the Greek *dia* (through) and *horoa* (view) and while this may initially have related

Lycaon pictus, Campbell Gallery, Durban Museum of Science
right: Mammal room, Kwazulu-Natal Museum

to Daguerre's diaphanous backdrops, the view through to the landscape has historical implications. Renaissance perspective provided an ordered, controlled organisation of a view over nature, dividing it into different grounds and framing it within a window. This formalised image of nature gave dominion to those who beheld it, and it is this visual legacy that persists within diorama construction. The frame of the diorama separates reality and illusion. Yet when a diorama is photographed, the illusion is complete, as the viewer becomes part of immediate foreground situated within the landscape. Hiroshi Sugimoto's black and white photographs of dioramas from the 1970s are clear examples of this, flattening any distinction between animals and the background and erasing evidence of the museum as a contextualising reference.

Carl Akeley, best known for his contribution to the American Museum of Natural History, New York, is credited with the first habitat diorama at the Milwaukee Public Museum in 1890.[8] Following this lead, museums throughout the world began to install similar displays and the allure of realism within habitat dioramas became standard practice within natural history museums well into the 1950s. The Durban Science Museum's dioramas from this period are typical of this style of display, and similar counterparts can be found nationally at the Iziko South African Museum, Kwa-Zulu Natal Museum and the National Museum, Bloemfontein. Indeed the display of leopards, described earlier, is remarkably similar to that of jaguars, set on the slopes of Box Canyon, Mexico, within the American Museum of Natural History's Hall of North American Mammals. Habitat dioramas generally contain single or double specimens, often with their young and sometimes with companion species, while lighting enhances the particularity of the geography and temporality. Specimens generally face forward and are frequently actively involved in hunting or feeding. Despite this, they are displayed in such a way as to suggest an inherent passivity and benign demeanour: their frontality and gaze acknowledges the viewer, while the distraction of the activity deflects a direct, challenging engagement. This has a particular appeal to an Edenic fantasy where humans and animals lived in companionable harmony. The suspended animation of the exhibits has the lure of familiarity in that year on year exhibits remain unchanged, predictable and familiar. As Michelle Henning suggests, there is a suppressed desire within the viewer that the animals may one day rise from sleep in their glass coffins and emerge as domesticated pets (Henning, 2006:51). Donna Haraway writes that taxidermied animals in dioramas allow a communion with the viewer that

transcends any lived experience. In every tableau there is an animal that arrests the gaze of the viewer – inviting visual penetration – caught "frozen in a moment of supreme life" (Haraway, 1984:54).[9] Animals here return the human gaze, recalling an idealised moment in an archaic past when humans and animals were in communion. The animals are perfect specimens, beyond mortality, disease and the ravages of time. The thick glass between observer and observed provides a conceptual threshold between species,[10] reinforcing an assumed hierarchy. Interestingly, there are very few examples of dioramas of domestic animals[11] – markers of the threshold between nature and culture. Instead, with the persistence of 'wild' specimens, human viewers are set apart from the landscape (nature), and located within the space of the museum (culture). This is a symbolic recreation of the expulsion. When Adam and Eve are banished from the Garden they are cast outside of the gates – set apart from nature to look from the outside into something separate from humans. At this point a threshold is established between nature (unchanging, constant, ideal) and culture (progressive, dynamic).

The term 'landscape' encapsulates the imagining of a relationship – both a vista and a surveillance – a clear political geography. Landscape is thus a cultural coding of nature and the space in which the tensions between these concepts is played out. At the end of the nineteenth century, landscape and the notion of nature were associatively conflated with the colonised body – a site to be ordered and controlled. Yet, at the same time, theories of evolution rendered 'nature' itself a space of anxiety, in that the distance between the animal and human body became contracted. Ideologically, structures had to be found to accommodate this repositioning and here Social Darwinist theories of the time provided justification for a racialised interpretation of evolution by linking survival, adaptation and race. In addition, a view of nature that was passive and, by association, able to be domesticated, fed into a hierarchical and tree-like understanding of the structure of speciation.[12] The will to tame the landscape through formal and aesthetic means has obvious political objectives. J. M. Coetzee's frequently referenced *White Writing* provides a useful entry point to understanding the dual appeal of the diorama and procession. He writes that "landscape remains alien, impenetrable, until a language is found in which to win it, speak it, represent it" (Coetzee, 1988:7). Referring to the indeterminacy of the colonial eye,[13] he identifies two responses to interpreting the unfamiliar landscape: that of appropriating a foreign image derived from the homeland and layering it over the landscape, or acknowledging the landscape as foreign and treating it as open, untamed wilderness. For my purposes I liken these responses respectively to Eden in the case of the museum dioramas, and Noah's Ark in the case of the museum procession.

Coetzee cites artist and cleric William Gilpin's popular eighteenth-century notion of the picturesque, which suggested that asymmetry and irregularity were desirable compositional devices, and that paintings should be structured around receding planes with clear fore-, middle- and background relationships (Coetzee, 1988:39–40). It advised that a foreground should be in sharp focus and characterised by rough elements and shadow, whereas distant plains should be atmospheric and luminous. I believe that this intense structuring of the landscape made (and still makes) an easy transition to the diorama, which, in order to seduce the eye, relies on highly structured visual grounds: the curved background, foreground specimen and foliage, and middleground 'tie in'. The backdrop most often depicts contemplative periods of the day: morning or late evening sky, and the glowing quality of light hints at a moment of epiphany – a re-enactment of a religious moment. Here two grand projects are powerfully conflated. In the appeal to the iconography of the Bible, and to the light of prophets, reassurance is given of the museum as a place of authority, illumination and truth. If museums are 'cathedrals of science', then illuminated dioramas are the stained glass windows, educating through an accessible narrative.

Typically, dioramas present a scenic backdrop painted from a superior viewpoint and elevated perspective to suggest a point of safety from where the 'active viewer' can imaginatively be inserted into the landscape. This connects with visions of colony and, in relation to this, Delmont and Dubow write of a "spatial inducement" and a "willingness to be located within a site and be enfolded by its perimeters," and of the picturesque they suggest that "it is a landscape which admits the colonial subject and, in reciprocity, returns his cultural gaze"

(Delmont & Dubow, 1995:14). Within their hermetic glass cases, animal specimens occupy this topography of paradise. The Garden of Eden is symbolically an enclosed space, uncontaminated by external influence. It is a place of arrested time, where species are immortal and perfectly formed. When Adam and Eve were cast from light and ordered to a dark wilderness, they found nature unpredictable, harsh, and animals were forced to prey upon one another. In a return to paradise within the diorama, animals are untroubled, seemingly non-predatory[14] and in catching the viewer's gaze, again commune with humans. Interestingly, in looking inwards to paradise, the viewer is cast into the space of the wasteland and forced to contemplate the chasm between the idyllic archaic past and the present.

The potential appeal of Edenic imagery at the end of the nineteenth century, when many museums of natural history were established,[15] is further complicated by a counter-industrial idealism and a romantic desire for spaces of origin, untainted by the city. The period is marked by a representational binary between a cyclical, Arcadian 'refuge from history' and a utopian modernism, which saw progress as desirable. Arcadia is scenic, passive, timeless, romantic and feminine whereas utopia is urban, active, masculine and linear.[16] Crudely, this can be applied to the Edenic diorama, which is a passive space of reflection and contemplation, whereas displays which appeal to Noah's Ark with an active, progressive parade of species, may relate to 'utopian modernism.'

The mythology of Eden establishes the fundamental gender stereotypes. Environmental historian, Caroline Merchant, writes of Eve's multiple roles: initially she is conflated with nature, virginal and pure. As fallen Eve she is associated with unpredictable, chaotic nature, while as mother Eve nature is a garden, nurturing and fertile (Merchant, 2004:22). Adam on the other hand is created in the image of God as creator, active and with agency. In this classic gender reading, the subjects within the diorama may be equated with the feminine – passive, inert and subject to the active spectator.

Merchant speaks of the Garden of Eden as one of the primary "recovery narratives" that have shaped western thinking (Merchant, 2004:11). She suggests that by the seventeenth century the Christian story had merged with science, technology and capitalism to form a progressive myth by which human industry and development attempted to recreate the Garden on earth.[17] Progress and recovery became conflated. The idea of progress can be translated to museum display, bound very much to the linearities of the iconography of evolution as previously discussed, this may indeed also play into a recovery narrative: an ascent towards an ideal state of purity and oneness with nature. Environmental activist, Alexander Wilson, makes a similar point in relation to 1950s Disney nature films that, while showing the cyclical and natural rhythms of nature, always constructed the films as a move towards a point of perfection – towards progress and the ideal (Wilson, 1992:119). In addition, video and film technologies of the time encouraged the translation of the experience of nature into those accessible to the camera. Thus, seen through the viewfinder, nature became a backdrop: familiar and known. The experience

of nature was a "viewing of" rather than "participation in" (Wilson, 1992:121). In contemporary society, the attempt to reclaim nature is correspondingly mediated by commercialism: tourism, parks, garden suburbs, gardening emporia, shopping malls, theme parks and the museum.

Eden and wilderness lie at each other's thresholds, and I argue that the natural history museum display works with both these contrasting spaces. The Eden myth is developed around binary terms: 'inside/ outside,' 'dark/ light,' 'order/ chaos,' 'fertile/ barren', 'known/ unknown.' The edge of paradise is a boundary place of change and transformation; peace and pain; pleasure and labour. Literary scholar Robert Pogue Harrison writes similarly of forests as the precipice at which humankind reflects on nature of being human. Forests separated communities and during the Dark Ages these were the spaces of fear, the unknown and superstition. In contrast to the ordered garden, vast European forests were seen as the place of the outsider, unhumanised heathens – set against Christian interior space (Harrison, 1992:62). Between 1,000 and 1,500 forestlands were cut and cultivated, becoming pastoral and domesticated – a literal emergence into light where "open fields became punctuated by church steeples" (Merchant, 2004:61–62). Merchant identifies this as an example of the recovery of Eden based on the transformation of wilderness.

The wilderness is a space of interiority, of emptiness and the unknown – a place before naming, before order, before Adam. It is also, in Judeo-Christian mythology, a place of challenges where faith and obedience are tested.[18] Within this characterisation, the flood was a test of faith, where a populated land was obliterated and returned to a *tabula rasa*. The flood produces a wilderness – a virginal landscape that, in readings of representations of the colonial (Coetzee, 1988; Delmont & Dubow, 1995), presents an unclaimed space over which the viewer can take symbolic ownership. The after image of the flood is of a denuded landscape, devoid of context and traversed by a procession of homeless animals.[19]

The Ark is the proto-museum – a gathering of specimens for posterity – a collection undergoing necessary confinement before release and propagation. In an evocation of evolutionary strata, species were paired and organised in layers within the ship in accordance with development and symbolic import (clean and unclean, male and female). The Ark was further divided into three stories: the lowest for wild beasts, the middle for birds and domestic animals, and the top level for humans (different versions of this myth report the layering in various ways). The righteous and virtuous were included within the orderly frame of the Ark, whereas the unnamed and the chaotic remained beyond its wooden confines.

Many late-Renaissance collections were part of a grand Noachian project. As mentioned, Jesuit, Athenasius Kircher's collection was inspired by Noah's Ark and in his book *Arca Noë* (1675), he set out to reconstruct meticulously the story of the Ark, including accurate measurements and a detailed list of species. In his rectangular drawing, animals were housed on the lowest level (*zootropheion*), food in the middle (*bromatodocheion*) and humans and birds at the top

(*ornithotropheion*). The need to argue convincingly for how so many animals were accommodated on one vessel resulted in a proto-evolutionary theory of hybridity, in which Kircher suggested that postdiluvian creatures developed as a result of different species coming together and in response to their environments. His vision of the Ark also allowed for mythical creatures (unicorns and gryphons) to inhabit the same space as known animals[20] (Findlen, 1994:92). Similarly, John Tradescant's collection of natural objects, the Musaeum Tradescantianum, which was to become the Ashmolean Museum, was known as 'The Ark' and was the first collection to be exhibited publically in England. Enlightenment museums were to start to select specimens based on typicality rather than scarcity and as in the Ark, needed at least two of each – one for display and one for the collection.

Within current museums, two galleries within the Muséum National d'Histoire Naturelle, Paris, present the most vivid examples of animal processions and references to Noah's Ark. In the Galerie de Paléontologie et d'Anatomie Comparée, hundreds of animal skeletons, sourced from all over the world, descend on the viewer. Framed within a skeletal architectural structure, reminiscent of the inside of a boat, the ghostly, unseeing assembly is led by a flayed figure, an embodiment of an illustration from Vesalius's *De humani corporis fabrica*. In the hierarchy of physiology, perhaps musculature sits above skeletal. The figure raises his hand skyward in a gesture of leadership and destiny and, as the only full human figure in the floor procession, compounded by the multiple ship references, the association with Noah is unavoidable. His other hand rests on a cut-off branch – a truncated tree of knowledge perhaps, or the beginnings of the 'tree of life'. The gallery displays a lateral symmetry, punctuated along its vast length by 'porthole' trophy heads. On the opposite end the 'Noah', a bust of Baron Cuvier, framed by whale jawbones, suggests the prow head of the ship. The frontally arranged animals are in pairs of equivalent scale and ordered into hierarchical groups – carnivores in the centre, flanked by herbivores, with omnivores on the periphery. Each specimen is raised on an oak platform, yet is given little contextual information beyond the species name. Like the Ark, this ship is ordered laterally and vertically. As the viewer progresses up the gallery, he or she moves backwards in evolutionary time, through dinosaur fossils on the first floor to non-vertebrate fossils – ammonites and trilobites – on the uppermost level. The effect of this gallery is extraordinary. On a hot mid-summer day in Paris, the gallery is infused with blinding natural light. There is no artifice, no boutique lighting, adding to a heightened sense of wonder, and no contextualising landscape. This is the barren wilderness at the end of the flood.

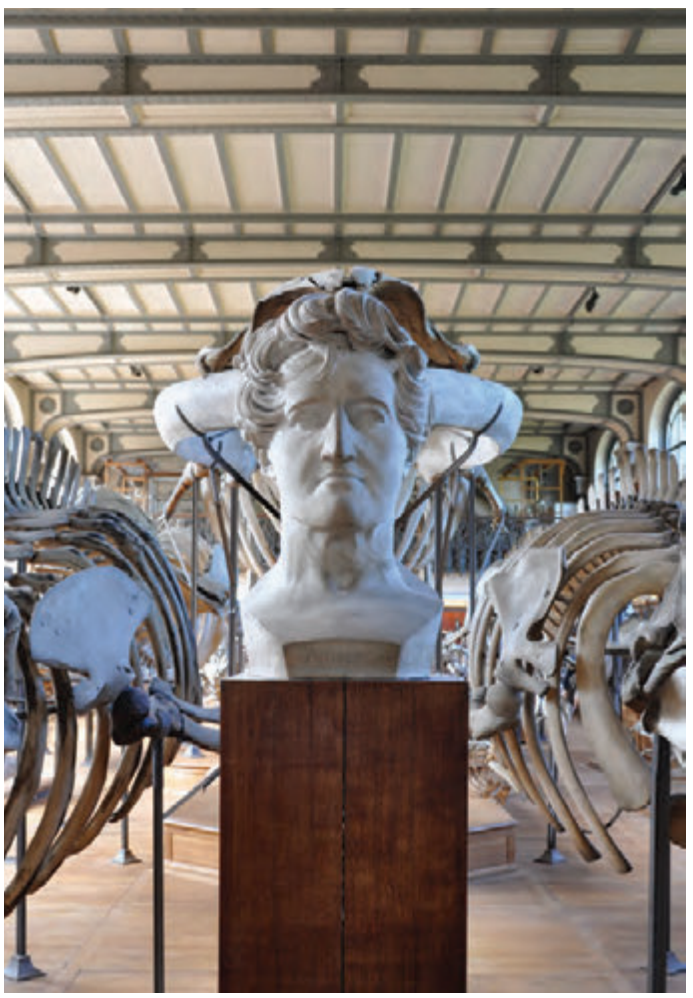
There is no individuated experience or intimacy in the relationship between the viewer and the single animal in the glass case. Here the natural world has been animated as a single unit, as a physical embodiment of the hierarchy of species, a skeletal *scala natura.* The presentation of the animal skeletons, without the context of fur, skin or habitat, does a number of things. Most obviously, the skeletons allow for a more direct anatomical comparison to be made – one that is not diluted by the vagaries of surface detail. More significantly, however, the stripped, treated and rearticulated bones exhibit a mastery over the animal kingdom. The specimens are not presented as artefacts that speak of their innate 'animalness', but as part of an entirety that is a human project of categorisation and ordering. This form of display is reliant on metaphor and narrative in order to function. In making appeal to deeply embedded iconography, the procession marks points of departure and points of destination and as such reveals the inevitability of the hierarchical order of the natural world.

The frontality, symmetry and massing of species is similarly demonstrated in the Grande Galerie de l' Évolution, a display assembled as part of the entire redesign of this museum in 1994. In this instance, however, the procession is of African animals only. Stretched across its length, bisecting the main gallery, these animals move towards the horizon – to a point of arrival rather than origin. Here the active procession is led by an African elephant, followed, in a taxonomy of scale, by rhinos, hippos, giraffes, zebras and smaller antelopes. Curiously gazing at their audience, one gets the sense that viewership has been inverted. These are

previous page: Central gallery, Muséum National d'Histoire Naturelle, Paris

right: Mammal gallery, NHM, London

below: Cuvier's bust. Galerie de Paléontologie et d'Anatomie Comparée, Paris



animals on parade, not moving through a barren plain, but cheerfully investigating their new surroundings. One is reminded of the journey of Geoffroy's giraffe in the 1820s. This giraffe, sent as a gift to King Charles X of France by the Pasha of Egypt in 1824, travelled up the Nile and across the Mediterranean by boat, where in 1827 it was collected in Marseilles by Étienne Geoffroy Saint-Hilaire of the Muséum National d'Histoire Naturelle before it was paraded 880 kilometres across France to Paris. Her death 18 years later went unnoticed (Ringmar, 2006). In this context one is struck by the thought that she has returned, yet this time as a tourist with agency rather than as a gift. Neither tethered nor bound by glass, this slow procession is reminiscent of an evolutionary march – a dimensional, if shuffled, evocation of Gould's "iconography of an expectation" moving from crouching ape to ascendant man.

But what are the myths of the expulsion from Eden and Noah's Ark if not the foundational supports of a taxonomical, hierarchical project? These two stories both point to key defining moments of human interaction with animals in which separation and division occurs. The expulsion from paradise results from human self-awareness – shame in the naked, aroused body – and an association between carnality and sin. It is this self-awareness and moral superiority that is the marker that separates human from animal. Adam's role as taxonomer reaches its natural conclusion when humans are elevated from the realm of animals: in eating from the tree of knowledge, humans are set outside of the animal kingdom. The appeal to Eden within dioramas is, in some sense, a nostalgic yearning to reunite this harmony between species from the inviolability of the space outside of the glass vitrine. Similarly, the flood is brought about to punish the morally suspect and those who demonstrate regressive carnality. Noah is positioned as the curator of worthy animals, selecting the best breeding pairs of land dwellers. For the first time a distinction is made between clean and unclean animals: the former making themselves known by demonstrating piety and kneeling before Noah. These animals were thus closer to humans on the hierarchical scale. One version of the myth is that as the animals chosen were the best examples of their species, they did not exhibit carnality until disembarkation, thus the Ark preserved its initial number of specimens. In this version, the curator's collection remained intact and humans retained their mastery over animals. The persistence of biblical iconography within contemporary museums of natural history is in many ways unsurprising and merely an extension of a worldview that sees evolution as an inevitable progression from simple to complex species, supporting human dominance. The idiomatic title of this chapter recalls a directive of the picturesque, that soft foliage should disguise structure, obscuring underlying form. In this respect mythology is the *Gypsophila paniculata* of hierarchical divisiveness. Within the Christian museum foliage conceals an anthropocentric agenda, based on the serialised, progressive narratives of the Bible: dominion over nature

and a divisive understanding of species. Within Eden the tree is at the centre – the spine of the book, surrounded by the landscape – the open book on either side. At the point of the expulsion, Adam and Eve move from the centre to the periphery. This is a directional move and the majority of iconic representations, for example Massacio (1425), Dürer (1510), Doré (1866), Michaelangelo (1509–1519), Signorelli (1499–1505), Ghiberti (1425–1452), indicate this as a move from left to right. This is in keeping with both the book as a progressive object that moves from verso to recto and with the directional movement of images of evolution.

1 The elevated positioning of the viewer over a mountainous landscape is reminiscent of the paintings by W. H. Coetzer of the Great Trek, designed for translation into embroideries for the Voortrekker Monument. All 14 diorama paintings characterise regional South African geographies and this, together with their aspect, also recalls Pierneef's nationalistic Johannesburg Station panels of the late 1920s. Anderson was largely known for his marine paintings and was deeply influenced by the highly structured work of fellow Durban artist Clement Sénèque (Berman, 1970:30).

2 That nature is a human construction was acknowledged by Enlightenment naturalists such as Comte de Buffon, who believed that nature's laws can never be known in themselves and that human behaviour guides knowledge. In addition, human nature is projected onto the animal world. His first animals of study in his *Histoire naturelle* were consequently domestic animals and pets (Asma, 2001:64).

3 The tree is frequently referred to as the tree of knowledge of good and evil. Rather than having a moral dimension, or being oppositional, biblical scholars suggest that this is a merism, a figure of speech which embraces a totality – thus a tree of all knowledge. In many ways this speaks to the museum impulse to provide an encyclopaedic view of a collection of all things.

4 See Donna Haraway in "Teddy Bear Patriarchy: Taxidermy in the Garden of Eden, New York City, 1908–1936" and Karen Wonders in *Habitat dioramas: Illusions of wilderness in museums of natural history*.

5 The Creation Museum in Petersburg, Kentucky, (opened in 2007) provides an extreme example of the conflation of biblical narrative with the display of speciation. This museum, established by the Answers in Genesis Ministry, presents a scenario in which time, science and mythology is collapsed within a world that is 6,000 years old. The central exhibit depicts a pastoral idyll framed between the tree of life and the tree of knowledge in which early humans and dinosaurs live companionably. In the exhibits, which are designed by the same people responsible for those at Universal Studios, Florida, the veracity and spectacle is a critical aspect of their persuasive argument. This argument asserts that there is no contradiction between the fossil record and creation, as dinosaurs boarded the Ark alongside all other animals and all geological evidence, used to support theories of evolution, originates at the same time as this.

6 The nineteenth-century sentiment that sent collectors, artists and taxidermists on imperialist hunting trips to secure perfect specimens in order to "bring a vision of the world to those who will never see it" (Henry Fairfield Osborn, President of the AMNH cited in Quinn, 2006:12) continues today. This was recently articulated by the Iziko SA Museum on receipt of hunter, Peter Flack's collection of rare taxidermied animals "the collection is of huge educational value. For many it will provide the only chance they will ever have to see these animals at close quarters" (iziko.org.za/static/landing/statement-peter-flack-collection-donation).

7 The relationship between visual art and natural theories in the mid-nineteenth century is discussed further by Rebecca Bedell in her fascinating essay "The history of the earth: Darwin, geology and landscape art" (Donald & Munro 2009).

8 Charles Willson Peale organised the first American scientific expedition in 1801 and founded what became the Philadelphia Museum. He developed habitat displays for specimens as a forerunner to the diorama and perfected taxidermy using arsenic and wooden carved armatures (Prince, 2003:15).

9 The reciprocal gaze between humans and animals has been the subject of much recent literature, most notably Derrida's discussion of his cat in *The animal that therefore I am* (2008) and Donna Haraway's dogs in *Companion species manifesto* (2003). Wendy Woodward has brought together African literature on the subject in *The animal gaze: animal subjectivities in Southern African narratives* (2008).

10 The word 'species' is derived from the Latin *specere* – to look at – and while it has come to mean entities that look the same and are gentically close, it is linked to the notion of spectacle.

11 Within Eden there exists the contradiction of co-existence of both domestic and wild animals. Only after the expulsion did farming, agriculture and thus the domestication of animals become necessary.

12 German biologist Ernst Haeckel's tree of 1876 traces a deliberate route from *monera* at the roots to *menschen* at the uppermost tips of the tree.

13 These ideas are expanded upon by Elizabeth Delmont and Jessica Dubow (1995).

14 There are of course instances of animals engaged in hunting and feeding. On the whole these are discrete and understate moments of carnality. One significant exception to this is found at the Maputo Natural History Museum, Mozambique, where animals are presented in a scene of frenzied carnage. The recent inclusion of the Peter Flack hunting collection within the museum represents a significantly different animal vision. The taxidermy has heightened the 'viciousness' of the animals that snarl and chew on bloodied meat. The representation of these specimens as predatory is a justification of hunting and a celebration of the hunter.

15 The Natural History Museum in South Kensington was founded in 1880 (move from British Museum); the American Museum of Natural History, New York, was founded in 1869; the Muséum national d'Histoire naturelle, Paris, was founded in 1793 and the Galerie de paléontologie et d'anatomie comparée in 1898; and the Smithsonian Museum of Natural History was founded in 1910.

16 The environmental art writer Rebecca Solnit suggests that landscape evokes a narrative of nostalgia and longing for a pastoral past that is simple, primitive and pure – set in opposition to the perceived corruption of the urban she says that contemporary art practice shifts landscape from the terrain of scenery to actively lived and experienced materiality (Solnit, 2001:48).

17 Merchant contrasts this with declensionist myths, which hold that the more humans progress technologically, the further they move from Eden.

18 Here Coetzee links notions of wilderness to the 'blood and soil' ideology of Afrikaner nationalism. Paintings of this period resonate with those from the American Manifest Destiny movement, demonstrating the same interest in 'religious' light and a conflation between light, ownership and civilisation. The use of this style of lighting within dioramas of the time in both countries draws attention to the national project of museums.

19 While the delivery of the olive leaf by a dove in Genesis 8:11 is evidence of foliage, the narrative of Genesis would suggest that plant distribution was limited immediately after the flood subsided.

20 Interestingly, this concern in the Ark coincides with the time of plague in London (1660-1665) and Italy (1656-1657). Kircher was one of the first people to observe microbes through a microscope. He proposed the plague was spread by small organisms and also suggested preventative measures, outlined in his *Scrutinium pestis physico-medicum* (1658).

right: Akeley Hall of African Mammals, AMNH, New York

overleaf: Central Hall, NMH, London

CHAPTER 4
LINEARITY AND WEBNESS WITHIN MUSEUMS OF NATURAL HISTORY

Collection and display are practices deeply invested in ways of knowing and ways of perceiving, and reliant on a dialogical relationship between objects. Since the early modern period collections have revealed the underlying assumption that objects are significant, able to augment complex narratives and that their particular arrangement can influence thinking about the world. It was precisely the physical proximity of massed objects within collections that allowed early biologists to imagine the formal and conceptual relationships between them (Jardine et al., 1997).

During the late Renaissance objects were organised according to points of similitude, with intuitive or chance relationships. In a move away from the textual, which dominated the study of natural history throughout antiquity and the medieval period, objects themselves were recognised as sites of knowledge. Findlen emphasises the importance of assembling of collections in the development of natural history as a discipline. Knowledge moved from text-based to object or image-based study and in this produced a "tactile, theatrical culture that spoke to a multiplicity of different audiences" (Findlen, 1994:192). The contiguity of the sixteenth-century curiosity cabinet was the ultimate interdisciplinary collaboration – an intuitive arrangement of dislocated objects and specimens from unrelated practices, with an organising principle based on resemblance, complex linkages and divine logic. Objects were recontextualised and ordered according to their 'intrinsic' meaning and symbolic value and the 'poetic' rearrangement of objects was encouraged to provoke conversation and reveal a divine code. The cabinet was a consilience – a literal connecting of dislocated objects and specimens from unrelated disciplines. This may be seen as a precursor of assemblage, a strategy that will be discussed later in this chapter.

Curator Ken Arnold, in his overview of early museums in England, points out that at the heart of seventeenth-century museum philosophy was an education reform that recognised the ambiguity of language and called for a pedagogy based on a system of objects. A language of things rather than words demanded a classificatory order and grammatology of entities – the emergence of display – and simultaneously required a new system of naming by which things could be unambiguously understood. The visual was thus held above the textual as a means of knowing. Within "houses of learning" objects were ordered so as to make visual arguments and meaning was entirely contingent upon the perceived relationships between them (Arnold, 2006:187). Objects were arranged in relation to narratives, and according to personal, contextual or circumstantial sets of connections.

The shift from cabinet to museum in the late eighteenth century has been seen as a change in representational spatiality. It was an epistemic shift towards a system of order based on the observation and physical evidence of objects (comparative binaries of observable differences and similarities) that ran parallel to the development of institutionalised spaces of collection. The novelty and wonder of the optically observable biological world required a tighter system of control that was to locate itself within the public museum, which as Bennett writes, as a result of its very publicness, took on systems of discipline and order (Bennett, 1995:94). Consequently, objects were seen to receive meaning from their relationship to the collection and were contextualised in direct comparison to others, rather than by previously loose and associative methods of order. In this way difference became the primary organising principle of taxonomy and classification during the Enlightenment and institutionalised museum. This ordering through difference has resulted in a display style that celebrates species as hermetic and singular. Specimens on display, while being emblematic, stand for a body of similar types and in so doing refer to a quantifiable body of knowledge about that specimen. In the nineteenth century specimens and artefacts were hierarchically and typologically arranged in ways that resembled physical lists or schemas, closely resembling those in books (Dias, 1994: 168). Classification in visible tables made the 'invisible' system (God's mysterious creation) apparent, and it is this legacy of display that persists in many museums of natural history today.

LINEARITY

The context in which objects are received impacts upon their reception and thus museum architecture can be used to reinforce a discrete understanding of species. What follows is a brief visual analysis of two canonical museums: The Natural History Museum, London and the American Museum of Natural History, and two local institutions: The Bloemfontein and Transvaal Museums. The design of institutional buildings, contributes to the reception and legitimisation of the bodies of knowledge that those institutions represent. It has already been mentioned that Victorian museums and their enshrined collections were seen as 'cathedrals of nature'. This was not only a conceptual association, but a formal one as well – the architecture of many museums being reminiscent of a church, and so reinforcing the embedded Christian narratives referred to in the previous chapter, and linking stability with authority. Christian churches are largely designed around a crucifix form, which reflects the bilateral symmetry of both the body and the tree. The progressive, narrative structure of the Bible is also recalled as participants move through a set of open doors, down a central nave that is flanked by aisles on either side, in the direction of the altar. This movement from the exterior through the congregation towards the site of authority, behind which is usually a grand window of light (God), is clearly a physical evocation of the hierarchical

scala naturae or Chain of Being – a chain that progressed from minerals, plants, animals, humans, angels to God at the pinnacle. In many museums of natural history (the Natural History Museum, London (NHM) and American Museum of Natural History, New York (AMNH) being two examples), this association is evoked. Visitors enter the buildings processionally, up wide flanking stairs that lead to the central point of the museum. From here they are directed towards an altarpiece – usually a dinosaur or large mammal. The museum spreads symmetrically from this point, horizontally to side aisles and chapels, and vertically in stratified layers. These layers are largely visible from a central open hall: various units of the whole being visible at once. In the Victorian museum this sense of unity made God's vision explicit. In addition to this, the obvious symmetry of the museum buildings together with arches of stone, metal and glass is suggestive of vertebrate bilateral symmetry. The viewer has the experience of entering the interior of an enormous creature and the experience of viewing nature is amplified by physically forming part of it. This is staged as a moment of epiphany for museum-goers, whose wonder at the majesty of creation is transferred to the mystery of their place in creation.

This ecclestiastic visual vocabulary is particularly evident in the NHM, London, designed by Alfred Waterhouse and opened in 1881 (Parker, 2010). Drawing on German Romanesque church architecture,[1] the central nave is lined by twelve side chapels with rising columns, vaulted ceiling, decorative stonework and stained glass clerestorey windows. The space of the altar is occupied by a statue of Charles Darwin installed in 1885, presiding as the symbolic high priest of the museum (removed and returned in 2009). The appeal of the building to religious iconography was seen by many to compete with the specimens that it contained – a tension between the cathedral and its congregation. The conflict between two key naturalists, Richard Owen and Thomas Huxley regarding the role that the museum should play in science, is manifest in the changes in the museum's form over time. Owen's approach to nature was religious and taxonomic rather than evolutionary. He believed that the museum should display its entire collection at once – this encyclopaedic approach being testimony to the power of God as creator. But it was also a nod to imperial conquest, displaying wealth through acquisition (Parker, 2010). By contrast, Huxley and Darwin's secular, scientific approach demanded the display of no more than exemplary specimens and emphasised that the role of the museum should be educational rather than entertaining. Both Darwin and Huxley saw taxidermy as theatre, vanity and crowd-pleasing and argued in favour of a skin, bone and specimen collection in storage and available to researchers (Yanni, 1999:113). This was realised in 1884 when Sir William Henry Flower, who succeeded Owen as museum director, was to re-organise the museum so that displays became increasingly intelligible. Flower envisioned the museum as a vast book, writing of the curator's role:

> Large labels will next be prepared for the principle headings, the chapters of a book, and smaller ones for the various subdivisions. Certain propositions to be illustrated … will be laid down and reduced to definite and concise language. Lastly will come the illustrative specimens, each of which as procured and prepared will fall into its appropriate place. (Flower, 1898 cited in Bennett, 1995:42)

The NHM developed to accommodate both Flower and Owen's positions, as did so many museums, separating the public view of the museum, where single and massed specimens are presented as spectacle (but with informational labels), from the research collection. The move towards the exemplary specimen in an isolated case that stands for the whole collection has in many ways contributed to a fractured discontinuous image of speciation. This is a bounded rather than relational image. Owen's plans for the entire collection to be visible to visitors – science as a product – anticipated some recent trends in museums. The Darwin Centre Cocoon, opened at the NHM in 2009, provides a bridge to research in the form of video insights by curators and views into the research collections, which contain in excess of 70 million specimens. The Iziko South African Museum is planning a similar project, starting in 2013.

Stegosaurus, NMH, London

The museum remains a place of spectacle with discrete sideshows. In the case of the NHM the dinosaur exhibits are the most popular, encouraging hundreds of visitors to queue in the rain in the hope of witnessing reptilian animatrons. Three million visitors pass through this exhibit annually. Upon entry into the museum, the 26-metre near-complete cast of *Diplodocus carnegii*[2] welcomes the viewer. This is significant in a number of ways. It is a reminder that the museum is a custodian of deep time and that evidence of this is held in its collection. The positioning of the skeleton, running the length of the central hall, introduces the idea of evolution as linear as it encourages the viewer to walk along a symbolic

above top: Mammal gallery. NMH, London
above: Origins of life gallery. National Museum, Bloemfontein
right: Central hall. Horniman Museum, London

timeline and consider their place in evolutionary history. Viewed from above, the vertebrae of the skeleton form a continuous ladder from the entrance to the central staircase, where the embedded message of ascendance can be physically enacted. From the entrance passage the visitor is channelled through to the dinosaur hall, where amidst screaming children, suspended dinosaur skeletons cast dramatic shadows onto the vertebral structures of the building. The exhibits are lit in such a way that they become one with the architecture, producing a strange combination between a charnel house and a shadow theatre. This theatricality is mirrored in the hall opposite the fossil hall – the shop – where museum visitors become less part of an audience and more part of an active acquisitiveness.

Although museums were initially designed in a way that more closely resembled a sequential narrative, older museums have developed somewhat haphazardly over time, newer exhibition wings and exhibits cast in layers over older ones. Although they do not always follow a chronological route, or a *scala naturae* from simple organisms through to human origins, they all have fairly tight thematic divisions along animal classes. The NHM retains the original internal architecture with halls dedicated to birds, reptiles and mammals remaining distinct. Segmented glass cases line outer walls and glass vitrines punctuate internal spaces, giving the sense of walking across a page of text: between paragraphs, broken into smaller units – words – the specimens themselves. The division into units that make up a coherent whole reinforces the experience of reading – one in which there is a sequential beginning and end, illustrating what Parry describes, that the "layout of physical space can become part of the reproduction of forms of enunciation and transmission of thought" (Parry, 2007:86). This is the case in Gallery 1 and 6, where taxidermied animals gaze out of cases over large, determining labels and are simply identified as meat-eaters, gnawing animals or even-hoofed mammals. Within the NMH mammal gallery, as in the Galerie de Paléontologie et d'Anatomie Comparée, Paris, specimens are arranged in a procession, symmetrically distributed around a large cast of a blue whale, *Balaenoptera musculus*.[3] Within this gallery one is able to follow the evolution of the elephant, walking from one cast to another, unfurling like a physical narrative animation. On the upper levels of the museum the exhibit 'Our place in evolution' contains a primate exhibition within which is housed a cast of an erect Caucasian man, set in stark contrast to the hairy creatures surrounding

him. Other than recalling Michelangelo's David, one cannot but be reminded of the marble statues of Huxley and Owen on the nearby apses. The museum is divided into various coloured zones within which further divisions are made into themed areas. The experience of moving between these areas is most distinct as varied lighting, and different forms of display and labelling systems define them. The museum is not apprehended in a progressive way, but rather as isolated units within which stories are presented as complete.

This is quite different on the top floor of the American Museum of Natural History, New York. The structure of the museum predictably makes its way from food halls on the lower level, through minerals, forests, and mammals to birds and peoples of America, to reptiles and primates, ultimately arriving on the top floor – the apex of the stratified *scala naturae* – to an area that celebrates the iconography of evolution. This section, opened in 1996, provides an extreme example of linear display. The entire floor is designed around a cladistic diagram of vertebrate evolution, a taxonomy that determines divergence in groups based on similarities and difference. Visitors are invited literally to walk from one node to the next, encouraging movement in a branched and binary direction. Starting in the orientation centre, the route is unidirectional, moving from vertebrate origins, to Saurischian dinosaurs, to Ornithischian dinosaurs to primitive mammals and, finally, to advanced mammals. The route is articulated by a terrazzo walkway, punctuated by circular nodes at which major evolutionary developments occurred, while information boards explain shared characteristics and divergences in diagrammatic form, pairing this with the route map. In contrast to the NHM, London, here the display of dinosaurs loses its obvious theatricality. Specimens are presented as tangible evidence of a scientific analysis: an empirical and incontrovertible voice of authority. This is supported by the choice of display materials: glass and steel – transparent, sterile and unequivocal. Here the spatial organisation is directly linked to the expression of a particular knowledge paradigm.

The Transvaal Museum and Bloemfontein Museum in South Africa both start with a walk through time, what Bennett refers to as contracted time and a "leisurely walk through evolution" (1995:186). The Transvaal Museum, now the Ditsong National Museum of Natural History, is famed for its collection of Robert Broom's hominin fossils from the Cradle of Mankind World Heritage Site, including the *Australopithecus africanus* skull, Mrs Ples. After ascending stairs flanked by trophy heads, visitors are directed into a display of 'Genesis van die lewe.' This circular walk starts with displays of an early reptile, *Cotylosaur,* and progresses 300 million years towards the first mammal, *Megazostrodon.*[4] Mammal-like reptiles on free-standing podia are oriented in the same direction as the route – sculptures on an evolutionary march of progress, walking towards a display of a 'tree of life' depicting the evolution of modern mammals. From here the viewer moves to displays of human origin, small tableaus in which 'a day in the life of the Swartkrans ape men' is enacted. There is a marked contrast between these small dioramas and the representation of other animals. In the mammal hall

above and right: Cladistic halls of early life. AMNH, New York
left: Victorian bird collection. NHM, London

specimens face the viewer with blank stares, standing passively on open platforms, whereas the hominins are actively engaged in communicating, hunting, cooking or caring for their young. The Bloemfontein Museum wholly embraces progress analogies within their display. The iconography of a river with an attached timeline is used to illustrate the development of life on earth. The viewer walks through an interpretation of a riverbed (a cast muddy floor with fossilised footprints), moving downstream from the source (protozoa) alongside cabinets of fossils, text and images, meandering through bends and tributaries to the origin of reptiles. At the bifurcating mouth of the river is found the development of mammals, culminating in the 'emergence of man' and examples from the Tang, Sterkfontein and Makapansgat archaeological sites.

These various examples serve to demonstrate that natural history museums have embraced an iconography based both on the tree and the book within their methods of display. In all instances the viewer becomes complicit within this visualisation of speciation and evolution as the requirement is to physically walk the route of progressive development. Unlike walking a labyrinth, where the circuit is a space of self-reflection and meditation, walking a line is the precarious route between two extremes. Applying this idiom to the linearity of the museum, the enactment of walking the path from unicellular organisms to mammals reinforces a view of the world that associates progress and development with merit.

WEBNESS

That the display of speciation within museums defers to tree iconography is fairly inevitable. It provides a stable and inflexible frame and reinforces what Eilean Hooper-Greenhill has described as the power of display in the modernist museum: "its capacity to produce visual narratives that are apparently harmonious, unified and complete" (2000:151). In an extension of the metaphor, the tree is nurturing, providing shade and protection, yet its foliage may disguise its underlying structure. It is both ascendant and descendant and its bilateral symmetry implies an inherent sense of order, whereas, if in a Cartesian framework order is taken to be positive, the web has negative connotations. It is complex and radial, simultaneously fragile and furtive and, rather

than inviting, it is a means to entrap. I emphasise this as the multivalent metaphors embedded within visual analogies have import for their endurance as cultural metaphors. It is impossible to speak of tree and web without reference to Deleuze and Guattari's late 1970s writings of arborescence and rhizomatics.[5] They identify the dominance of the tap and dichotomous root in most western thinking – a lateral system that foregrounds progression. The tree or arborescence is a hierarchical organisation of thought, demonstrating centres of significance and subjectification, defined and connected (Deleuze & Guattari, 1987:16), whereas rhizomatic systems take into account that ideas are dynamic, making connections with other systems. The web as a schematic of speciation may not correspond entirely to the Deleuzian rhizome, which is fuzzy, indeterminate and thus able to connect to other systems at any point, yet it comes very close. Interestingly, Deleuze and Guattari pre-empt the W. Ford Doolittle debate in 'Uprooting the Tree of Life' (2000) when they suggest that we may have to "abandon the tree as organisms do not move from simple to complex form, but from one differentiated line to another" and that genetic mutations in viruses "cause us to form a rhizome with other animals" (1987:10). This idea of interconnectivity is not a new one. Wittgenstein too in his *Tractatus logico-philosophicus* (1921), referred to language as a 'game' in which the meaning of a word or phrase is nothing more than the set of informal rules governing the use of its expression, and that things that appear to be connected by one essential feature may rather be connected by a series of overlapping similarities. Language here is seen as a multiplicity of criss-crossing networks of 'family resemblances,' and suggesting a complex system akin to the rhizomatic webness. More recently, Umberto Eco uses the idea of the net to best describe the structure of the encyclopaedia. In the net every point can be connected with another and any connection is conceivable; "a net is an unlimited territory. A net is not a tree" (Eco, 1989: 81).

A more useful trope to apply to the construction of display may be assemblage or collage, and although this loosely refers to Deleuze's (1987) term as a non-linear, fluid and adaptable method of knowing, it also has art historical roots. Collage is active and contingent, continually shifting and is able to embrace a range of incompatible components. As a modernist device, assemblage is an extension of collage and its extreme contiguity brings together a range of seemingly incompatible objects and images.[6] Assemblage is synchronous and relies on the symbolic reading of relational material values and forms (Deleuze & Guattari, 1987:23). Deleuze writes that in assemblage there is no division between reality and the world; representation and the book; subjectivity and the author. It flattens hierarchies and is thus non-linear. It is both additive and subtractive, simultaneously exhibiting an equivalence of values and stressing connections between elements. In Deleuzian terms, when viewing indeterminate objects in close proximity, assemblage suggests both a dematerialisation and an emergence. Assemblage is of course also an archaeological term used to describe a range of artefacts found in the same location or context – in this instance assemblages are seen to represent singular moments, cultures or industries. Assemblage develops relationships without symmetry – a perpetual, non-static dialogue between things. With respect to museum display, assemblage recalls the Renaissance *wunderkammer*, collections of eclectic objects juxtaposed to form connections based on similitudes and confluences. These connections ignored context, historical continuity or function and focused on visual interest and poetic arrangement in order to prompt conversation. This spirit re-emerges in recent times, as post-modernism has encouraged the fragmentary in the reassembling of images and the connection of the decontextualised, unfamiliar shards of information (Stafford, 1996:4). It is within these unexpected and unreliable relationships – the active place of association and the productive space of emergent ideas – that the entangled and web-like potential for museum display lies.

Digital information has clearly facilitated the manner in which seemingly different ideas and images can at any instant be brought into close proximity. When museums changed from the fixity of analogue catalogues to digital systems, the collection moved into a virtual space, allowing fluid connections to be made with ease, and as Parry remarks, authorship in the digital realm is an open process and at variance with the inviolate role of the curator[7] (Parry, 2007:106–9). The internet encourages visual curatorship as a daily tool – sites like Tumblr, Pinterest and Kapsul provide platforms where collections of images can be grouped and rearranged, whereas Picasa allows tagging to create infinite sets of relationships between images. Whereas these sites rely on a degree of active 'curation,' Google's 'search by image' brings together a collection of images by a seemingly random taxonomy. Grouped together by similar colour weightings, forms and textures, a search initiated with an image of a spider web will yield a collection of dead fish, zebras, cityscapes, grapes, cupcakes, blossoms and trees. Here formal allegiances suggest an infinite connectedness, again akin to the early modern museum collection. Julia Marcus describes the moment of insight within the museum as one that is entirely reliant upon the visual. The moment, in which the promise of truth is collapsed with the power of looking, resulting in a "poiesis which is so seductive, and so pleasurable" (Marcus, 2000:229). This is the primacy of vision and appreciation of wonder and the marvellous that is embedded within the curiosity cabinets of the early museum.

Museums should be spaces of thinking as much as they are spaces of learning. Julian Spalding (2002:22) alerts us to the important place of ignorance within museums and the need to emphasis what is not known, rather than what is. He says that this not only gives us a better understanding of the searching enquiries of past scientists who have shaped contemporary knowledge,

but that this is also the dynamic space in which audience attention can be captured. The appeal of museums has always been the encounter with wonder and this is still a powerful position to occupy – a space of incredulity about the world and what is being observed. Most self-consciously, this is practiced in David Wilson's Museum of Jurassic Technology, Los Angeles, where the collection of extraordinary exhibitions begs questions of veracity and authenticity. In presenting what is unknown as primary, the museum shares in a will to develop new knowledge, to question and to engage the public in debate. Doubt becomes a critical strategy as this uncertain space is one in which all participants can make a contribution. What I am suggesting is that while museums have long been predicated on certainty, it is through exploding what is known into a space of doubt that will create the fertile, discursive ground of dialogue. This alternative space of the museum is one of unknowing, the imagination, and the sensorium, where creative production is primary and understanding is not gleaned through empiricism.

CURATORSHIP

The etymological source of curator as carer, keeper and custodian has proprietorial connotations. The term curation has developed a wide usage and too frequently it is used to describe dry reiterations of overused visual forms or to describe acts of randomly assembled collections of artists' work. My understanding of curatorship, and the way in which I use it in this discussion, is one of active intellectual engagement. It is a discipline whereby images, objects and texts from several or disparate sources are, as defined by Stephen Greenblatt (1991), assembled in a new space in such a way as to deflect attention away from objects and images themselves and onto their cultural agency. Objects in museums are subject to a process of conceptual accretion and thus the role of the curator is to allow for the object to be redirected and speak from multiple positions. This suggests a move away from the authoritarian museum to a position where objects have a certain autonomy and the interpretation and meaning of which can be guided by the curator. It is in this reattribution and proximity of objects that chains of connections and associations can be made. For me, this is where curators defy established linear systems of display and start to work with a mode of display that approximates a 'webness'.

Guest curatorship by artists has become fairly *de rigueur* within museums, and the tendency has frequently been to foreground the language of the museum as subject. Of this Wellcome Trust curator Ken Arnold (2006:97) writes: "we probably do not need any more cases of unlabelled objects, old labels without objects, empty frames." It is not enough to quote the methods of the museum without engaging with its content and finding ways of representing that content. As Greenblatt writes "a resonant exhibition often pulls the viewer away from the celebration of isolated objects and towards a series of implied, only half-visible relationships and

previous page: Grande Galerie de l' Evolution, Paris

below: The spectrum of life, AMNH, New York

questions" (Greenblatt, 1991:232). It is in the understated juxtaposition of objects that these particular relationships emerge, and as recognised by Peter Vergo (1989), objects are contingent and contextual, 'reticent' until meaning is extracted from them.

Artists, unencumbered by scientific modalities, have been instrumental in the reinvention of museum practice. By uniting scattered collections and creating a 'community of objects' artists have been able to reflect on past practices, disrupt categories of display and comment on contemporary concerns. It is where objects are able to permeate multiple contexts and to be associatively interpreted outside of their given taxonomies that the work suggested by Greenblatt starts to happen. The projects of Fred Wilson and Mark Dion are frequently quoted in this regard. In his now legendary work that examined the politics of collection and display, Fred Wilson's *Mining the museum* at the Historic Society Baltimore (1992), displayed selected items from the collection in unexpected juxtapositions. These questioned the manner in which the history of slavery had been represented and, simultaneously the canons of display within the institution. Ku Klux Clan hoods reclined in push chairs and whipping gallows nestled amongst regency furniture. By merely opening conversations between objects due to their extreme proximity, Wilson was able to shift the interpretation of the familiar. Mark Dion both reclaims and recontextualises found objects and rearranges found collections. Working specifically with science collections and concerned with institutional shaping of knowledge, he appeals to the language of curiosity in constructing exhibits. He is perhaps best known for his *Thames dig* (1999–2000), in which the systematic archaeological uncovering of a site on the Thames revealed a mix of contemporary and older objects, which were taxonomically presented within eighteenth and nineteenth-century cabinet arrangements. The appeal is to a Linnaean system, yet closer inspection reveals the collapse of temporal and historical space, destabilising the expected and known. His work with museums and the representation of 'nature', mimics those systems of display and taxonomy in a reflection upon their ideologies and practices. *Scala naturae*, 1994, is a direct quotation of the Aristotelian system. Presented on a set of stairs[8] reaching to the ceiling are objects in various strata, but rather than conforming to the linear progression from minerals to humans, objects at the bottom of the stairs are technological residues – suggesting a circularity in the hierarchy. His work is formally aligned to its quoted sources, and the attraction is one of wonder in his use of systematics and process – a conflation of the *wunderkammer* with an Enlightenment regime of order. In this way it does not set up the curatorial web-like juxtapositions and connections that are of interest to this thesis.

Peter Greenaway also famously works with encyclopaedic lists and inventories. His films, *Zed and two noughts* (1985), *Prospero's books* (1991) and *Belly of an architect* (1987), are richly layered, connecting hybrid contexts: blending art historical, literary, scientific, filmic and contemporary reference, making webs of connections and a visual hypertext. They are temporal curations of complexly interwoven references. He has worked with physical objects too, but somehow these curated projects do not have the same density as the films. His *100 Objects to represent the world* is an opera presented as a catalogue and points to the arbitrary, cross-referential, impossible and absurd attempt to order and structure, intentionally colliding objects that sit outside of their taxonomic boxes. Responding to the Voyager spacecraft's 1977 collection of (white, patriarchal, privileged) images and sounds gathered to showcase earth to extra-terrestrials, his work brings together umbrellas, a crashed plane, melting ice block, Adam and Eve, Freud's briefcase and, in item number 6, the catalogue itself (Pascoe, 1987). Here the script self-consciously orates: "the whole world exists to be put in a book[9] – this is the book" (cited in Maciel, 2006:59). When considering these seemingly random objects and their relationships, connections are made between them – and as Greenaway points out in the script for the sixth object, 'catalogue' – any two items share a common history and "one object can represent many others" (cited in Maciel, 2006:59).

> A pen is made of plastic and metal and represents all plastic, from an intrauterine device to a trash bin, and all metal, from a needle to war ships. It has a clip to fasten in the pocket, recognising all the world of fashion, clothes, and costumes. It is covered by letters and numbers to represent a world of signs and symbols. It is a machine to represent all machines, projected to produce writing, from belles-lettres to gutter press. Its shape recalls a penis and produces ink to fertilise the page. You can see then how a simple object can represent so much. With such a pen we have compiled, to celebrate the millennium, a list of 100 OBJECTS TO REPRESENT THE WORLD. Nothing was left out, everything is represented, everything that is alive and everything that is inert, all materials, all sciences, all ideas, all teachings, concepts, illusions, tricks, types and all types of types. (Greenaway, *100 Objects to represent the world*. Object 6. Cited in Maciel, 2006:59)

Joseph Kosuth's *The play of the unmentionable* (1990) at the Brooklyn Museum exhibition was a critique on the institutionalisation of art, concerned with context and the making of meaning: how "art provides the evidence for what cannot be said, or for what can be said only indirectly" (Freedberg, 1992:38). Concerned with issues of censorship, work from the collection relating to taboos, expression and suppression was selected and juxtaposed with wall texts and statements from censors and the censored. Seemingly random juxtapositions of objects and texts with varying degrees of controversy made the


Supralittoral
Médiolittoral
Infralittoral
Circalittoral

viewer "as self-conscious as possible about the relation between conditions of context and the production of meaning" (Freedberg, 1992:44).

While Wilson and Kosuth's exhibitions rely on the recognition of the cultural contexts in which work was produced for the potency of their juxtapositions, the exhibition *In-finitum* at the Museo Fortuny (2009) opted for a more open-ended range of associations. Taking the notion of infinity, indeterminacy and incompletion as its theme, the exhibition proximately presented objects and artworks bridging 2000 years. In a temporal collapse, the curation aligned artefacts in such a manner that the incidental sat next to the grand gesture; aged objects appeared contemporary and contemporary objects ancient. The curation, loosely based on a taxonomy of formal resemblance in the manner of sixteenth-century display, paired nights skies and millstones, Anish Kapoor and a dusty Egyptian Bastet cat. It was a sensorium, using light, shape and texture as points of connection and in this way the exhibition spoke deeply to art practice itself and to what it is to be human. The content was illusive, labels only indicating the provenance of objects, and in viewing the exhibition the viewer was entirely activated in the creative sense-making process.

While these exhibitions are intended as temporary interventions into established institutional systems of display, they do not suggest any alternative for permanent exhibitions. They are tolerated as small incursions that do not threaten the status quo of the grand collections, the presentation of which remains fairly static. The Jay Walker Library (2002) is a permanent and private collection, and in contrast, can achieve what is only temporary in other museums. This museum has attempted to present its collection of books and artefacts in ways that suggest an interconnectedness of disciplines and ideas. Employing multiple floating platforms, etched glass panels and a structural layout based on an Escher design it collapses categories between objects and areas of study. It is more difficult for established museums to reimagine their display strategies, and where innovation has occurred it has been within new museums, such as the National Museum of Australia, Canberra (2001) and the National Museum of the American Indian, Washington (2004), where the architecture and systems of display have been sympathetic to content. Both of these examples work with objects, texts and audio visual material in dense layers. Julia Marcus argues that the danger is that these exhibitions become increasingly opaque. In response to the Museum of Sydney (1995) with "its collage of quotations, its erasure of distinctions and the absence of evaluation" she argues that the erotics of the museum – that based on desire and looking – are lost when comprehension and evaluation are removed (Marcus, 2000:231). With reference to a central display case, presenting fragments of the evidence of human technology, she argues that while this method of display of heterogeneous shards undermines grand narratives by collapsing distinctions between objects and knowledge silos, it does not filter what is presented in any way. She calls this "reactionary nihilism" in that the absence of texts and primary reliance on aesthetics within display produces an "unreadable visual text" (Marcus, 2000:240). She argues that while

left: Grande Galerie de l' Evolution, Paris

below: Google 'search by image' results using the input image of a spider web

this is an effective means of breaking up colonial narrative, it also denies those who most need access to their past, instead presenting a fragmented equivalence that is ultimately conservative. This is a valid criticism that I take into account within my own project. The luxury of disabling legibility is the preserve of the artist.

Most examples of 'webness' within display are found within social history, where the politics and literature of museum practice have had a radical impact on display practices. There has not been the same consciousness within natural history, seemingly reinforcing the perception of nature as neutral and unproblematic. An exception to this is the Grande Gallerie de l' Évolution in Paris which demonstrates what I consider to be one of the few examples of 'webness' in the display of evolution. This is all the more ironic as the Museum National d'Histoire Naturelle, of which it forms part, was the original home of Cuvier and Buffon, leaders in the systematic ordering of species. The gallery, built in 1889, was designed very much along the principles of a cathedral, as described previously: the central nave, surrounded by three layers of open galleries from which the entire museum can be observed. After slow deterioration, the museum was closed to the public in the 1960s. Most canonical museums have changed slowly over the years, adding new exhibits to old ones. This museum had the opportunity to refashion itself entirely when in the mid-1980s a plan was devised to renovate the museum and redesign it around the theme of evolution. Involving 200 experts under the curatorship of Michel Van Praët, the museum was reopened in 1994. There is a curious play between the highly stratified structure of the building and the interruption of this by the contemporary display. Transparency, reflection and lines of sight have been used as devices that deny any sequential experience of the museum. At any point an exhibit is either seen through another, reflected in another, or light from one penetrates another. The viewer is situated within a dense compositional matrix of vertical glass sheets and horizontal hanging clusters of specimens. In this way rather than observing from outside the cabinet, the viewer becomes embedded within the display. Repetition of materials and shapes create a rhythm throughout the space and this integration suggests an interconnectedness of exhibits, and by implication, an interconnectedness of speciation. Despite this, the Noah's Ark procession, discussed in Chapter 3, is visible from all floors. While this may be a reflexive gesture it is more likely that even in the face of 'webness', the musem is unable to escape its inherited linearity and occasions of 'webness' are only found on the periphery, clinging to the outer walls.

Although the various permanent and impermanent curatorial actions described above do not all locate themselves within natural history museums, they go some way to working towards what I would describe as the exploded book. In all instances there has been an attempt to acknowledge established linear systems of display and produce an alternative, open-ended and interconnected model. In this model, what I refer to as 'webness,' chronologies and standard taxonomies are interrupted and dispersed. This would perhaps be easily achieved through a virtual curation – the museum as a network of hyperlinks. This is not my interest, however, as it is through the affective and the apprehension of real objects within the particular context of the museum that the legacy of the 'book' can be redressed. Rather than relying on known relationships and set hierarchies between objects, these exhibitions allow for a three-dimensional experience: a zig-zag and up-down interpretation and affect. In this way their curatorial strategies fracture the book and are both explosions and collisions.

1 Alfred Waterhouse changed Francis Fowke's 1864 Italian Renaissance design for the museum to one based on Romanesque design. He believed that this style more closely reflected Christian roots (Girouard, 2005:31).

2 Of course the dinosaur is particularly pertinent to this museum as Richard Owen, the first director, was the first to suggest the name 'dinosauria' in a paper of 1842.

3 Across from one of my installed exhibits in *R-A-T,* opposite aquatic mammal skeletons, is a drawing of a whale and mouse skull. This refers to Linnaeus's classification of the blue whale – *Balaenoptera musculus* in *Systema naturae* (1758) as a possible play in scale between the largest of creatures and *Mus musculus* – the house mouse.

4 This early mammal from 210–190 mya closely resembled a rat.

5 "Rats are rhizomes" (Deleuze & Guattari, 1987:7).

6 Robert Rauschenberg is perhaps one of the most famed assemblage artists, combining found objects with printed material and paint. He relied on a vast range of visual resources or what Rosalind Krauss (1999) referred to as a 'perpetual inventory', from which he was able to create complex networks of associations. Interestingly he also was one of the first artists to include taxidermy in his work in his *Monogram* (1959).

7 Parry points out that the introduction of digital media to museums coincided with a general opening of the museum to public/ shared authorship (community projects and active participation) (Parry, 2007:109).

8 Dion's work is closely aligned with my own interests in the museum. This is acknowledged in *R-A-T*, where this work is referenced in the broken ladders in the water world display.

9 Here quoting Mallarmé's famous dictum.

Subtle thresholds seen through the rock art exhibition, ISAM

right: Iziko South African Museum, entrance

CHAPTER 5
CASE STUDY: THE BOOK IN THE IZIKO SOUTH AFRICAN MUSEUM

I was introduced to the printmaking section at the Michaelis School of Fine Art as an undergraduate in 1989. Although this was a period when print was becoming less conservative and more questioning of its own tenets, the historical residue of a discipline that had defined itself as one dealing with the relationship between text and image, typesetting, illustration and bookmaking deliberately persisted. Having been aligned to this section of Michaelis for more than 20 years, it is apparent to me that the historical legacy of print and the manner in which printmakers respond creatively from within the parameters of the discipline, is very much a feature of the school. My own practice is deeply informed by printmaking, and I now see curatorship as an extension of this language. An argument that I am making within this thesis is that museums are predicated on the form and structure of the book and thus many of the concerns are shared with printmaking, particularly the tension between object/ image and its text/ label. The binary structure of the book, the ubiquity of the rectilinear window that both the book and the printed image impose on the world are mentioned previously in relation to the linearity of display. Book Arts has become a tangent of printmaking and it questions what is understood by a book, rejecting its formal structure and finding alternatives to linear, sequential pages. Much of my earlier work questioned the authority of the form of the codex as well as the faith in texts. One of these projects used old school history textbooks, flotsam of the apartheid regime, to construct a paper armoury – permeable armour made of redundant texts. The power and strength of words in one regime becoming obsolete waste in another.

The dualistic form of print – existing as both matrix and printed image – has a curious reverse parallel with the museum collection. The single matrix is able to generate multiple, similar images which are publicly accessed, whereas the vast storage collection of the museum generates a single item for public display. The 'generative matrix' remains hidden behind closed doors. While this may be a conceit, there is something in the comparison between disciplines that have at their core the relationship between the unit and the whole. This opposition has been a significant aspect of my creative practice. Print and reproduction is also of contingent multiplicity, where a system is apparently connected through its visual congruity. This sense of a finite system that may at any time collapse has also impacted upon my creative choices. Printmaking is systematic, requiring careful planning for the realisation of an image and the technology imposes a delay in the creative process – an interruption in which the image is processed before printing. Further analogies can be made to curatorship as this pause is the necessary space of reflection and analysis of a collection before it is organised. Print is also directional, the realisation of the image moving from state to state until a final edition is signed off.[1]

My interests in the visual schematics of science go back to my MFA project, *The Dissection*, which reflected on the authorship of the medical image of the body and since 2002 I have been invested in creative practice that reflects on taxonomies, diagrammatic analogy and the schematics of knowledge systems, the form of the book and the structure of museum display. Within all of my past projects (introduced in the appendix) and within the two exhibitions to be discussed, there is a play between structure and randomness; use of language and its unreliability; repetition, serialisation and the undermining of the expectations that repetition sets up.

It is not incidental that I have chosen to work in the Iziko South African Museum. The Michaelis School of Fine Art shares a delicate border with the museum

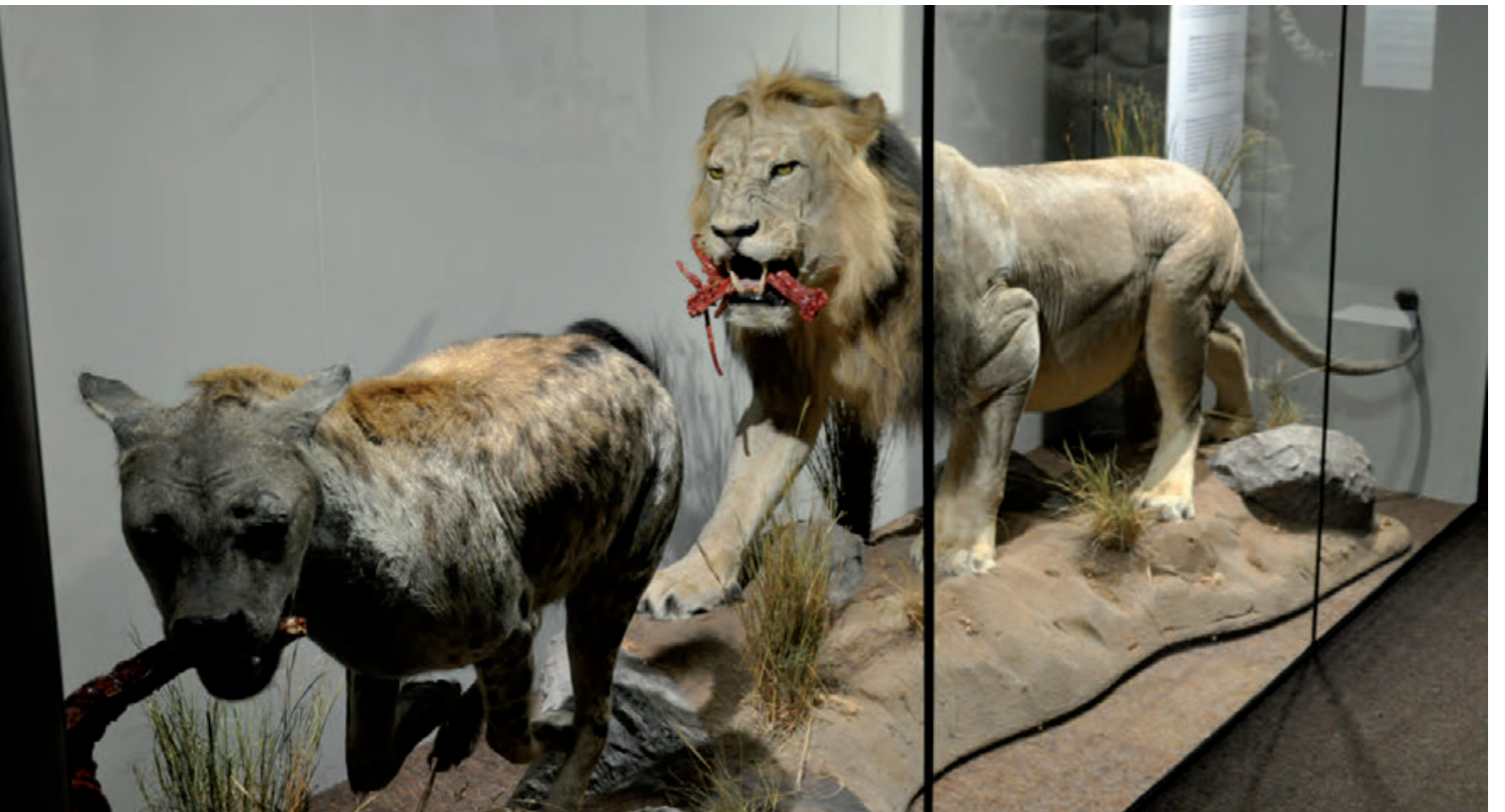
beyond which students are observed from the research wing of the museum and students, in turn, are able to imagine the careful classifying in the grid of rooms opposite. As an undergraduate who took bioscience as an elective, this imagined space was deeply appealing to me, although I was not initiated into the back rooms until my postgraduate years. Prior to that my interaction was with the display area of the museum, an experience inaugurated during junior school outings to the old insect room, printing exhibition and Boonstra dioramas of ancient Karoo reptiles, and capped by the many art school drawing, print and painting projects set within the museum. It was as an assistant to Pippa Skotnes in the production of the exhibition *Miscast* (1996) that I was first introduced to the collections, particularly those in social history. I subsequently designed *Ulwazi Lwemvelo* (1998), an exhibition focusing on indigenous knowledge systems in South Africa: technical, medicinal and structural, and curated *Charting the Earth* (1998) which looked at the museum's early lithograph collection of natural history, including works by Louis Agassiz. *The iconography of the genome* (Langerman, 2003) was another exhibition at ISAM, and was the first in which I experimented with a dispersed presentation throughout the museum. I was approached by Wilmot James, Director of the African Genome Education Institute to curate an exhibition that invited a number of South African artists to respond to the iconography of the genome. The choice of ISAM as a venue by the Institute was strategic. The implications of the Human Genome Project were by many identified as neo-colonialist, corporations taking possession of the genotypes of African populations without the informed permission of those communities. Its situation in the museum, with its particular history of human representation, was particularly poignant. Many of the works were site-specific and related directly to the context and history of the museum. My own work, *Model-making*, consisted of an eight-metre-long fluorescent 'model' constructed from disposable pharmaceutical paraphernalia. This was a symbolic unravelling of Watson and Crick's double helix model fifty years previously and questioned who the new model-makers are. Positioned directly above the whale well, the skeletal object of small units was contrasted with the enormity of the suspended blue whale skeleton. While some works were more successful than others in relation to the site, the exhibition did alert me to public expectation within this particular museum. The presence of artworks was extremely confusing to staff and visitors who were not inclined to try to understand them. That the works did not come with defining labels proved to be tremendously frustrating to visitors, and although a map was provided, the uninitiated visitor could not reconcile the sudden appearance of the works with the predictable order of the museum. *R-A-T* (2012) acknowledges many of these frustrations with the dispersed exhibition and co-opts them into the strategy for display. The discussion that follows provides some background to ISAM as a context for this study and as the site for my two exhibitions. I draw attention to the curatorial paralysis within the museum and suggest ways in which the 'exploded book' may overcome this.

THE IZIKO SOUTH AFRICAN MUSEUM

The Iziko South African Museum with its co-habiting social and natural history exhibits is, similarly to other museums of natural history around the world, essentially one that talks of the culture of science. The manner in which the objects are displayed and the history of the collections says as much about the museum as it does about the

Peter Flack collection, ISAM

right: Naro dancers, African cultures gallery, ISAM



specimens themselves – probably more. Yet these two provinces of science and culture lie in an uncomfortable proximity that has not been convincingly bridged. Rather than any attempt to co-opt display strategies to break with the colonial past, the museum has chosen to foreground the natural history collection – social history remains a side chapel to the central nave. As a means to obfuscate familiarity, certainty and any clear curatorial strategy, the museum has literally been plunged into darkness – increasingly so as the budget and pessimism of staff works militates against replacing bulbs.

ISAM is an institution built upon racial classification and determinism, as evidenced by the early collecting policy that, under Louis Péringuey (Director of the Museum, 1906-1924), developed the collection of Khoisan skulls and Bushman life-casts (Davison, 1991:105). The spread of Social Darwinist ideals in the late nineteenth and early twentieth centuries legitimised the association of race with evolutionary progress and so naturalised the conflation of 'primitive races' with animals (Gould, 1981; Gilman, 1985). In this way, collections of zoological and anthropological specimens were comfortably housed together in museums around the world. In describing the newly installed 1959 Bushmen exhibit, based on the natural history convention of habitat dioramas, the Director of the South African Museum, Alfred Crompton was to write: "The Cape Bushmen casts … will be seen against the colourful background of their natural environment as hunters, crude implement makers and inhabitants of primitive shelters" (Cape Times, 4 Sept 1959, cited in Davison, 1991:158), thus perpetuating the nineteenth-century construction of the Bushmen as close to 'nature', monkey-like and lesser humans. Much of the residue of the ISAM colonial collection is still on display. Unable to resolve the tensions between what is construed as natural and social history, the ethnographic gallery – constructed during the time of apartheid – has become increasingly dislocated from the rest of the museum – and also increasingly dark. Despite attempts at contextualising its 1972 displays, this wing, housing a number of cast figures in 'habitats' together with indigenous technologies, perpetuates the classificatory divisions between subjects of anthropological study and those conducting and observing the product of the study. In the late 1980s the museum introduced a contextualising label 'out of touch' that asked the viewer to consider the accuracy of the display in a contemporary South Africa. Current newspaper images were overlaid in the displays to point out that the population of South Africa was largely urban, and not conforming to the display of rural idyll. The 'out of touch' label and newspaper clippings remain untouched 20 years later – further evidence of paralysis in the ability to rethink the exhibits. The diorama of the |xam figures from Prieska, cast in 1912, has remained closed since 2001. Although several meetings and discussion groups have contemplated its future, the museum has been unable to act and respond to this heavily loaded symbol of imperialist and racialised study. It remains boarded, hidden from public sight, the figures shrouded

ghosts of the past. Interestingly, the 'Bushman Boy' cast by Drury in 1910, Tokai, remains on view, as do twelve other figures.[3] Contextualised by various technologies and ritual practices, these figures sit outside of the landscape in a denuded, labelled backdrop, suggesting that the offence of the Prieska exhibit may have been to connect the San with the landscape and nature. In the social history storeroom rests another impenetrable crate. In 2003 the remains of Saartjie Baartman, the 'Hottentot Venus' were returned to South Africa from Paris. As an icon of reconciliation and restoration of justice, her remains were buried near the Gamtoos River Valley. This box was used to transport her coffin and seems an extremely resonant symbol, that, were it placed within the ethnographic gallery, would enable a more complex reading of the space. Although the museum is aware of the potential of this object, until this moment it remains mute and in indefinite storage.

While museum studies over the past 30 years have foregrounded reflexivity – the need for museums to draw attention to the processes that gave rise to their collections (Ames, 1992; Clifford, 1988) – this process has been particularly slow within ISAM. Anthropologist and past curator at the museum, Patricia Davison (1991:89) writes that museums in post-apartheid South Africa faced the challenges of responding to changing conditions while remaining subject to institutional conservatism and entrenched historical modes. Although this was written more than 20 years ago, little has changed within certain aspects of this museum. While new displays of rock art, dinosaurs and whales[2] have been added, these have made appeal to aesthetics: to the devices of wonder and beauty, and have done little to introduce reflexivity into the display of animals. The isolated presentation of species

left: Peter Flack collection, ISAM
overleaf: Whale Well, ISAM

The King's Map exhibtion, ISAM. 2013

throughout the museum does nothing to contradict the assumption by the viewer that a lineage of diverse speciation culminates in humankind at the terminal point of the tree, which, within this particular context implies a racial hierarchy too. Nowhere is there evidence of the long and connected relationship that humans have had with animals. Nowhere is there evidence of the rich symbolism of animals in African mythology, (other than in the Rock-art exhibit, which remains discrete). While labels may give brief snippets of information, nowhere is there material and experiential evidence of animals as companion species, as desirable trophies, disease carriers, threats to livestock, urban pests or objects of experimentation. Even in the whale well, where the Museum attempts to give a direct, sensory experience of nature, amplified by sound and light, with evidence of the scale of the Leviathan, of its provenance, nomenclature, its extraordinary beauty and architectonic form, there is little of the intersection between whales with humans. There is nothing of the remains of whale bones left within the West coast middens by gather populations; of the history of whaling in the Cape, begun in 1792; or of the 12,000 Southern Right whales killed between Walvis Bay and Maputo over the next twelve years. The lone harpoon hidden in the upper gallery has to carry a weighty burden. There is nothing of the African legends that tell of the huge creature that rose from the sea, consuming all in its path, sent by God to teach humility to the king, or of all the biblical references in which the whale is used as a lesson in obedience. The Whale Well lives up to its name, and is a repository begging to be filled.

While the ethics of representing human form within museums has been hotly debated, the ethics of animal display within museums have largely been overlooked. This is notwithstanding the concerns that are raised as to the manner in which the specimens were sourced, which is countered by the inclusions on the label of the provenance of the animal – where it was found, when, and who performed the taxidermy – imbuing it with some sense of biography and historical reference. Yet this does little to elevate it from the typical to the specific. That these layers of reference are absent from ISAM is unsurprising, given its history. Founded in 1825 by Andrew Smith as an establishment for "the reception and classification of the various objects of the Animal, Vegetable and Mineral Kingdoms which are found in South Africa" (Cape Town Gazette, 11 June 1825 cited in Summers, 1975), it primarily focused on the collection and organisation of local flora and fauna. Its meagre collection grew to such proportions that it was relocated in 1897 from the bottom of the Company's Gardens to a custom-built space where it now stands. The display areas in the new building were restricted to the top floor and showcased mammal, bird, reptile and fish collections with a small area of stone tools at the top of the staircase. A typical late Victorian museum, exhibits presented in large glass cabinets, replete with

requisite classificatory labels, the museum was extended in 1977 and again in 1987 to include its current research and collections wing and what is now the four levels of the whale well area. While the old part of the museum houses dioramas, the social history collection, the old mammal collection[4] and the Boonstra dioramas, the new building opens to a central cavity or nave surrounded by the natural history collection. Although a fairly recent addition, this focal space attempts to place the viewer, as in many Victorian museums, at the middle point of natural history – the centre of power.

Interestingly, the museum used to house a large display dedicated to the history of print. Located alongside a section on the history of the museum, this exhibit (dismantled 2006–2007) unconsciously made the connection between the history of display and the history of printing – the museum as the physical manifestation of the book of nature. Designed in the early 1960s by Maciek Miszewski, who was to become the 'South African Museum architect', it was intended as the beginnings of a museum of technology, and reflected a largely Western history of printing, paper and typography. It contained a number of dioramas of printmaking workshops and processes, large printing and book presses and small recessed cases in which elements of printing were described, appropriately, with extensive textual labels. It also housed a large tree diagram of the development of type families. Since this exhibit was removed the resultant empty hall has remained one of temporary exhibits. Exhibiting only photographic exhibits, in grids of uniform, illuminated lightboxes, the space continues to reinforce museum display as a series of pages on the wall.

Ironically, in a hall directly adjacent to this space an exhibition opened in November 2012 that reinforced the connection between natural history and its propagation through the printed image still further. *The king's map: Francois le Vaillant in southern Africa: 1781–1784*, curated by UCT Film and Media professor, Ian Glenn, ran until May 2013. The hall, previously containing *Ulwazi Lwemvelo* an exhibit on indigenous knowledge,[5] within an amphitheatre and modernist design by Miszewski, was, in order to house the map, restored to its original form. With gold painted, moulded cornices and rich red walls, the gallery conjures up a Neo-Classical salon, fitting to house the map designed for Louis XVI. At the pinnacle of the Enlightenment, Le Vaillant's books and illustrations from his voyages in South Africa of indigenous peoples, birds, mammals and plants epitomise a way of organising the world with a classificatory eye. Glenn's intention was to open interpretations of Le Vaillant and his work, as presenting a complex view of colonial, Africanist discourse (Glenn, 2012). Although a noble intention, the method of display did nothing to mediate a re-examination of the subject, reinforcing a particular worldview of nature as part of a systematic, quantifiable structure: the museum as a book on the wall. Within an anti-chamber a preface introduces the exhibition – a frontispiece perhaps where images and texts set up an expectation of its contents. In the main gallery prints are hung in double volume in groups of eight or twelve, suggesting page impositions. The images are contextualised by small captions, again acknowledging their source and limiting them to illustrations. The display is punctuated with taxidermied animals that perch, like iconophors,[6] above each 'chapter'.

Many of these animals are sourced from the recent donation by hunter Peter Flack, including a six-metre giraffe – believed to be the tallest specimen of its kind in any museum in the world. The circulation of Le Vaillant's books of travel in eighteenth-century Europe is recognised as contributing to a vision of Africa as an open territory of new experience. Glenn alludes to this role of the imagination when he writes of Le Vaillant: "Before him, nature was a problem of farming and trade and killing pests; after him, nature is a space of liberty, revelation and adventure. Before him, the hunting expedition and safari were unthinkable; after him, they were inevitable" (2012:18). Roger Summers (1975) in his history of the museum, largely an inventory of past directors and staff, begins by describing Wouter Schoutens's reference to the number of stuffed and mounted animals in the fort at Cape Town in 1665. While he intends to illustrate a lineage of animal collections at the Cape, what this passage does is to illuminate the inextricable connection between settlement, colony, hunting and collection. Early collecting trips to the interior were often shallowly disguised political reconnaissances to ascertain the state of indigenous populations in remote areas (Kirby cited in Summers 1975:10). Big game trophy hunting continues to be more prolific in South Africa than any other country, reinforcing what Michelè Pickover describes as "imperialist practices of control and domination" and ideas of power, masculinity, paternalism and otherness (Pickover, 2005:19). While Le Vaillant's books may have inspired the genre of hunting fiction and travel writing, hunting and the collecting of animal trophies is what Peter Singer (1977) calls the ultimate form of speciesism: the legitimation of killing based on a hierarchical division of the natural world into categories of animals – a division actualised by the page and the cabinet within the book and museum.

1 My two recent exhibitions react against this progression and completion by intentionally allowing open-endedness and no obvious point of departure and conclusion within the exhibitions.

2 The museum has continued to focus on these areas, and it was for most of the twentieth-century known as the museum of Bushmen, whales and dinosaurs, also the title of a book on James Drury, taxidermist and modeller at the museum until 1942.

3 Many of these exhibits were removed just at the time of this document going to print.

4 Director Edwin Gill introduced the first habitat dioramas to the mammal wing in 1930. He was also responsible for revolutionising the museum labels, by introducing both a new typeface – Volva – and bilingual labels.

5 I worked on the design of this exhibition that opened in 1998 with its curators, Patricia Davison and Gerald Klinghardt. Set up next to the print exhibit, this created a bridge between the ethnographic gallery and other technologies.

6 This is a specific form of illustration emerging in late seventeenth-century French dictionaries in which the objects represented within the image start with the given letter. The first lexical work that made use of iconophors was Diderot and D'Alembert's supplement to the *Encyclopédie* in 1776.

When microbiologists began naming species in the 1800s, they could not inspect feathers or flowers like zoologists and botanists can. Microorganisms—especially bacteria and archaea—generally look a lot like one another. Some are rod-shaped, for example, and some are tiny spheres. To distinguish two rod-shaped bacteria from each other, microbiologists would run experiments on their metabolism. One kind of microbe might be able to feed on, say, lactose, whereas the other could not. From clues of this sort, microbiologists described such species as *Escherichia coli* or *Vibrio cholerae*. Underlying their work, however, was no clear concept of what it meant for microbes to belong to a spe-

TAXONOMY

1. Classification, esp. in relation to its general laws or principles; that department of science, or of a particular science or subject, which consists in or relates to classification; *esp.* the systematic of living organisms.

2

The exhibition establishes its own internal system of organisation. It makes use of a number of elements which exist both in series and find analogues in other parts of the exhibition. Formal repetition, the use of both positive and negative shapes, material pairings and the use of the cabinets as an index to the wall and floor pieces, make the project self-referential. The use of written texts, held in retort stands, provide the project an opportunity for self-reflection.

CHAPTER 6
STRATEGIES FOR TWO EXHIBITIONS

The title of this thesis is provocative. Explosions can be interpreted in three ways. The first is as the exploded diagram where component parts are liberated from their sutures – their borders and identities exposed. Here the explosion is controlled and the components are held in tension – liberated from the centre. The second form of explosion is cleansing – breaking down old, redundant structures to clear space for the new; and the third is as an act of terrorism – destroying that which is considered safe for mercenary ends. As a metaphor it is both liberating and threatening. It is a rapid release of energy and a resultant fragmentary scattering of parts. The exploded book relates both to the undoing of the integrated, progressive and binary structures of the book, and to the exploded view. Here a composite object is separated into its component parts, showing the means of assembly. All are appropriate metaphors. The explosion separates pages from text and denatures the bonds that present a strictly linear view of evolution; however, within the fragments is a suggestion that order exits – but one of many potential orders. *Subtle thresholds* operates as the exploded diagram, separating components within a finite space, whereas *R-A-T* operates as a more violent explosion, fragments dispersed and dislocated.

This is the core intention behind this body of work – to liberate the display of speciation from the sequential constraints as introduced through the 'Christian museum', and to present an alternative that is entangled, dense, complex and representative of contemporary web iconography. This is achieved by disrupting a linear progression through the display area, fracturing components of displays, dislocatiing objects from their labels, undoing the narrative structure and textual reading, and liberating display from the rectangle or page format. It is important to note that while this gesture is aimed at disrupting the legacy of the book as a linear system of display, transmission and understanding within the museum; it recognises, at the same time, that the book is perceived as an object under threat (Eco & Carrière, 2011; Stoicheff & Taylor, 2004) and that to explode it may, in the age of hypertext, be an unnecessary act. (While information access is dominated by the hypertextual, this language has not penetrated ISAM).

One of the problems that I have identified with display arises from the tension between the museum and its audience – what is anticipated of the museum as a location of knowledge and how the museum responds to this. Audience expectations within museums of natural history are fairly predictable. Having spent months installing exhibitions I was able to witness what has been the subject of many tomes on museum culture – 'the viewer experience' and to confirm that expectations are fairly standard across audiences and that when these are not met, the response is hostile. There are four main lines of questioning: Where does it start? Why is this on display here? What does it mean? Where is the text? The first question points to the yearning for a linear narrative that comfortably takes the viewer from start to finish. There is a security in this that nothing has been missed and the sequence has been completed. The second question stems from both a disciplinary expectation (that natural history museums should be about nature – that which can be understood at a distance) and from the expectation that natural history conforms to a particular type of representation. The third and fourth are compounded and appear absurd, but are the crux of the visitor experience – that meaning should be clear, defined and easily packaged for take-aways. It is for me the most concerning question as it implies that without an authoritative text the visual is impenetrable and redundant.

Mieke Bal describes museum display as a "sign system working in the realm between the visual and the verbal, and between information and persuasion, as it produces the viewer's knowledge" (Bal, 1992:561). My strategy has been to provide text, but to do it in a way that is visual. The text and the reading of the text does not open a door to the 'meaning-making' of the exhibition, but requires the same degree of interpretation as the visual components. The links between elements are often circular, returning viewers to a starting point and insisting that only through an investment in the visual shall the exhibition be understood. The experience of the museum as book is one that locates the viewer within a particular moment. Visual practice, however, while not necessarily producing verifiable evidence of the empirical world, does reveal knowledge and understanding through sensory and intellectual experience, and, in being both immediate and associative is both synchronic and diachronic. As curator Ralph Rugoff (1999) writes, "curators need to begin by addressing the audience's actual experiences in a gallery. And this involves re-imagining the conceptual context in which art is encountered by viewers". One of these contexts is determined by active engagement. What follows is a discussion of some of the strategies that I have considered in approaching the exhibitions, in particular making the viewing experience a more conscious and prescient one.

ACTIVE ENGAGEMENT

Typically, museums present objects as discrete entities – as synecdochical or metonymical specimens – within temporal or spatial sequences; and in physically traversing between cabinets, the viewer becomes complicit within a sequential articulation of species. Thus evoking what both Hooper-Greenhill (1992) and Foucault (2002) have identified as mechanisms of the disciplinary museum, the viewer becomes a passive recipient of this serialised march of progress. Many recent museum studies have claimed the museum as a discursive space and, in response, museums have recognised that in order to enrich the 'viewer experience' and delay the museum

fatigue that sets in after a studied 45 minutes, they need to develop programmes that solicit audience engagement and participatory activity. In a parallel to the shopping mall experience that William Kowinski (1985) describes as a paradox between stimulation and sedation, the passive viewing experience has been shifted to align with a reality TV paradigm that proclaims 'you too can be a part of this'. Interactive worksheets at MOMA encourage responses to artworks, while swipe cards in the Darwin Cocoon at the NHM, London and Greenwich Naval Museum allow you to gather data as you make your own unique museum database. Although the educational team at ISAM is more low-key, for *R-A-T* it suggested that I have a play area with living rats, a treasure hunt for children, and that I perform walkabouts as a Pied Piper of sorts. Tony Bennett writes that the museum spaces that he once described in his "exhibitionary complex" have been replaced by discursive ones. Within ethnographic collections and display intercultural dialogues are sustained by open texts that encourage interpretation and are not enunciated by a curator or a dominant position (Bennett, 2006:63). The indeterminate has supplanted observation and description. The visual will no longer suffice and exhibits have to be part of a 'museum experience': conversation and activity replacing the exalted hush of the museum.

Acknowledging that the viewer welcomes a degree of activity, both *Subtle thresholds* and *R-A-T* were indeed designed as challenges:[1] encouraging the collection of clues, ideas, images and texts, and spatially navigating a dense matrix of connections. In *R-A-T*, the dislocation of displays meant that many were missed – the viewer looking for the exhibition needed to seek help and so the search for the work became conversational – a communal experience. Both the curatorship and experience of the exhibitions were web-like**,** making the viewer walk the exhibitions in either defined or dislocated spaces. Neither had obvious starting or termination points, and could be entered at any location, so denying any progressive, sequential experience of the display. This search for linkages with no overt chronology is reminiscent of the strategy of the Renaissance *wunderkammer,*[2] where the appeal to the senses allows for associations, dissonances, resemblances and analogy to lead interpretation. Within the curiosity cabinet polyphonic relationships, speaking and hearing are stressed over 'ocular-centrism' (Daston & Park, 2001:274), and as Barbara Stafford writes of analogy:

> It offers a non-algorithmic technique for binding our perceptual system to our cognitive systems, expressed in terms of similarities and antithesis. Learning, in this development scheme, does not spring from a chain of reasoning, but from a dynamic back-and-forth motion among choices that embrace the entire universe in their scope. (1999:176–177)

SITES OF DISPLAY

As was mentioned in the introduction and in the previous chapter, the post-apartheid ISAM has found itself unable to resolve the tensions between various collections in the museum. In this deep paralysis, two things happened: the development of spaces for temporary exhibitions; and the proliferation of empty cabinets, that once exhibits were removed, remained vacant. Temporary exhibits allow for fluid and intermediate responses to circumstances, and need no permanent solution to problems of representation, whereas the neglected cabinets speak more deeply to an inability to redefine the role of the natural history museum. While both my exhibitions aimed to critique the display of natural history and find alternatives to the trope of the tree and the book, my additional intention was to design exhibitions whose subject matter responded to the particular challenges that the two different types of spaces presented. The subject matter and sites determined two very different conceptual responses and while strategies of display were primary, they were able to accommodate the insights that the subject matter – infectious disease and rats – provided.

Both exhibitions were highly structured and complex projects, wherein small, contained units operated within internal systems of categorisation and cross-reference. Attempts to analyse each project tends to be reductive and reduce each exhibition to thematic silos. Furthermore, as Peter Greenaway writes, any object can sensibly be connected to any other through association: text can be convincing where there is no visual coherence (Greenaway cited in Maciel, 2006:59). As the potential for visual display is the affective, textual discussion tends to dilute and redirect that which can only be apprehended in the presence of the work. What

follows is an attempt to describe the strategies of the two exhibitions as a form of methodology within this thesis. Although *Subtle thresholds* was contained within a single gallery, and *R-A-T* was spread throughout the museum, both exhibitions relied on the disorientation and destabilisation of the viewer and the viewing experience to affect interpretation. Certain conceptual choices were made in favour of the subject matter: infectious disease and *Rattus novegicus* are both markers of mobility – moving in and out of or around species. Both are agents of contagion, bound by stereotype and linked by the Great Plague. Both are borne out of human settlement and are dependent on interaction with humans for survival. Despite this, both are largely neglected by natural history museums as subject matter. In this way the insertion of rats and infectious disease into the museum is, I would argue, fitting in a thesis that looks to disrupt a hierarchical representation of speciation.

IMMERSION: Subtle thresholds

As Elaine Scarry reminds us, pain is the only perceptual state with no object and so cannot be expressed through language. It is the most contracted human experience, as it cannot be paired with any external referent, as opposed to the imagination, which she describes as the most expansive human experience. Although disease, unlike pain, has external markers and language, it is experienced in a way that is both contracted and at times, immersive (Scarry, 1985:162). With this in mind, my decision was to reflect the subject of *Subtle thresholds: the representational taxonomies of disease* within its construction. Exhibited in a large but bounded gallery it sought to challenge navigability and cross-referencing within a single, area that could be apprehended at once. Although 'pages' of the book were symbolically exploded, the exhibition could still be held in sight from a single point, and so while disintegrated, the evidence of the book remained. Although comprehending the exhibition required active participation in the linking and cross-referencing of images and texts, the viewer remained positioned at the centre of the museum, viewing the display from a position of authority. The exhibition was hermetic, and while the surrounding exhibits from social and natural history framed the reading of the exhibition, having some impact on the sequential encounter, it did not physically extend to other areas of the museum. The contracted experience of complex reading within the exhibition was intended to influence the visitor interpretation of consecutive exhibits. Thus, although the exhibition was not literally 'exploded' through the museum, the intended effect was of a delayed response to other exhibits on display, when seen in the context of those observed in *Subtle thresholds*.

Furthermore, in keeping with early museum construction, the exhibition self-consciously references the formal language of a cathedral. While there were also thematic reasons for this, the design along a central nave, culminating in an altar of wings, flanked by trefoils and rose windows with a central congregation of light boxes and confessional, referenced the museum of life, the cathedral of knowledge and, with its symmetrical design, the tree and book of life as well. This has multiple intentions. It draws attention to the relationship of Christianity to museums of natural history, the paradoxical position of religion to disease – both sin and redemption. Lastly, its obvious construction, draws attention to the artifice of exhibition construction, and in doing so, self-consciously proclaims itself as a critique of display. Mieke Bal writes that narrative is the most powerful form of address in the museum (Bal, 1992: 561) and the structure of the cathedral seemingly satisfied the expectation of narrative form – the security in a familiar symmetry that would reward careful observation with equally careful textual responses. It is this 'entryism'[3], this absorbing the patterns of museum display in order to invert them, that was a chief strategy in this attempt to destabilise the form of the book.

DECENTRALISATION: R-A-T

Human relationships with other species are variable: conditional, furtive, intense, irregular – very much like evolution itself. In keeping with this, the intention behind *R-A-T: an associative ordering* was to 'explode' a set of ideas about display throughout the museum rather than in a single location. It took a single species as subject, *Rattus novegicus*, and dispersed it throughout the museum, impacting on various sites in unpredictable ways. The interventions were designed specifically to relate to proximate exhibits and to shift the reading of those exhibits. In this sense it followed the modalities of assemblage, described in a previous chapter, which bring

together seemingly unrelated materials and images in the synthesis of a new complex whole. This strategy aimed to undermine the display of specimens as isolated units that stand as exemplary, typical and as visible components of a greater, hidden collection. I particularly selected areas for display where neglected cabinets had remained empty for more than ten years – markers of a post-apartheid museum unable to reinterpret their collections and displays. In this context the act of filling these cabinets, and with rats, no less, was a provocation. The reoccurrence of the rat throughout the museum not only referred to the furtive prevalence of this ubiquitous creature – an agent of mobility – but also served to draw attention to the dense layers of cultural and social history that connect humans and animals. The scattering of the interventions and the increasing impenetrability of the museum floor plan[4] itself undermined any form of sequential navigation: accessing the exhibition was random. The 'tree of life' is a two-dimensional icon, whereas the web or rhizome occupies three-dimensional space, able to be viewed from multiple positions, without ever achieving a sense of the whole. Similarly here, the entirety of the exhibition dissolved, and unlike *Subtle thresholds*, it was unable to be apprehended at once. Images and connections had to be mentally transported from one space to another in order to get any sense of a whole, and there was the prescient sense that parts may have been missed. This is the exploded book in the extreme: pages shredded, lost and reordered – torn from its spine, the book becomes a collection of loose leaves that have been allowed to flutter through the museum, erratically adhering to walls and floors. A far remove from the structure of the tree, this is a model of speciation that is contingent on a random context, connected, and rhizomatic.

The typical design of a museum places the observer at a single, central vantage point from where they are able to survey the institution. Resonant of Jeremy Bentham's eighteenth-century panopticon, the museum visitor is positioned in the space of the 'inspection house', able to observe the collection from one position.[5] Tony Bennett points to the open gallery as a mechanism whereby the public can exercise self-surveillance, and so enact one of Bentham's aims: to become "both the object and subject of a controlling look" (1995:101). Within *R-A-T* the starting point was unintelligible. At the entrance to ISAM was placed a panopticon on wheels. This contained a stuffed rat – a sign of the exhibition – positioned as surveyor of the museum. Whereas in most museums the entrance would signal an infinite space – the entry to an endless vista of the natural world – ISAM is truncated; new architectural interventions obfuscate any visual access to what lies beyond. The positioning of the rat, hiding under a dark stairwell is a further furtive act, small and insignificant, situated where dinosaur, whale and elephant skeletons may, in most circumstances, be expected. Rather than creatively reimagining itself as a post-apartheid museum, ISAM has chosen to construct a front desk and information board that dominate the entrance and give no particularity to the identity of the institution. In this context the rat changes families and becomes a metaphorical mole – an agent of dissent and critique operating from within the museum. Its place within the panopticon is an inversion, drawing attention to relationship between viewer and exhibits. It also signals the theme of perspective. Situated on a tiled Victorian floor (an allusion to a Renaissance Albertian painting) under what was originally the grand stairway of the museum, this particular perpective has no vanishing point.

Single point perspective, developed during the Renaissance, reinforced the position of the viewer, and privileged the human viewpoint. The codification of the rendering of a view became the seemingly "objectification of the subjective" (Panofsky, 1991:65) – an accurate image of the world. The museum typically immobilises this viewpoint within visible grids and lines of sight through the use of rectilinear display cases and dioramas with their single vanishing point and horizon line calibrated to the average male height. The viewer is positioned outside the frame or rectangle as an onlooker and passive observer. The view through a window onto a continuous landscape is one that, in Panofsky's words, is aggregated, as opposed to the "radically discontinuous" space of antiquity (Panofsky, 1991:44). In museums this continuity of vision reinforces the idea of progressive, linear evolution rather than one that is fractured and entangled. The modern vista is an opening up – the convergence of distant points of orthogonal lines in a view to infinity – "the concrete symbol for the discovery of the infinite itself" (1991:57). Perspective makes a worldview possible and so the positioning of the viewer within a vista is also firmly located within a Christian modality where the omnipotence and omniscience of God is proof of his

infinite being. Neolithic agrarian settlements established a relationship with nature as separate: as a resource or commodity, and furthermore the development of fixed homes, through whose windows nature was viewed, fixed the distinction between inside and outside spaces: spaces of culture and spaces of nature (Aloi, 2012:14). These windows were to become the rectangular frames of paintings and the rectangular glass dioramas. Expediency dictated my selection of cabinets within the museum, and I chose to work within the convention of cabinet display rather than introducing an alternative structure. Viewing is consequently contained and focused in nodes throughout the museum, yet the overall sense of the exhibition is scattered. The tradition of perspective in museums is alluded to by the inclusion of photographic backdrops taken from the Muséum National d'Histoire Naturelle, Paris, and, most conspicuously, this is parodied in the Mammal Room 'rats in Eden' diorama on wheels where the ideal view can be randomly redeployed. The museum view is typically directed, with a focal point centred on specimens within a predictable environment. In contrast, *R-A-T* employs collage and assemblage resulting in a scattered view with no vanishing point, undermining the tensions between equivalence and difference.

REFLECTION

The rejection of the book as an appropriate form of display also rejects the symmetrical pairing between an object and its equivalent: the recto-verso binary of the book; the matrix and the print; species and their printed image. Mirror reflection is the literal manifestation of this and mirrors, repetitions and inversions have been extensively used in both exhibitions.[6] At the most obvious level, this draws attention to the acts of looking and seeing.

Museum practice is on the one hand based on careful study of the collection, and on the other the observation of the collection as presented for display. The natural history museum is thus an edifice of directed looking. The insertion of the mirror literally reflects the museum and its own practice, reminding the viewer that looking is a complicated act. Elkins suggests that there is porosity within the established binary between observed object and viewing subject. The viewer is changed by the encounter with the image, therefore the object itself and the viewing of that object is constantly changing (Elkins, 1996:44). This recalls Lucretius's theory that the image comes from the object, that it emits corpuscles, 'atoms' or 'simulacra' that pull together when they meet the eye. Lucretius explains sensation as contact: the act of viewing is an exchange (Melchior-Bonnet, 1994:103). The use of mirror activates the moment of seeing and serves as a reminder that the act of viewing is dynamic and that interpretation is contingent upon the visual intersection with objects. Mirrors throw back the image of the museum and, with the associations of trickery, uncertainty and deception, bring into question the veracity of what is on display and the authority of museum. The reflection captures the surrounding displays in infinite series of reflections and here acknowledges the vanity of Narcissus, in that museum display is frequently confounded by a solipsistic concern with its own history of practice.[7]

The mirror and its origins are used in a highly self-referential and self-conscious way as not only is the Latin origin of the mirror, *speculum* – to see – but also the etymological root of spectacle, speculate, species and specimen. In contemporary use the speculum is a medical device used for examination (20 of which were used in *Subtle thresholds)* – in this case relevant as a diagnostic tool for unobstructed visual access to the 'internal body' of the museum.

Genesis 1:27 begins with a mirroring: "God created man in his own image." Reproduction and echo is thus at the start of the Christian project, and taken up in the Middle Ages, the mirror becomes a site of knowledge: a space to know God and human limitations (Melchior-Bonnet, 1994:106). The mirror reflected the light of divinity, collecting the image of all of God's creation over time, and it is this sense that inspired medieval encyclopaedic collections. Not only were these testimony to the magnitude of God's creation, but in their vast catalogues and inventories, created a likeness, a symmetrical "book-mirror" of creation (Melchior-Bonnet, 1994:113). This encyclopaedic mirror of creation repeats itself in the comprehensive Enlightenment and Victorian museum. The mirror as a symbol of the inestimable, the unseen has some origin in Renaissance optics where the mirror facilitated entry to the infinite universe, magnifying the invisible,[8] and in this way the mirror still remains a symbol of illumination.

Elkins (1996:48) writes that mirrors are like empty eyes, blind until the viewer is in front of them. They are both looked at and looking at: seeing and being seen. This dual functioning is significant within the exhibitions as the mirror is able to shift subject/ object relations, making the viewer consciously complicit within the viewing experience. On the most obvious level, the viewer's reflection becomes part of what is viewed – a point of self-reflection – but more than that, the moving reflection introduces a temporality to the viewing experience, which is changed by aspect and proximity. The mirror documents the walked passage through the museum and the performance of that journey.

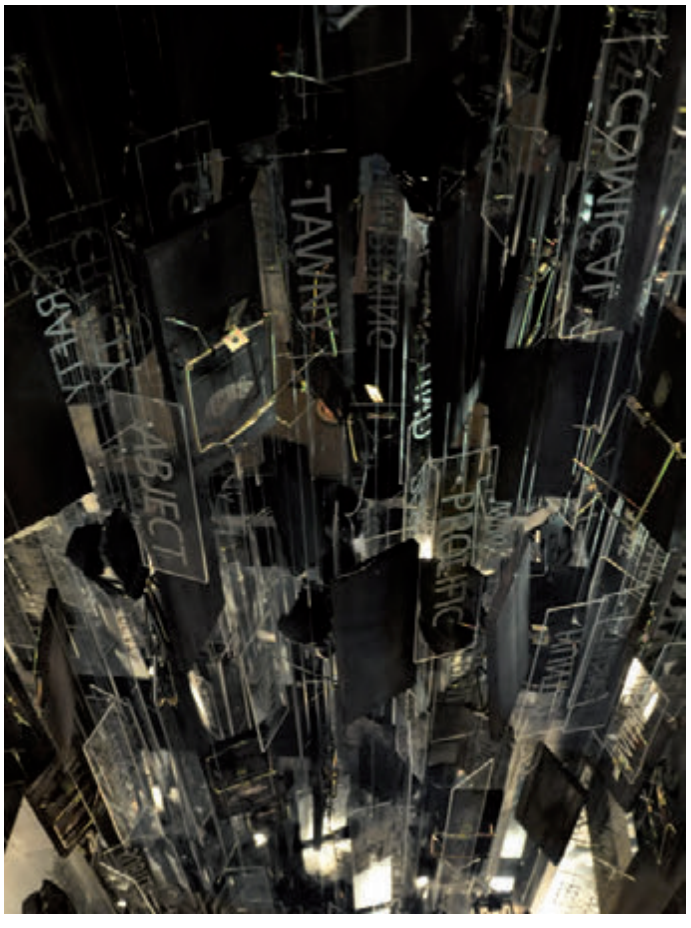
As Melcior-Bonnet (1994:192) writes, the mirror is a perfect resemblance, but rather than a perfect truth, it plagiarises the image. The mirror does not discriminate. It is non-selective and non-hierarchical: a leveller that inverts and relays all that it receives. In this sense it is the foil to the curator. An antithesis of careful selection and sequential narrative, the mirror foregrounds equivalence rather than difference, and in creating doppelgangers emphasises points of similarity. In setting up infinite repetitions chronology is interrupted and all images and objects are mediated through a screen – seen past and in relation to each other. In a Lacanian sense, the idea of human as animal, previously fractured by a hierarchical ordering of species, is integrated within the wholeness of a visually entangled view of speciation. The use of reflection as an equivalent for a web iconography of evolution can be seen as an aberrant moment in horizontal gene transfer where material is relocated from one organism to another.

Moreover, both of these exhibitions are about looking and the power of viewpoint within the museum. Museums and the display of collection are dependent upon a visual discursive schema that acknowledges proprietorial vision – the domination of the viewer.

LABELLING

In order to dislodge the certainty of interpretation, these projects attempted to disaggregate object and image from text and label, allowing for a sensorial apprehension of the material presented.

The emergence of the museum label is indicative of the dual functioning of the museum: both classification and display. Parry traces the origin of the emblematic label to the Renaissance, where images and objects were connected to mottos and abstruse texts (Parry & Ortiz-Williams, 2007). The label was an opportunity to expand the interpretation of the object and its association with other objects in the collection. He sets this in contrast to the emergence of the label as a means to classify and order. How, where and when labels should appear has plagued museum exhibitions, and the current use of labels sits somewhere between these two uses. Labels have a poetic and practical relationship to objects, yet the dominant sense is that objects can only be animated and illuminated through informative texts, and that curatorial



intent should be transparent. That the curator should be in dialogue with the museum audience is nothing new. Athanasius Kircher's Musaeum Kircherianum included speaking trumpets in the halls so that visitors and curators could converse. In the Enlightenment museum this dialogue became more discrete, emphasising reading and looking.

Louis-Jean-Marie Daubenton, appointed as the chief curator of the Cabinet d'Histoire Naturelle, Paris was to write of the collections on display in 1749:

> Everything in effect will be instructive; at each glance not only will one gain knowledge of the objects themselves, one will also discover relationships between given objects and those which surround them. Resemblances will define the genus, differences will mark the species; those marks of similarity and difference, taken and compared together, will present to the mind and engrave it in the memory of the image of nature. (cited in Bennett, 1998:351)

In this way objects were arranged by curators to communicate an authority of order to the visitor. Labels and objects became a singular entity and experience. Bennett writes of this "to see is to name correctly, to name correctly is to see" (1998:351). In the Victorian museum this was amplified, and the didactic label required extensive reading. Visitors progressed from case to case as through the pages of a book. Labels became increasingly important as a way in which to pin down the interpretation and understanding of objects, filling the gap between expert and observer. Smithsonian secretary George Brown Goode, saw the museum as best exemplified as "a collection of instructive labels, each

illustrated by a well-selected specimen" (cited in Bennett, 1998:363). The narrative power of the object was elided, as objects were illustrations of texts.

Label writing for museums has recently developed into an independent study, with countless books and journal articles dedicated to the subject. Studies have concluded that museum visitors will read no more than 50 words in object labels, 150 in room labels and 300 in introductory texts (Bitgood, 1989:4). Furthermore, research into legibility has identified that the following hold the attention: labels making explicit reference to observed objects, labels divided into small units of information, and labels that ask questions of the viewer (Roberts, 1997:218). The shift in the 1990s from the curator to the educator as producer of label content, driven by assumed audience expectation, has resulted in what has been termed a 'Disney-fication' of museum halls (Roberts, 1997:219). There has been a move towards encouraging the public to bring personal experience to bear on the interpretation of exhibitions, shifting the responsibility of interpretation from institution to viewer. This sets up an opposition between the 'visitor experience' and its role in 'meaning-making' and the curatorial-positivist approach (Roberts, 1997; Serrel, 1996). As Arnold writes, the meaning of objects remains somewhere between curatorial intention and viewer perception – between object presented and objects perceived (2006:91).

The label governs perception. Even when viewers first engage with a display, they invariably confirm their experience by reading the label. The text legitimates the viewing experience, confirming a prior conceptual framework or assisting when it proves inadequate.

When the script is not made available, the accuracy of interpretation cannot be verified and the answers cannot be checked. It is assumed that without these nodes of authority the object or display remains reticent and obdurate and that only through informative labels can any understanding of an exhibit be achieved. The disaggregation between the object and the label has become a central critical strategy within contemporary curatorship. Objects may be contextualised by proximate objects, becoming surrogate labels; text becomes object; and labels themselves become the objects of display. Kosuth's *Play of the unmentionable* (1990), as previously described demonstrates this principle: wall texts holding primary value as bearers of meaning. Fred Wilson's work, *A collection of numbers 76.1.25 3–76. 1.67.11; white drawing ink, black India ink and lacquer, c. 1976*, is a prime example of the use of the title to invert the causal relationship between the label and the object. In the presentation of these chiselled arrowheads, the collection dates are presented, prioritising the collection system above the objects themselves: the system eclipses the object.

My strategy has been to introduce a visual complexity that does not rely on the textual for verification. Labels become dynamic. Objects are labelled but the labelling system is self-contained and independent of the objects to which they are related: the label becomes an object and the object a label, the location of authority in the textual is thus undermined. In *Subtle thresholds*, text is manifest in many forms. Numbered retort stands, scattered throughout the cabinets, hold texts that are self-reflective, containing source texts, quotes, theoretical inspiration and planning documents for the exhibition: construction as meaning rather than final product. Specimens are labelled with diseases that they may carry. No further information is given, thus drawing attention to the barrier of textual interpretation. The walls of the gallery do not use the reflective strategy of the other areas so are 'read' across the surface, resulting in a more constrained experience. Access to texts are restricted: framed mythological texts are literally inaccessible and too small to read; a 68-metre timeline of small type circumscribes the entire exhibition area, and includes a biblical concordance of disease running counter to a more conventional microbial history; GPS co-ordinates on signage plates allow coded access to sites of outbreaks; Latin species names provide a veiled clue to SEM images of animal excrement; bacterial forms are hidden within steel renditions of pharmacological and demonic images; and handwritten 'chalk texts' reflect the personal, mythical and philosophical reading of the diseased body. In this exhibition restricted access to text is related to the inaccessibility of medical text to the uninitiated. The light boxes contain international disease codes and disease abbreviations, impenetrable to most of the audience. While these are deciphered within one of the cabinets, the numerical system on the 'angelic wings' is not. These units become part of a disavowed indexical system.

R-A-T is even more reliant on the idea of the label to be a carrier of meaning in itself. It is an exhibition of labels, referring both to a history of museum practice and to classification and naming as a potentially divisive political process. It evokes the small museum specimen that is so covered by labels as to be drowned by provenance. In a display of rat representations from books and folios, a mirrored surface is covered with the rat evolutionary taxonomy interrupted by rat idioms. Above this are magnifiers, centred on the prints and containing texts about how natural history is perceived and how rats see. This play is a literal moment of reflection – the museum reflecting its own practice. Nearby bottles are labelled with major rat exterminations on islands. The bottles are empty and the label is drawing attention to an emptiness – a deficit. Luggage labels, museum tags, book covers, specimen tags, urn plaques, test-tube labels: labels proliferate. The display is one of text, for which objects are the receptacles: there are no explicatory texts attached to each display. The museum requested that an information brochure be supplied, yet although this proports to provide access, the small typeface and dense text is illegible in the darkened interior. The authority of text is diluted and it becomes a momento to be read outside the museum.

ENCYCLOPAEDISM

The medieval encyclopaedic system, the *imago mundi,* aimed at representing a compendium or cosmology of the known world (the Creator and the created) within a geometric order: arranged in concentric circles and in numerical clusters of symbolic significance. This is apparent in the stained glass windows, and the conceptual significance of light as a vehicle of truth and spiritual 'enlightenment' that was married to the ideological position of the knowledge that this system chose to impart (Cowen, 2005). The schematics of the *imago mundi* provided a reliable, codified, if reductive, means of knowledge dissemination by which a closed, finite theology was communicated to those for whom the written word was inaccessible.

The symmetrical geometry of the *imago mundi* was a development of an early Christian ordering system and world view – the *scala naturae* that listed the known universe in a hierarchical, and thus finite, structural form. The encyclopaedia of the Enlightenment, by contrast, was infinite, endlessly adding to its net of connections. Eco (1984) describes the encyclopaedia as a labyrinth shaped like a net and indicates the frustration of early encyclopaedists with the tree as an organisational system. Similarly to Deleuze and Guattari's rhizome, Eco values the net analogy as implying a structure in which every point can be connected with every other and where these connections do not exist, they are imaginable[9] (1984:81). Natural history museum collections fall between two systems: finite ordering systems and infinite objects, categorising and listing all known species, yet bound by hierarchical taxonomies. Lists too are finite and boundless, continuous and discontinuous, having a beginning and end and structural order, yet without an obvious structural logic between one item and the next. In his book *The infinity of lists* (2009), Eco indicates lists as agents of control and exclusion – what is reflected and what is not.

The reordering of museum collections by artists (as cited in Chapter 4) is pre-empted by literary works that draw attention to the impossibility and fallibility of comprehensive taxonomic systems. Jorge Luis Borges's often quoted Chinese Encyclopaedia (in "The analytical language of John Wilkins," cited in Foucault, 2002) presents the arbitrariness of taxonomies of difference: from animals divided along the lines of "those who belong to the Emperor" to "those who have just broken a vase". This, together with his infinite books in 'The Library of Babel', are reminders of the random and misguided attempt at controlling bodies of knowledge and collections and that all classification systems are provisional and subjective. Similarly, Flaubert's work *Bouvard and Péchuchet* (1881) describes two early nineteenth-century clerks attempting to represent the entire world and all knowledge in a book. The book becomes incomprehensible as all difference is flattened and value distinctions erased. The book expresses disillusionment with the grand project of science, as every attempt to definitively classify is doomed to failure.

With these things in mind, my previous practice has been dedicated to the use of taxonomies and lists in the creation of impossible systems of order (see appendix). Within the two exhibitions described in this thesis there is a play between index and content – the

difference between the two becoming indistinguishable – and so the structure of reference starts to encroach upon that to which it provides clarity. The sheer volume of text becomes asphyxiating and disorienting.[10] It is not possible to read all of it – only to scan and take away the 'sound-bite' – the small portion of text that the museum experience allows. Both exhibitions are encyclopaedic inventories – impossible and futile attempts to collect all zoonotic diseases, all animal-human disease mythologies, all rat horror movies, all rat strains, or all museums with mammal collections. The labour in the collection and translation of these collections becomes a significant part of the work: as simulated taxonomy and an exhibition as a collection of labels. While there is evidence of this ordering principle, without providing insight or clarity, it ultimately disappoints. While the fragment has become an icon of contemporary art practice, set in opposition to the entirety of the Enlightenment list, in both of these exhibitions the list becomes a fragment. As such it stands both as a reflection on museum practice and the museum experience.

STAGING

Light in the two exhibitions was realised very differently. *Subtle thresholds* made use of existing spotlights, which in combination with light boxes, made the space an illuminated beacon within the sepulchral museum. *R-A-T* however, was integrated into the existing lighting system, which, given the regularity at which globes in the museum are extinguished, and then not replaced, is extremely dark. Light boxes and LEDs were used at key points to highlight works. The exhibition did not announce itself as separate from the rest of the exhibits, but using entryist tactics, was camouflaged. Darkness was appropriated as an analogy for that which is unclear, unknown – the uncertainty of knowledge. Together with darkness and blackness, shadows formed a significant part of both exhibitions.

Contrary to the centralised, interior experience of *Subtle thresholds,* the physical walking between sites of display in *R-A-T* appealed to a sense of performance and theatre. The natural history museum is itself a form of theatre, where the author is hidden and various acts are staged behind glass, augmented by dramatic lighting. Here each case forms an act within a long narrative script, following a sequential dialogue. The dispersion of display in *R-A-T* interrupts this narrative, and with its circularity and disjunctures is as an act of theatre most closely aligned with a Samuel Beckett play. The script is unclear.[11] Without contextual labels it requires the audience to make sense of its content in relation to proximate exhibits. The structure is such that the play becomes unintelligible, repetitive and random, having no obvious starting point and constantly referring back to its own text. As with Beckett, it is skeptical of any firm positions, both open to and resisting interpretation.

The exhibition is episodic, as movement between spaces happens over time and, as it is not apprehended at once, scene changes are temporal. Each cabinet and insertion is a small performance – a set piece or tableau within a play, asking questions of the grand narrative of the museum and sitting outside of any resolution. Furthermore, in order to see the exhibition, the viewer has to take on the characteristics of a rat, skulking through the dark museum, furtively seeking out elusive elements. This is a very different viewing experience to one at an art gallery, where, in bright light the act of viewing is given precedence and is consciously presented as an empowered act. Here the magisterial eye has become a fleeting glimpse.

EMPATHY

The final strategy I wish to discuss is that of evoking empathy. Familiarity and the appeal to beauty and wonder in the construction of the exhibitions allows the viewer to invest in what would otherwise be abhorrent subject matter, disease and rats. The petitioning of emotions provides a point of access, inviting closer inspection and intimate contemplation. Humour is used to dislodge expectations. In *Subtle thresholds* the bandaged animals in the plague altar together with animals bearing oxygen masks and stethoscopes in the cabinets were an alert to the tendency to anthropomorphise animals within museum displays. In a more discrete nod to anthropomorphism, an oar, white handkerchief and Kenneth Grahame[12] 1908 label has been added to the existing *Rattus norvegicus* specimen in the mammal gallery.

Taxidermied animals are the ultimate tamed beasts, benign and loyal, never moving from their place of rest,

they always satisfy the returning viewer's expectations. The typical response lies somewhere between "cute" and "wow", and nowhere was this more apparent than in the study skin display in the Marion island area. Situated directly opposite a display of penguins – one that never fails to elicit cries of "Happy feet" from both adults and children (the manner in which these specimens were procured was not as happy I imagine) – it was interesting to note the marked different response to my display. Whereas mounted specimens are theatrical, activated in a staged drama (recalling Darwin's objection to taxidermy) and their individual death disguised by their transformation into a singular specimen that stands for the whole, study skins are clearly dead animals and their eyeless sockets signs of mortality. Responses to the study skins ranged from "cruel", "shame" to "sies".[13] Dead rats were clearly not for museum viewing. The rats, resting on satin cushions or funereal biers and surrounded by mothballs were inanimate. The use of desiccated specimens was contrasted with the 'resuscitated' four white lab rats in various areas of the museum. These served as luminous beacons, drawing viewers to the cabinets: "kyk die rot" (look at the rat) was the cry of many young visitors, and although these specimens were not strictly beautiful, they did appear to solicit feelings of tenderness. Comments directed towards the rat diorama based on Masaccio's *Expulsion of Adam and Eve from Eden* (1424) and a view of paradise were quite different. Here in a self-consciously anthropomorphised display, the seduction of the context and appeal of the diorama was so strong that the rat itself was forgotten with comments of "so real", "beautiful" and "stunning". Within the diorama the frame separates the image from the world around it, taming the image and reducing its ability to reach outside that which it represents. It creates a fiction of the immortal, strengthened by the taxidermic allusion of the reversibility of death.

1 Many of the positive responses to *R-A-T* were the pleasure that people took in the hide-and-seek aspect, discovering parts of the museum that they had not been to previously.

2 A return to curiosity as an escape from the modern didactic strictures has been advocated by Clifford (1988), Greenblatt (1991) and Bann (1995), amongst others.

3 I am indebted to Carolyn Hamilton for alerting me to this term.

4 Since the opening of *R-A-T* ISAM has built an area of permanent storage in the gallery that housed *Subtle thresholds*. As one of the major arteries from the front desk to the display areas, this blockage has made orientation in the museum increasingly difficult.

5 Tony Bennett (1995:68) writing of the "exhibitionary complex" says that the exhibition combines aspects of the panorama and panopticon, in making the crowd visible to itself and thus the ultimate spectacle.

6 The use of mirroring references similar usage in the Evolution Gallery, *Muséum national d'Histoire naturelle*, Paris. There the mirroring is used to augment a sense of wonder and diversity and is less concerned with mirroring as a self-conscious reflection.

7 By this I mean that despite what Bal (1992:562) identifies as the metamuseum function of museums – to provide critique of their own practices as well as meet educational/ pedagogical expectations – in conservative museums the practices of collection, taxonomy and order tend to override any criticality and reflexivity of display. This is not true of all museums. The NHM, London, for example, hosts art interventions that provide points of reflection on their displays. In the case of ISAM, this reflexivity has been limited to exhibitions by Pippa Skotnes and myself.

8 The development of the microscope by Hooke was dependent on mirror/ lens technology. The early compound microscope was developed by Galileo in 1609. It is said to have been named by Johannes Faber, also responsible for the first recorded rat dissection. Hooke's louse from *Micrographia* is presented in a cabinet in *R-A-T*.

9 Julian Barnes, in his *Flaubert's parrot* (1984), quotes a lexicographer's definition of a net as "a collection of holes tied together with string".

10 Text is either in English or Latin. A conscious decision was taken not to try and include all or even three official languages. This would have drawn attention to the project as an act of translation and exclusion through language itself. Where Latin is used as an agent of exclusion this refers to the specific disciplinary practice of taxonomy.

11 I am indebted to Jules Brown and Andrew Lamprecht for these observations.

12 Kenneth Grahame's *Wind in the willows* is recognised as a critical work in the anthropomorphism of animals, and his 'Ratty' character changed the reputation and appreciation of rats.

13 South African colloquial expressions that denote sympathy and disgust respectively.

CONCLUSION

The thesis has introduced the idea that the successive and hierarchical representation of speciation within natural history museums is the consequence of a deeply embedded relationship with both Christian iconography and the book. It has suggested that the book has acted as an extension of the church and that, in order to present an understanding of speciation that is not hierarchical, the museum may require a new framework for display that is responsive to current biological analogies. In the production of two exhibitions, the study has suggested ways in which this shift may be affected.

Unlike western science, which is predicated on evidentiary systems and uses analogy as a form of persuasion, what is suggested here is that art, or in this case curatorship, that engages with new knowledge depends on an explosion of established systems. Powerful mnemonics are activated when the viewer is confronted with new images and the default position is to rely on established, learned patterns for interpretation. The role of curatorship is to disorder accepted structures, and limit the known values that can be brought to the reading and experience of exhibitions. It is in this disorientation that active engagement may be generated. Accepting this process, particularly within the museum environment that comes with set expectations, *Subtle thresholds* and *R-A-T* were intended to test the ways in which acts of curatorship are simultaneously able to adopt and disrupt recognised modes of display and the understanding of speciation. In doing so they propose a system that dislodges those strong visual prescriptors.

The selection of two iconic and, for many, distasteful themes: disease and rats, allows the subjects of display to act as intercessors. Drawing attention to viewer assumptions and stereotypes, the exhibitions surface expectations around museum display and its anticipated subject. They operate in two ways: firstly the subject matter is a device that focuses on the arguments elucidated in this thesis and, secondly, they operate as exhibitions in their own right in which the subject itself vies for primacy. In this second case the exhibitions were a major focus of research, an aspect of the research that was central to this thesis, yet ultimately not a part of it. Its presence, however, is imbricated into the various display strategies I employed. Research for the exhibitions was initiated with wide reading of the literature in the area: the representation and critical discourse of disease and a history of representation of rats. From there I developed an encyclopaedic method of research, dividing themes into dense lists and categories of information. Research included visiting museum collections, zoos, pet shops, research centres and biomedical departments for the collection of material and sources. Once accumulated, this material was adapted, reimaged and reorganised for display. This encyclopaedic method resulted in an excessive volume of information, and while this is in keeping with the encyclopaedic museum collection (hidden from the public) it undermines the authority of museum display that reduces the collection to a limited label and singular insights. The irony of the fine art PhD is that it is detached from the method of art production and cannot contain, at least in this thesis in its book form, the insights of the exhibition research.

It may be that the museum is a relic of the past and that to work with objects in museums at the time of the digital archive merely perpetuates this anachronism. Print and the physical book may well be as outmoded as taxidermy and to replace one system with another is not radical enough. But to accept this would be to deny the power of the presence of objects, and the impact of the affective on understanding.

* * *

As I reach the end of this thesis it is apparent that the term ‘conclusion’ is at once a requirement and a misnomer, and that what is presented here as a result of this study is less an end than an invitation to contemplate the exhibitions that the thesis has both given rise to and results from. The success of the exhibitions and the impact on the museum can only be measured over time and by the ways in which they are contemplated by others. Thus, to begin this process and to end this thesis, I present two visual catalogues of the exhibitions that attend to the process of production and foreground the latency of making. Although the layout attempts to communicate the dense, encyclopaedic and web-like nature of the exhibitions, these ‘catalogues’ are testimony to the irreplaceability of the immersive and embodied experience of the exhibition by photographs. The threading that connects the exhibits and is apparent in the museum experience is not easily achieved in a layout, allowing me to conclude, indeed, that the book as a form is unable to meet the challenges presented by the iconography of the web.

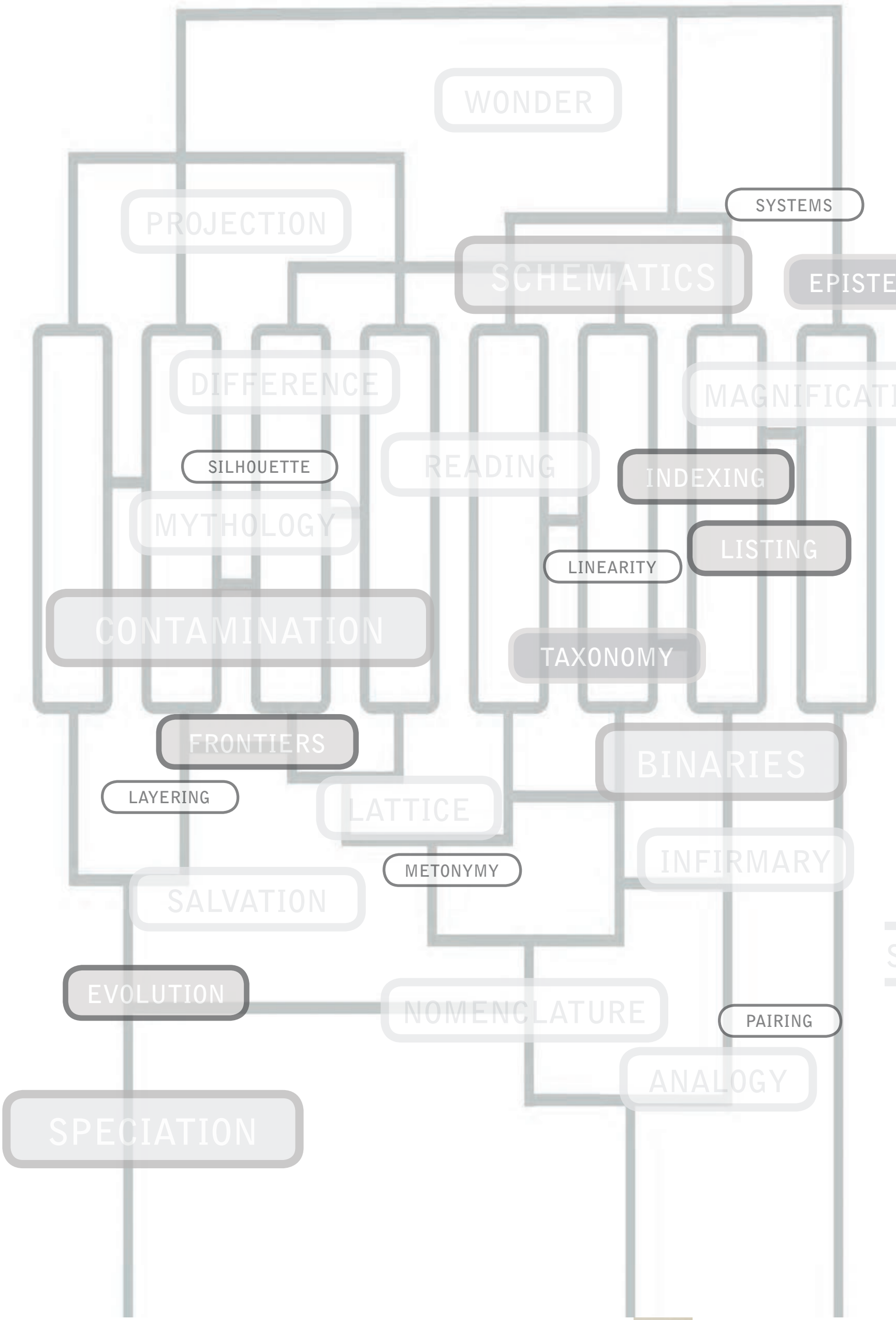
FRITHA LANGERMAN

2009-2010

IZIKO SOUTH AFRICAN MUSEUM
CAPE TOWN

SUBTLE THRESHOLDS

the representational taxonomies of disease


WONDER
PROJECTION
SYSTEMS
SCHEMATICS
EPISTE
DIFFERENCE
MAGNIFICATI
SILHOUETTE
READING
INDEXING
MYTHOLOGY
LISTING
LINEARITY
CONTAMINATION
TAXONOMY
FRONTIERS
BINARIES
LAYERING
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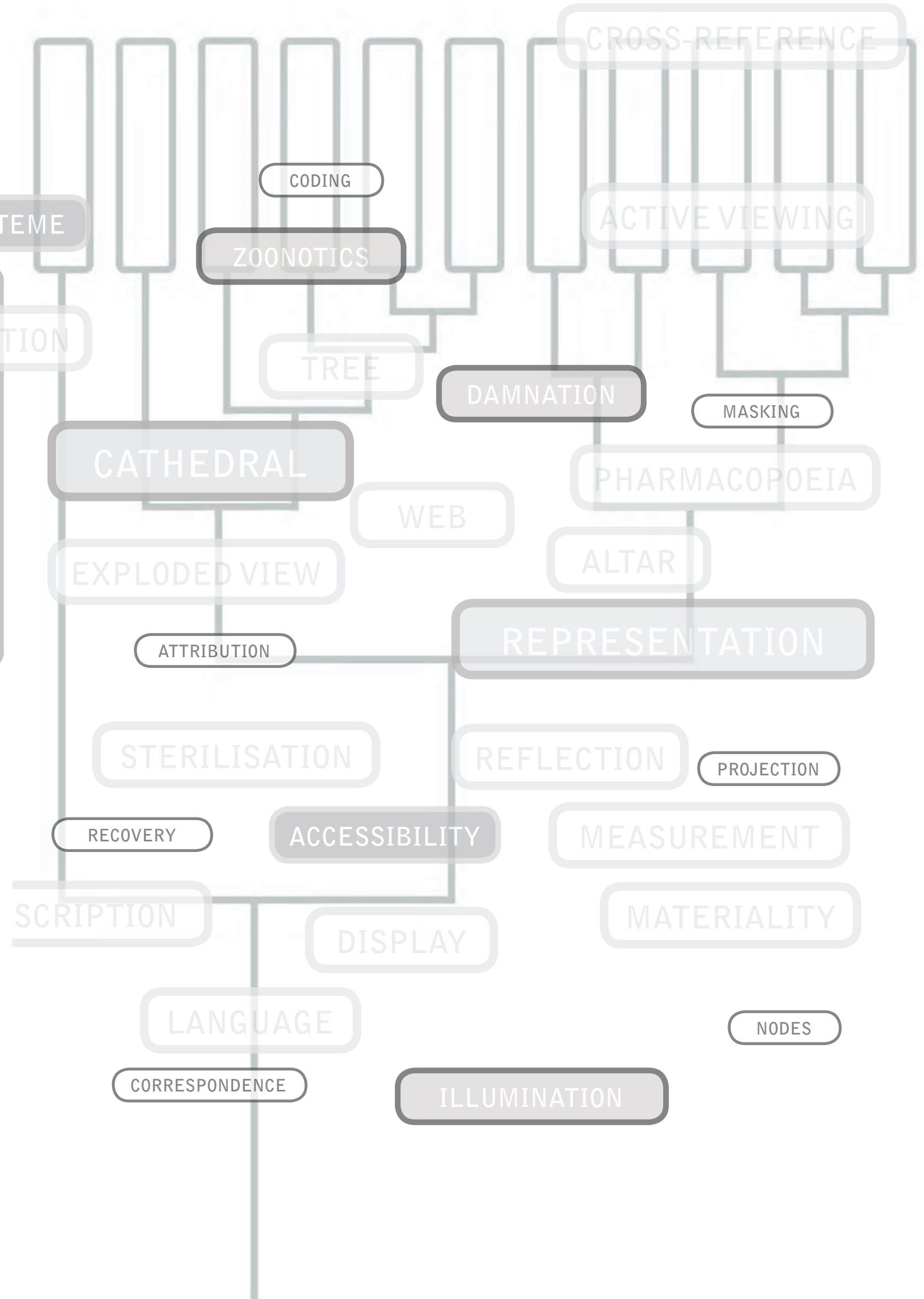
INFIRMARY
METONYMY
SALVATION
EVOLUTION
NOMENCLATURE
PAIRING
ANALOGY
SPECIATION


CROSS-REFERENCE
CODING
TEME
ACTIVE VIEWING
ZOONOTICS
TION
TREE
DAMNATION
MASKING
CATHEDRAL
PHARMACOPOEIA
WEB
EXPLODED VIEW
ALTAR
ATTRIBUTION
REPRESENTATION
STERILISATION
REFLECTION
PROJECTION
RECOVERY
ACCESSIBILITY
MEASUREMENT
SCRIPTION
MATERIALITY
DISPLAY
LANGUAGE
NODES
CORRESPONDENCE
ILLUMINATION


27°37'S
32°7'E
The worm medicine given him by the village apothecary had no effect. Instead, he felt movements in his stomach, and later vomited a small, hairless dog that, it was noted, looked rather like a pug. After his death it was preserved in alcohol as a curiosity.
AUV
B15

While museums of natural history rely on a stability and longevity of display, public exhibitions are chimerical creatures. They are developed and conceptualised with multiple agendas and with multiple expectations. They evolve unseen over long periods, shape-shifting and morphing before being unleashed into the public realm in their imaginative and perhaps monstrous form. *Subtle thresholds* was in this sense a project like any other. Initially intended as a critique of the visual politics within the representation of infectious disease, emphasis shifted to allow for a response to the context of the exhibition, the Iziko South African Museum. Thus, it was as much about the politics of display as it was about the medical body.

Disease has often been represented as singular content in exhibitions, and while contextualised, has offered a focused viewpoint. Disease here is presented as biological, set within a complex network of cultural interpretations. The exhibition received impetus from key texts on medical representation and episteme by Foucault, Gilman and Sontag and it was concerned with the stigma surrounding infectious disease and the manner in which it has been imaged in both the popular imagination and medical literature. Disease has frequently been expressed as a space of separation and difference: a reviled state wherein the patient becomes identified through and by their illness. This also relates to the language surrounding disease, which relies on the binary oppositions of clean/ unclean; known/ alien; contaminated/ sterile, as well as the history of epidemiology that interprets infectious diseases in the west as arising from outside European borders – as immigrant, foreigner and invader. *Subtle thresholds* co-opted a visual strategy that appealed to senses of wonder and beauty. This was in an attempt to provide an aesthetic distance in the presence of the stigma and fear typically associated with disease. In disrupting the typical associations with disease as a site of ugliness and fear, the intention was to facilitate a point of contact that promoted further discussion or investigation of how disease is understood.

Using objects from the Iziko South African Museum, the Wits Adler Museum collection and a series of manufactured objects it referenced plague-altars, zoonotics, pharmacopoeias, 'sites' of contamination and bestiaries, and presented an exploded view of science – indicating an interconnectivity or slippage between organisms, world-views, science and mythologies.

The title of the exhibition, *Subtle thresholds*, suggests a narrow point of contact – the fuzzy-edged, in-between spaces. Similarly, infectious disease provides a slim meeting point between species: human, animal and microbial, as disease is not something discrete and autonomous, but dependent on a relationship between a host and an organism in order to exist. Rather than acknowledging a continuous interaction with other organisms, cultural and linguistic codification has generated an understanding of humans as a distinct species, with unambiguous boundaries. Perhaps this ascendant bias and the denial of a constant biological dialogue with other species – both animals and micro-organisms – may be held responsible for the prejudice and stereotyping that is endemic within much human interaction.

The exhibition layout referenced the visual language of a cathedral, with its central nave, altar, rose and trefoil windows, confessional, and 'vestments.' This had multiple intentions: drawing attention to the relationship of Christianity to museums of natural history as well as the paradoxical position of religion to disease – both sin and redemption. Lastly, the obvious constructedness of the exhibition, drew attention to the artifice of display, and in doing so, self-consciously proclaimed itself as a critique of representation within museums.

DIFFERENCE

The installation is presented in an L-shaped gallery space. The walls are covered with layered images, painted grey shadows, painted chalk boards, metal discs, shaped frames with digital prints, framed index cards, magnifiers and number plates. At the end of one wall white cut-out hands are arranged in the shape of wings. In front of this ten light boxes run in a straight line along the length of the gallery. The short end of the gallery is lined with glass cabinets filled with taxidermied animals, study skins and specimens, medical tools and equipment, mirrors and printed images. A deep recess is covered by a wooden screen, punctured by apertures of cut-out hands. Behind this are six bandaged taxidermy animals. Opposite this recess is a platform on which stand two metal medical cabinets covered with black text. Attached to these are fish-hooks, sterilisers and autoclaves.

16 quatrefoils and trefoils of Scanning Electron Microscope images of animal excrement, 10 chromed steel plates of bacteria and parasites, 1 carrier pigeon, 1 dispensing scale, 10 rusted steel plates of bacteria and parasites, 4 percussion hammers, 63 metres of concordance ruler, 5 bats, 24 coordinate plates, 2 ophthalmometers, 4 rat skeletons, 40 framed mythological index cards, 220m^2 of shadow paintings, 1 jackal pelt, 1 pharmaceutical prescription book, 2 rolls of bandage, 220m^2 of schematic grid, 25 chalk texts, 4 zebra hooves, 10 viral light boxes, 4 auriscopes, 512 healers' hands, 1 pheasant, 22 wax moulding plates, 488 microbial test tubes, 1 parrot, 6 plague saint animals, 7 ophthalmoscopes, 7 rusted synonyms, 1 cockatoo, 2 medical cabinets, 6 autoclaves, 1 caracal pelt, 9 sterilisers, 40 metres of ducting, 3 pneumothorax apparatus, 2 video projections, 3 coprolites, 1 marmot, 1 fox, 1 rabbit, 21 dental impression trays, 1 partridge, 1 foal, 4 hearing aids, 1 pig foetus, 5 snakes, 14 bottles, 7 retort stands, 2 pill makers, 1 snake bite kit, 50 small birds, 30 syringes, 14 cause of death reagent bottles, 25 dental moulds, 9 lion claws, 21 anaesthetic masks, 1 sheep skull, 20 surgical scissors, 50 ampoules, 2 uv lights, 3 trial lens cases, 10 stethoscopes, 1 zebra foetus, 40 syringes, 1 wax scabies model, 15 glass cupping devices, 2 mice, 1 baboon pelt, 2 oxygen masks, 3 monkey skulls, 22 glass slides, 5 pairs of antlers.

and mix with them, and soon they are all mangy.' The Prophet counters: 'And who caused the mange in the first one?' IBN MAJAH, IRAN, 850. Conrad 1992: 89

SILHOUETTE

The Prophet says, 'No contagion', and a bedouin replies: 'O Apostle of God, what about my camels? They are like gazelle does on the sand; but let a mangy camel come and mix with them, and soon they are all mangy.' The Prophet

Their bodies broke out in sores that became ulcers; sleepless and agitated, unable to bear the touch of clothes or bedding, they staggered naked through the streets, seeking water for their unquenchable thirst.

430 BC, ATHENS. Karlen 1995:59

Central Nave
A pair of 'angelic wings'/ lungs/ tree/ caduceus constructed from 512 silhouettes of art historical and popular images of healer's hands (2500 BC–2000 AD).


RECOVERY

Plague Altar
4 animals not indigenous to South Africa: full capybara mount, full vicuna mount, full wild turkey mount, full husky mount and one giraffe head; one buffalo head from the old mammal room (ISAM), wooden screen of open hands (negative of healing hands), plague doctor silhouettes running above the screen, chalkboard rendering of the Celera Genomics diagram of human chromosome 13 and 14.

ALTAR

1855 BUNSEN INTRODUCES THE USE OF THE GAS BURNER 1952 HERSHEY AND CHASE SHOW BACTERIOPHAGES INJECT DNA INTO HOST CELLS 1914 MARY MALLON (TYPHOID MARY) CAUSES A TYPHUS OUTBREAK IN THE SLOANE MATERNITY HOSPITAL, NEW YORK 1990 THE HUMAN GENOME PROJECT IS INITIATED BY JAMES WATSON 1937 KREBS DISCOVERS THE CITRIC ACID CYCLE

Central platform
2 steel medical cabinets containing extraction ducting (Groote Schuur Hospital), 8 sterilising trays, 4 autoclaves filled with remnants of chalk (Adler Museum), 18 metres of barrier tape, black Rockwell typeface with synonyms for pain and disease.


On the first or second day
the germ assaulted the nervous
system, causing lethargy and
hallucinations. Half or more of
those infected died by the fifth
day.
7°00´N
81°00´E

TUBERCULOSIS *Mycobacterium tuberculosis*

MALARIA *Plasmodium falciparum*

TYPHUS *Rickettsiae typhi*

SLEEPING SICKNESS *Trypanosomiasis*

LEPROSY *Mycobacterium leprae*

MENINGITIS *Neisseria meningitidus*

CHAGAS DISEASE *Trypanosomiasis cruzi*

BILHARZIA *Schistosomiasis*

CHOLERA *Vibrio cholerae*

LEISHMANIASIS *Leishmania donovani*

MATERIALITY

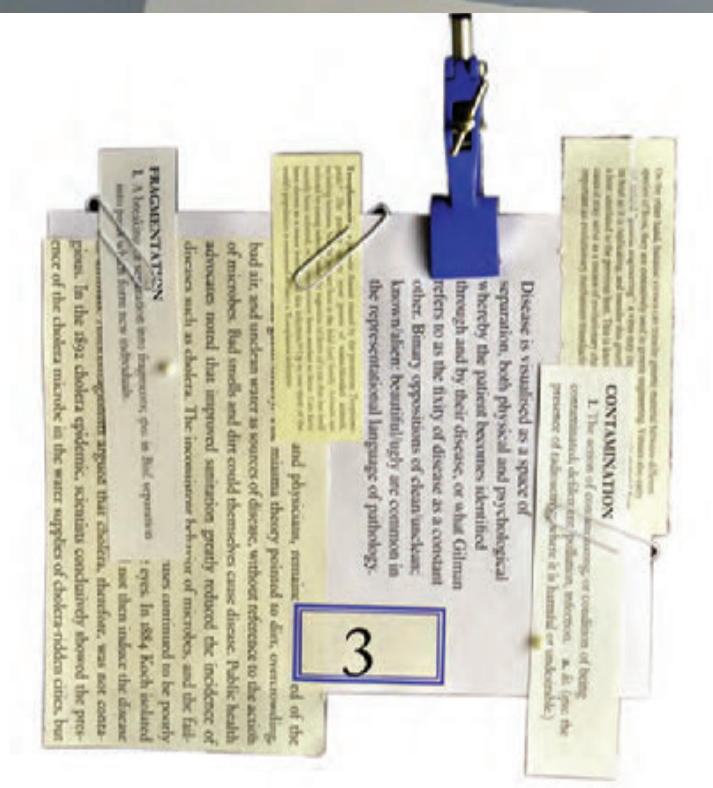
Designs in steel that include: Erlenmeyer flasks, test tubes, beakers, syringes, measuring cylinders, reaction tubes, dropper bottles, specimen bottles, Oxford tips and images of hell and purgatory by Albrecht Dürer, Francesco Guazzo, Luca Signorelli, Hieronymus Bosch, Taddeo di Bartolo, Gustave Doré and Pieter Breughel.

ch insects streamed out
y; two of his Ethiopian
e employed in emptying
kets of them into the sea.
ks, he was devoured by
engendered under his
PORTUGAL, 1556. Bondeson 1997: 59

WEB

Leprosy in its heyd
disproportionatesens
the leper was the s
which corruption
visible; an exemplum
of decay. Nothing is n
than to give a diseas
– that meaning bein
a moralistic one. Sonta

1857. PASTEUR SHOWS THAT LACTIC ACID FERMENTATION IS DUE TO A MICROORGANISMS. 1895. RÖNTGEN DISCOVERS X RAYS. 1546. FRACASTOROS SUGGESTS INVISIBLE ORGANISMS CAUSE DISEASE. 2007. 49 PATIENTS WITH (MDR) AND (XDR) TB. ESCAPE FROM JOSE PEARSON HOSPITAL IN PORT ELIZABETH. 1900. REED PROVES THAT MOSQUITOES TRANSMIT YELLOW FEVER. LEVITICUS 13:8 THE PRIEST SHALL EXAMINE HIM: AND BEHOLD, IF THE SCAB HAS SPREAD ON THE SKIN, THEN THE PRIEST SHALL PRONOUNCE HIM UNCLEAN. EZEKIEL 14:19 OR IF I SEND DISEASE INTO THAT LAND, LETTING LOOSE MY WRATH ON IT IN BLOOD, CUTTING OFF FROM IT MA



Walls

Shadows of pests and armoury painted in grey on 220m^2 of wall space, 16 quatrefoil and trefoil images of scanning electron microscope magnifications 10µm at 1–2K of animal faeces collected from various pet shops, farms and zoos in the greater Cape Town area, 10 chromed steel plates with images derived from pharmaceutical labware and parasitic and bacterial disease forms, 10 rusted steel plates with enlarged disease forms populated with demonic images silhouettes, 24 yellow number plates with GPS coordinates of sites of major disease outbreaks in history, 25 chalk texts written in Times Roman script that quote personal, mythical and philosophical readings of the diseased body, 40 framed index cards of mythological animal diseases with magnifiers and retort holders, a 63-metre timeline circumscribing the room.

EXPLODED VIEW

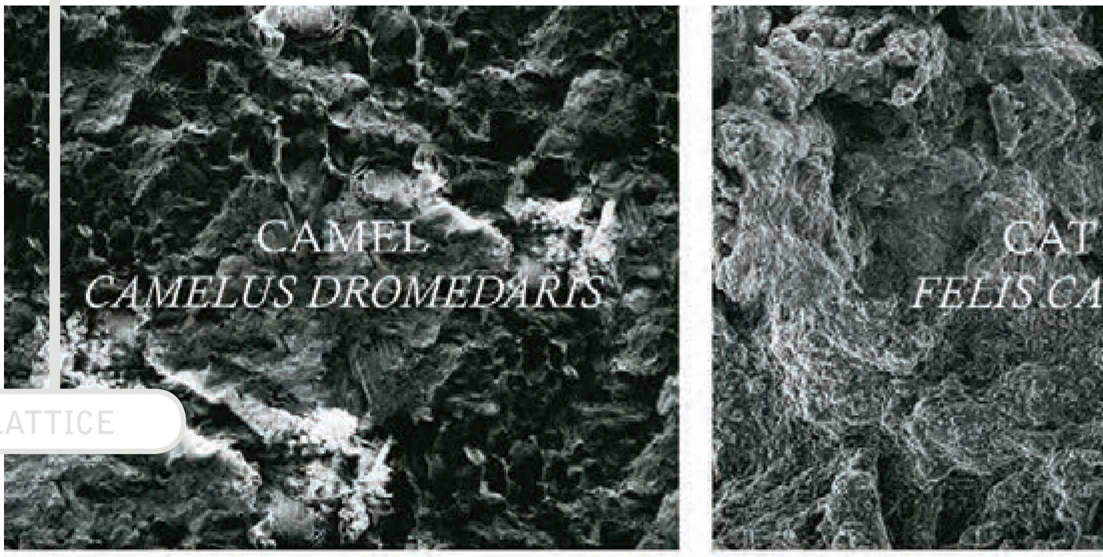
LANGUAGE

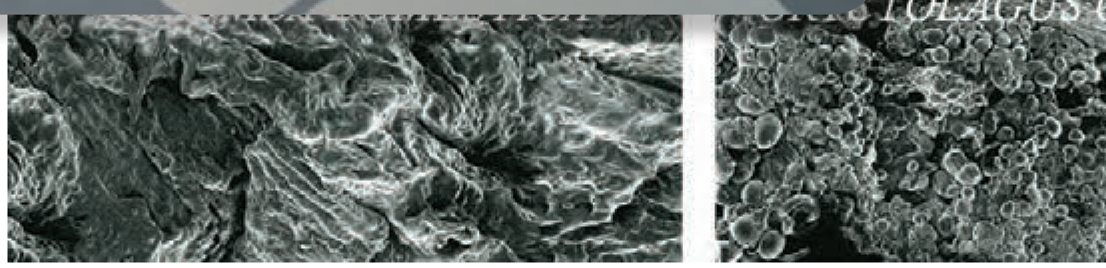
51´N
36´E
1979

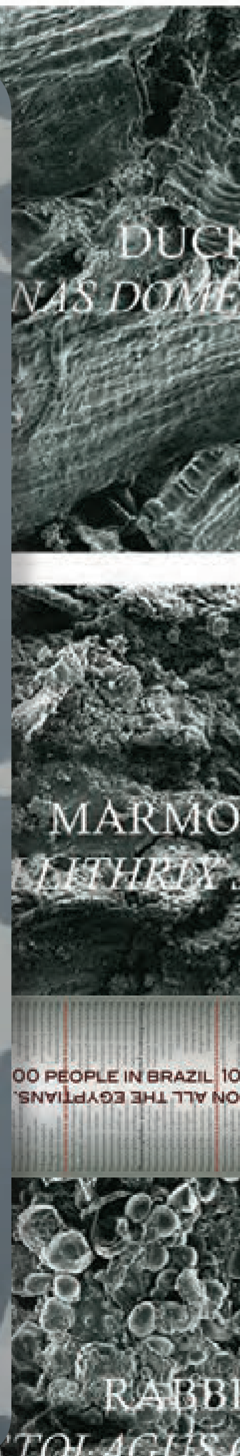

56°51
60°36
Anthrax

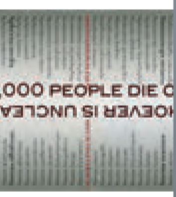

SE WHO WENT TO SEE THE LAND, WERE NOT TOUCHED BY DISEASE. LEVITICUS 26:25 AND I W
WILL BE THAT IF THE WOMAN HAS BECOME UNCLEAN, SINNING AGAINST HER HUSBAND, WHE
O KEEP AND DO EVERY DETAIL OF THE TEACHING OF THE PRIESTS, THE LEVITES: AS I GAVE T
OR THREE MONTHS, WHILE THEY GO AFTER YOU? OR WILL YOU HAVE THREE DAYS OF VIOLE
E IN THE LAND OF YOUR HERITAGE, NUMBERS 11:33 BUT WHILE THE MEAT WAS STILL BETWEE
THERE BE NO SORROW OR WEEPING OR DROPS RUNNING FROM YOUR EYES. LEVITICUS 13:37
N DISEASES; JEREMIAH 27:13 WHY ARE YOU DESIRING DEATH, YOU AND YOUR PEOPLE, BY THE
HEM. LEVITICUS 21:20 OR HUNCHBACKED, OR A DWARF, OR ONE WHO HAS A DEFECT IN HIS EY
S OF THE EARTH, TO BE A CURSE AND A WONDER AND A SURPRISE AND A NAME OF SHAME A
OF ZION, AND THE LORD WILL LET THEIR SECRET PARTS BE SEEN. JEREMIAH 28:8 THE PROPHE
LEAN: LET HIM KEEP BY HIMSELF, LIVING OUTSIDE THE TENT-CIRCLE. ISAIAH 10:16 FOR TH
ISEASED FLESH IS UNCLEAN, HE IS A LEPER. NUMBERS 31:16 IT WAS THESE WHO, MOVED BY
SES OF EGYPT, WHICH YOU KNOW, HE WILL PUT ON YOU, BUT WILL LAY THEM ON ALL THOSE
QUIET MIND IS THE LIFE OF THE BODY BUT ENVY IS A DISEASE IN THE BONES. DEUTERONOMY
E HOUSE AFTER HE HAS TAKEN OUT THE STONES AND AFTER THE WALLS HAVE BEEN RUBBED
LAGUE OF LEPROSY; AND THE PRIEST SHALL EXAMINE HIM, AND PRONOUNCE HIM UNCLEAN. 1
D, BE LIFTED UP AGAINST ME AND AGAINST MY FAMILY, BUT NOT AGAINST YOUR PEOPLE TO SE
NE. MARK 5:29 AND STRAIGHT AWAY THE FOUNTAIN OF HER BLOOD WAS STOPPED, AND SHE H
THIS IS WHAT THE LORD HAS SAID: HOW MUCH MORE WHEN I SEND MY FOUR BITTER PUNISH
THEN THE DISEASE HAD MADE A START AMONG THEM; AND HE PUT SPICES IN HIS VESSEL TO T
AND GREAT. NUMBERS 14:12 I WILL SEND DISEASE ON THEM FOR THEIR DESTRUCTION, AND TAKE
S IS WHAT YOU ARE TO SAY TO THEM: THE LORD HAS SAID, BY MY LIFE, TRULY, THOSE WHO ARE
CUS 13:42 BUT IF, ON HIS HEAD OR ON HIS BROW, WHERE HE HAS NO HAIR, THERE IS A RED AND
E DISEASES. HIS PEOPLE MADE NO BURNING FOR HIM, LIKE THE BURNING OF HIS FATHERS.2 SA
E. JEREMIAH 38:2 THESE ARE THE WORDS OF THE LORD: WHOEVER GOES ON LIVING IN THIS TOW
T THE GROWTH OF THE DISEASE HAS BECOME RED AND WHITE ON HIS HEAD OR ON HIS BROW WH
OU WASTING OF THE LEGS AND DISEASE OF THE STOMACH; 1 KINGS 8:37 IF THERE IS NO FOOD IN
56 IF THE PRIEST LOOKS, AND BEHOLD, THE PLAGUE HAS FADED AFTER IT IS WASHED, THEN HE S
D, OR A DWARF, OR ONE WHO HAS A DEFECT IN HIS EYE, OR AN ITCHING DISEASE, OR SCABS, OR
HE TIME OF HIS OLD AGE HE WAS DISEASED IN HIS FEET. JEREMIAH 44:13 FOR I WILL SEND PUNISH
E HOUSE, BEFORE HE GOES IN TO SEE THE DISEASE, SO THAT THE THINGS IN THE HOUSE MAY N
SEASE. LEVITICUS 13:57 AND IF THE MARK IS STILL SEEN IN THE CLOTHING OR IN THE THREADS O
ING OF ISRAEL, CAME DOWN TO HIM, AND WEEPING OVER HIM SAID, MY FATHER, MY FATHER, THE
IR SOUL FROM DEATH, BUT GAVE THEIR LIFE TO DISEASE. 1 CHRONICLES 21:12 THREE YEARS WHE
LORD TAKING DESTRUCTION THROUGH ALL THE LAND OF ISRAEL. NOW GIVE THOUGHT TO TH
CUS 13:29 AND WHEN A MAN OR A WOMAN HAS A DISEASE ON THE HEAD, OR IN THE HAIR OF TH
US 13:27 AND THE PRIEST IS TO SEE HIM AGAIN ON THE SEVENTH DAY; IF IT IS INCREASED IN TH
ME TO HIS END THROUGH NEED OF FOOD AND DISEASE. 2 CHRONICLES 16:12 IN THE THIRTY-NI
NG HEAT AGAINST YOU, KEEPING BACK THE RAIN TILL YOUR LAND IS WASTE AND DEAD; SO WIL
MAKE CLEAR WHEN IT IS UNCLEAN AND WHEN IT IS CLEAN: THIS IS THE LAW ABOUT THE DISEASE
R BOWELS, UNTIL YOUR BOWELS FALL OUT BY REASON OF THE SICKNESS, DAY BY DAY. LEVITICUS
COME TO THEIR END BY DISEASE, THEY ARE NOT PUT INTO THE EARTH, AND THEIR WIDOWS ARE
SEASE ON THE KING AND HE BECAME A LEPER, AND TO THE DAY OF HIS DEATH HE WAS LIVING SE
VE GLORY TO THE GOD OF ISRAEL: IT MAY BE THAT THE WEIGHT OF HIS HAND WILL BE LIFTED FR
E ALTAR TO THE LORD. 1 CHRONICLES 21:22 THEN DAVID SAID TO ORNAN, GIVE ME THE PLACE WHE
HE LEPROSY SEVEN TIMES, AND SHALL PRONOUNCE HIM CLEAN, AND SHALL LET T LIVING BIRD
AND HE SENT MESSENGERS, AND SAID UNTO THEM, GO, ENQUIRE OF BAALZEBUB THE GOD OF EKR
ISEASE," THEY SAY, "HAS AFFLICTED HIM. NOW THAT HE LIES HE SHALL RISE UP NO MORE." LEVIT
T OF DISEASES. NUMBERS 14:37 THOSE SAME MEN WHO SAID EVIL OF THE LAND, CAME TO THEIR D
VID. A FOOL SAID IN HIS HEART, 'THERE IS NO GOD.' THEY HAVE DONE CORRUPTLY, YEA, THEY HA
ER OF THE CHIEF OF MIDIAN, WHO WAS PUT TO DEATH AT THE TIME OF THE DISEASE WHICH CAME
ID, YOUR DISEASE MAY NOT BE MADE WELL AND YOUR WOUND IS BITTER. PROVERBS 12:4 A WOMA
SEVEN DAYS MORE: JEREMIAH 32:36 AND NOW THE LORD, THE GOD OF ISRAEL, HAS SAID OF THIS
FOR HIS SOUL OF ALL THAT HE DESIRES, YET GOD GIVES HIM NO POWER TO EAT OF IT, BUT AN ALI
END ON HER DISEASE AND BLOOD IN HER STREETS; AND THE WOUNDED WILL BE FALLING IN THE M
SEVEN MORE DAYS. 2 SAMUEL 24:25 AND THERE DAVID PUT UP AN ALTAR TO THE LORD, MAKING
SE. HE WAS DESPISED AS ONE FROM WHOM MEN HIDE THEIR FACE; AND WE DIDN'T RESPECT HIM.
LL BE THE FATE OF ALL THE MEN WHOSE MINDS ARE FIXED ON GOING INTO EGYPT AND STOPPING
, AND KEEP YOU SAFE FROM WASTING DISEASE. ISAIAH 53:10 YET IT PLEASED THE LORD TO CR
H THE LORD WILL SEND ON ALL THE PEOPLES WHICH HAVE BEEN WARRING AGAINST JERUSALE
R IN WHICH IS THE DISEASE, IS TO BE BURNED: FOR THE DISEASE IS BITING INTO IT; LET IT BE BURN
Y NEED OF FOOD AND BY DISEASE. ZECHARIAH 14:15 AND THE HORSES AND THE TRANSPORT BEAS
OF ALL THE EVIL AND DISGUSTING WAYS OF THE CHILDREN OF ISRAEL: FOR DEATH WILL OVERTAK
M, AND SAID, THY SON BENHADAD KING OF SYRIA HATH SENT ME TO THEE, SAYING, SHALL I RECOVE
WHO KEEPS IN THIS TOWN WILL COME TO HIS DEATH BY THE SWORD AND THROUGH NEED OF FOOD A
EEN MADE CLEAN, NUMBERS 16:50 THEN AARON WENT BACK TO MOSES TO THE DOOR OF THE TEN
NT AFTER THE MAN OF ISRAEL INTO THE TENT, DRIVING THE SPEAR THROUGH THE TWO OF THEM,
AND WHILE HIS WRATH WAS BITTER AGAINST THE PRIESTS, THE MARK OF THE LEPER'S DISEASE CA
OLENT DEATH WILL GO THROUGH YOU: AND I WILL SEND THE SWORD ON YOU: I THE LO HAVE SA
GHMENT ON THAT NATION, SAYS THE LORD, BY THE SWORD AND NEED OF FOOD AND BY DISEASE, T
AND GREAT ICE-DROPS, FIRE, AND BURNING. PSALMS 106:15 AND HE GAVE THEM THEIR REQUEST,
HEY SAID, THE GOD OF THE HEBREWS HAS COME TO US: LET US THEN GO THREE DAYS' JOURNEY IN
E WITH HOLLOW STREAKS, GREENISH OR REDDISH, AND THE APPEARANCE THEREOF BE LOWER T
ND DISEASE AND NEED OF FOOD; AND I WILL SEND YOU WANDERING AMONG ALL THE KINGDOMS OF
RE SURPRISED AT HIM, AND HIS FACE WAS NOT BEAUTIFUL, SO AS TO BE DESIRED. HIS FACE WAS S
ED WITH A LOATHSOME DISEASE: AND THERE IS NO SOUNDNESS IN MY FLESH. JEREMIAH 24:10 A

Itching skin eruptions first appeared on the breast and stomach and soon spread all over the body. When such an eruption was scratched, a multitude of these insects burst forth. The tissues were slowly eaten away and the insects emerged from many small holes in the skin. 50 BC, AFRICA. Bondeson 1997:5


CAMEL
CAMELUS DROMEDARIS
CAT







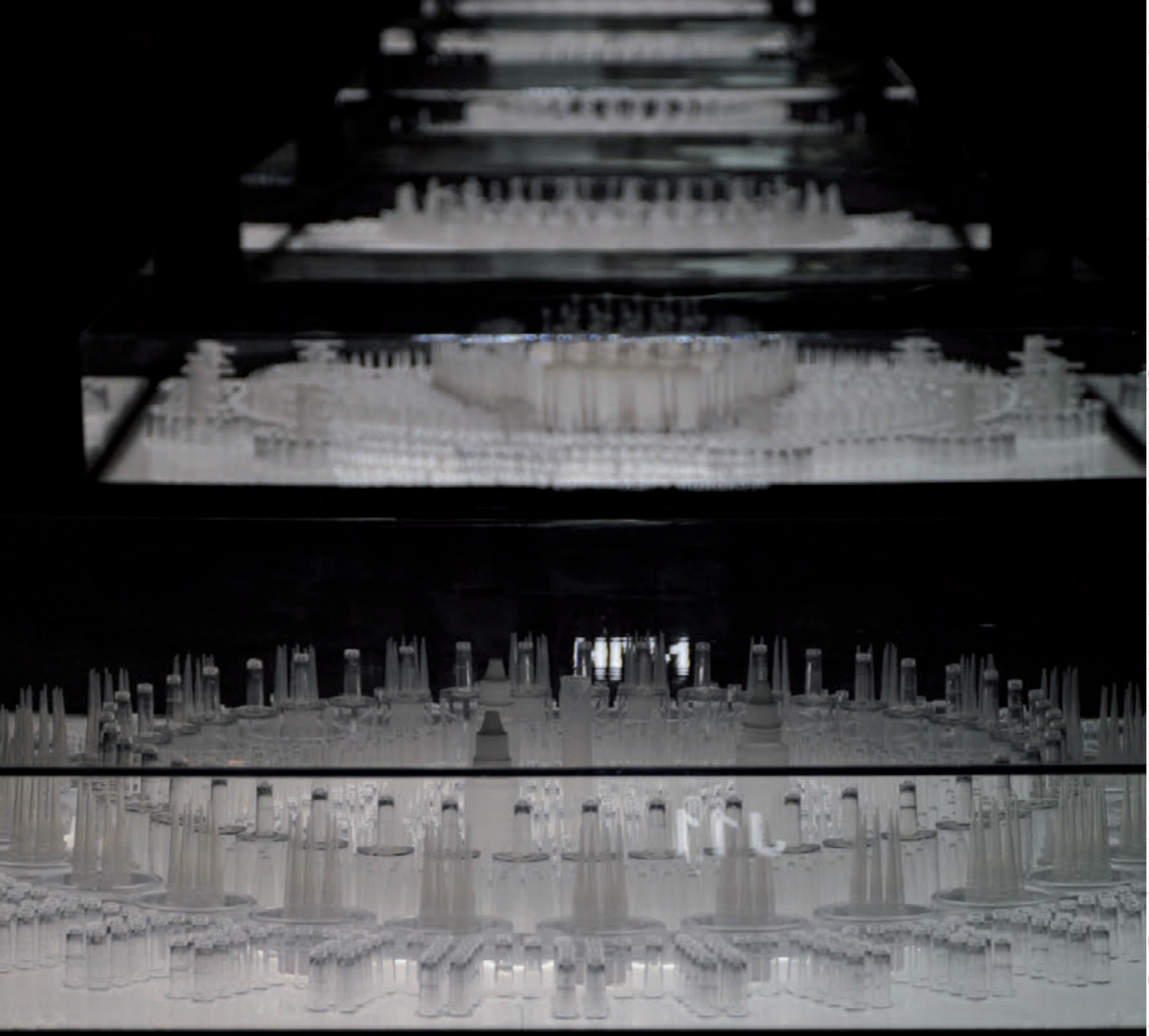

EXCREMENTUM
Rattus norvegicus

[Cholera] like any other disease, has in itself no meaning: it is only a micro-organism. It acquires meaning and significance from its human context, from the ways in which it infiltrates the lives of people, from the reactions it provokes, and from the manner in which it gives expression to cultural and political values. 1980, INDIA. Arnold 1986: 151

tching skin eruptions first
ppeared on the breast and
tomach and soon spread all over
he body. When such an eruption
vas scratched, a multitude of these
nsects burst forth. The tissues
ver slowly eaten away and the
sects emerged from many small
oles in the skin.

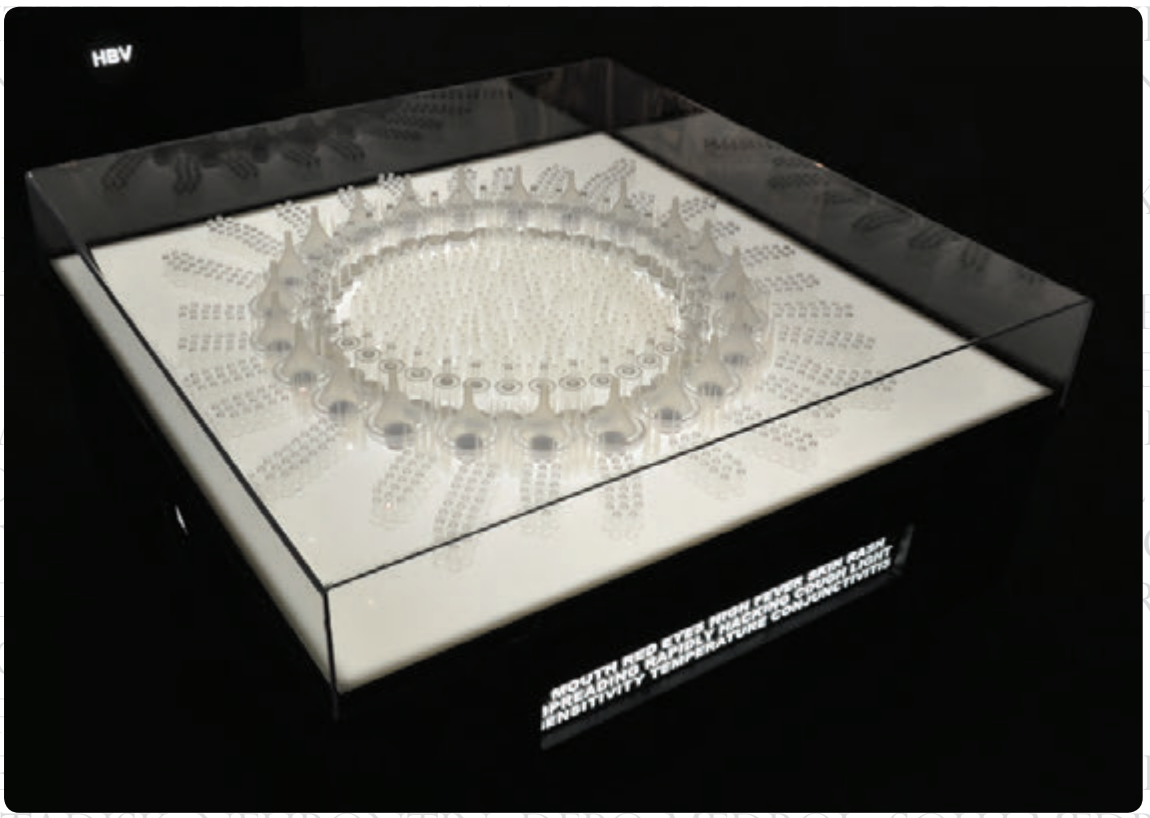
experienced an attack and it
deserves no less a name of the
Benchuca, the great black bug of
the Pampas. It is most disgusting
to feel the soft wingless insects
about an inch long, crawling over
one's body. Before sucking they
are quite thin, but afterwards they
become round and bloated with
blood.

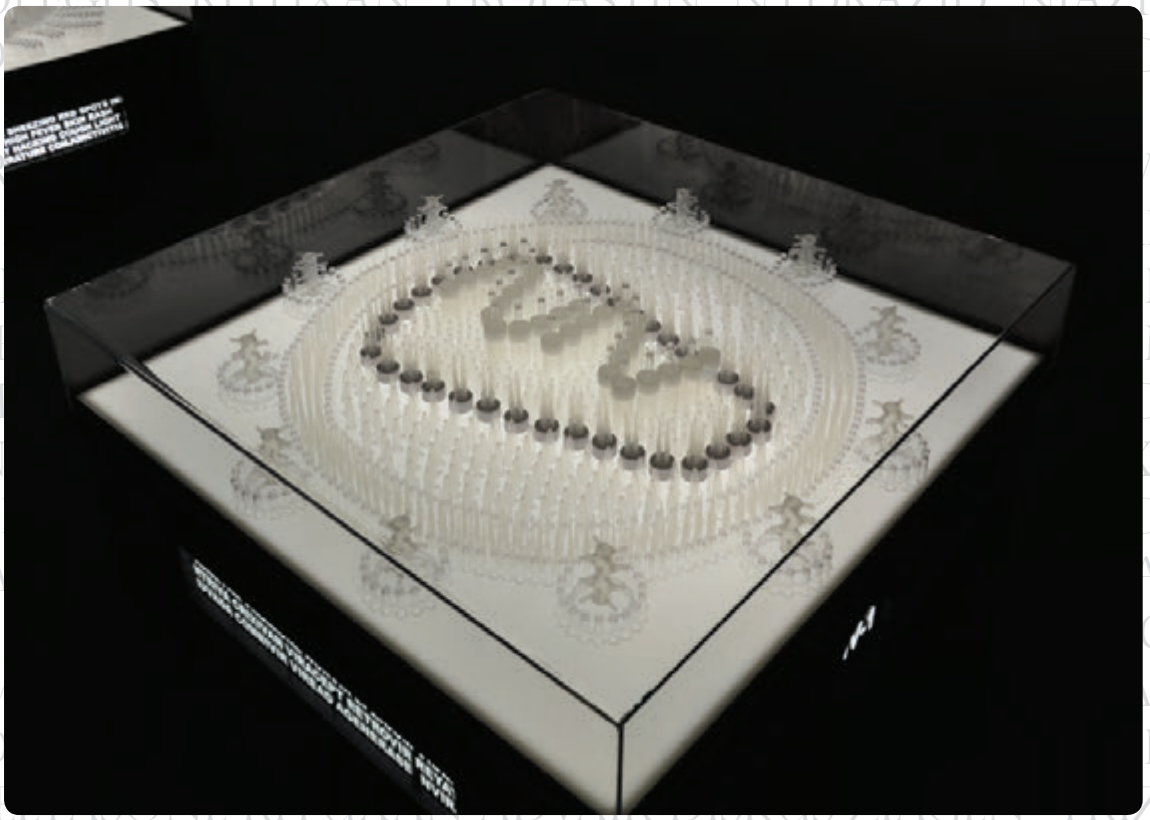
39°45'N
105°0'W



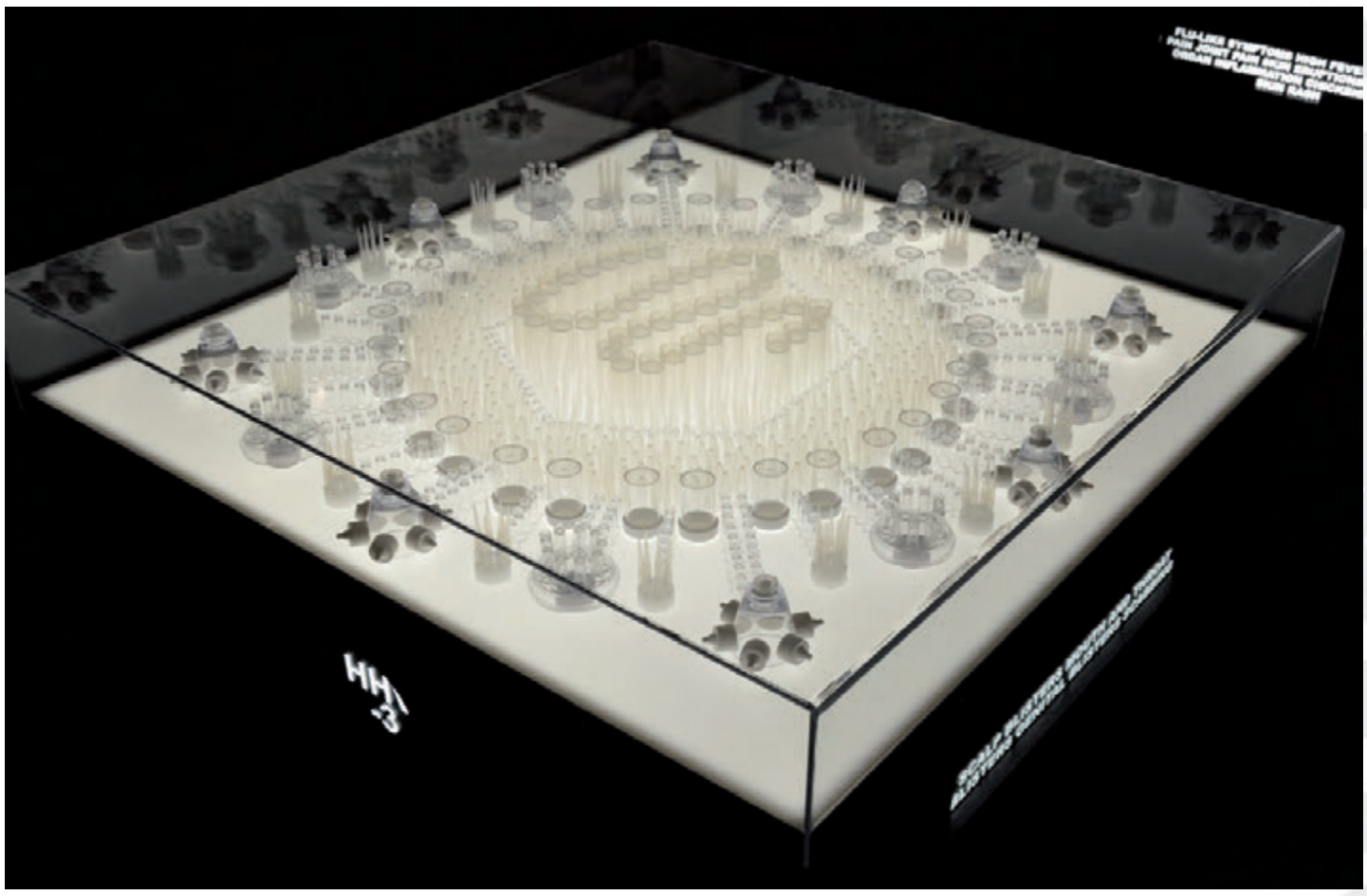
INDEXING

SWOLLEN LYMPH GLANDS PAINFUL BLISTERS
HEADACHE MUSCLE ACHE FEVER GENITAL
DISCHARGE URETHRA INFECTION BACK PAIN
SMALL RED BUMPS IN THE GENITAL AREA



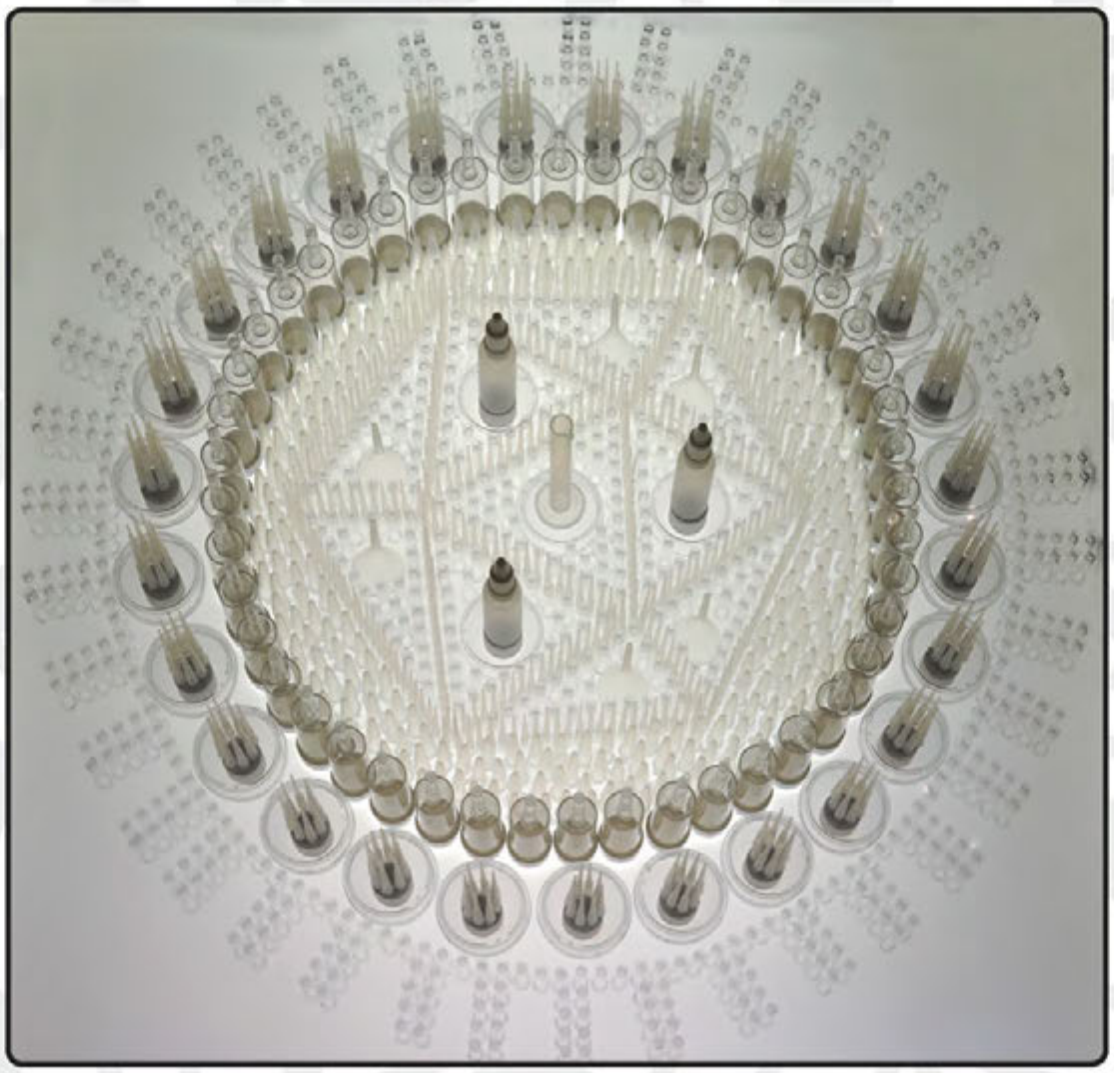


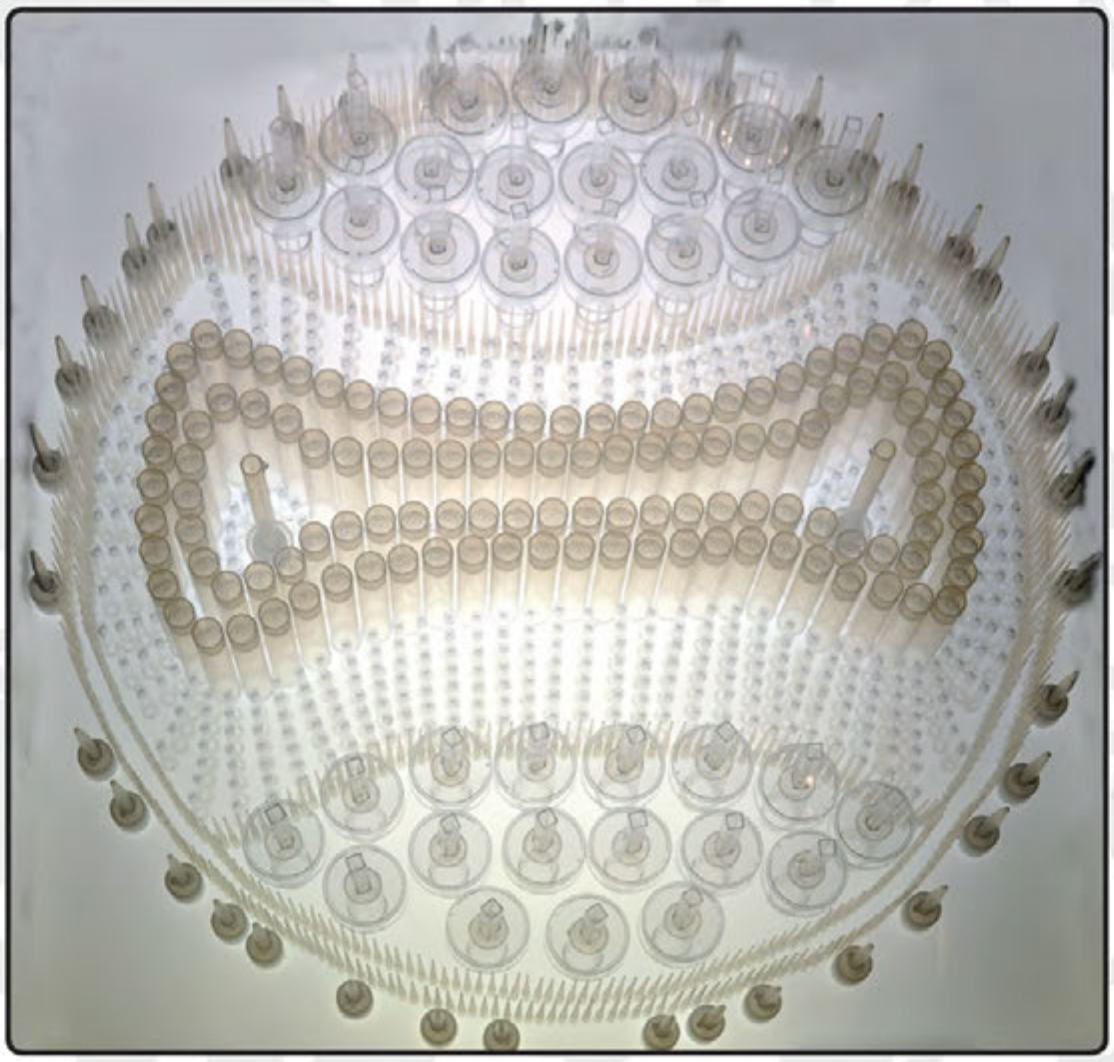
DISPLAY



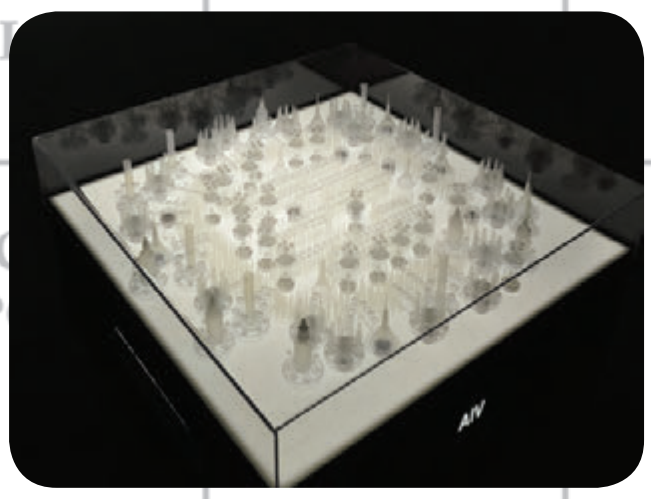
Central Nave

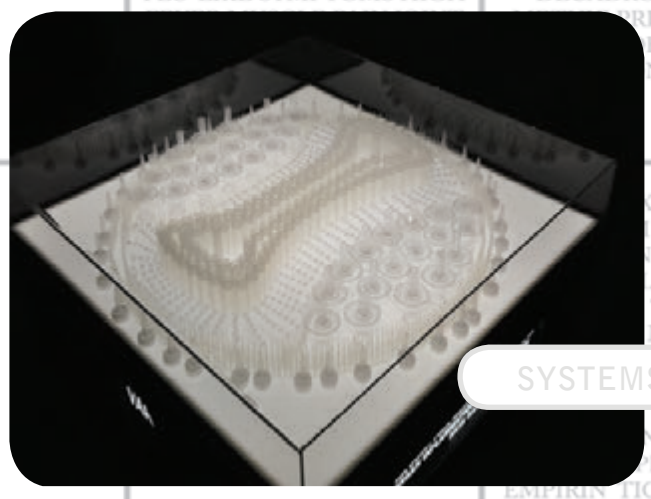
10 light boxes or vitrines containing representations in pharmacological labware of 10 viral forms known to cause disease: herpes, chickenpox, yellow fever, HIV, avian flu, hepatitis, influenza, rubella, smallpox, measles; and labelled with international disease codes, taxonomy codes, medications and symptoms.

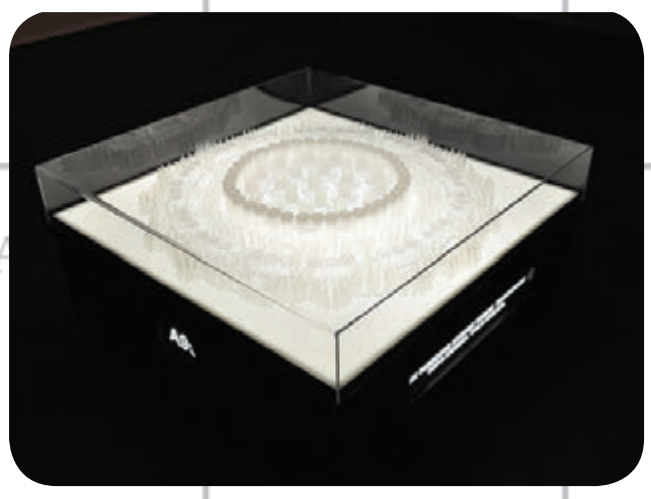


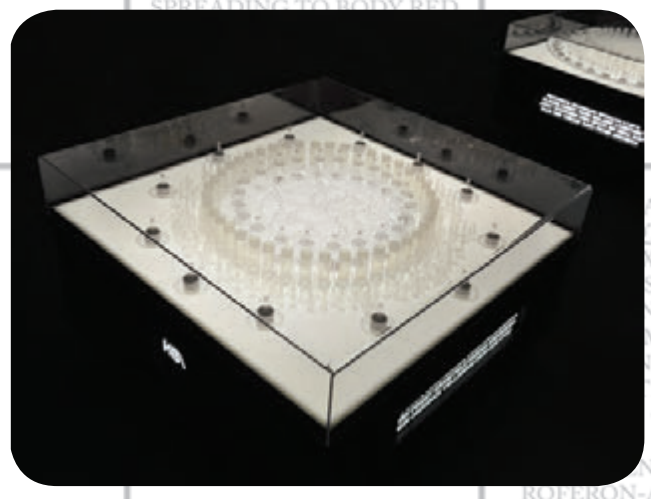


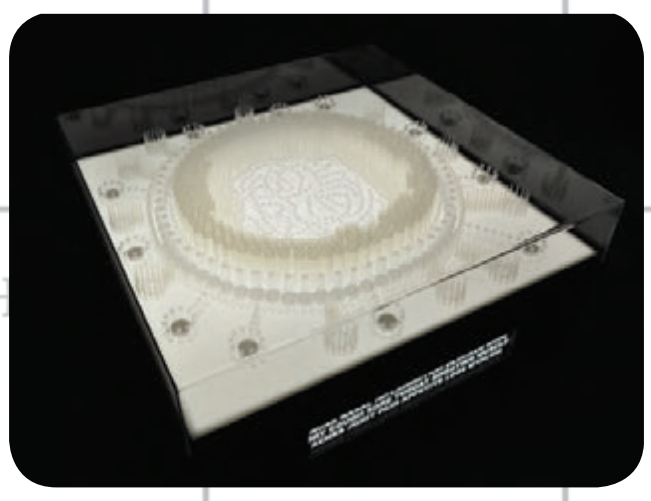
			ABDOMINAL PAIN CHEST PAIN EYE INFECTIONS BLEEDING NOSE AND GUMS SORE THROAT ACUTE RESPIRATORY DISTRESS VIRAL PNEUMONIA	
SMA		B03	FLU-LIKE SYMPTOMS HIGH	DECADRON DEXPAK REDNISOLON EPO-MEDRO NE PEDIAPI
CHI P		B01		VACCINE EQUAGESIC AGGRENOX FIORMOR TRILISATE MOBIGESIC BUFFERIN EMPIRIN TIGAN ZOVIRA HUMIRA QVAR PULMICO NEORAL SANDIMMUNE
RUBELLA	RUBV	B06	HEADACHE SHIVERING SWOLLEN LYMPH GLANDS RUNNY NOSE MALAISE LASSITUDE TEMPORARY JOINT STIFFNESS PINK SPOTS ON NECK AND FACE SPREADING TO BODY RED	MERUVAX II M-M-R II GAMASTAN, GAMMAR
HEPA		B15		COMVAX HB REBET RITUXAN NYDRAZID MATE TRIZI NE REYATAZ RIVA TRUVA GAMASTAN ALFERON N INTRON A ROFERON-A COMBIVIR REVIA VIRAMUNE VIRAMUNE REBETRON
MEASLES	MEV	B05	COUGH RUNNY NOSE SNEEZING CONJUNCTIVITIS RED EYES HIGH FEVER RED SPOTS IN MOUTH SKIN RASH SPREADING RAPIDLY HIGH TEMPERATURE HACKING	MERUVAXII ENTOCORT EC ADRENOCOT CPC- CORT-D DECADRON DECAJECT-10 SOLUREX A-HYDROCORT SOLU- CORTEF M-M-RII ORAPR PREDNISONE GAMMAR ROTADISK VENT GEMZ PREDNISONE DELTASONE DVAIR DISKU
H		B24		TRIZIVIR RIT HEPSER VIR KALET NE NORVIR DEX EMTRI VIRACEPT R REYATAZ COMBIVIR AGENERASE FORTOVASE SUSTIVA VALTREX GLEEVEC STROMECTOL ALINIA ORIMUNE RYTHMOL RAPAMUNE
HERPES	HHV - 2	B00	SWOLLEN LYMPH GLANDS PAINFUL INFLAMED BLISTERS HEADACHE MUSCLE ACHE FEVER VAGINAL OR PENIS DISCHARGE INFECTION OF THE URETHRA BACK PAIN SMALL RED BUMPS IN THE GENITAL AREA	ZOVIRAX VALTREX FINACEA FAMVIR FOSCA ORALONE ABREVA CYTADREN BECONASE VANCENASE VISTIDE CIPRODEX GENGRAF NEORAL SANDIMMUNE DECADRON HEXADRO ETOPOPHOS TOPOSAR

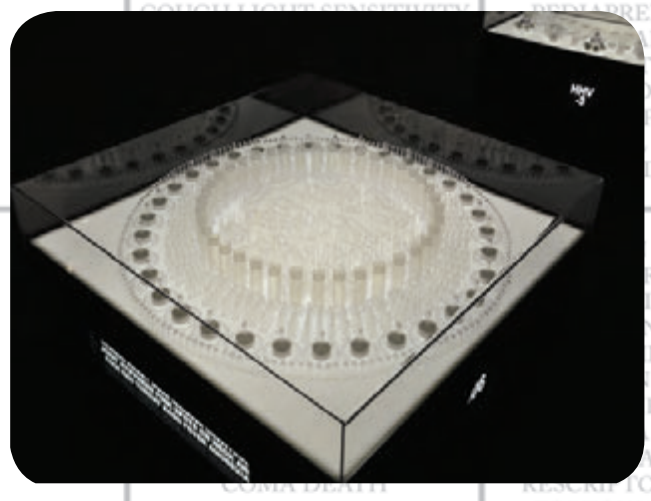




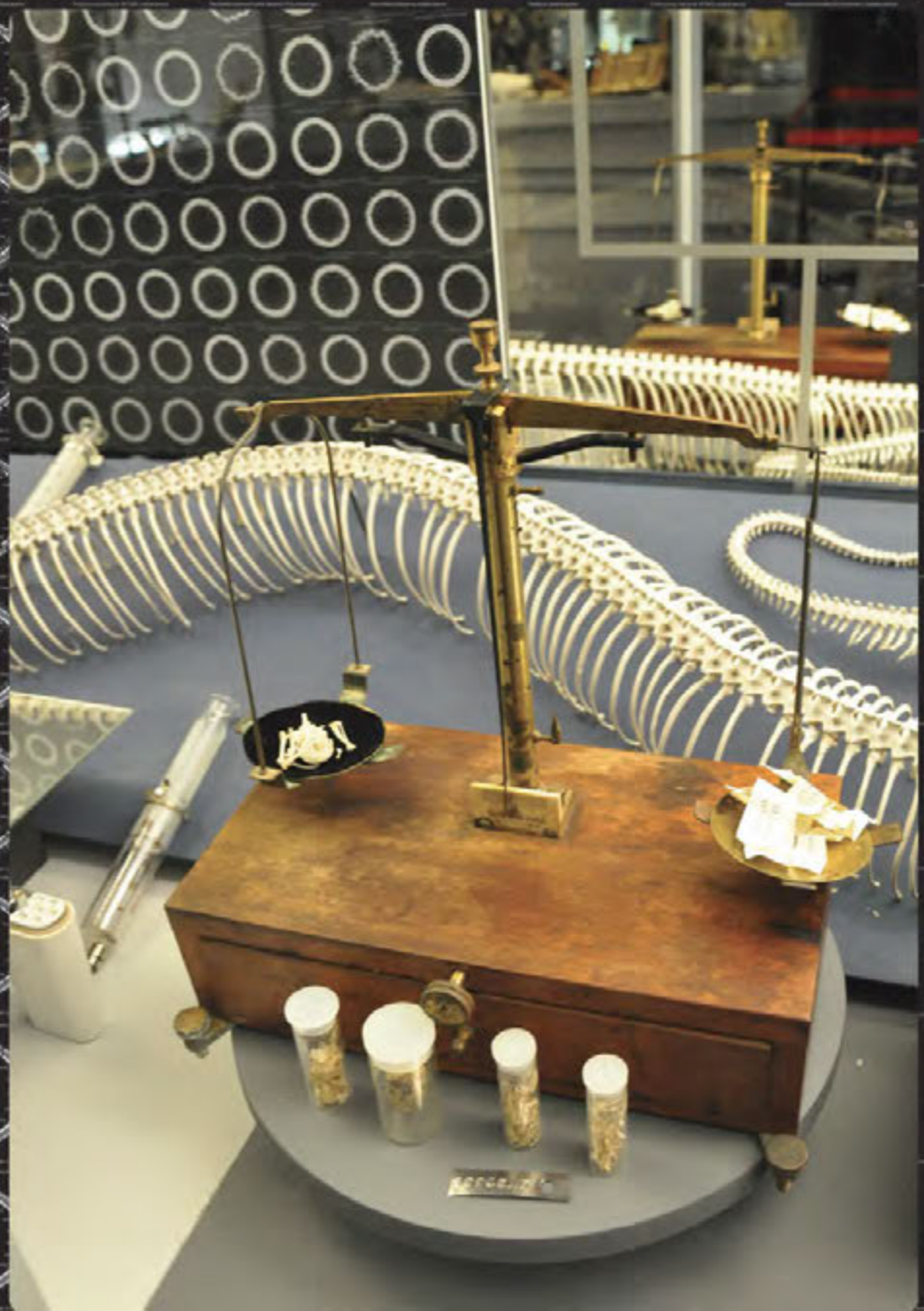








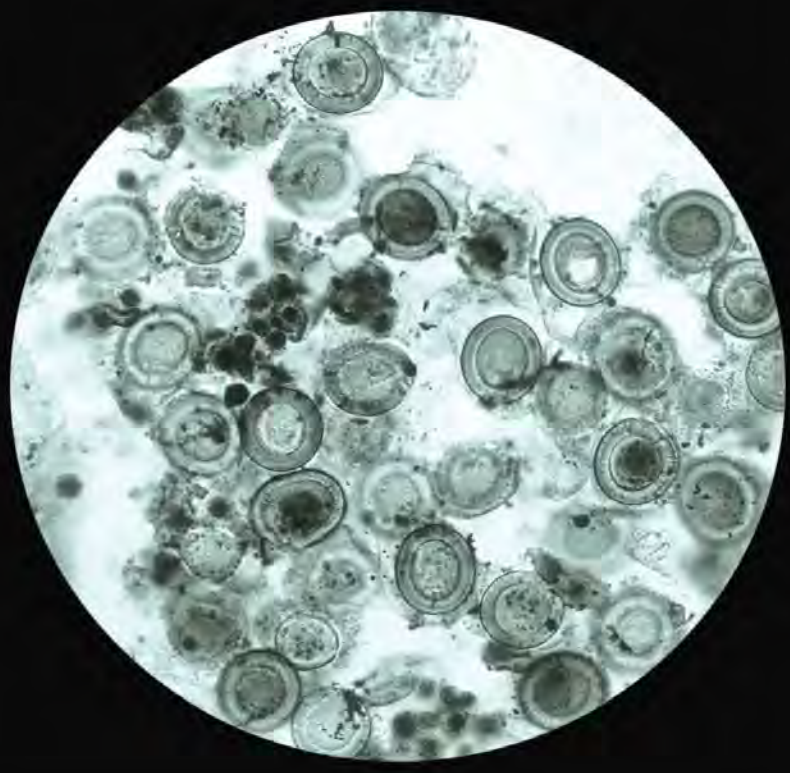

ATTENUA
LIMIT

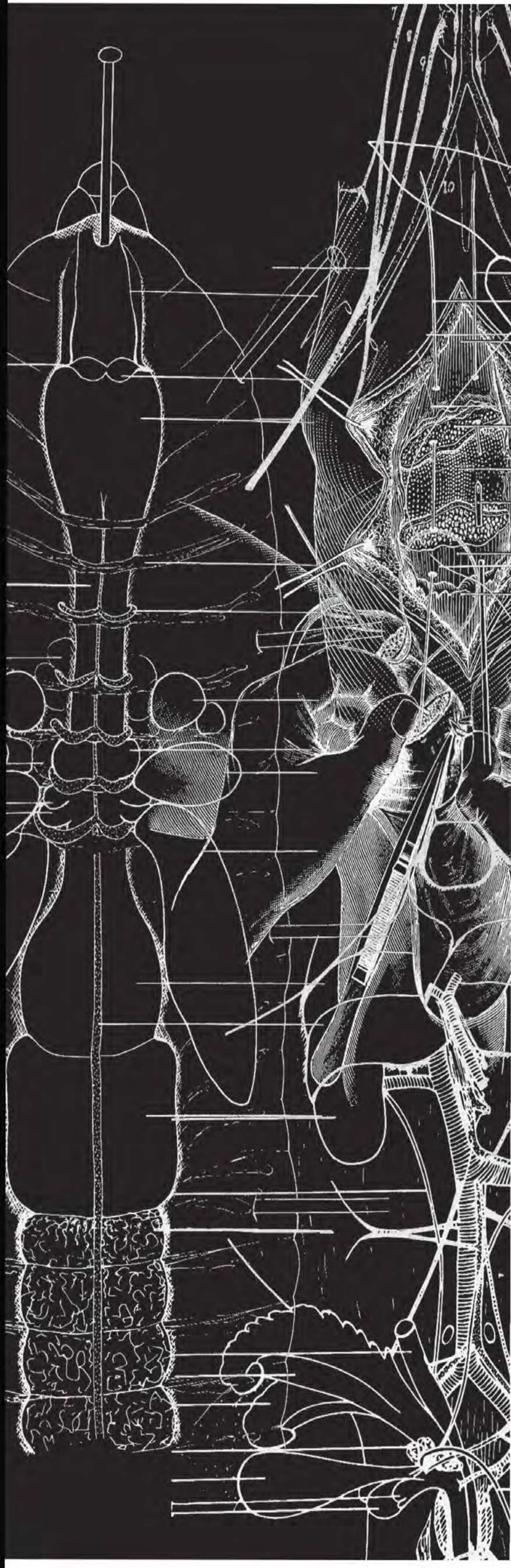


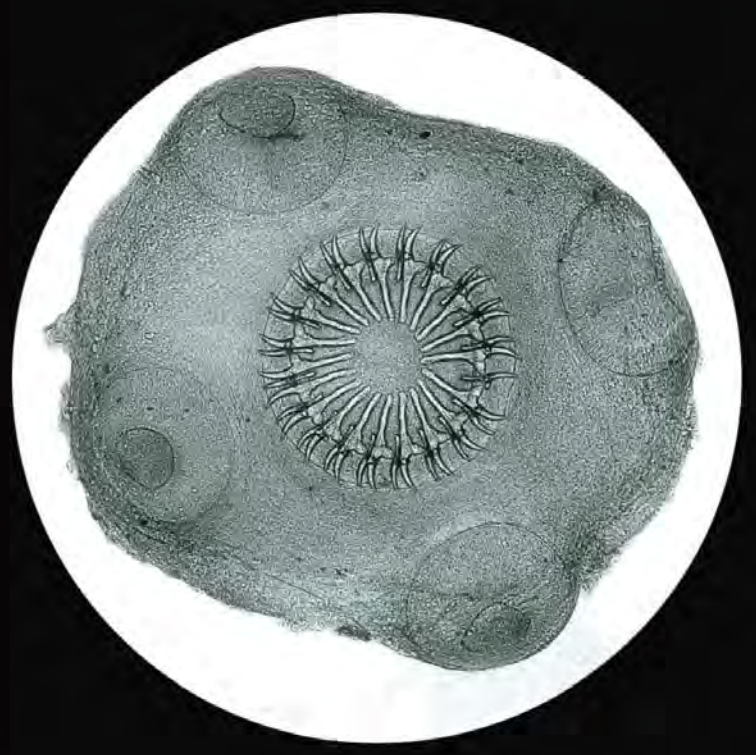
CROSS-REFERENCE

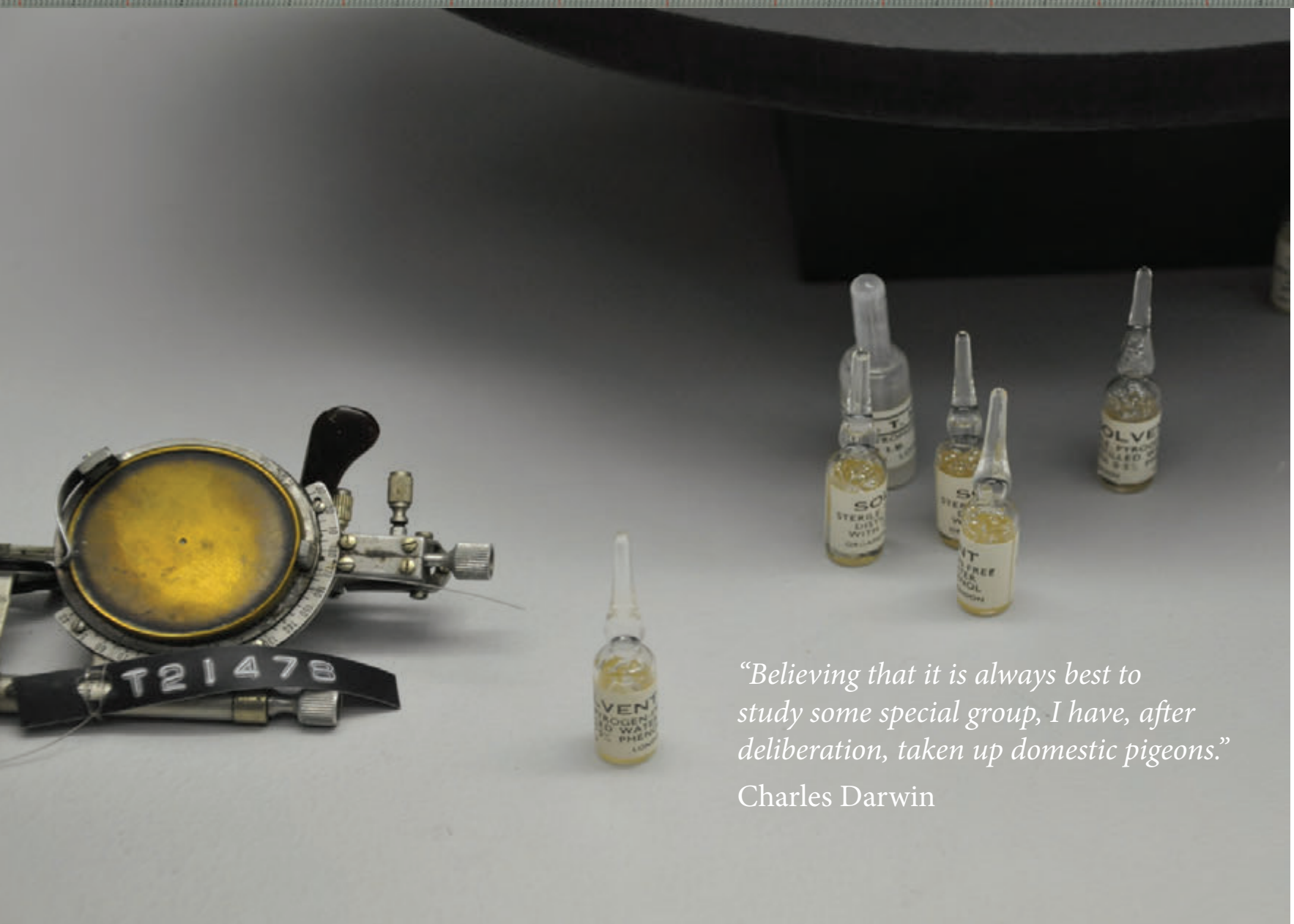
VIDEOS

1000 images of bacterial genetic maps, 60 images of rat, frog, fish and human dissections.





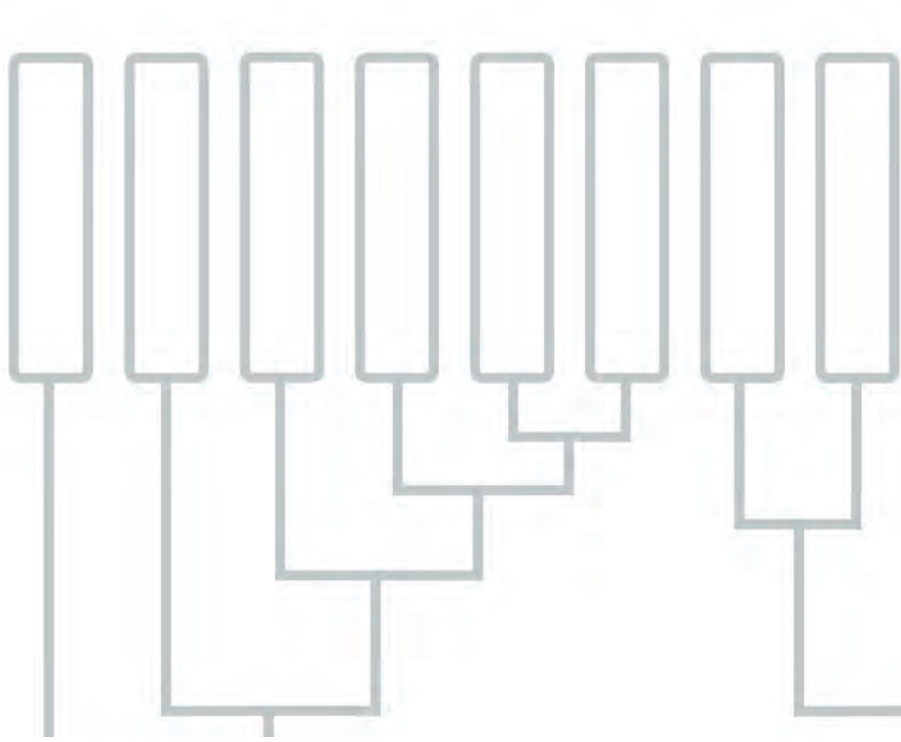




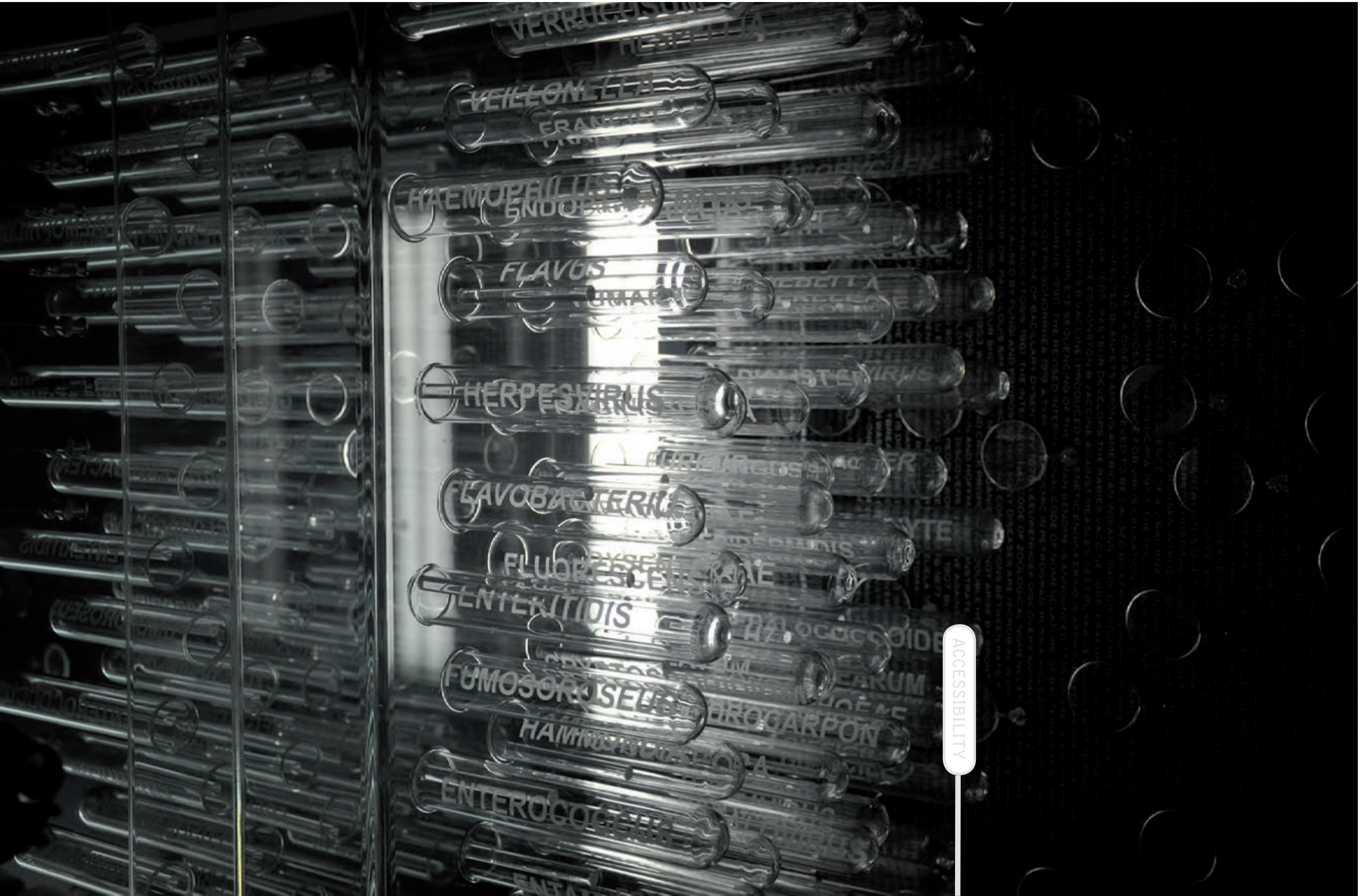
"Believing that it is always best to study some special group, I have, after deliberation, taken up domestic pigeons."

Charles Darwin

GLASS CABINET 5
63 x 56 x 130 cm
Bell jar with pigeon and medal, 2 striped mice (ISAM), 2 opthalmometers, eye lenses, collection of ampoules (Adler Museum), mirror with sandblasted HGT tree of life, concordance references of disease in the Bible, retort stands with contextual texts, 80 test tubes labelled with bacteria.

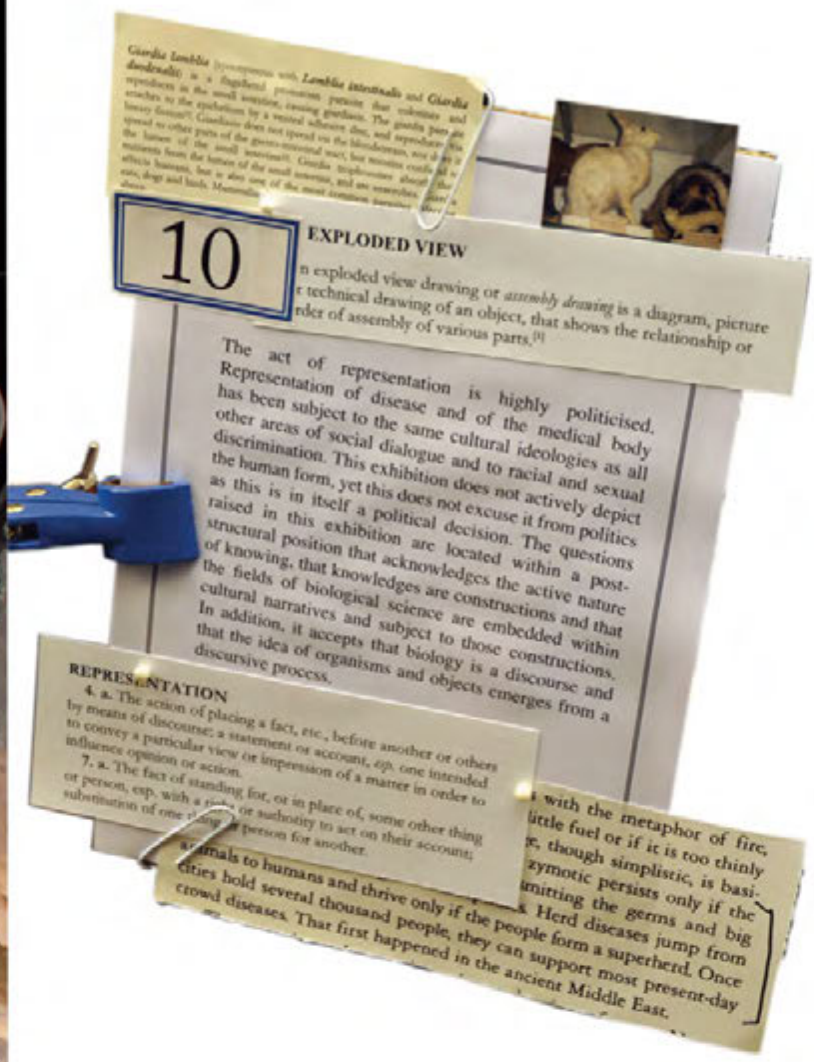


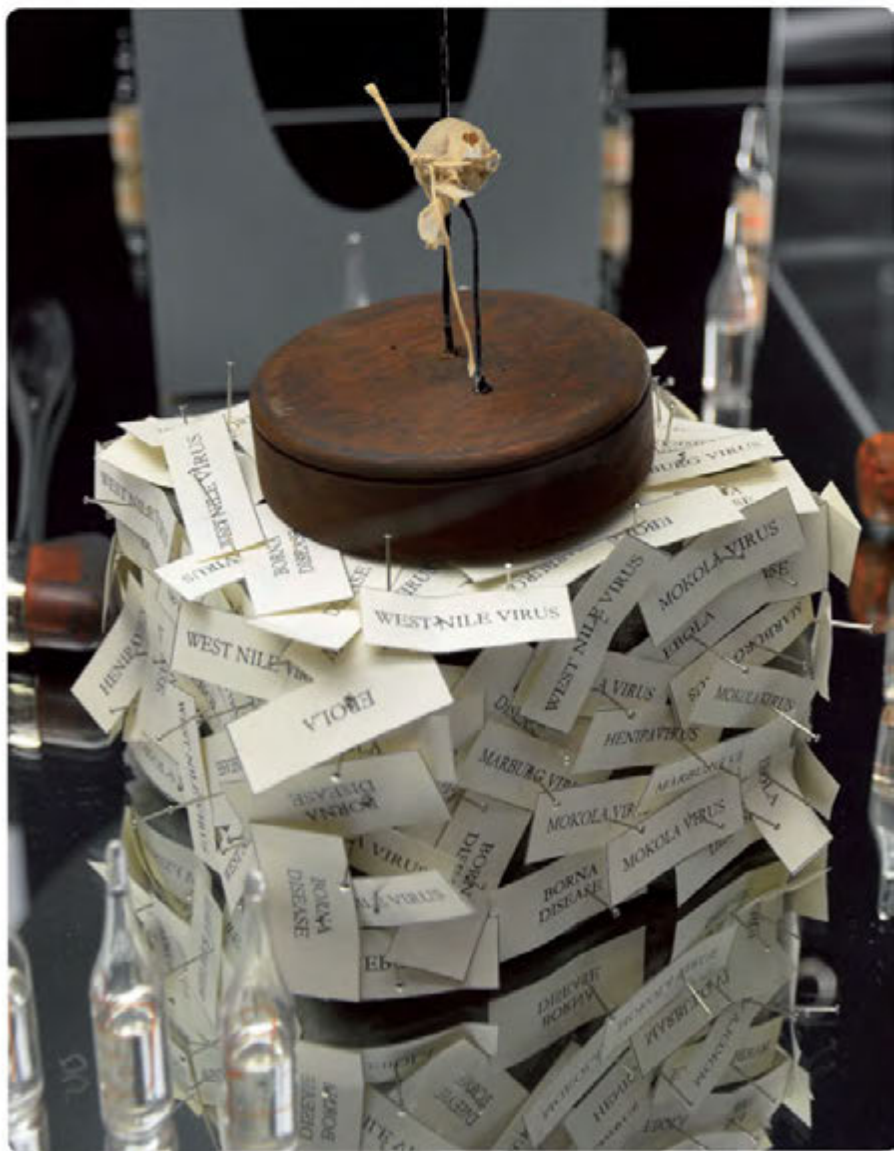
MEASUREMENT


VEILLONELLA
FRANCISELLA
HAEMOPHILUS
ENDOCARDITIDIS
FLAVOBACTERIUM
FLUORESCENS
ENTERITIDIS
FUMOSOROSEUS
HAEMOLYTICUS
ENTEROCOCCUS
HERPESVIRUS
STREPTOCOCCUS
PYOGENES
PEPTOCOCCUS
PEPTOSTREPTOCOCCUS
ANAEROBIUS
STAPHYLOCOCCUS
ALBUS
ACCESSIBILITY

INFIRMARY

Disease follows the obscure, but necessary ways of tissue reactivations. But what now becomes of its visible body, that set of phenomena without secrets that makes it entirely legible for the clinician's gaze: that is, recognizable by its signs, but also decipherable in the symptoms whose totality defined its essence without residue. Foucault 1975:59





Glass cabinet 6
63 x 56 x 150 cm
24 surgical scissors, 4 ophthalmic lens boxes with lenses, steel syringes, medical percussion hammers (Adler Museum), 4 bats, cockatoo mount, pheasant mount with anaesthetic mask, bird and mammal skulls (ISAM), 80 test tubes labelled with bacteria, glass beakers and Erlenmeyer flasks.

ANIMAL: Acheri
DISEASE: sickness
MYTH: "According to folk tradition of India, an acheri is the ghost of a little girl, and who comes down at night from her mountain haunts to bring sickness to children in human habitations." (Lindemans, 1998: Online)
"This solitary ghost of a little girl is portrayed as a thin, frail creature with a grey complexion wearing worn-out deerskin clothes. It comes down from its mountain dwelling to sing and dance in human settlements, sometimes drumming an accompaniment. It revels in human misery and is considered to be primarily a bringer of sickness to children. It acts by casting its shadow over its victim. An acheri may be the ghost of a child that died of disease. Hearing its song or voice is a sign of impending illness or death. Acheri have the knowledge of incurable sicknesses." (Alex, 2002: Online)
ADDITIONAL INFO: "A protection against such a molestation would be to wear a bright-red thread around the neck." (Lindemans, 1998: Online)
"The colour red affords protection against this entity. Typically a red thread is worn around the child's neck but it was common practice among mothers to make sure that their child was always wearing a bit of red somewhere in its clothing and red fabric, thread or beads are widely used in the embroidery or fringes of garments worn by the tribes it haunts. The ghost is, as far as I can tell, indestructible--par for the course for a bringer of disease--but there is a Chippewa tradition, mentioned in a recent report of a mystery disease outbreak that was said to be an acheri manifestation, that says that wrapping the red cloth of a medicine woman around its neck will put it to rest. No mention is made of how to capture it but its pursuers are advised to also wear red for protection." (Alex, 2002: Online)
CULTURE/PEOPLE: Indian folklore
LOCATION: America
SOURCE(S): Lindemans, M. F. 1998. Acheri. [Online]. Available from Encyclopedia Mythica online at: http://www.pantheon.org/articles/a/acheri.html. Accessed [2008-10-29].
Alex. 2002. Acheri@everything2.org. [Online]. Available: http://www.everything2.org/title/Acheri. Accessed [2008-10-29].

ANIMAL: Dog
DISEASE: Death
MYTH: "The Origin of Death - There was Death. So everyone had a meeting to tell Sky that they wanted reincarnation for themselves, but that the grass that is used for thatch, once having been burnt, would never grow back. They sent Dog and Cat as the messengers to tell this to Sky. When they set off, Dog found some bones and ate them on the path. So Cat went on ahead of him. But Cat hadn't understood the message well and told the Sky the opposite of what he should have: that when burnt, the grass for thatch would grow back quickly, but that humans would not be revivified. And that's how it is that humans die today." (Gottlieb, 1986: 479)
ADDITIONAL INFO: "The Beng, whose language is classified as Southern Mande, are a minority ethnic group living in east- central Cote d'Ivoire, with an estimated population of 10,000 in the prefecture of M'Bahiakro (Cote d'Ivoire 1984). Their indigenous religion is focused on forest spirits that reside at certain spots on named Earths and are worshiped regularly … Recently, many Beng have converted to Islam and some to Catholicism. Nevertheless, the traditional religious practices and system of knowledge including those described in this article remain strong even among many of the converts." (Gottlieb, 1989: 497)
CULTURE/PEOPLE: Beng, French is the national language.
LOCATION: Ivory Coast, Africa,
SOURCE(S): Gottlieb, A.1986. Dog: Ally or Traitor? Mythology, Cosmology and Society among the Beng of Ivory Coast. *American Ethnologist* 13(3): 477-488. [Online] Available http://www.jstor.org/stable/644099. Accessed [2008-08-15].

ANIMAL: Ba
DISEASE: dea
MYTH: The
Isi
far
Pli
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"It
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"Pl
and
spe
ADDITIONAL INFO:
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wor
SOURCE(S): Bad
(20

ANIMAL: Arthropod, possibly a mite
DISEASE: Ebola and Marburg virus
MYTH: "Also, it is not known what the vector host Animal is, that is a carrier for Ebola and Marburg Hemorhagic Fever; the host Animal would carry the virus but not die for it, and would act as the hiding place for the virus between human outbreaks in Africa. Finding the host vector would be a big step forward. So we will look for matrices on the Ebola and Marburg host Animal vector, that could be a bird, insect, mite, tick, reptile, bat, mammal; there have been a lot of theories on this, but no one knows for sure. We will see on this page that the Ebola vector may be an arthropod, possibly a mite. But in one matrix on Ebola, Birds, ferret, and Chameleon show up; so I don't know if they or similar Animals could also be Ebola carriers. And caves are mentioned in the matrices. So maybe an arthropod vector that lives in caves, such as a mite, tick, or spider, and bites bats in the caves, infecting [illegible] bat which then bites a person, infecting him." (Ch
ADDITIONAL INFO: The "Bible Code" is a way of looking for hid
search for messages in the Old Testament Hebrew te
a continuous block of Hebrew letters. Then, by ski
There appear to be patterns to the passages where
that these words and phrases in the Bible Code can
SOURCE(S): Chase, T. 2008b. Revelation 13: Ebola and Marburg
"Andromeda Strain"? - A New Age / Bible Prophecy /
http://revelation13.net/Ebola.html. Accessed [2008

Chase, T. 2008a. Revelation 13: The English King J
AIDS/HIV, Mad Cow Disease, Flu. [Online]. Availabl

ANIMAL: The !num !num moth (or Aloa amasis)
DISEASE: lice lay their eggs on the infected peoples
MYTH: "The !num !num moth (or Aloa amasis) is said by the !nam to pour lice upon them when it hovers above."
ADDITIONAL INFO: Author(s): Lucy Lloyd, Contributor(s): Dia!kwain (David Hoesar) (V). Started: October 1875
CULTURE/PEOPLE: !nam
LOCATION: Southern Africa
SOURCE(S): University of Cape Town Libraries, Manuscripts & Archives Department. Bleek and Lloyd Collection, BC151_A2_1_067: 5374-5
About a moth called by the Bushman !num-!num and said to pour lice upon them. [Online]. Available: http://www.lloydbleekcollection.uct.ac.za/story.jsp?id=96595. Accessed [2008-07-25].

ANIMAL: Hyena
DISEASE: A fit of uncontrollable laughter that results in death
HEALING METHOD: Prevention - inserting a dried and stripped corncob into the pulsating anus of what the Beng mistakenly identify a 'newly' dead hyena.
MYTH: The Beng have witnessed that the Hyenas rectum continues to rhythmically contract, in a manner that some Beng equate to a heartbeat. (Gottlieb, 1989: 493). If one discovers a newly deceased hyena one must find a find a dried, stripped corncob and use it to plug the Hyenas rectum.

"In the absence of performing this ritually required act, the observer of the trembling rectum will be seized with a fit uncontrollable laughter that will continue for the rest of his or her life" (Gottlieb, 1989: 493). This laughter will oc regardless of the seriousness of circumstances, until the person eventually dies of it.
CULTURE/PEOPLE: Beng of Cote d'Ivoire (Ivory Coast)
ADDITIONAL INFO: "The Beng, whose language is classified as Southern Mande, are a minority ethnic group living in east- central C6t d'Ivoire, with an estimated population of 10,000 in the prefecture of M'Bahiakro (Cote d'Ivoire 1984). Their indigenous religion is focused on forest spirits that reside at certain spots on named Earths and are worshiped regularly (on Earth worship, which is fairly common in West Africa, see Gottlieb 1986a, 1986d, 1988a). Recently, many Beng have converted to Islam and some to Catholicism. Nevertheless, the traditional religious practices and system of knowledge including those described in this article remain strong even among many of the converts." (Gottlieb, 1989: 497)

"Dried corncobs are used for one's ablutions after defecation and are readily available in the forest. Given this use, would also be appropriate in the present instance." (Gottlieb, 1989: 497 endnote 17 on 493)

'Zoologist Alan Schumacher, a hyena specialist at the River Banks Zoo (Columbia, SC), confirmed the likelihood of this described action (personal communication, 15 April 1988). Hyena's scent-mark by conspicuously exerting the rectum about inch, and Schumacher deems it likely that a dying hyena might exert the rectum as a reflex. This action would take place while the Animal still technically lay dying and would be terminated before its clinical death, but Schumacher acknowle that an untrained observer could reasonably conclude that the hyena was already dead.
(Gottlieb, 1989: 497 endnote 15 on 493)
LOCATION: Cote d'Ivoire (Ivory Coast)
SOURCE(S): Gottlieb, A. 1989. Hyenas and Heteroglossia: Myth and Ritual among the Beng of Côte d'Ivoire. *American Ethnologist* 16 (487-501. [Online] Available http://www.jstor.org/stable/645270. Accessed: 2008-08-15.

ANIMAL: Jackal or the hyena
DISEASE: skin disease
MYTH: All places where the jackal, or the hyena, has
ADDITIONAL INFO: Author(s): Lucy Lloyd, Contributor(s): (ha
Started: July 1879
CULTURE/PEOPLE: !xam and !kun
LOCATION: Southern Africa
SOURCE(S): University of Cape Town Libraries, Manuscripts
8586v.
Avoiding where the jackal or the hyena have pas
http://www.lloydbleekcollection.uct.ac.za/story

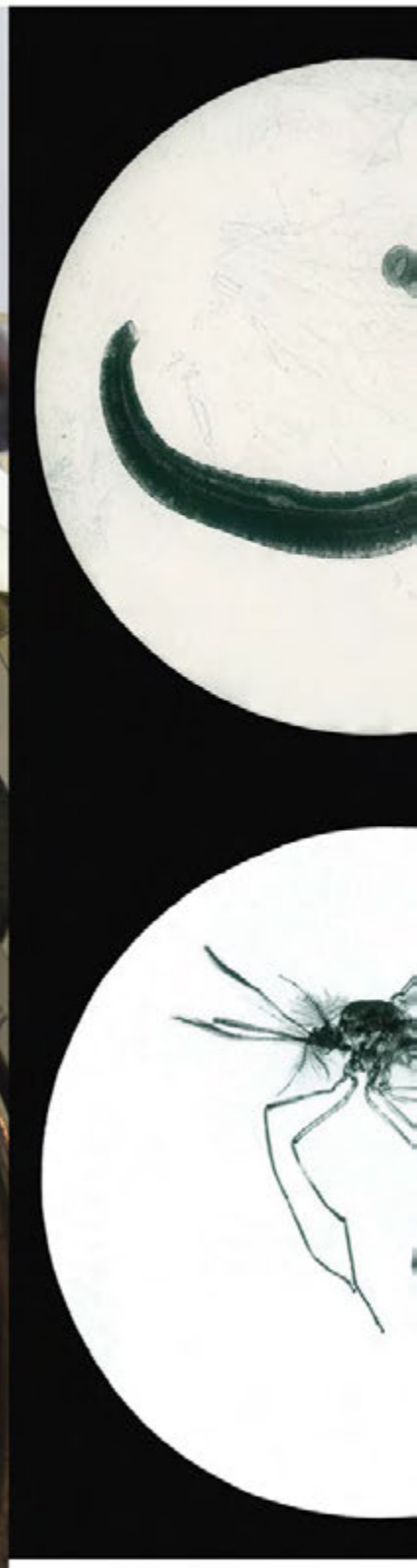
ANIMAL: Dog
DISEASE: hydrophobia
MYTH: "The dog had the power of seeing ghosts. (Hende
Many a time has it happened to the belated traveller, as he was returning home through some lonely wood, or crossing bridge with a deep dark pool below it, that the faithful dog has come up to his master, and with drooping tail kept him, and neither coaxing nor threats would make him move a step away from his master's foot; waterkelpie, or an evil was stalking beside.

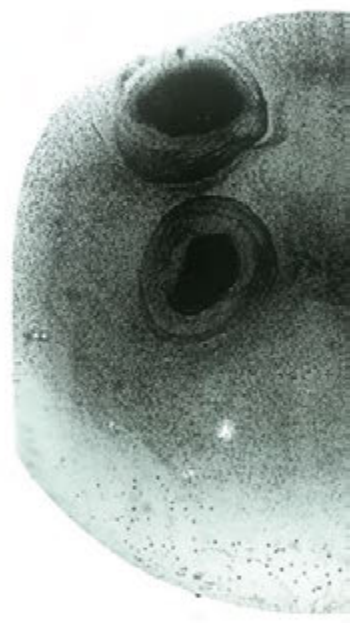
If a dog bit one it was a common thing to kill the dog. It was believed that, if the dog became mad afterwards, the was bitten was seized with hydrophobia.

If a mad dog bit one, the dog was killed at once, the heart taken out, dried over the fire, ground into powder, and the powder given as a potion. No evil followed from the bite. (Henderson cited in Gregor, 1881: online)
ADDITIONAL INFO: "It was believed that a dog would not approach a fey person, i.e. a person who was soon to die. When a member family was ill, watch was kept how the dog behaved towards the sick one. The approach of the animal to the sick one good hope of a recovery. A dog howling at night was the omen of the death of a member of the family, or of one nearly related to the family, or of some one in the neighbourhood." (Henderson cited in Gregor, 1881: online)
CULTURE/PEOPLE: Folklore of North East Scotland
LOCATION: North East Scotland
SOURCE(S): Gregor, W. 1881. Chapter XX: Animal And Plant Superstitions in *Notes On The Folk-Lore Of The North-East Of Scotland.* Elliot Stock. [Online]. Available:. http://www.theology101.org/neu/celt/nes/nes23.htm. Accessed [2008-10-30]. [Digiti with adaptations. 26 September, 2004, at Sacred-texts.com, by John Bruno Hare].

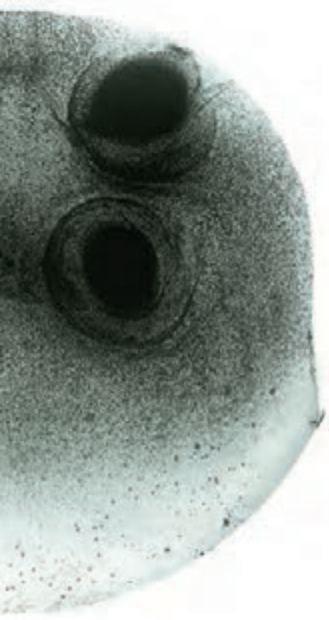
ANIMAL: Fachen
DISEASE: heart attack
HEALING METHOD: None
MYTH: "In Scottish and Scots-Irish folklore, this creature has only half a body. It has a mane of black feathers tufted at top. A very wide mouth is so horrible that it may lead to heart attack." (Durande, 2007: Online)

MAGNIFICATION





LINEARITY




EVOLUTION

Glass cabinet 2
63 x 56 x 150 cm
Stillborn foal, donated by Boswell Wilkie Circus to ISAM in 1922, lion claws, parrot skeleton (ISAM), 16 stainless steel anaesthetic masks on black satin, aural and ophthalmic surgical instruments, lenses, pneumothorax, chest of remedies, medical glass cups, hearing aids, stainless steel bacterial test case (Adler Museum), an image of the 1918 Spanish Influenza pandemic in Hong Kong.

CHAGAS DISEASE – CHOLERA – EBOLA - BORNA DISEASE - MOKOLA VIRUS - DUVENHAGE VIRUS – HENIPAVIRUS - MARBURG VIRUS - WEST NILE VIRUS - INFLUENZAVIRUS A - CHLAMYDOPHILA PSITTACI – BARTONELLOSIS - CUTANEOUS LARVA MIGRANS - GIARDIA LAMBLIA - OCULAR LARVA MIGRANS – RINGWORM – TOXOCARIASIS - DEER TICK VIRUS - ENCEPHALITIS – LEPROSY – TOXOPLASMOSIS – ANTHRAX - OROPOUCHE FEVER – BRUCELLOSIS – LYMPHOCYTIC – CHORIOMENINGITIS – TRICHINOSIS – TULAREMIA – OMSK - HEMORRHAGIC FEVER - CREUTZFELDT–JAKOB DISEASE – CRYPTOSPORIDIOSIS – SALMONELLOSIS - COLORADO TICK FEVER – SCHISTOSOMIASIS – HANTAVIRUSES - KYASANUR FOREST DISEASE - LASSA FEVER - MYCOBACTERIUM BOVIS - CAMPYLOBACTERIOSIS - EASTERN EQUINE ENCEPHALOMYELITIS VIRUS - STREPTOCOCCUS SUIS - WESTERN EQUINE ENCEPHALITIS VIRUS - VENEZUELAN EQUINE ENCEPHALITIS – HENIPAVIRUS - ST. LOUIS ENCEPHALITIS - BORRELIA - YELLOW FEVER - HIV AIDS - TYPHUS - BARMAH FOREST VIRUS - DENGUE FEVER – MALARIA - HERPES B VIRUS - COWPOX VIRUS - VARIOLA VIRUS - PARIETARIA PESTIS – LEISHMANIASIS - TUBERCULOSIS – ORF - CRIMEAN-CONGO HEMORRHAGIC FEVER – CRYPTOSPORIDIOSIS - ESCHERICHIA COLI - Q FEVER - AVIAN INFLUENZA – LEPTOSPIROSIS – RIFT VALLEY FEVER – MENINGITIS – CHICKEN POX - LYME DISEASE - AVIAN TUBERCULOSIS - BAYLISASCARIS PROCYONIS - POLIOMYELITIS - SMALLPOX - VIRAL ENCEPHALITIS - SARS - RUBELLA - AFRICAN TRYPANOSOMIASIS - ASCARIASIS - CHAGAS DISEASE – CHOLERA – EBOLA - BORNA DISEASE - MOKOLA VIRUS - HENIPAVIRUS - MARBURG VIRUS - WEST NILE VIRUS - INFLUENZAVIRUS A - CHLAMYDOPHILA PSITTACI – BARTONELLOSIS - CUTANEOUS LARVA MIGRANS - GIARDIA LAMBLIA - OCULAR LARVA MIGRANS – RINGWORM – TOXOCARIASIS - DEER TICK VIRUS - ENCEPHALITIS – LEPROSY – TOXOPLASMOSIS – ANTHRAX - OROPOUCHE FEVER – BRUCELLOSIS – LYMPHOCYTIC – CHORIOMENINGITIS – TRICHINOSIS – TULAREMIA – OMSK - HEMORRHAGIC FEVER - CREUTZFELDT–JAKOB DISEASE – CRYPTOSPORIDIOSIS – SALMONELLOSIS - COLORADO TICK FEVER – SCHISTOSOMIASIS – HANTAVIRUSES - KYASANUR FOREST DISEASE - LASSA FEVER - MYCOBACTERIUM BOVIS - CAMPYLOBACTERIOSIS - EASTERN EQUINE ENCEPHALOMYELITIS VIRUS - STREPTOCOCCUS SUIS - WESTERN EQUINE ENCEPHALITIS VIRUS - VENEZUELAN EQUINE ENCEPHALITIS – HENIPAVIRUS - ST. LOUIS ENCEPHALITIS - BORRELIA - YELLOW FEVER - HIV AIDS - TYPHUS - BARMAH FOREST VIRUS - DENGUE FEVER – MALARIA - HERPES B VIRUS - COWPOX VIRUS - VARIOLA VIRUS - PARIETARIA PESTIS – LEISHMANIASIS - TUBERCULOSIS – ORF - CRIMEAN-CONGO HEMORRHAGIC FEVER – CRYPTOSPORIDIOSIS - ESCHERICHIA COLI - Q FEVER - AVIAN INFLUENZA – LEPTOSPIROSIS – RIFT VALLEY FEVER – MENINGITIS – CHICKEN POX - LYME DISEASE - AVIAN TUBERCULOSIS - BAYLISASCARIS PROCYONIS - POLIOMYELITIS - SMALLPOX - VIRAL ENCEPHALITIS - SARS - RUBELLA - AFRICAN TRYPANOSOMIASIS - ASCARIASIS - CHAGAS DISEASE – CHOLERA – EBOLA - BORNA DISEASE - MOKOLA VIRUS - HENIPAVIRUS - MARBURG VIRUS - WEST NILE VIRUS - INFLUENZAVIRUS A - CHLAMYDOPHILA PSITTACI – BARTONELLOSIS - CUTANEOUS LARVA MIGRANS - GIARDIA LAMBLIA - OCULAR LARVA MIGRANS – RINGWORM – TOXOCARIASIS - DEER TICK VIRUS - ENCEPHALITIS – LEPROSY – TOXOPLASMOSIS – ANTHRAX - OROPOUCHE FEVER – BRUCELLOSIS – LYMPHOCYTIC – CHORIOMENINGITIS – TRICHINOSIS – TULAREMIA – OMSK - HEMORRHAGIC FEVER - CREUTZFELDT–JAKOB DISEASE – CRYPTOSPORIDIOSIS – SALMONELLOSIS - COLORADO TICK FEVER – SCHISTOSOMIASIS

"The observing gaze refrains from intervening: it is silent and gestureless. Observation leaves things as they are; there is nothing hidden to it in what is given. The correlative of observation is never the invisible, but always the immediately visible, once one has removed the obstacles erected to reason by theories and to the senses by the imagination." Foucault 1975:107

I experienced an attack and it deserves no less a name of the Benchuca, the great black bug of the Pampas. It is most disgusting to feel the soft wingless insects, about an inch long, crawling over one's body. Before sucking they are quite thin, but afterwards they become round and bloated with blood. 1835, ARGENTINA. Charles Darwin

PROJECTION

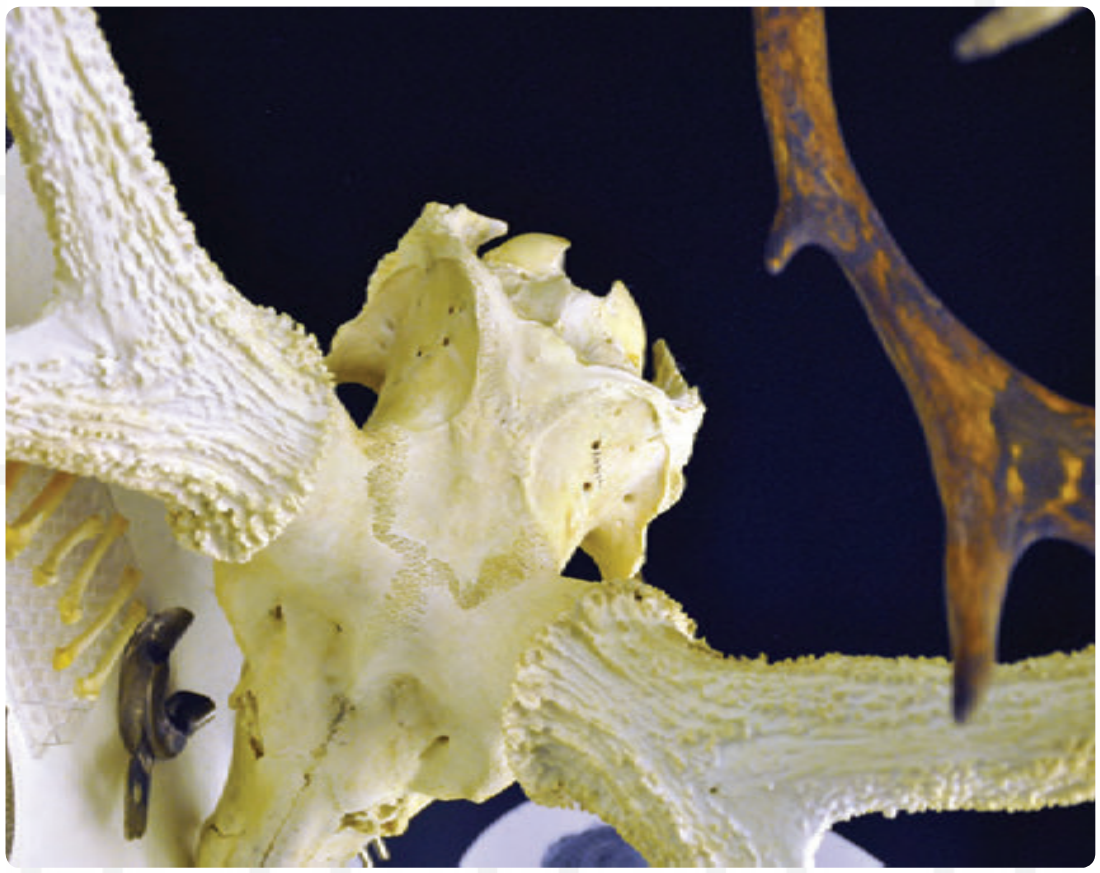
Xenopipo atronitens
Xenopipo flavicapilla
Xenopipo holochlora
Xenopipo unicolor
Xenopipo uniformis
Agriornis albicauda
Agriornis lividus
Agriornis micropterus
Agriornis montanus
Agriornis murinus
Alectrurus risora
Alectrurus tricolor
Anairetes agilis
Anairetes agraphia
Anairetes alpinus
Anairetes fernandezianus
Anairetes flavirostris
Anairetes nigrocristatus
Anairetes parulus
Anairetes reguloides
Aphanotriccus audax
Aphanotriccus capitalis
Arundinicola leucocephala
Atalotriccus pilaris
Attila bolivianus
Attila cinnamomeus
Attila citriniventris
Attila phoenicurus
Attila rufus
Attila spadiceus
Attila torridus
Camptostoma imberbe
Camptostoma obsoletum
Capsiempis flaveola
Casiornis fuscus
Casiornis rufus
Cnemarchus erythropygius
Cnipodectes subbrunneus
Colonia colonus
Colorhamphus parvirostris
Conopias albovittatus
Conopias cinchoneti
Conopias trivirgatus
Contopus albogularis
Contopus caribaeus
Contopus cinereus
Contopus cooperi
Contopus fumigatus
Contopus hispaniolensis
Contopus latirostris
Contopus lugubris
Contopus nigrescens
Contopus ochraceus
Contopus pallidus
Contopus pertinax
Contopus sordidulus
Contopus virens
Culicivora caudacuta
Deltarhynchus flammulatus
Elaenia albiceps
Elaenia chiriquensis
Elaenia cristata
Elaenia dayi
Elaenia fallax
Elaenia flavogaster
Elaenia frantzii
Elaenia gigas
Elaenia martinica
Elaenia mesoleuca
Elaenia obscura
Elaenia pallatangae
Elaenia parvirostris
Elaenia pelzelni
Elaenia ridleyana
Elaenia ruficeps
Elaenia spectabilis
Elaenia strepera
Empidonax affinis
Empidonax albigularis
Empidonax alnorum
Empidonax atriceps
Empidonax difficilis
Empidonax flavescens
Empidonax flaviventris
Empidonax fulvifrons
Empidonax hammondii
Empidonax minimus
Empidonax oberholseri
Empidonax occidentalis
Empidonax traillii
Empidonax virescens
Empidonax wrightii
Empidonomus aurantioatrocristatus
Empidonomus varius
Euscarthmus meloryphus
Euscarthmus rufomarginatus
Fluvicola nengeta
Fluvicola pica
Gubernetes yetapa
Hemitriccus cinnamomeipectus
Hemitriccus diops
Hemitriccus flammulatus
Hemitriccus furcatus
Hemitriccus granadensis
Hemitriccus griseipectus
Hemitriccus inornatus
Hemitriccus iohannis
Hemitriccus josephinae
Hemitriccus kaempferi
Hemitriccus margaritaceiventer
Hemitriccus minimus
Hemitriccus minor
Hemitriccus mirandae
Hemitriccus nidipendulus
Hemitriccus obsoletus
Hemitriccus orbitatus
Hemitriccus rufigularis
Hemitriccus spodiops
Hemitriccus striaticollis
Hemitriccus zosterops
Heteroxolmis dominicana
Hirundinea ferruginea
Hymenops perspicillatus
Inezia caudata
Inezia inornata
Inezia subflava
Inezia tenuirostris
Knipolegus aterrimus
Knipolegus cyanirostris
Knipolegus hudsoni
Knipolegus lophotes
Knipolegus nigerrimus
Knipolegus orenocensis
Knipolegus poecilocercus
Knipolegus poecilurus
Knipolegus signatus
Knipolegus striaticeps
Lathrotriccus euleri
Lathrotriccus griseipectus
Legatus leucophaius

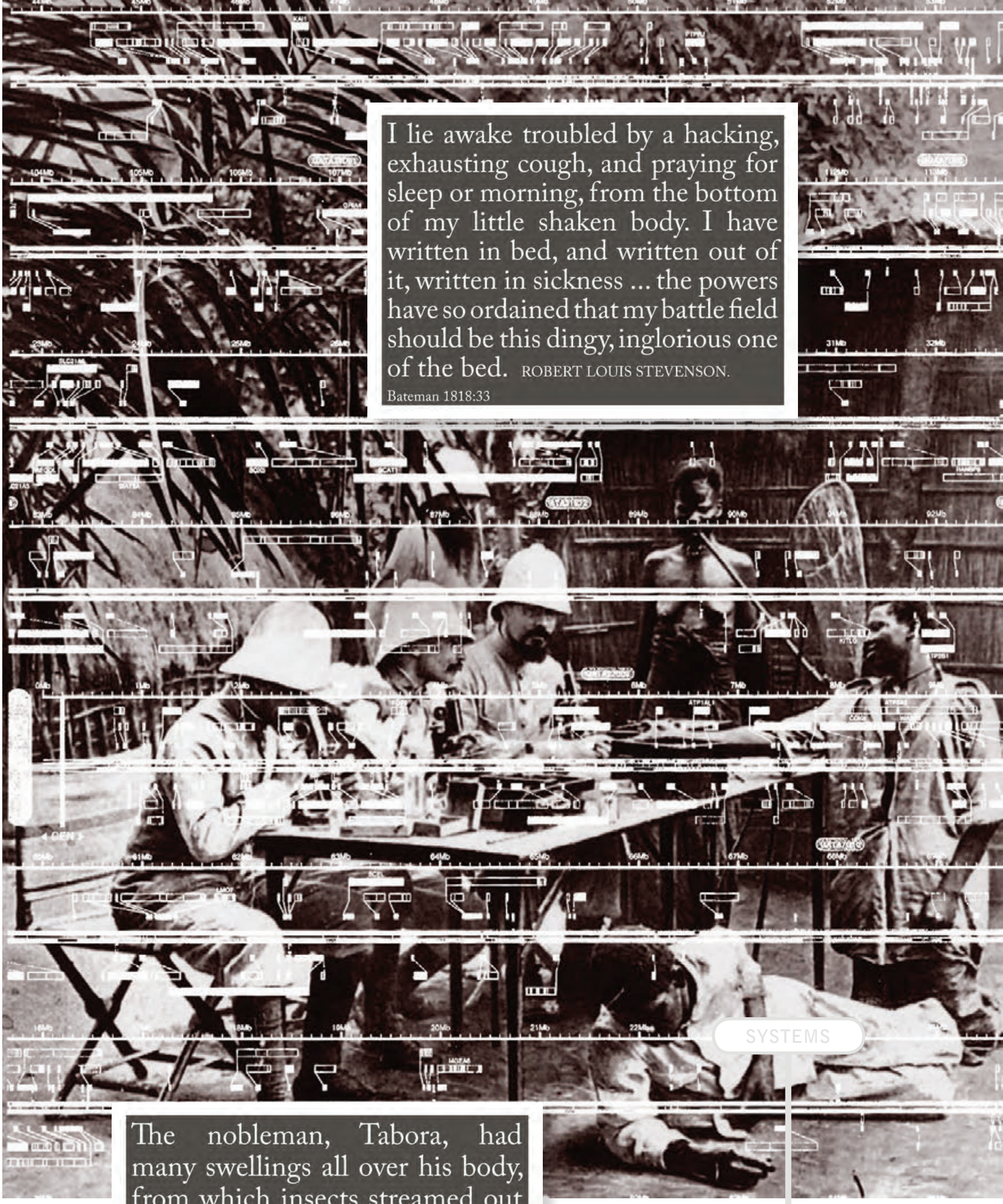
INSCRIPTION

Glass cabinet 4
63 x 56 x 180 cm
Various ungulate horns, marmot mount with open stuffing with stethoscope, European mountain hare and fox mount with oxygen masks, zebra foetus, zebra and cow hooves (ISAM), ampoule set, 30 dental moulds, 15 dental impression trays, 10 stethoscopes (Adler Museum), 80 glass test tubes etched with names of bacteria, an image of Robert Koch testing TB vaccines in Africa in 1906, blue surgical masks, map in which geographical landform is determined by the incidence of 10 major infectious diseases.

Ampelion rubrocristatus
Ampelion rufaxilla
Calyptura cristata
Carpodectes antoniae
Carpodectes hopkei
Carpodectes nitidus
Carpornis cucullata
Carpornis melanocephala
Cephalopterus glabricollis
Cephalopterus penduliger
Conioptilon mcilhennyi
Cotinga cayana
Cotinga cotinga
Cotinga maculata
Cotinga maynana
Cotinga nattereri
Cotinga ridgwayi
Doliornis remseni
Doliornis sclateri
Gymnoderus foetidus
Haematoderus militaris
Iodopleura fusca
Iodopleura isabellae
Iodopleura pipra
Laniisoma elegans
Laniocera hypopyrra
Laniocera rufescens
Lipaugus fuscocinereus
Lipaugus lanioides
Lipaugus streptophorus
Lipaugus unirufus
Lipaugus uropygialis
Lipaugus vociferans
Lipaugus weberi
Oxyruncus cristatus
Pachyramphus aglaiae
Pachyramphus albogriseus
Pachyramphus castaneus
Pachyramphus cinnamomeus
Pachyramphus homochrous
Pachyramphus major
Pachyramphus marginatus
Pachyramphus minor
Pachyramphus niger
Pachyramphus polychopterus
Pachyramphus rufus
Pachyramphus spodiurus
Pachyramphus surinamus
Pachyramphus validus
Pachyramphus versicolor
Pachyramphus viridis
Perissocephalus tricolor
Phibalura flavirostris
Phoenicircus carnifex
Phoenicircus nigricollis
Phytotoma raimondii
Phytotoma rara
Phytotoma rutila
Pipreola arcuata
Pipreola aureopectus
Pipreola chlorolepidota
Pipreola formosa
Pipreola frontalis
Pipreola intermedia
Pipreola jucunda
Pipreola lubomirskii
Pipreola pulchra
Pipreola riefferii
Pipreola whitelyi
Piprites chloris
Piprites griseiceps
Piprites pileata
Porphyrolaema porphyrolaema
Procnias albus
Procnias averano
Procnias nudicollis
Procnias tricarunculatus
Pyroderus scutatus
Querula purpurata
Rupicola peruvianus
Rupicola rupicola
Schiffornis major
Schiffornis turdina
Schiffornis virescens
Snowornis cryptolophus
Snowornis subalaris
Tijuca atra
Tijuca condita
Tityra cayana
Tityra inquisitor
Tityra leucura
Tityra semifasciata
Xenopsaris albinucha
Xipholena atropurpurea
Xipholena lamellipennis
Xipholena punicea
Zaratornis stresemanni
Antilophia bokermanni
Antilophia galeata
Chiroxiphia boliviana
Chiroxiphia caudata
Chiroxiphia lanceolata
Chiroxiphia linearis
Chiroxiphia pareola
Corapipo altera
Corapipo gutturalis
Corapipo leucorrhoa
Heterocercus aurantiivertex
Heterocercus flavivertex
Heterocercus linteatus
Ilicura militaris
Lepidothrix coeruleocapilla
Lepidothrix coronata
Lepidothrix iris
Lepidothrix isidorei
Lepidothrix nattereri
Lepidothrix serena
Lepidothrix suavissima
Lepidothrix vilasboasi
Machaeropterus deliciosus
Machaeropterus pyrocephalus
Machaeropterus regulus
Manacus manacus
Masius chrysopterus
Neopelma aurifrons
Neopelma chrysocephalum
Neopelma chrysolophum
Neopelma pallescens
Neopelma sulphureiventer
Pipra aureola
Pipra chloromeros
Pipra cornuta
Pipra erythrocephala
Pipra fasciicauda
Pipra filicauda
Pipra mentalis
Pipra pipra
Pipra rubrocapilla
Tyranneutes stolzmanni
Tyranneutes virescens


1925



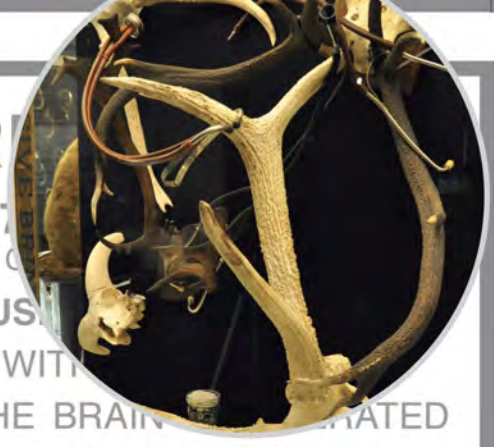


I lie awake troubled by a hacking, exhausting cough, and praying for sleep or morning, from the bottom of my little shaken body. I have written in bed, and written out of it, written in sickness ... the powers have so ordained that my battle field should be this dingy, inglorious one of the bed. ROBERT LOUIS STEVENSON.

Bateman 1818:33

The nobleman, Tabora, had many swellings all over his body, from which insects streamed out incessantly; two of his Ethiopian slaves were employed in emptying small baskets of them into the sea. After weeks, he was devoured by these lice engendered under his own skin. PORTUGAL, 1556. Bondeson 1997: 59


39



CHAR

(17

C

CAUS

MENINGITIS WITH

SERUM ON THE BRAIN ATED

BY A FALL DOWN STAIRS

THOMAS HUXLEY

(1825 –1895)

ZOOLOGIST

CAUSE OF DEATH

PLEURISY AND HEART DISEASE

ROBERT KOCH

(1843 –1910)

MICROBIOLOGIST

CAUSE OF DEATH

HEART ATTACK

GEORGES CUVIER

(1769 – 1832)

COMPARATIVE ANATOMIST

CAUSE OF DEATH

CHOLERA

ALFRED WALL

(1823 – 1913)

NATURALIST

CAUSE OF DEA

RECURRENT MALA

CHARLES DARWIN

(1809 – 1882)

NATURALIST

CAUSE OF DEATH

NIC CARDIAC FAILURE POSSIBLY

CAUSED BY CHAGAS DISE

CAROLUS LINNAEUS

(1707 – 1778)

TAXONOMIST, ZOOLOGIST, BOTANIST

CAUSE OF DEATH

STROKE

COMTE DE B

(1707 – 178

NATURALIST

CAUSE OF DEATH

POSSIBLE KIDNEY FAILURE

CH LYELL

SION OF

SE ELERATED

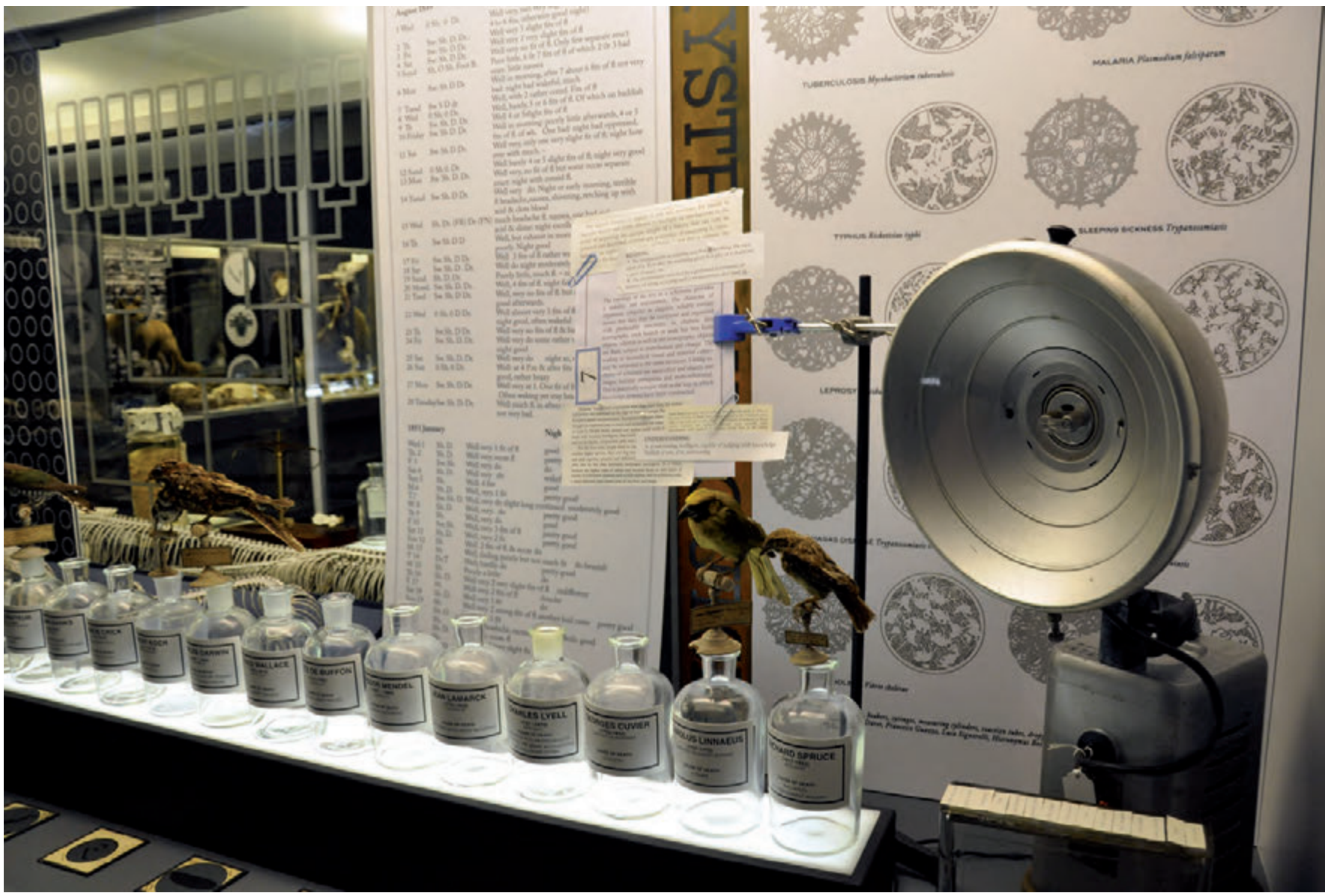
AIRS

KLEY

TH

PLEU ART DISEASE

53 WATSON AND CRICK PROPOSE THE DOUBLE HELIX STRUCTURE FOR DNA 1883 KOCH DISCOVERS CHOLERA 1866 ERNST HAECKEL PROPOSES THE PHYLUM PROTISTA 1999 26 PEOPLE DIE FR

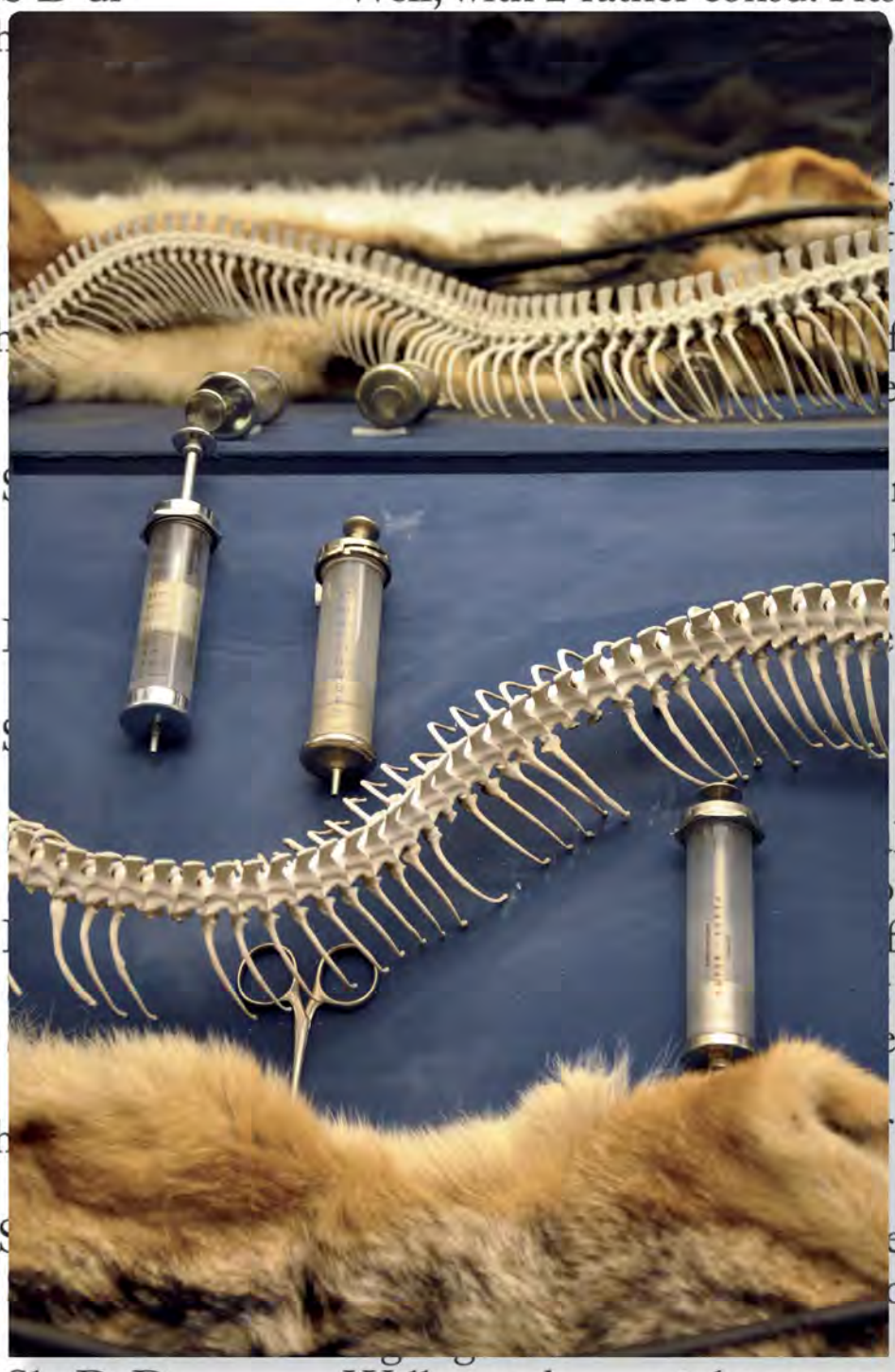


GLASS CABINET 1
63 x 56 x 190 cm
14 glass slides (Medical Microbiology Department, UCT), 2 surgical lights, a dispensing scale, glass syringes, a snake bite kit (Adler Museum), 4 rat skulls, a puff adder skeleton, baboon and caracal skin (ISAM), 14 empty reagent bottles on a light box, labelled with the names, dates and causes of death of naturalists, geneticists and microbiologists, an enlarged detail from Darwin's diary of health, a diagram of the 20 steel disks presented on the walls, a sandblasted mirror representation of Darwin's evolutionary tree, retort stand with contextual texts, 500 bacterial genome diagrams from the Bacmap project.

SCHEMATICS

August 1849

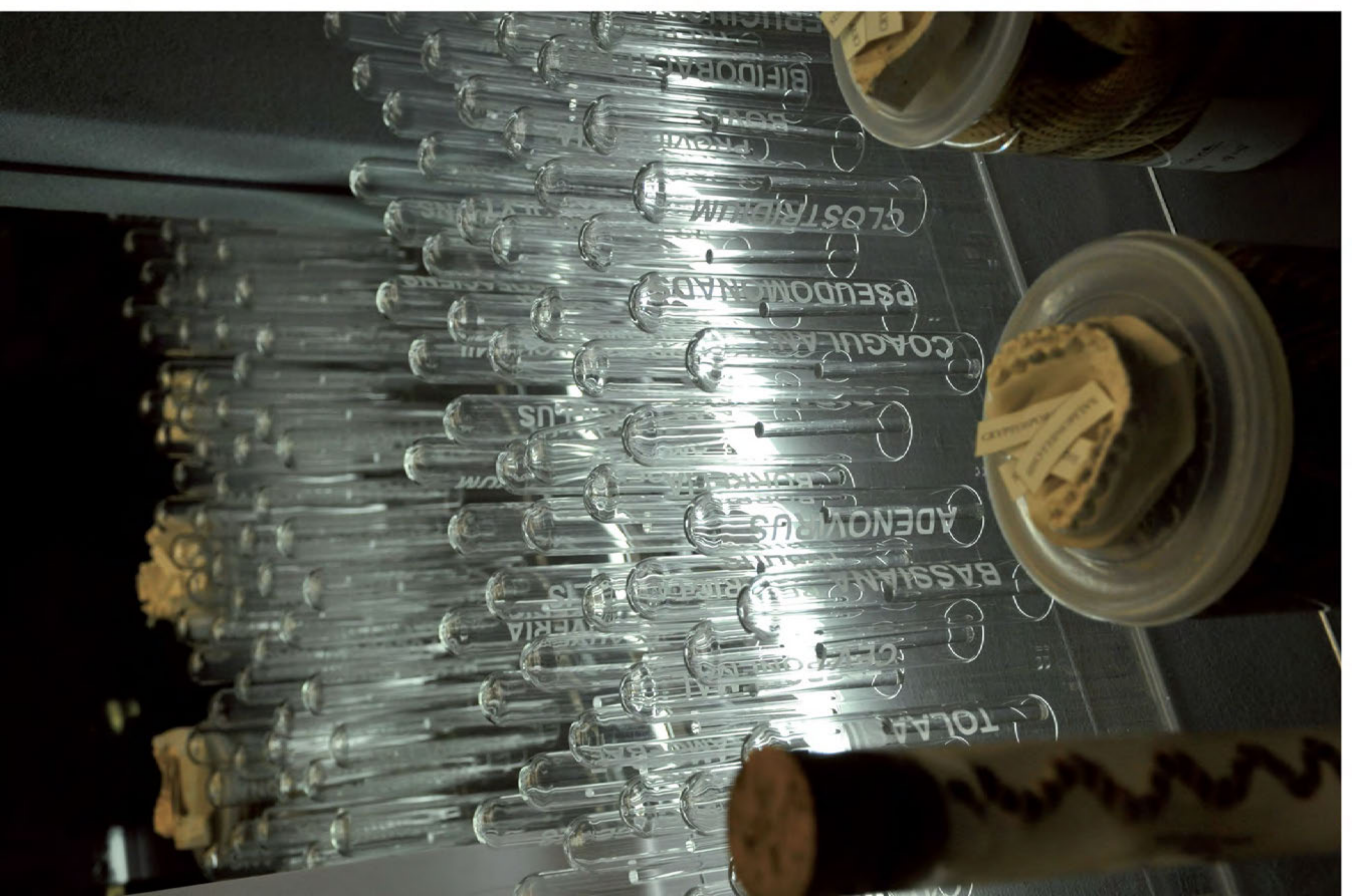
1 Wed	0 Sh: 0 Dr.	Well very, two very slight fits of fl (no eruption 4 to 6 fits, otherwise good night)
2 Th	Sw: Sh: D: Dr.:	Well very 3 slight fits of fl
3 Fri	Sw: Sh: D Dr.	Well very 2 very slight fits of fl
4 Sat	Sw: Sh. D Dr.	Well very no fit of fl. Only few separate eruct
5 Sund	Sh. O Sh. Foot B.	Poor little, 6 0r 7 fits of fl of which 2 0r 3 bad ones: little nausea
6 Mon	Sw: Sh D Dr	Well in morning, after 7 about 6 fits of fl not very bad: night bad wakeful, much
7 Tuesd	Sw S D dr	Well, with 2 rather consd. Fits of fl
8 Wed	0 Sh	f which on baddish
9 Th	Sw.	
10 Friday	Sw.	afterwards, 4 or 5
		ht bad oppressed,
11 Sat	Sw.	fit of fl; night how
12 Sund	0 Sh	f fl; night very good
13 Mon	Sw.	occas separate
14 Tuesd	Sw	morning, terrible
		retching up with
15 Wed	Sh.	bad sickness,
16 Th	Sw	In evening little
17 Fri	Sw.	l much fl
18 Sat	Sw.	d
19 Sund	Sh.	fair
20 Mond.	Sw.	heazy
21 Tued	Sw.	arly night much,
22 Wed	0 Sh	wh. One longish
23 Th	Sw.	ery little occas.
24 Fri	Sw.	omfortable feels-
25 Sat	Sw. Sh. D. Dr.	Well very do night so, so
26 Sun	0 Sh. 0 Dr.	Well: at 4 P.m & after fits of fl. night ["very" de] good, rather heazy
27 Mon	Sw. Sh. D Dr.	Well very at 1. One fit of fl. night uncomfort. Often waking yet stay heazy much fl
28 Tuesday	Sw. Sh. D. Dr.	Well much fl. in afternoon to cleansing. Night not very bad.



1851 January

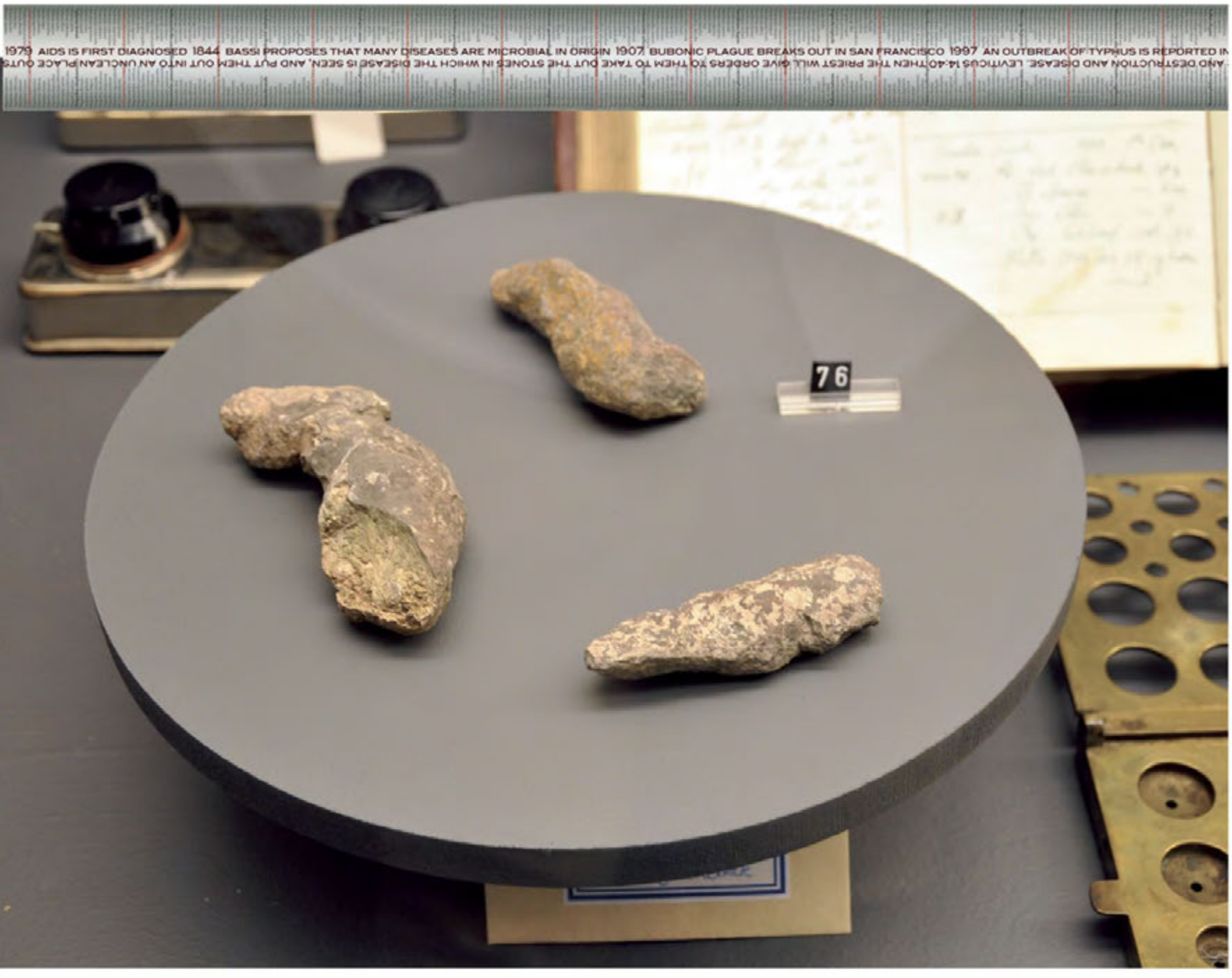
			Night
Wed.1	Sh. D.	Well very. 1 fit of fl	good
Th. 2	Sh. D.	Well very. occas fl	pretty good
F. 3	Sw. Sh.	Well very. do	do


PLEASE
INSTRUCTIONS
CAUTION

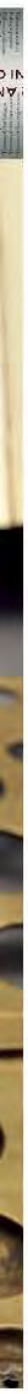

ADENOVIRUS
TOLA

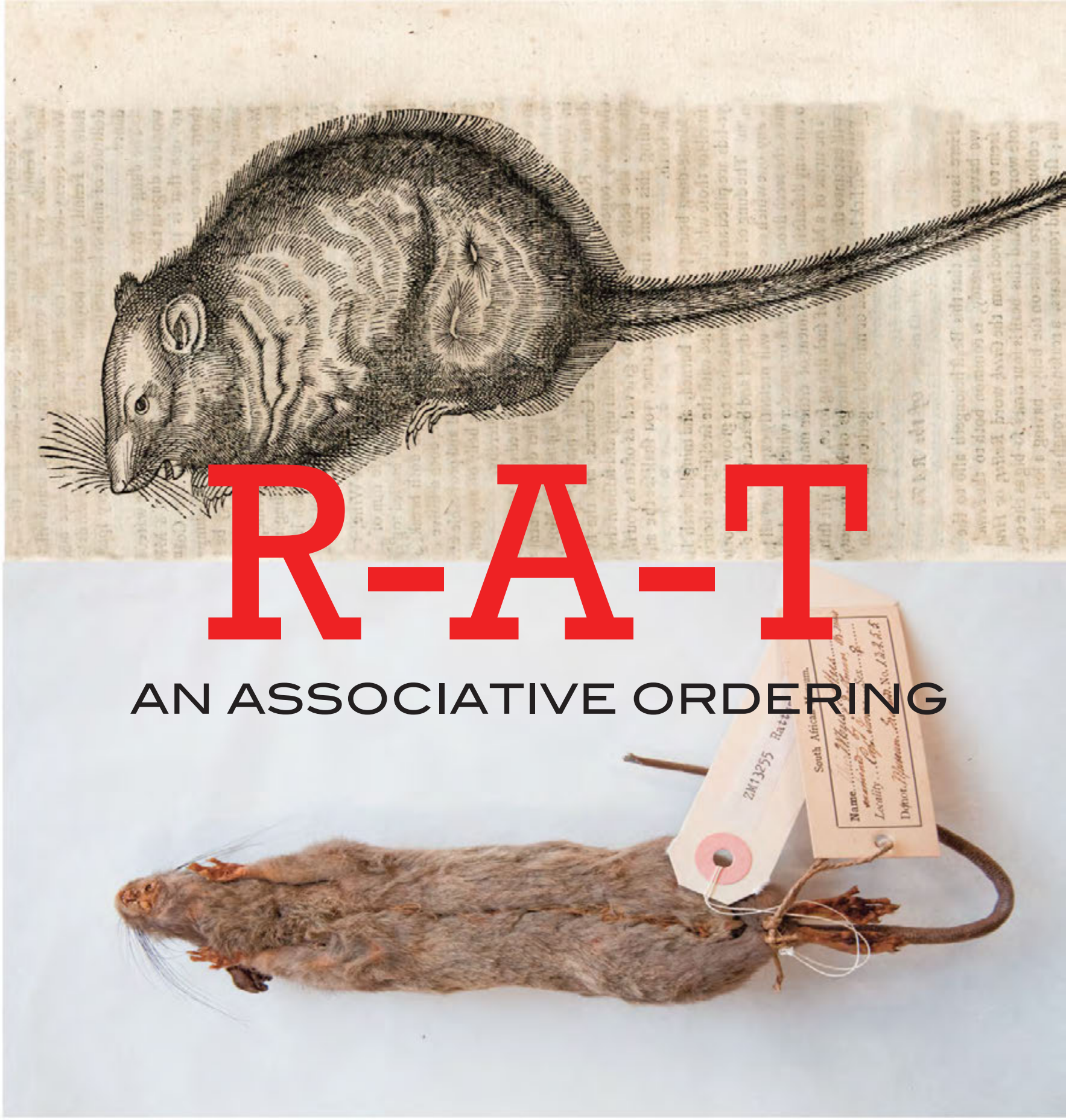
"Many of the views which have been advanced are highly speculative, and some no doubt, will prove erroneous; but I have in every case, given the reasons which have led me to one view rather than to another.
False facts are highly injurious to the progress of science, for they often endure long, but false views; if supported by evidence, do little harm, for everyone takes a salutary pleasure in proving their falseness."

Charles Darwin



Glass cabinet 3
63 x 56 x 150 cm
40 birds from the old mammal room, 3 mammal-like reptile coprolites found in the Karoo, rodent and bird bones (ISAM), 2 pill makers, 20 dental moulds, a pharmaceutical logbook (Adler Museum), 200 diagnostic testing microplates (8 x 12) (Pharmacology Department, UCT).





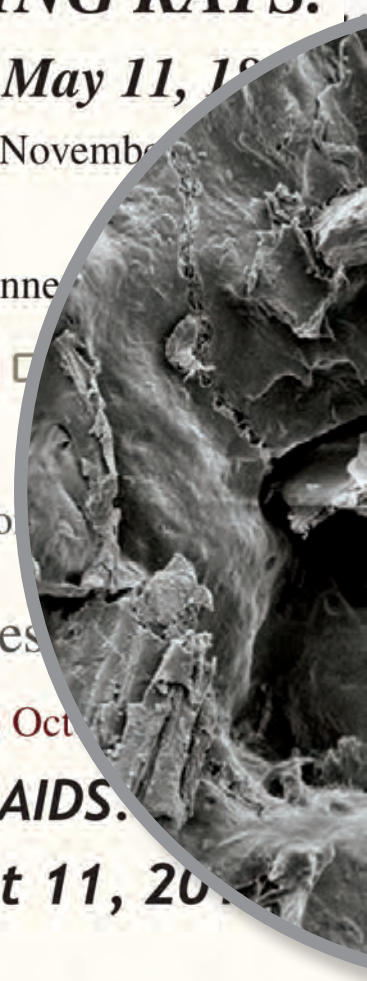
R-A-T

AN ASSOCIATIVE ORDERING

FRITHA LANGERMAN

2012–2013

IZIKO SOUTH AFRICAN MUSEUM
CAPE TOWN

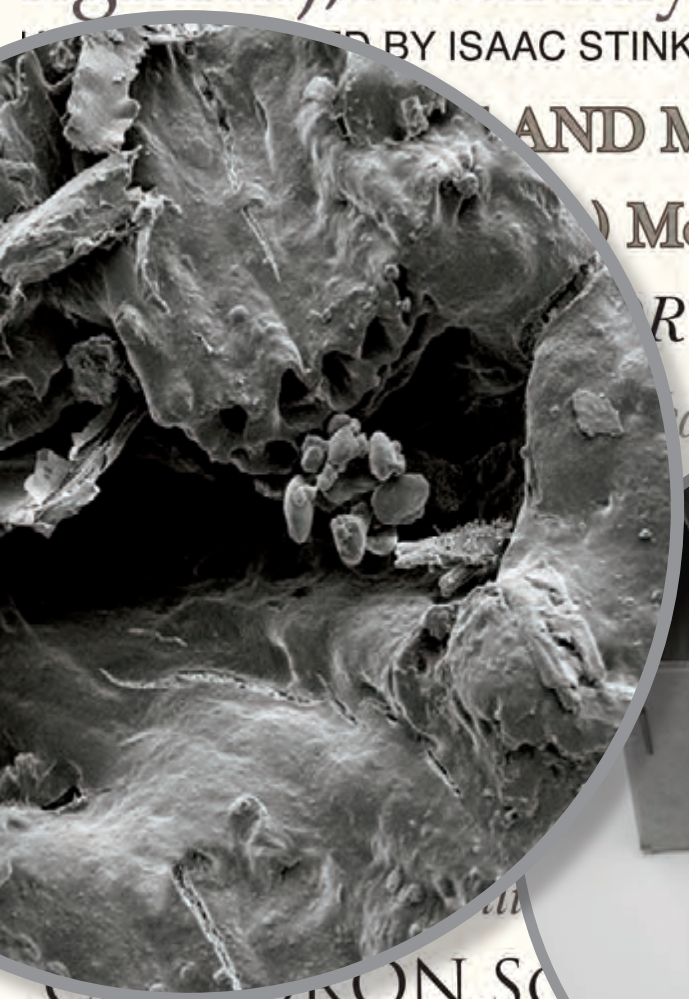


Dracula. 1979
Altered Species. 2001
Deadly Eyes. 1982
The Food of Gods. 1976
The Rats. 2002

WA
George Shaw.
Zoology or Systematic
Natural History. 1801,

WEIGHT:
280–480g.
Length: (nose to
tail) 325–460
HEAD AND BOD
blunt; heavy, thick b
255 mm.
EARS: Small, close
fine hairs, appear
buried in fur. R
over 20 mm

pes of
sexes. The
with the main
ut 50 kHz, occur
action with solicitation
g activity. The second type of
call is the long, 22 kHz whistle which is
emitted mainly by the male during the
post-ejaculatory refractory period,
but also by both male and female
at other times during the
copulatory



The male rat's sexual behaviour constitutes a highly ordered sequence of motor acts involving both striate and smooth muscles. It is spontaneously displayed by most adult made rats in the presence of a sexually receptive female. Although the behaviour is important for the survival of the it is not necessary for survival of the . In that way it is different from ntaneous behaviours such drinking, avoidance respiration or regulation.

T:
g.
to tip of
0 cm.
DY: Nose
body; 180–
n.
se set, with
aring half
Rarely
nm.

Burmese
Agouti – light brown to sandy colour
Champagne – very light cream
Chinchilla – deep grey with paler nose
Chocolate – sleek, rich brown
Chocolate Agouti – chestnut brown
amon – anywhere between soft cream to reddish cream.
n Pearl – soft cream with white base fur
very deep, greyish blue.
American Blue
er with flecks of
te fur

by Dr.
n the early
acteristics include
ocile behaviour, and low
The Lewis rat suffers from several spontaneous pathologies: first, they can suffer from high incidences of neoplasms, with the rat's lifespan mainly determined by this. The most common are adenomas of the pituitary and

[1551] THE BROWN RAT IS DESCRIBED FOR THE FIRST TIME IN CONRAD GESNER'S HISTORIAE ANIMALIUM [230–190 MYA] RODENT-LIKE REPTILES DEVELOP [1752] THE COMMUNE OF PIURO PURCHASE MALEDICTIONS FROM THE POPE TO GET RID OF RODENTS [1685] RATS CAUSE THE DEATHS OF ALL THE RESIDENTS OF RONA ISLAND, SCOTLAND AFTER EATING ALL FOOD SUPP

The exhibition hints at an alternative experience of the visual within the museum, that destabilises linear hierarchies and is visually entangled. It uses *Rattus norvegicus*, the brown rat, as a means to explore the representation of species. Rather than a discrete display, *R-A-T* is dispersed throughout the museum, furtively making its way into disused corners and cabinets. This distribution introduces the rat in relation to ranging themes, forming a meta-narrative of connections while suggesting manners in which museum display impacts on the understanding of species.

The rat, an urban creature abhorred within the anthropocentric city, has been largely excluded from presentation in museums of natural history. This, despite rodents making up 40% of the total mammalian diversity, and *Rattus* being the largest mammalian genus, consisting of more than 60 species. As an animal that is closely related to the development of human populations, the rat speaks as much to a cultural and social history as to a natural one. It is an icon of modernity: of disease, migration, stereotype, destruction, behavioural psychology, literature and pharmacology. The archaeological record reveals that rats are reliant on human movement and settlement – and that they are as vivid a marker of settlement as domestic animals – while in the modern world rats have followed a trail of destruction caused by war, colonisation, conquest and urbanism, living on the waste of human society.

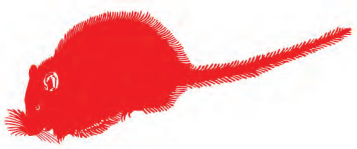
The title, *R-A-T* is taken from James Rodwell's book, *The rat* (1858), in which he suggests that the sound and form of the word is synonymous with its nature – harsh and aggressive, "the foulest name in zoology", associated with dirt, pollution, lasciviousness and unbounded appetite. One million rat bites are reported annually, and while they carry epithets such as furtive and skulking, they are also known to giggle when tickled and to behave with empathy towards fellow rats. In this way terms such as 'vermin' can be ascribed to categories of animals that become lesser, allowing for their extermination on a mass scale. The human relationship to the rat is schizophrenic. It is the loved pet and character of children's literature, while at the same time domestic rat killings are proudly posted on YouTube. The rat straddles definitions and in so doing questions the premise of museums of natural history – what is meant by nature and what is natural?


R-A-T

ORIENTATION LOBBY

The exhibition is introduced by a display-stand reminiscent of both a rat catcher basket and Jeremy Bentham's panopticon of the 1790s. Originally designed as a centrally positioned observation tower to watch prison inmates undetected, here the rat is positioned as the insider at the centre of the panopticon. It is thus both the observer of the museum and the observed, introducing the ambiguity of the human relationship to this particular animal. The freeze dried rat at the centre, bought at the Evolution Store in New York, is also an aside to Bentham who, after his death, had his body dissected, preserved and displayed in a wooden cabinet. This panopticon functions as an orienting device, noting some rat geography and containing the map of the project. The fat rat is the ultimate sewer rat, the global rat that has made its way across continents. It is Robert Sullivan's urban rat, James Rodwell's despised rat and Maud Ellman's modernist rat.

A timeline runs across the stairwell. This line is dispersed throughout the museum, moving up, across and down cabinets. Together with the red rat tag, based on Gesner's rat, it signs areas of the exhibition display, connecting different sites. It disrupts chronology and linearity, presenting facts of ranging significance and unrelated contexts.



WORLD OF WATER
Marion Island

This site uses three metal cases that currently house study skins, including the historical collection of *Rattus norvegicus*. The first cabinet is surrounded by prints taken from books and folios of natural history between the 1600 and 1800s from the Iziko South African Museum and University of Cape Town collections. Included in this is a woodcut of the black rat, *Rattus rattus*, originally printed in Volume 1 of Conrad Gesner's *Historiae animalium* (1551), which also contained the first mention of the brown rat. The book was a Renaissance compendium of everything known of various species, from observation to allegory and symbolism. This image of the world as a collection of related elements is a spirit that is picked up throughout the exhibition. This cabinet is covered by mirrored texts of idioms interspersed with rat evolutionary taxonomy. It reflects on natural history museums, their knowledges and practices and presents the viewer with an image of themselves amidst a dense textual network. Within this the viewer is witness to their own confusion. The framed images are punctuated with magnifying glasses containing texts about sight: how nature is viewed and how rats see.

THE RAT,

(*Mus Rattus*, Lin.—*Le Rat*, Buff.)

Surmulot.

BROWN RAT.—*Mus Decumanus.*

BOOKS FROM THE UNIVERSITY OF CAPE TOWN RARE BOOKS COLLECTION

George Shaw. Zoology or systematic natural history. 1801, London.

Thomas Bewick. A general history of quadrupeds. 1807, London.

Abraham Rees. The cyclopaedia or universal dictionary of arts, sciences and literature. 1820, London.

Comte De Buffon. Oeuvres complètes de Buffon. 1819, Paris.

Charles Knight. Natural history or second division of the English cyclopaedia. 1867, London.

Charles Knight. Penny cyclopaeia of the society for the diffusion of useful knowledge. 1839, London.

Richard Lydekker. The royal natural history. 1894, London.

Edward Topsell. History of four-footed beasts and serpents describing at large their true and lively figure, their several names, conditions, kinds and virtues ... 1658, London.

FOLIOS AND BOOKS FROM THE SOUTH AFRICAN MUSEUM COLLECTION

Geoffroy Saint-Hilaire & Frédéric Cuvier. Histoire naturelle des mammifères. 1842, Paris.

Lefebvre Théophile. Par une commission scientifique. Voyage en Abyssinie - pendant les annees. 1839-1840, Paris.

George Shaw. Engraved by John Frederick Miller. Cimelia physica. Rare and curious quadrupeds, birds &. together with some of the most elegant plants. 1796, London.

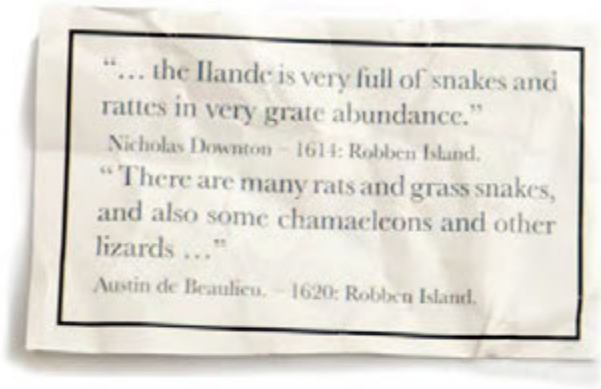
Commandee M Vaillant . Voyage autour du monde. Sur la corvette La Bonita, 1836-1837, Paris.

Eduard Rüpell. Atlas zu der reise in nördlichen Afrika. 1826, Frankfurt.

THEY RECEIVE COUNSEL AND FAIR TRIAL [1956] J

AMES OLDS PUBLISHES HIS WORK ON THE PL

1488] RODENTS ARE EXCOMMUNICATED FROM THE DIOCESE OF AUTUN FOR THE DESTRUCT



4/12/1902 5/6/1908 29/6/1938 13/7/1905 9/5/1938 19/7/1925 8/5/1899 8/1925 5/1912 12/1902 8/5/1899 20/8/1908 3/7/1906 19/6/1902

WORLD OF WATER
Marion Island

The second case contains rat study skins from the Iziko South African Museum collection, originally sourced in Cape Town, Port St Johns, Stellenbosch and Chishawasha, Zambia. The skins are housed within the very cabinets now used for display: the collection is literally being surfaced. The cabinet is lined with tags that list more than 500 museums with mammal collections, and the skins themselves are recumbent on hand-stitched silk cushions reminiscent of those of the wax models at La Specola in Florence. Interspersed amongst these are labels that augment the existing study skin labels. They contain information about taxidermy methods and museum taxidermists and collectors Shortridge and Smithers, text from ISAM experts on rat paleontology and an image of Government Avenue in 1902, when and from where many specimens were sourced. At the back of the cabinet a series of degraded mirrors are inscribed with the dates of specimen collection between 1899, shortly after the museum was relocated to its current position and 1938, the year that dredging for the Duncan Dock began.

rniman Museum
LONDON

Naturhistorisches Museum
VIENNA

Oberösterreiches Landesmuseum
Biologiezentrum
LINZ

Fukui City Museum
of Natural History
FUKUI

Pella M
AMM

luseo de Ciencias
MADRID

El Museo de Ciencias
Naturales
LA SALLE

Nationalparkzentrum Bios
Mallnit
MALLNITZ

Gunma Museum
of Natural History
TOMIOKA

Saitama M
of Natural
NAGAT

Museo Nacional
Historia Natura
GUATEMALA

Museum Schloss Lackenbach
LACKENBACH

Universalmuseum Joanneum
GRAZ

National Museums
of Kenya
NAIROBI

Osaka Mu
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OSA

Museum of Biodiversity
ch National University
of Singapore
SINGAPORE

Haus der Natur
SALZBURG

Museum der Stadt Mödling
Nature and history
MÖDLING

Kanagawa Prefectural Museum
of Natural History
ODAWARA

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OSAKA

LOS BAÑOS

Museo Nacional
de Historia Natura
GUATEMALA

Museum Schl
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gawa Prefectural Museum
of Natural History
ODAWARA

Iziko South African Museum
CAPE TOWN

Qatar National Museum
DOHA

Raffles Museum of Biodiversity
Research National University
of Singapore
SINGAPORE

Haus d
SALZ

Natural History Museum

Earth History Museum

Muséum national
d'histoire naturelle

Natural His

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Muzium Negara
KUALA LUMPUR

Horniman Museu
LONDON

a Museum
ural History
GATORO

Pakistan Museum
of Natural History
ISLAMABAD

Museo de Ciencia
MADRID

Museum of
al History
SAKA

UPLB Museum of Natural History
University of the Philippines
LOS BAÑOS

Museo Nacional
de Historia Natura
GUATEMALA

African Museum
PE TOWN

Qatar National Museum
DOHA

Raffles Museum of Biodiversity
Research National University
of Singapore
SINGAPORE

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TCHAN

Earth History Museum
Vernadsky State Geological
Museum
MOSCOW

Muséum national
d'histoire naturelle
PARIS

Natural History Museum
YEREVAN

Landschaftsmuseu
im Schloss Trauten
PÜRGG-TRAUTENF

istory Museum
ological Park
OHASHI

Zoological Museum
of Moscow University
MOSCOW

Museo de Historia Natural de
Tamaulipas
TAMAULIPAS

Natural Science Museum
TIRANA

Landesmuseum
Niederösterreichis
ST. PÖLTEN

istory Museum
CHIBA

Kunstkamera
SAINT PETERSBURG

Wienerwaldmuseum
EICHGRABEN

Museum of Biodiversity
PANAMA CITY

Landesmuseum für K
KLAGENFURT

al Museum
e and Science
OKYO

State Darwin Museum
MOSCOW

Biozentrum Grindel und
Zoologisches Museum
HAMBURG

Museo de Ciencias Naturales
Panama
PANAMA CITY

Inatura Erlebnis Natu
DORNBIRN

torisches Museum
VIENNA

Oberösterreiches Landesmuseu
Biologiezentrum
LINZ

Horniman Museum
LONDON

Naturhistorisches Museum
VIENNA

Oberösterreiches Landes
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Naturales
LA SALLE

Nationalparkzentrum Bios
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Museo de Ciencias
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El Museo de Ciencias
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Museo Nacional
de Historia Natura
GUATEMALA

Museum Schloss Lackenbach
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Museum der Stadt Mödlin
Nature and history
MÖDLING

Raffles Museum of Biodiversity
Research National University
of Singapore
SINGAPORE

Haus der Natur
SALZBURG

Museum der Stadt M
Nature and histo
MÖDLING

History Museum

Landschaftsmuseum
im Schloss Trautenfels

Muséum national

Natural History Museum

Landschaftsmuseu

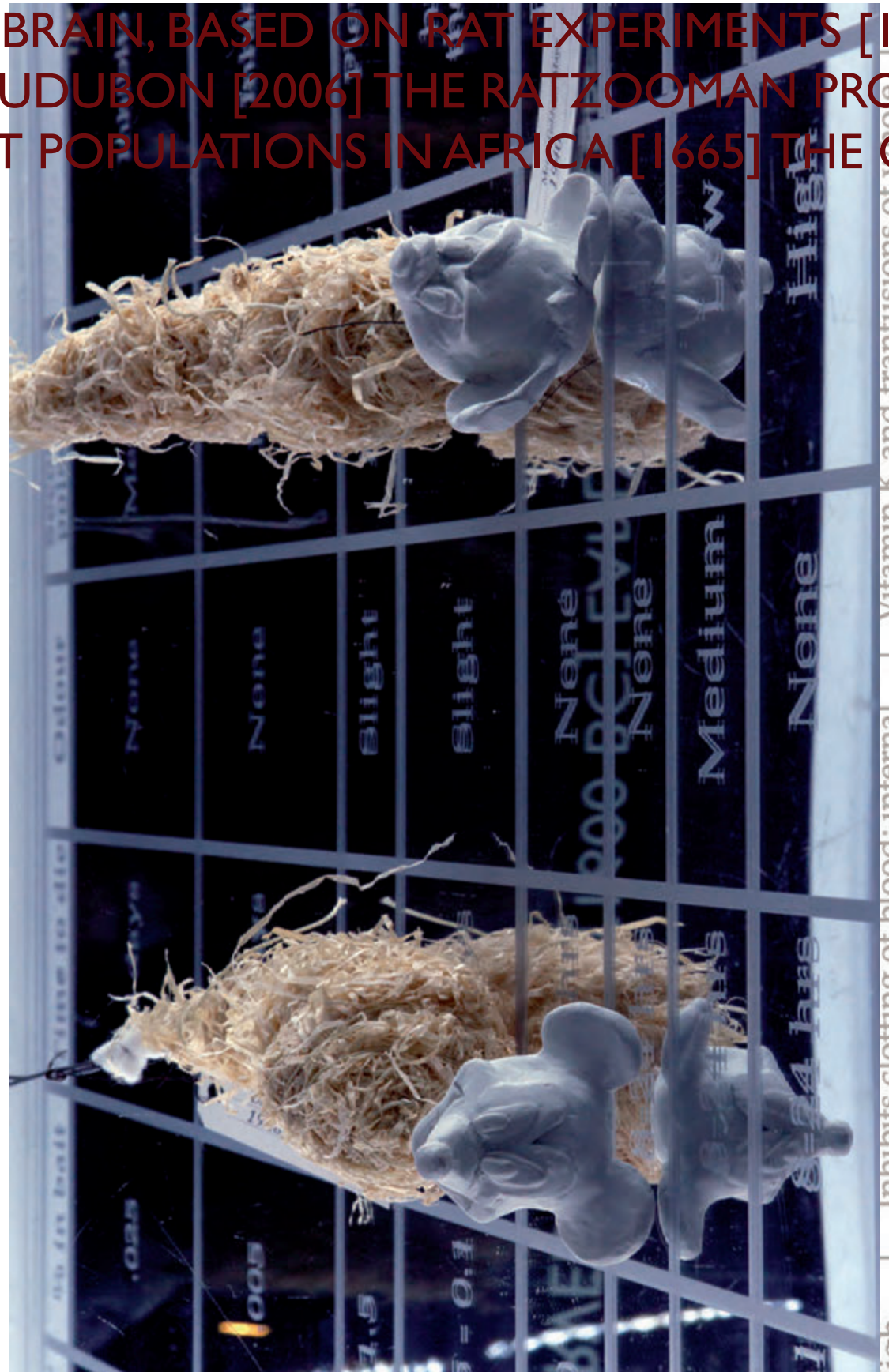
WORLD OF WATER
Marion Island

The third cabinet is in close proximity to the display of a feral cat preying on birds at Marion island. It houses chemical bottles that were previously labelled with the deaths of naturalists in *Subtle thresholds*. These have been relabelled with large-scale rat exterminations that have taken place on various islands. Ranging from 305 tonnes of Brodifacoum on MacQuarie Island, Australia in 2010 to 64 tonnes of Arsenic in Alberta, Canada in 1951. Petrie dishes with broken egg shells are labelled with bird species endangered on those islands. Lying alongside this on mirrored surfaces sandblasted with neutral information about rat habitat and rat poisons are taxidermy 'dummies' of popular rat characters: the implied 'fillings' of the nearby skins. Three responses to rats are represented here: observation, extermination and 'Disneyfication'.

NORWAY RAT - *RATTUS NORVEGICUS* (Berkenhout) 1769
VEIGHT: 280–480 g. LENGTH: (nose to tip of tail) 325–460 cm.
IEAD AND BODY: Nose blunt; heavy, thick body; 180–255 mm.
ARS: Small, close set, with fine hairs, appearing half buried in fur. Rare
IIND FOOT: Usually over 40 mm from heel to tip of longest toe.
OAT: Coarse. Brown or dark grey, under parts lighter grey. More than 7
narkings in specially bred rats.
EETH: Able to exert pressure of 10 800 kilograms per square inch with
row 30 cm over 3-year lifespan. Able to cut through most materials.
YESIGHT: Pigmented rats poor 20/600; albino rats 20/1200.
IABITATS: Burrows and nests near buildings, walls or earth banks. Ce
tores, slaughterhouses, docks. Adaptable to most climates. Not found in
rctic.
IIGRATION: Originated from Asia and moved across Europe. Limited s
OOD: Omnivorous - grains and animal matter, including humans and
teady feeders. Able to eat a third of body weight/day. Can survive 2 we
IEART RATE: 300 to 400 beats per minute. Respiratory rate of around 1
REEDING: Gestation period 22 days. Up to 5 litters/year. 8 pups/litter.
5% yearly mortality rate.
Nocturnal; semi-aquatic; unable to vomit. Naturally clean, demonstrating

Chlorophacinone Brodifacoum Flocoumafen Bromadiolone Difethialone	0.5[1]	.005	3-6 days	None	Hi
Alpha-naphthylthiourea	8[2]	1.5	2-4 hr	Slight	Mec
CALCIFEROLS Cholecalciferol Ergocalciferol	42.5	0.075 - 0.1	3-7 days	Slight	Lo
FLUOROACETAMIDE (1081)	15	2.0	8- 48 hrs	None	Hi
NORBORMIDE	12	1.0	8-24 hrs	None	Lo
RED SQUILL	500[2]	10.0	8-24 hrs	Medium	Lo
SODIUM FLUOROACETATE (1080)	5	1/2 Oz/Gal	8-24 hrs	None	Hi
VACOR	5	2.0	24 hrs	None	Lo
ZINC PHOSPHIDE	40	1.0	3-12 hrs	Strong	Lo

THE BRAIN, BASED ON RAT EXPERIMENTS [1824] RATS EAT 200 PICTURES BY NATURALIST JOHN
ES AUDUBON [2006] THE RATZOOMAN PROJECT CONDUCTS RESEARCH INTO HUMAN AND
DENT POPULATIONS IN AFRICA [1665] THE GREAT PLAGUE IN LONDON KILLS 68 596 PEOPLE



							Vitamin K and tranfusions of whole blood
							None
							Calcitonin, a hormone that lowers the blood levels of calcium
							None
							None
							Acts as own emetic to animals capable of vomiting
							None. Monoacetin or ethyl alcohol and acetic acid recommended
							Nicotinamide in lab rats
							Copper sulphate before emesis; cathartic and water. Avoid fats and oils
							Inhibits clotting of blood; internal haemorrhages Organ failure
							Pleural effusion (over production of fluid in lungs)
							hypercalcaemia and calcification of the blood vessels renal failure, cardiac abnormalities, hypertension
							Paralysis of heart and central nervous system
							Blood vessels constrict, failure of organ systems
							Heart paralysis
							Paralysis of heart and central nervous system
							Respiratory failure
							Heart paralysis; gastro-intestinal and liver damage

CAROLI LINNAEI
SYSTEMAE NATURAE
REGNUM ANIMALE
1758

61

Rattus. 9. M. cauda elongata fubnuda, palmis tetradactylis cum unguiculo pollicari, plantis pentadactylis.

Mus

62 MAMMALIA GLIRES.

Mus cauda elongata subnuda, corpore susco cinerascente. *Faun. suec.* 28. *Syst. nat.* 10. *n.* 6.

Mus domesticus major. *Gesn. quadr.* 109. *Aldr. quadr.* 417. *Raj. quadr.* 217. Glis. *Jonjl. quadr.f.* 66. *Habitat in domibus* Europae. *Cautum animal, utensilibus insestum.*

Glirem *veterum me ignorare agnosco, nifi sit Marmota aut Cricetus.*

JOHN BERKENHOUT
OUTLINES OF THE NATURAL HISTORY OF GREAT BRITAIN AND IRELAND
1789

MAMMALIA GLIRES (5)
MUS. Lower fore-teeth small, poited. Toes 4 before, 5 behind. Tail long.

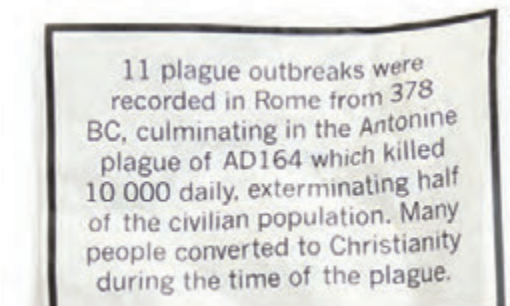
1. Norvegicus. *Brown Rat.* Length to the tail 9 inches ; tail 9 inches. Back tawny. Belly dirty white. Feet and legs almost bare. Tail scaly. Omitted by Linnaeus.

4. Rattus. *Common Rat.* Tail longer than the body. On the fore feet 4 claws and a kind of thumb nail; behind 5. White whiskers. Almost extinct.

WORLD OF WATER

This cabinet responds to its proximate location to underwater displays. It alludes to a space of imagination, dread and fantasy as well as rational ordering and psychology. In response to a particular display of comparative seal skulls in the museum, stepped in an evocation of evolutionary progress, rodent skulls are presented here on a flat, non-hierarchical surface surrounded by broken ladders – the scaffolding of an ascendant iconography of evolution. Behind this are chalkboard texts that are taken from the classification of *Rattus rattus* by Linneaus in 1758 and *Rattus norvegicus* by John Berkenhout in 1789. Gesner's description of the rat from 1551 is also included. Alongside this a tower of large white books of rat fiction are marked with library cards from academic texts, and simulated rat tails are labelled with 'luggage tags' from a host of ships that arrived in Cape Town harbour over the past 350 years. Interpretations of seven rodent and one seal brain, based on those found at the

Gallery of Palaeontology and Comparative Anatomy, Muséum national d'Histoire Naturelle, Paris, are presented upon a light box. They are surrounded by hundreds of specimen bottles, labelled with rat experiments, alluding to the estimation that an article based on rat research is published worldwide every minute. Frames texts held by retort stands draw connections between unihemispheric sleep in seals, sleep deprivation tests on rats, musophobia, pleasure centre tests and the amygdala. Behind these are texts taken from Skinner's survey of operant behaviour, 1963 and Freud's Ratman notes on obsessional neurosis from 1909. Opposite the cabinet, facing the whale skeletons is a drawing of whale bones and a mouse skull. This refers to Linnaeus's classification of the blue whale – *Balaenoptera musculus* in *Systema naturae* (1758) as a possible play in scale between the largest of creatures and *Mus musculus* – the house mouse.



CONRAD GESNER
HISTORIAE ANIMA
1551
DE MAIORE DOMESTICO MURE VULGO RATTUM VOCANT. 829

A.

Muris genus magnum, rattum uocamus, Albertus & Liber de naturis rerum. Ratti quidem uox non Germanis tantum, sed Gallis etiam, Hispanis, Italis & Anglis in usu est. Plura de diuersis nomenclaturis huius animantis uide supra in Mure A. Soricem non esse rattum uulgò dictú, id est maiorem murem domesticum, sed omnino syluestrem, ex Plinio demonstrabimus infra, ubi de Sorice separatim agetur. Sed murem araneum quoq à ratto differre, ex eius historia patebit: quãquam Ge. Agricola eundem esse iudicat. Colotes, stellio est. Albertus ubi Aristoteles asinum impugnare coloten scribit, rattum imperite interpretatur.

B.

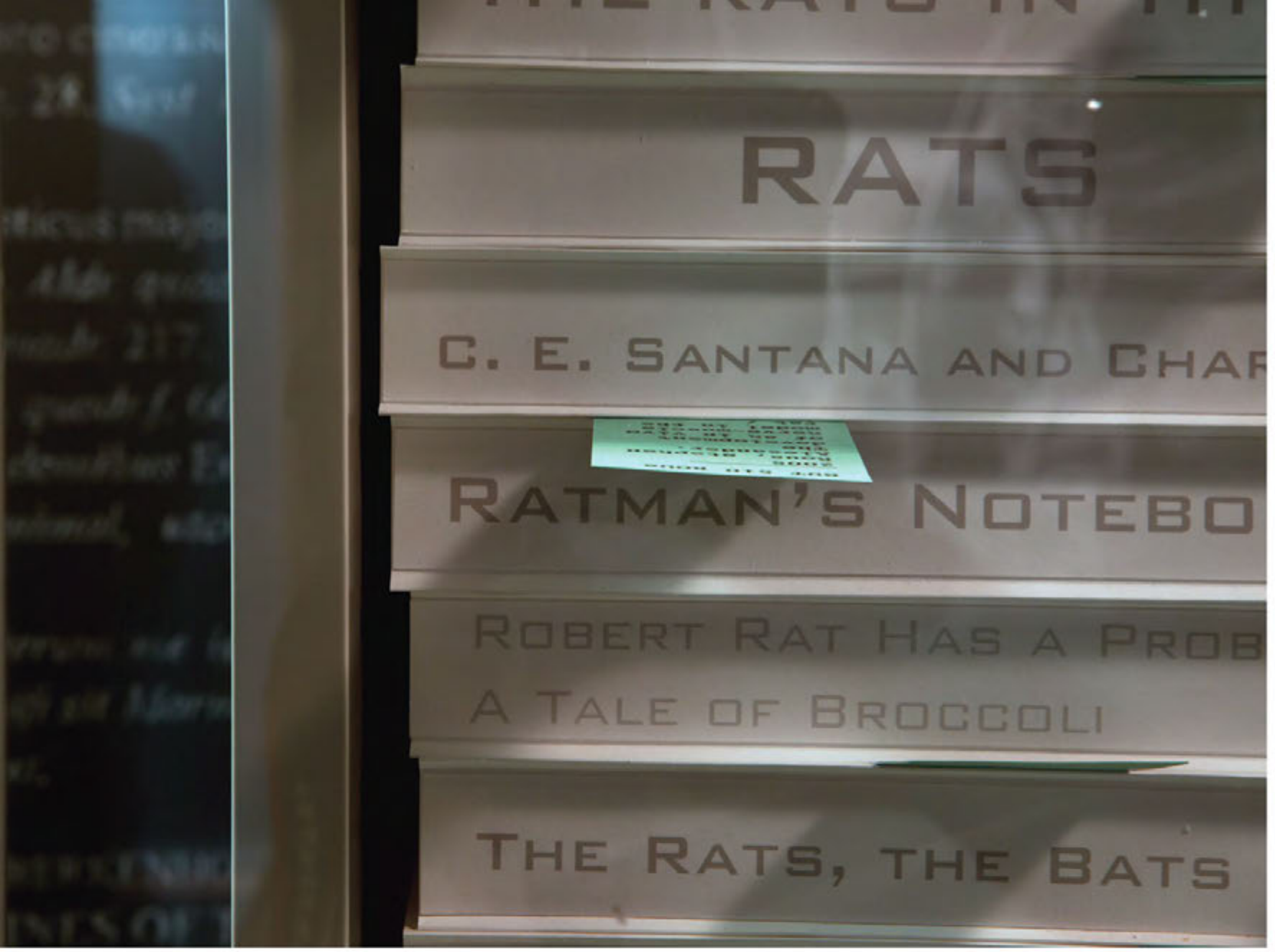
Rattus quadruplo sere maior est mure: colore subniger uel suscus, qui ueuntrem uersus dilutiorest. Capite longiusculo cauda procera, tenui, nuda pilis: mole corporis mustelae magnitudinem assequitur, Ge. Agricola. Ego rattum un diquaq albissimum uidi nuper apud nos captú Aprilis medeo, oculis rubicundis prominentibus, barba multis & oblongis pilis hirsute. Auguste Vindelicorum circa templum diui Huldrici ratnos nullos inueniri audio. Nõ latet in terra ueluti reliqui mures domestici, tametsi in ualle Ioa chimica ex proximis domicils in cuniculos (fodinas) ingrediat, & in his uerset: alioqui hyberno


1688
Oosterland
VESSEL
882
Nubian
TINTAGEL CASTLE
1896
1978
Good Hope Castle
VESSEL
1688
SCHELDE
1878
La Rochelle
VESSEL
1688
BERG CHINA
1871
Broxbourne bury
1708
SAN JOSE
LEIJO
VESSEL
MEERMIN
1764
VICTORIA
1850
184
DUKE
VESSEL
VESSEL
Wandrahm
1860

was beyond my power. He might just as well ask me to give him the moon. The overcoming of resistances was a law of the treatment, and on no consideration could it be dispensed with... I went on to say that I would do all I could, nevertheless, to guess the full meaning of any hints he gave me. Was he perhaps thinking of impalement? – 'No, not

In the presence of a threatening stimulus, the amygdala - a small, almond-shaped cluster of nuclei located behind the pituitary gland - generates the secretion of hormones that influence fear and aggression. This defensive fight-or-flight response is regulated by the hypothalamus.

... and t y... – me had again got up at was owing e sign of h rror a d resistan 'bored th ir way in ...' – I his anus. I helpe him out. At all he mo e importan moments while h was telling his story his f ce took on a very strange composite expr sio n. I ould on


RATS
C. E. SANTANA AND CHAR
RATMAN'S NOTEBO
ROBERT RAT HAS A PROB
A TALE OF BROCCOLI
THE RATS, THE BATS


Hydrochoerus hydrochaeris
CAPYBARA
Bathyergus suillus
CAPE DUNE MOLE RAT

[1821] ‘BILLY’ THE BULL TERRIER KILLS OVER 100 RATS IN LESS THAN 12 MINUTES [1917] RAT NU
ESCALATE DURING WW1 AS THEY FEED ON DEAD BODIES IN NO MAN’S LAND [1612] THEOPH
MÜLLER AND JOHANN FABER PERFORM THE FIRST RECORDED RAT DISSECTION AT THE ACCA
DEI LINCEI [1969] A SHOWER OF RATS FALLS ON THE ISLAND OF LOMBOK, INDONESIA [190–1
MYA] MULTITUBERCULATES (RODENT-LIKE MAMMALS) DEVELOP [1730] THE BROWN RAT ARRI

Squirrel - Sciurus carolinensis
Ground squirrel - Xerus inauris
Woodland Dormouse - Graphiurus murinus
Cape Mole rat - Georychus capensis
Cape dune mole rat - Bathyergus suillus
Cape Porcupine - Hystrix africaeaustralis
Cape Gerbil - Tatera afra
Barbours’ Rock mouse - Petromyscus barbouri
African pygmy mouse - Mus minutoides
Brant’s Whistling Rat - Parotomys brantsii
Cape Spiny Mouse - Acomys spinosissimus
Spring hare - Pedetes capensis
Black rat - Rattus rattus
Brown rat - Rattus norvegicus

A hungry rat is placed in a semi-soundproof box. For several days bits of food are occasionally delivered into a tray by an automatic dispenser. The rat soon goes to the tray immediately upon hearing the sound of the dispenser. A small horizontal section of a lever protruding from the wall has been resting in its lowest position, but it is now raised slightly so that when the rat touches it, it moves downward. In doing so it closes an electric circuit and operates the food dispenser. Immediately after eating the delivered food the rat begins to press the lever fairly rapidly. The behavior has been strengthened or reinforced by a single consequence. The rat was not 'trying' to do anything when it first touched the lever and it did not learn from 'errors.'

To a hungry rat, food is a natural reinforcer, but the reinforcer in this example is the sound of the food dispenser, which was conditioned as a reinforcer when it was repeatedly followed by the delivery of food before the lever was pressed. In fact, the sound of that one operation of the dispenser would have had an observable effect even though no food was delivered on that occasion. When food no longer follows pressing the lever, the rat eventually stops pressing. The behavior is said to have been extinguished.

B F Skinner. A brief survey of operant behaviour. 1963

Here the patient broke off, got up from the sofa, and begged me to spare him the recital of the details. I assured him that I myself had no taste whatever for cruelty, and certainly had no desire to torment him, but that naturally I could not grant him something which was beyond my power. He might just as well ask me to give him the moon. The overcoming of resistances was a law of the treatment, and on no consideration could it be dispensed with… I went on to say that I would do all I could, nevertheless, to guess the full meaning of any hints he gave me. Was he perhaps thinking of impalement? – 'No, not that; … the criminal was tied up …' – he expressed himself so indistinctly that I could not immediately guess in what position- '… a pot was turned upside down on his buttocks … some rats were put into it … and they…' – he had again got up and was showing every sign of horror and resistance- 'bored their way in …' – Into his anus, I helped him out.

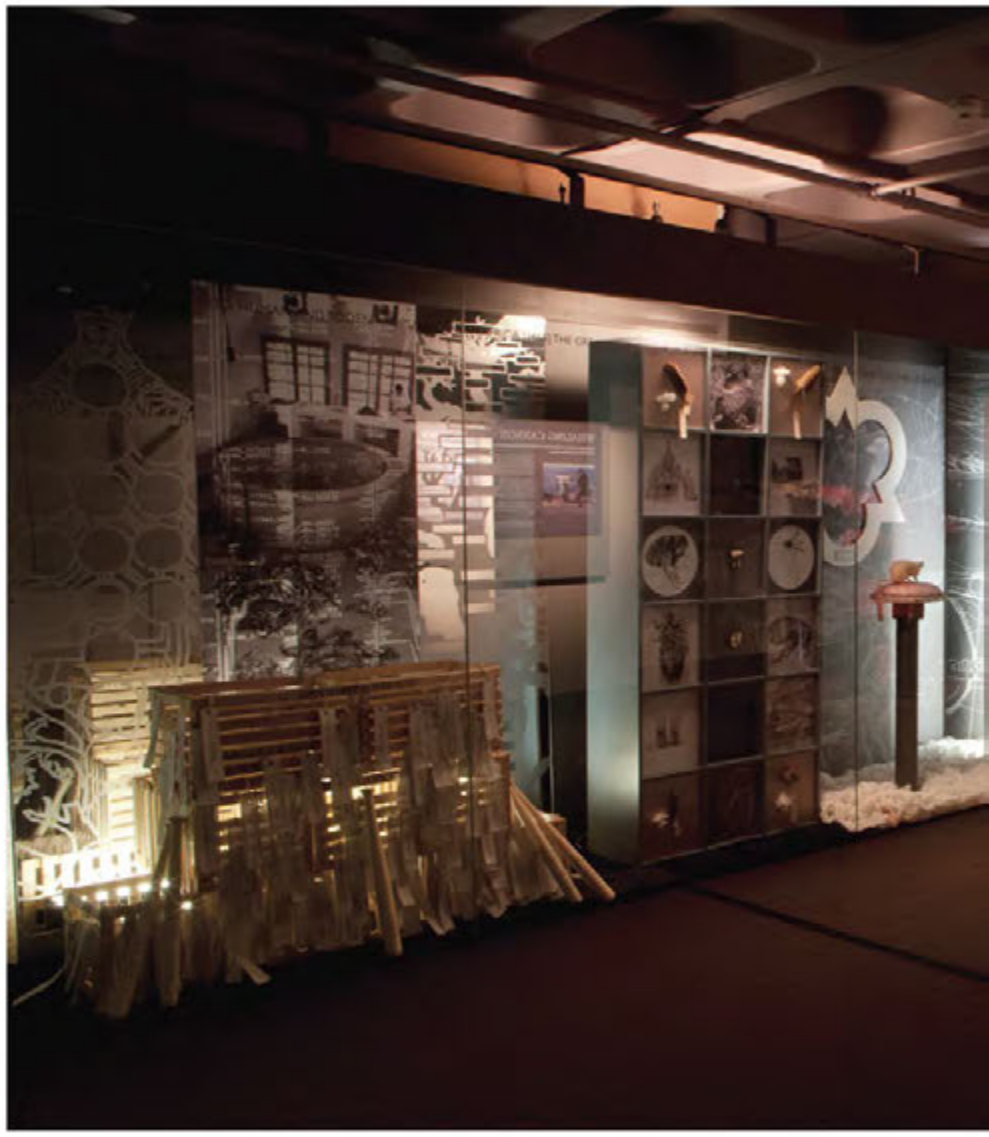
At all the more important moments while he was telling his story his face took on a very strange, composite expression. I could only interpret it as one of horror at pleasure of his own which he himself was unaware. He proceeded with great difficulty: 'At that moment the idea flashed through my mind that this was happening to a person who was very dear to me.'

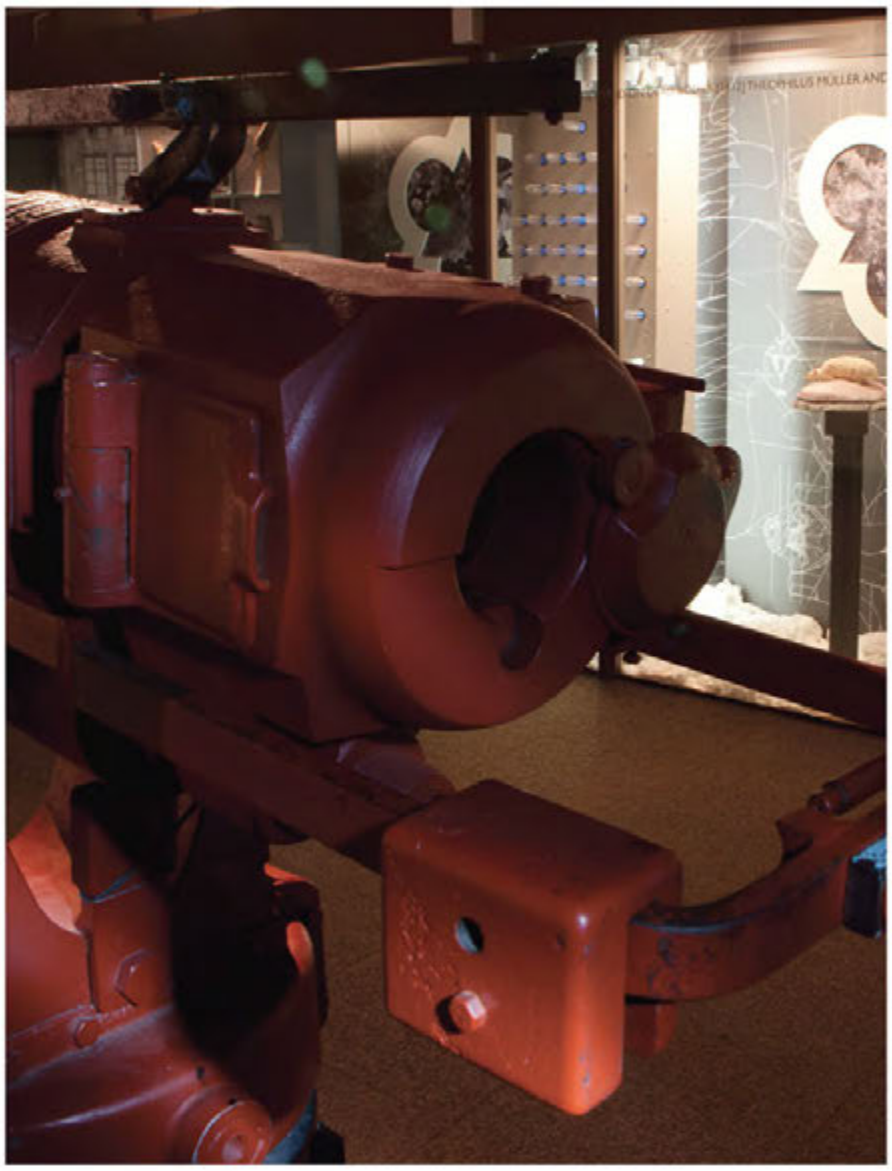
Sigmund Freud. Extracts from the Ratman notes upon a case of obsessional neurosis. 1909

BRAIN WEIGHT
ADULT HUMAN 1,300-1,400G
SPERM WHALE 7,800G
BEAVER 45G
PORCUPINE 25G
MARMOT 17G
RABBIT 10-13G
SQUIRREL 7.6G
GUINEA PIG 4G
HEDGEHOG 3.35G
RAT 2G
HAMSTER 1.4G

SHARK WORLD

Dominated by a whaling harpoon, this cabinet takes death and sacrifice as its theme. Shadows of rat traps and killing devices are suggested on the sliding doors behind the harpoon, again connecting whales and rodents. The cabinet is symmetrically organised and recalls the cathedral layout of *Subtle thresholds*. A central 'lancet window' houses conical bio-reaction tubes labelled with diseases carried by rats and test tubes labelled with disease experimentation done on rats. Above this rests a collection of glass reagent bottles and beakers labelled with information about the plague. On either side are trefoil frames, previously used in *Subtle thresholds*, housing electron microscope images of rat food and rat poison, the difference between the complex materials impossible to discern. The images are observed by two white *Sprague-Dawley* rats on satin cushions, that were in their past lives used in pharmacological tests for malaria drugs. These gaze at their own representations, avoiding eye contact with the viewer. On the right a gallows of rat traps recalling a rat catcher baskets is labelled with adjectives attributed to rats. On the left is a grid of skulls, skins and images – one of these a glass slide of an Anopheles mosquito. The grid also contains YouTube videos of rat killings and rat pettings. Genealogical and evolutionary tree schemas are etched onto mirror in the background. These surround urns that are labelled with extinct and rare rats – an Adamic or Linnaean task of naming and unnaming, set at the outer edge of paradise. On the far left baseball bats with names of recognised vermin are propped against empty food crates. These are assembled to constitute a Noah's Ark, labelled with animals from Athanasius Kircher's *Arca Noë* diagram (1675). Kircher described Noah's Ark as the first museum of natural history. Rats were not included in his list.





G: PASSAGE.

[PASSAGE]

X: WOLVES.

O: CASKS FULL OF WATER FOR NECESSARY USE.

Y: 2 FOXES.

[PASSAGE]

Z: WILD BOAR, 2 DOMESTIC SWINE.

P: TREE-LEAVES FOR THE USE OF ANIMALS IN WINTERTIME.

LIBRA: CISTERN

Q: HAY FOR THE HERBIVOROUS ANIMALS.

14: Cranes and Storks.

3: Pernices, Partridges, Attagenes.

15: Herons of different species.

4: Kingfishers.

[passage]

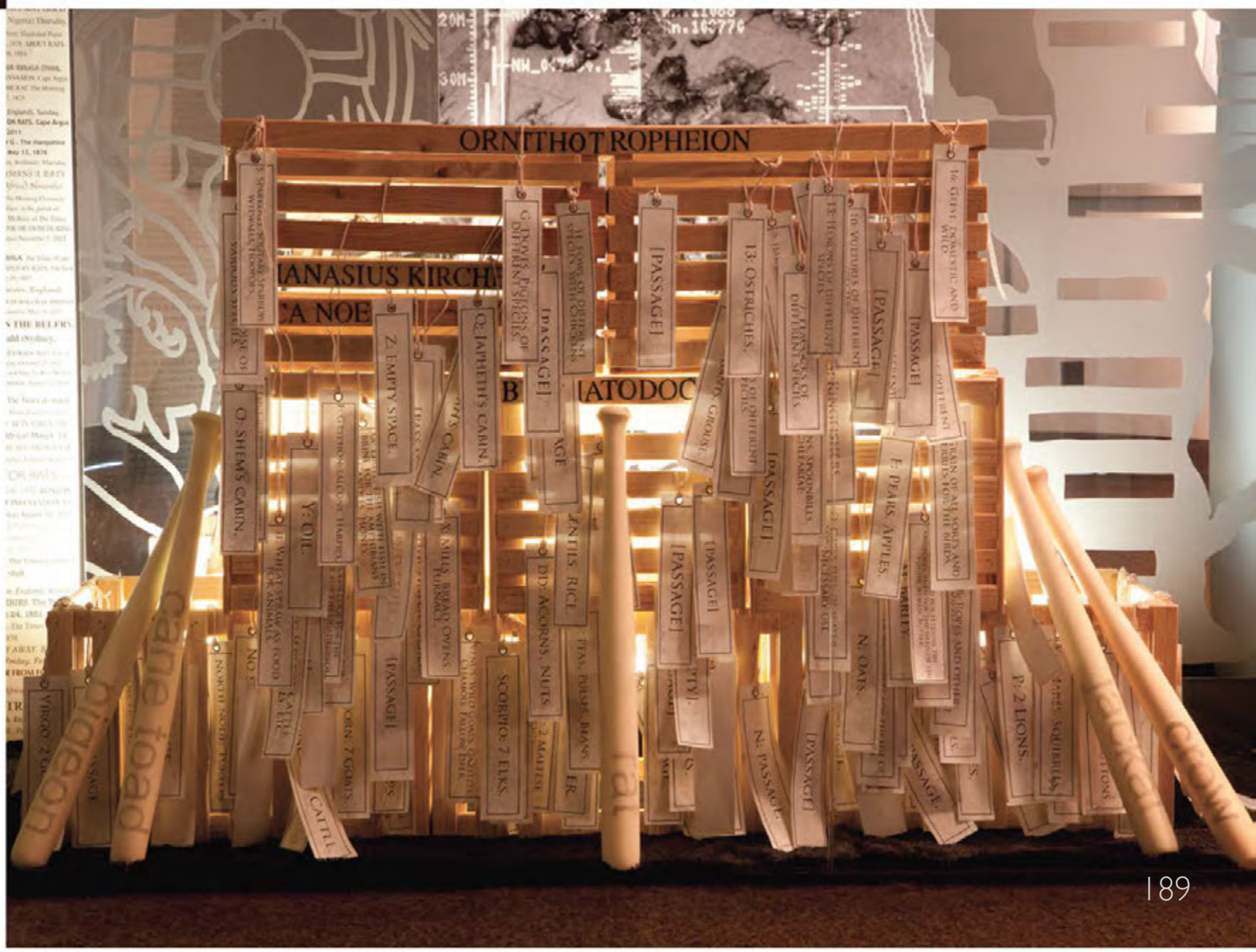
5: Magpies of different species.

16: Geese, domestic and wild.

6: Parrots of different species.

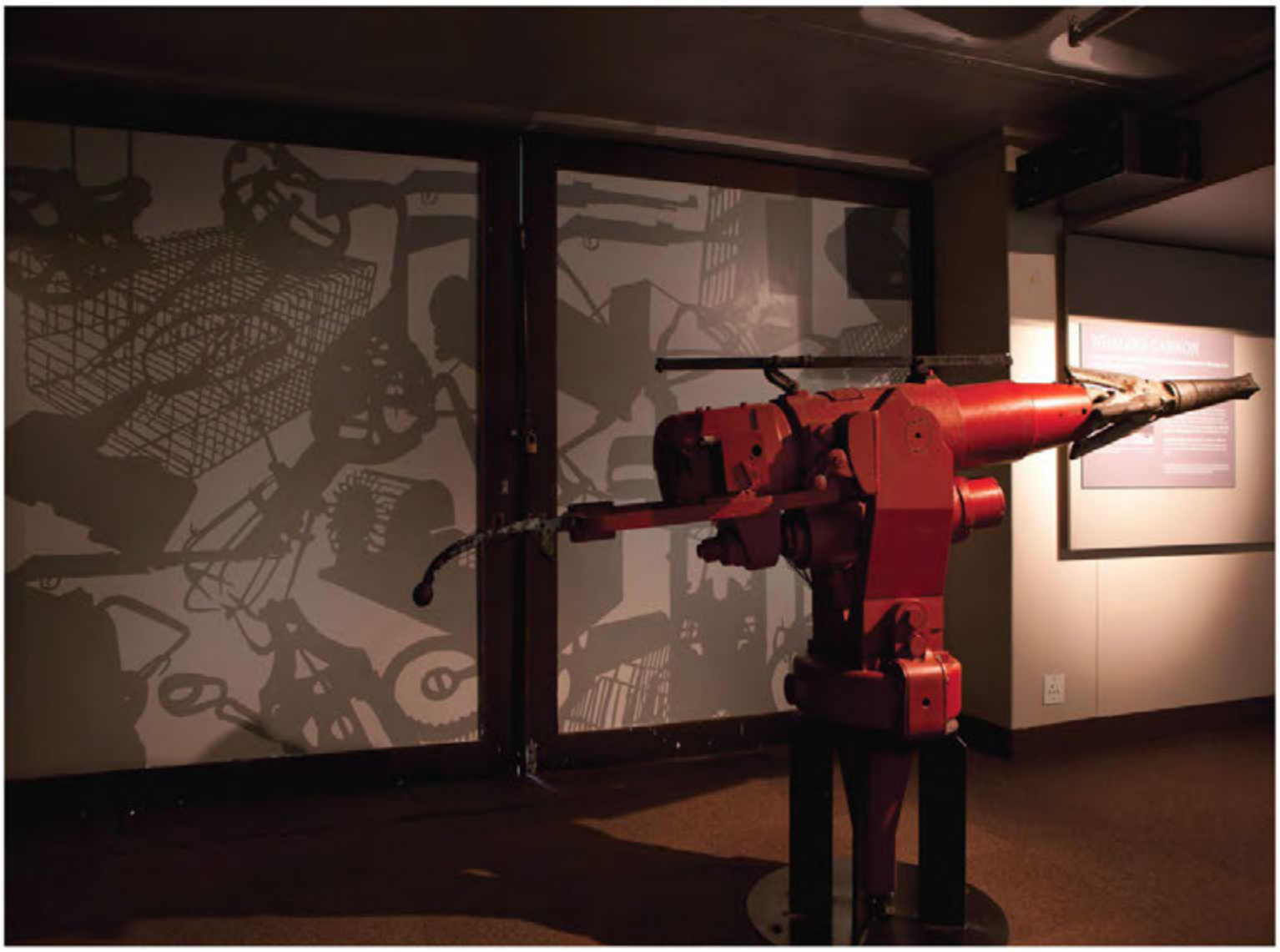
17: Ducks of different species.

7: Peacocks of different species.



ONDON KILL 68 596 PEOPLE [182] BILLY THE BULLTERRIER KILLS

ENGLAND FROM THE EAST [1902] CAPTAIN G C SHORTRIDGE COLLECTS RATTUS NORVEGICU
SPECIMENS AT PORT ST JOHNS [2012] 55 TONNES OF BRODIFACOUM IS DROPPED ON SOUTH
GEORGIA ISLAND [1729] VAST NUMBERS OF BROWN RATS ARRIVE IN RUSSIA, ACROSS THE


VIMANA CANNON

WESTERN DESERTS [1940] BUBONIC PLAGUE SPREADS TO TEN STATES IN THE USA. ONLY 65 DE
ARE RECORDED [1894] C C STEWART USES RATS TO TEST THE EFFECT OF ALCOHOL AND DIET
ANIMAL ACTIVITY [1913] JOHANNES FIBIGER INTRODUCES CANCER CELLS INTO RATS [1284] A


Rn.1253
Rn.1476
Rn.3589
Rn.2953
Rn.162208
Rn.29857
Rn.136644
Rn.106826
Rn.4234
Rn.3114
NW_047658.2


VENEN
Rattus nor


ENUM
norvegicus


Rn.2344
Rn.66531
Rn.146093
Rn.55145
Rn.266
Rn.8074
Rn.2269
Rn.119634
Rn.101146
Rn.3606
Rn.8426
Rn.162938
Rn.103146
Rn.33311
Rn.25717
Rn.202954
Rn.98146
Rn.45835
Rn.103977
Rn.199092
Rn.116613
Rn.9002
Rn.98516
Rn.108014
Rn.1233
Rn.4248
Rn.12030
Rn.107165
Rn.128903
Rn.8937


DDIES [1612] THEOPHILUS
ST RECORDED RAT DISSECTION AT THE ROYAL
PRECIOUS
PRECIOUS

BUBONIC PLAGUE CAPILLARIA AEROPHILA CAMPYLOBA
DYSENTERY CRYPTOSPORIDIOSIS CYSTICERCOSIS DYS
EOSINOPHILIC MENINGITIS HANTAVIRUS HEPATIC CAPILLA
HYMENOLEPIASIS LASSA FEVER TYPHUS LEPTOSPIROSIS
CHORIOMENINGITIS TYPHUS MYCOPLASMA Q FEVER O
PUUMALA VIRUS RABIES RINGWORM PASTEURELLOSIS

JAUNDICE KIDNEY DISEASE LACTOSE INTOLERANCE
CANCER LIVER DISEASE LYMPHOMA MALARIA M
MUMPS MENINGOCOCCAL DISEASE MYOPIA MIGR
SCLEROSIS MUSCULAR DYSTROPHY NARCOLEPSY
LYMPHOMA OBESITY OSTEOPOROSIS OSTEOMY
POLIO PANCREATITIS PARKINSON'S DISEASE PE
CANCER RUBELLA SARS SCARLET FEVER SPIN
THRUSH TETANUS THYROID DISORDERS TUBERCU
YELLOW FEVER

Leporillus apicalis
LESSER STICK NEST RAT

Boromys torrei
TORRE'S CAVE RAT

Rattus macleari
MACLEAR'S RAT

**Diplothrix legata*
RYUKYUS ISLANDS TREE RAT

florensis
VE RAT

Canariomys bravoi
TENERIFE GIANT RAT

Boromys offella
ORIENTE CAVE RAT

Uromys imperator
EMPEROR RAT

**Thallomys short*
SHORTRIDGE'S R

rillus apicalis
STICK NEST RAT

Boromys torrei
TORRE'S CAVE RAT

Rattus macleari
MACLEAR'S RAT

**Diplothrix legata*
RYUKYUS ISLANDS TREE RAT

**Rat*
SAHYAD

galomys luciae
ANT RICE RAT

Spelaeomys florensis
FLORES CAVE RAT

Canariomys bravoi
TENERIFE GIANT RAT

Boromys offella
ORIENTE CAVE RAT

Uromys
EMPER

egalomys desmarestii
ARTINIQUE MUSKRAT

Leporillus apicalis
LESSER STICK NEST RAT

Boromys torrei
TORRE'S CAVE RAT

Rattus macleari
MACLEAR'S RAT

***
RYUK

nsis
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Canariomys bravoi
TENERIFE GIANT RAT

Boromys offella
ORIENTE CAVE RAT

Uromys imperator
EMPEROR RAT

**Thallomys shortridg*
SHORTRIDGE'S RAT

s apicalis
K NEST RAT

Boromys torrei
TORRE'S CAVE RAT

Rattus macleari
MACLEAR'S RAT

**Diplothrix legata*
RYUKYUS ISLANDS TREE RAT

**Rattus s*
SAHYADRIS FO

pelaeomys florensis
FLORES CAVE RAT

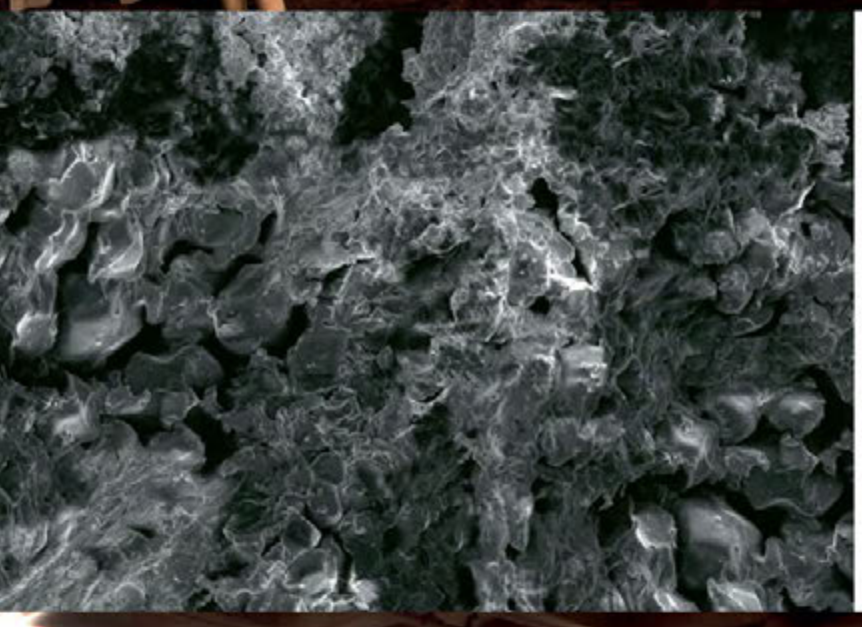
Canariomys bravoi
TENERIFE GIANT RAT

Boromys offella
ORIENTE CAVE RAT

Uromys imperator
EMPEROR RAT

**Thall*
SHO


KILLS OVER 100 RATS IN LESS THAN 12 MINUTES [1917]




INDONESIA II

CATCHER LURES RATS INTO THE WESER RIVER, HAMELIN [1971] THE RAT HORROR MOVIE, WIL
RELEASED [1894] TROOPS IN CHINA SPREAD BUBONIC PLAGUE TO HONG KONG WHICH IS C
BY RATS TO OTHER WORLD PORTS [1565] CONRAD GESNER DIES OF PLAGUE [1963] RESEARC

MAMMAL ROOM

The mammal room has remained unchanged for the past 30 years and displays a number of South African rodents. Amongst these are two *Rattus rattus* and a single bleached *Rattus norvegicus*, which, with its back to the viewer, appears to be attempting an escape from its hessian-bound confinement. To this specimen has been added a white handkerchief of surrender, a small wooden oar and a label: Kenneth Grahame, 1907. Diagonally across the room, a mobile diorama, designed as a scale version of the metal cabinets, has been inserted into a disused corner. Based on poses of Adam and Eve from Masaccio's *Expulsion from the Garden of Eden* (1424), two rats stand under sodium light at the outer edge of Paradise (Kirstenbosch Gardens), gripping a small fragment of hessian. The work makes reference to a long history of dioramas within museums where, in arrested time, specimens are immortal and perfectly formed. At the time of the *R-A-T* exhibition opening a cabinet opposite this had been cleared of it specimens and, strewn with rodenticide and insecticide, was an appropriate foil to paradise. These two rats were acquired from a snake park after the skins from Rentokil exterminations proved beyond saving. In an inversion, these specimens were not the fruits of temptation, but escaped the jaws of snakes in order to return to paradise.


TOWN DOCK-WORKERS (1954) 64 TONNES OF ARSENIC TRIOXIDE IS USE

MASACCIO, 1424

Expulsion of Adam and Eve from Eden

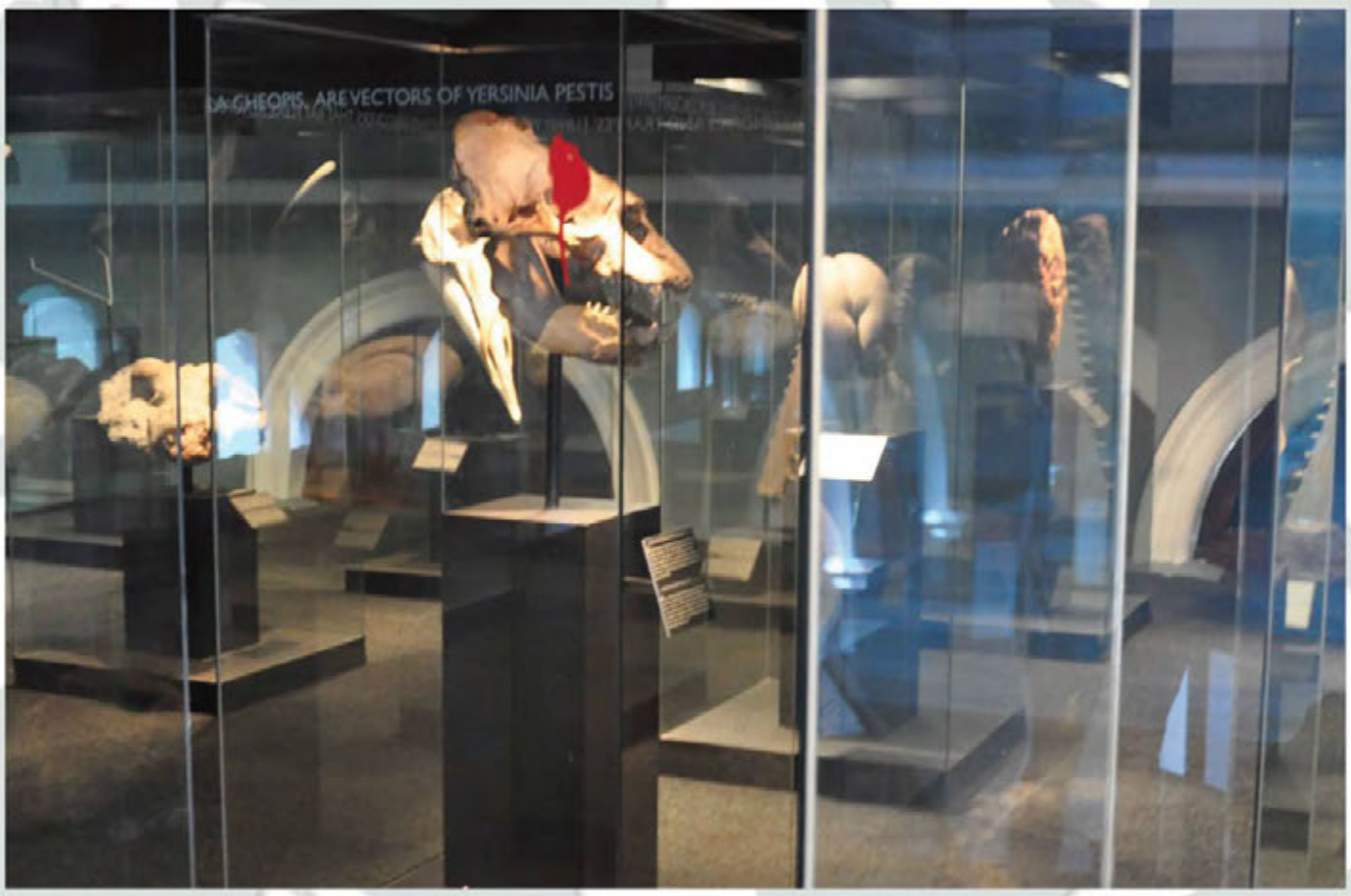
Brancacci Chapel, Santa Maria del Carmine. Florence

WONDERS OF NATURE

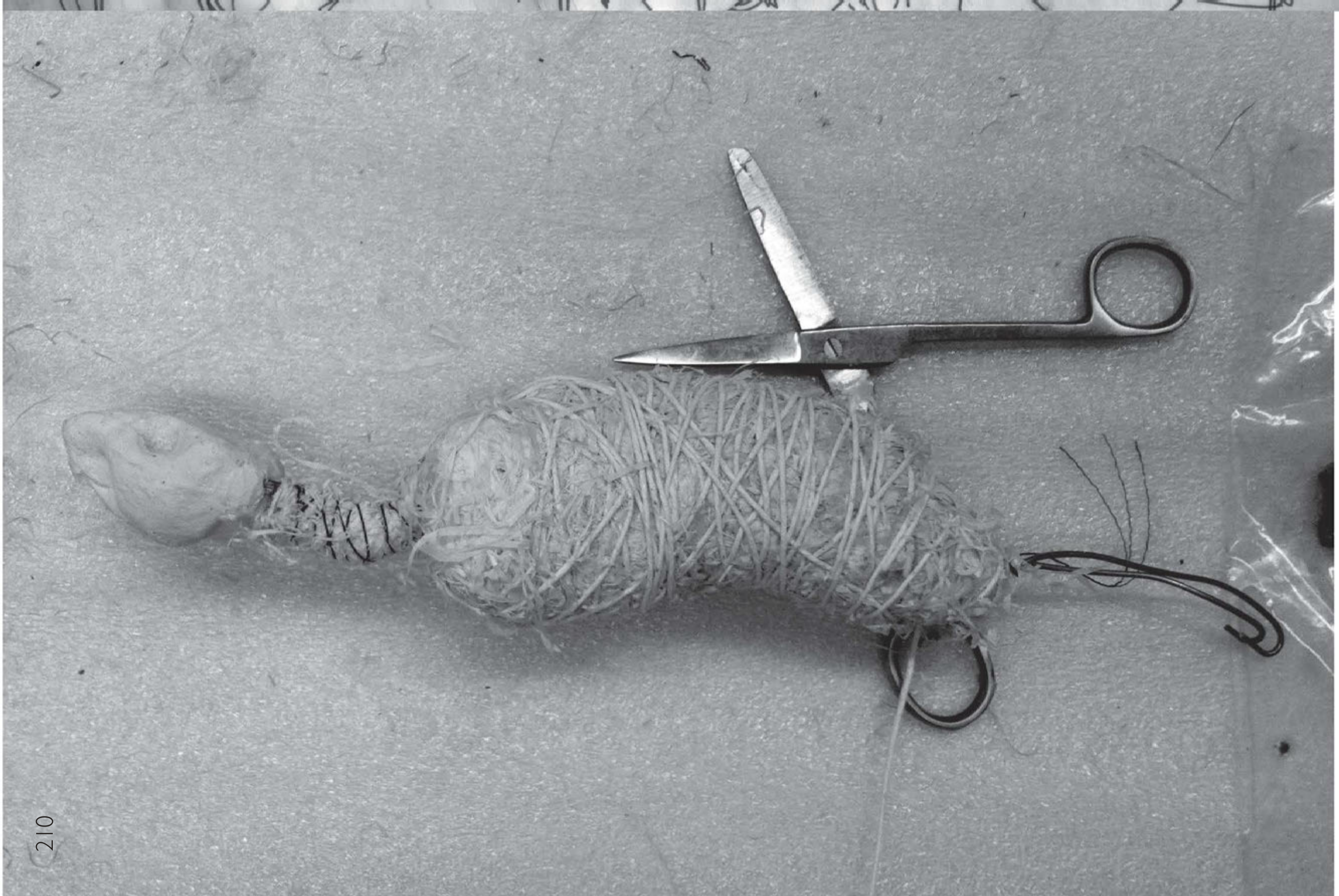
To the regular grid of wonderful and curious natural specimens in glass cabinets is added an inconsequential rat skull. This was sourced from one of the taxidermied rats on the exhibition and nestles alongside an elephant seal skull. On a carpeted area stretching below the glass cabinets are 500 different rat cut-outs, many labelled with titles of rat movies. Melodramatically illuminated by torches, the shadow-rats refer to the horror genre that has had such a strong influence upon the way in which rats are perceived.


BOUNDARIES AND TRAPPES, [1888]


THE DEATH


CHEOPIS, ARE VECTORS OF YERSINIA PESTIS


APOCALYPSE
NOW
1979




RODENTS

BIRD GALLERY

This cabinet, in the midst of bird displays designed in 1959, makes obvious contextual reference to cages, breeding and feather-like colour swatches. When Jack Black, Queen Victoria's official rat catcher, began to experiment with rat breeding this resulted in a fashion for domesticated rats in Victorian England. This was cemented when Mary Douglas's black and hooded rat won first prize in at the national mouse club exhibition. This was the origin of the 'fancy rat' that heralded the contradictory relationship humans have to these animals. Both Beatrix Potter's *Samuel whiskers* (1908), said to be based on a rat obtained from Jack Black, and Kenneth Grahame's *Wind in the willows* (1907) were written after the craze for domesticated rat breeding. The coloured feather-like labels at the back of the cabinet refer to the excess of 60 different rat colours and markings in bred rats. From a cavity in the cabinet, that was previously used to display an archaeopteryx cast, cascade fabric 'mutant' rats: ear, foot and tailless. The bitumen-black cages are labelled with the sex habits of rats and they refer to the dark practice of rat baiting – a simultaneous Victorian pastime whereby rats were pitted against dogs. Here Jacko the terrier held the world record of 100 rat kills in 5.5 minutes. Also included are laboratory rat housings, labelled with the more than 200 strains of lab rat that have been developed for research purposes since a colony of hooded rats were bred in the Jardin des Plantes, Paris in 1856. A *Spague-Dawley,* one of the most popular research rats sits within a commercial trap, sniffing Vapona, an insecticide used to protect museum specimens.

WISTAR PRODUCE THE SPONTANEOUSLY HYPERTENSI
AT, USED TO FIND GENES THAT REGULATE BLOOD
RESSURE [2011] DR KEVIN ROWE EXTRACTS DNA FRO
SPECIMEN OF RATTUS NORVEGICUS, PRESERVED IN
963 [1600 BC] EARLY RATS APPEAR IN THE MIDDLE EAS
817] BARON CUVIER DESCRIBES RATS AS 'CONTINUA
ATING MACHINES'. EXHIBITION THE RAT:
IAN'S INVITED AT THE ANACOSTI
OMMUNITY OLOGIST CHARL
REIGHTO HE HOUSE OF
LAGUE VI SPREAD ALON
HINE AN N LONDON
2002] PIG BDOMENS
720] FISH DEAD RATS IN
HE HARBO TO SEA [1907] J
VATSON TES TS WITHOUT SEN
ORGANS IN MA ST TRANSGENIC RA
WITH A HIGH BLOOD URE GENE, IS PRODUCED
N GERMANY [1807] RAT CATCHER TO KING GEORGE
I, E TUFFIN PUBLISHES THE COMPLETE ART OF RAT
ATCHING [1930] THE WORD 'RODENT' BECOMES
OMMONPLACE IN THE ENGLISH LANGUAGE [1640]
TRYCHNINE FIRST USED TO KILL DOGS, CATS, AND

Rats can reach sexual maturity at 5 weeks of age.

Rats don't have a breeding season, although very hot or cold temperatures will reduce breeding.

Females of breeding age come into heat all year round, every 4 to 5 days, unless they are pregnant or nursing.

A female rat approaches menopause at about 18 months.

Most pet shops sell 50-90% of their rats for reptile food.

The rat gestation period is normally 22 days.

Female rats come back into heat within 24 hours of giving birth.

If two female rats with litters are left together they may steal each other's babies.

In rat society, a mother rat is usually dominant over all other rats, even if she is usually submissive.

Rat birth normally takes about an hour or two. The mother will help deliver them with her hands and teeth.

Most female rats are good mothers, but if stressed, may kill and partially eat some healthy babies.

If female rats co-habit without male rats, they will mount each other when in heat.

Female rats go into heat every 5 days.

Jack Black, Queen Victoria's official rat catcher started a fashion for domesticated, 'fancy' rats in Victorian England.

There are more than 200 strains of lab rat that have been developed for research purposes since 1856 in Paris.

There are now in excess of 60 different rat colours and markings in bred rats.

In Victorian London there were at least 70 rat pits in which bets were placed on how long it took to kill all the rats in a pit.

In 1823, Billy the Bull Terrier killed 100 rats in 5 and a half minutes.

Rat catchers provided in excess of 1000 rats for rat baiting matches in Victorian London.

Today rewards are offered for catching rats in urban environments. Payment is made on number of tails collected.

The average pack size is between 15-220 rats.

The male rat's sexual behaviour constitutes an ordered sequence of motor acts involving both striate and smooth muscles.

Ultrasonic vocalizations are conspicuous during rat mating activity.

Prolonged stress interferes with the onset of rat sexual behaviour at puberty and with fertility at adulthood.

When in heat the female prompts the male into mounting her by darting towards him and hopping, sometimes wiggling her ears.

Lordosis is the female rat mating posture. She stands immobile, back arched downward, rump elevated and tail deflected .

The male rat sex drive is expressed after puberty, when testosterone is secreted.

After mating, the male may emit ultrasonic vocalizations, and he becomes sexually inactive and lethargic.

Rats can reach sexual maturity at 5 weeks of age.

Rats don't have a breeding season, although very hot or cold temperatures will reduce breeding.

Females of breeding age come into heat all year round, every 4 to 5 days, unless they are pregnant or nursing.

A single pair of rats can produce 359 heirs in 3 years.

8-10 young are born in each litter.

Female rats bear 3-7 litters in their lifetime.

On average a female weans 20 young each year.

Rat pups are born 22 days after conception.

Rat are altricial – born blind and helpless with pink wrinkled, bald skin, and can only wriggle and paddle.

Pups eyes open after 10-15 days.

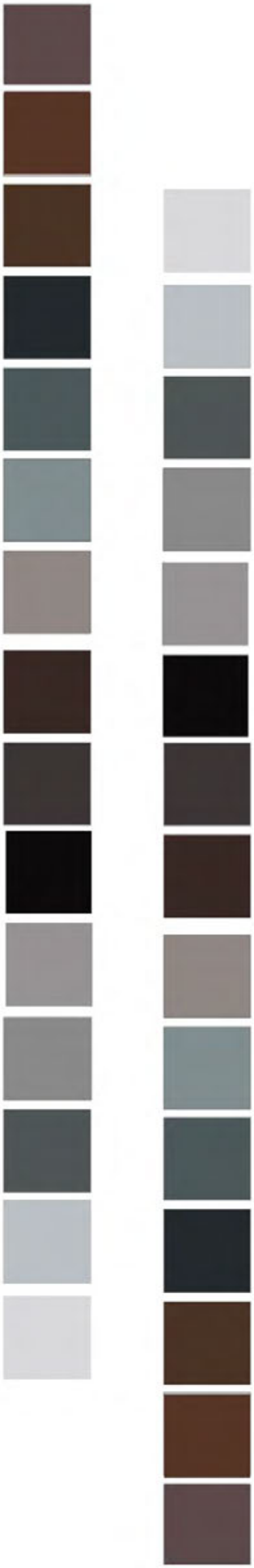
Pups are fed by their mother until 4-5 weeks and eat solid at 3 weeks.

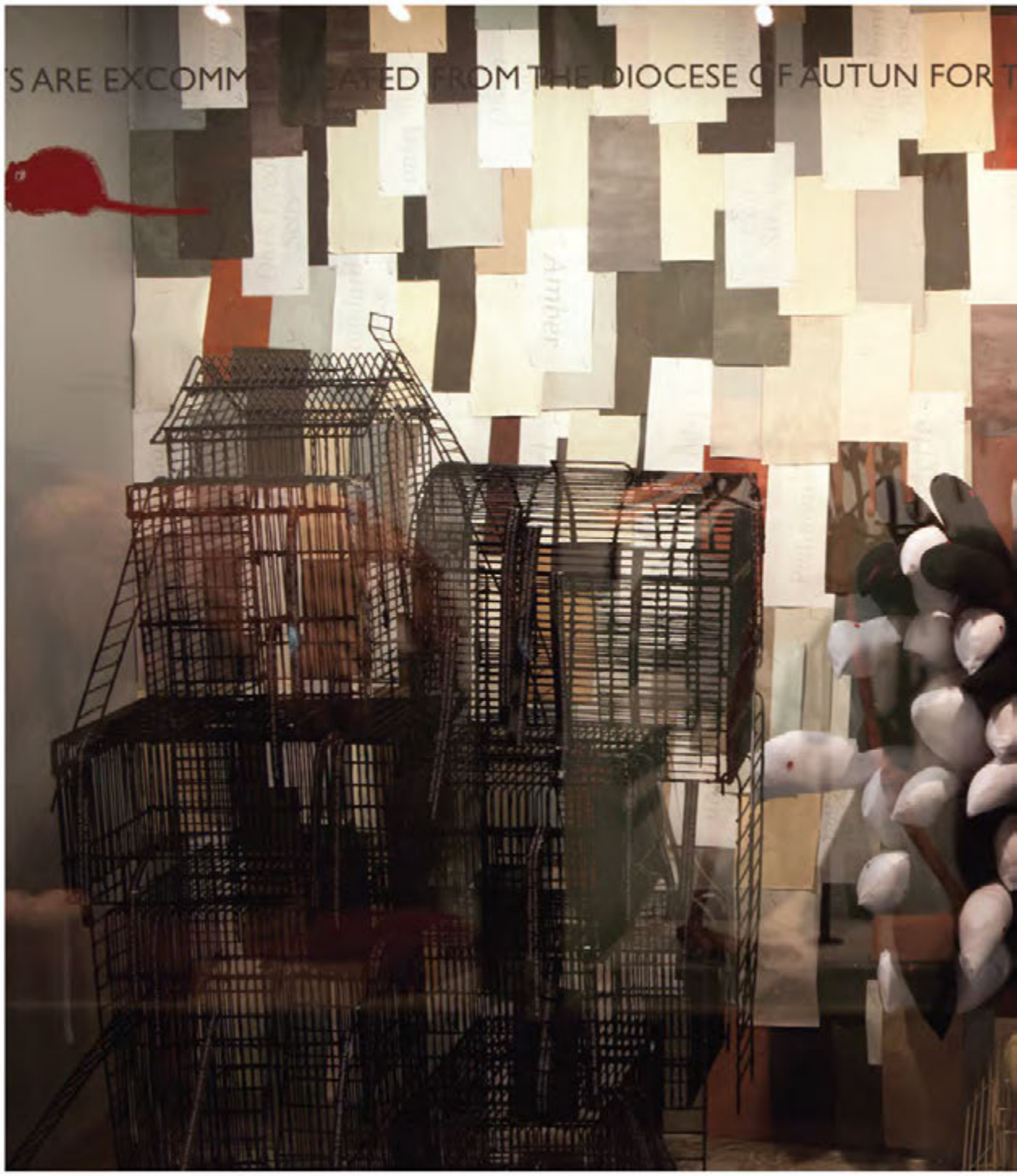
Rat pups reach maturity at 80-90 days and are able to mate. Rats reach old age at 15 months.

Young rats are raised communally, and females will raise orphaned pups.

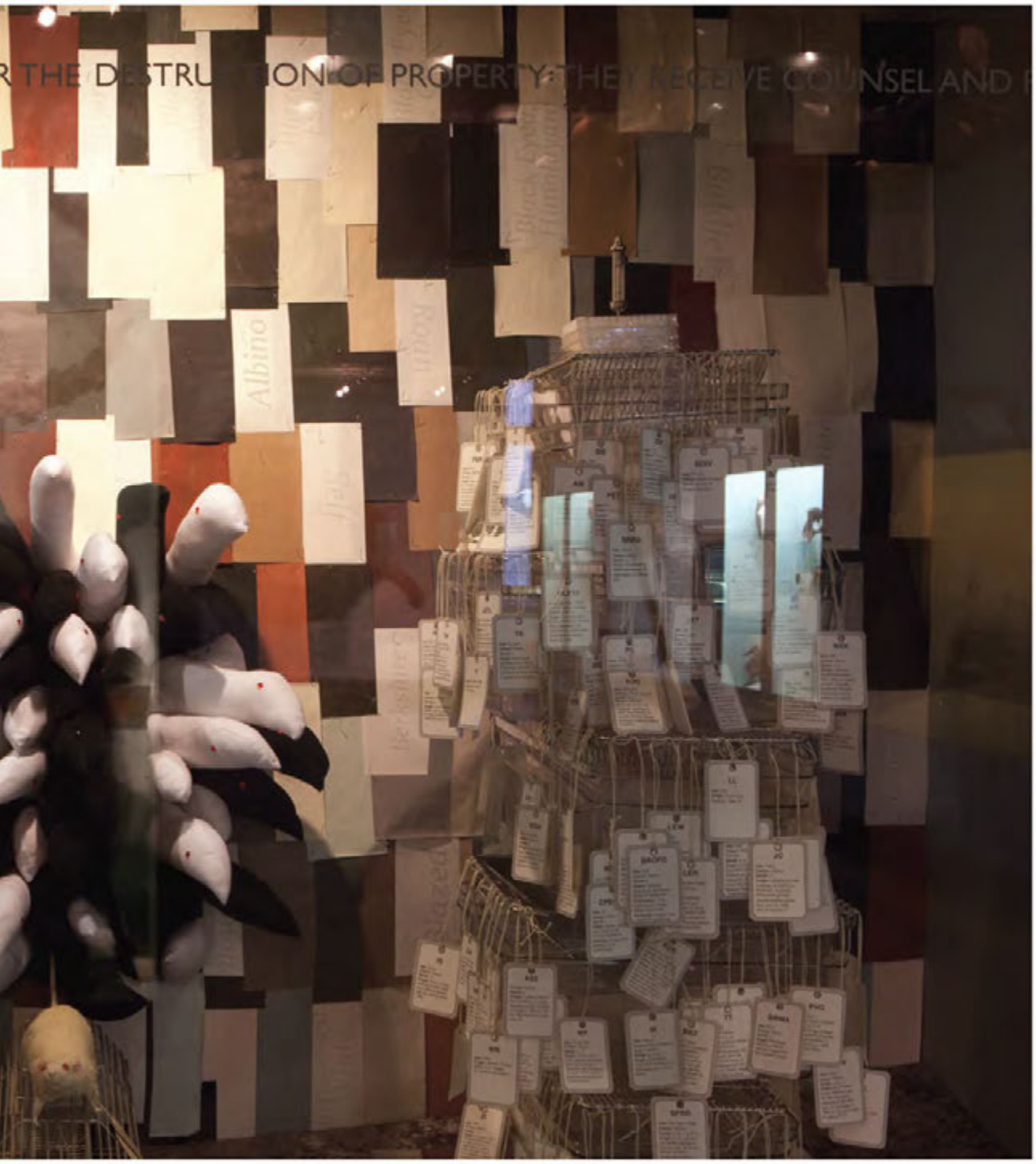
Mothers will eat their litter under stressful conditions.

When female rats are not available, male rats will display homosexual behaviour.





Agouti – range of browns and reds mixed into the fur
Albino – all white, pink-eyed
Amber – pale brown to cream
Apricot
Argente Creme
Baldie
Bareback
Black eyed cream
Black Eyed Himalayan
Blazed
Blazed Essex
Beige – deeper brown than amber.
Black – very deep black with no sign of other colours
Blue – pale silvery sheen
Blue agouti- silvery blue with other colours mixed into the fur
Blue Point Himalayan
Blue Point Siamese
Buff
Burmese – rich, soft brown with no other colour traces
Burmese Agouti – light brown to sandy colour
Champagne – very light cream
Chinchilla – deep grey with paler nose
Chocolate – sleek, rich brown
Chocolate Agouti – chestnut brown
Cinnamon – anywhere between soft cream to reddish cream
Cinnamon Pearl – soft cream with white base fur
Coffee
Dark blue – very deep, greyish blue
Dark American Blue
Dove – silver with flecks of white fur
Fawn – all over cream to reddish
Havana
Himalayan
Lilac – white with brownish purple hood
Lilac Agouti – predominantly brown, white nose
Merle
Mink – mostly brown, very dark
Pearl – white/silvery coat with a variety of other colours.
Platinum – predominantly striking white.
Platinum Agouti
Powder blue – lighter than standard blue
Russian blue – very deep grey
Russian blue agouti
Russian Blue Point Siamese
Russian silver – striking silver blue
Russian Silver agouti
Russian topaz – cream/white fur with silver flecks
Satin



The first recorded incidence of plague is found in the Bible in Samuel 1. It is written that the Philistines were punished when God "smote the men of the city" with swellings in the groin.

REPTILE GALLERY

Projected onto the white linear drawing of dinosaurs and reptiles is a video that combines drawings of rat dissections with the rat genome, connecting a timeline between the first recorded rat dissection by Theophilus Müller and Johann Faber at the Accademia dei Lincei in 1621 and the publication of the rat genome in 2004. In a space of predation, where snakes are located at the apex of the reptile pyramid, the rat is anatomised and reduced to its smallest units.

...pestis. At about ...same time, Microbiologist Dr Shibasaburo Kitasato also identified them and named them Pastuerella pestis. The bacterium was officially named *Yersinia pestis* in 1970.

In 1898 Dr Paul Louis Simmond established plague as a disease of rats and rodents, noting that rats carry the fleas responsible for spreading the disease. Although rats carry over 100 species of flea, *Xenopsylla cheopis*, is the best known agent of the disease.

...migrate ...in the ...in the ...40s. ...gely ...d.

In 1896, 100 00... of plague br... rat infested s... Hong Kong.

There are mo... than human d... in any incident... plague. The rat ... go unrecorde...

...in ...pecies ...uding ...nts.


South
Name
Locality
Donor
And he that digs it, spies
of bright hair about the bone,
Will he not let us alone,
there a loving couple lies,
device might be some way
at the last busy day
make a little stay?
John Donne
The Relic

IN CAPE TOWN IN ADVANCE OF THE SOCCER WORLD CUP [1890] 44RAT AUTHORITY TOM SPEEDY SUGGEST THAT RATS BE USED AS HAT TRIMMINGS IN A BID TO REDUCE THE RAMPANT POPULATION [1900] RATS FROM CHINA ARRIVE IN SAN FRANCISCO [1924] WILLIAM CASTLE ANALYSES COLOUR PATTERN IN 25 000 RATS [1901] 14 -YEAR-OLD OTTO ORKIN BEGINS SELLING HIS SPECIAL BLEND OF RAT POISON DOOR TO DOOR IN LOCKPORT, PENNSYLVANIA [1907] PLAGUE BREAKS OUT IN SAN FRANCISCO FOLLOWING EARTHQUAKES AND THE DISRUPTION OF THE SEWER SYSTEM [1934] 230 000 RATS ARE KILLED IN ONE WEEK IN NEW YORK WHILE THE CENTRAL PARK ZOO IS RESTORED [1898] 1261 PEOPLE DIE OF PLAGUE IN BANGALORE [2008] GIANT GAMBIAN POUCHED RATS SNIFF OUT LANDMINES IN MOZAMBIQUE [1775] RATTUS NORVEGICUS ARRIVE IN NORTH AMERICA ABOARD SETTLER SHIPS [1901] FOR THE FIRST TIME RATS COMPETE IN THE ENGLISH NATIONAL MOUSE CLUB SHOW: THEY WIN 'BEST IN SHOW' [1909] ALBINO RATS ARE FIRST BRED AT WISTAR FOR EXPERIMENTAL PURPOSES [1908] 350 000 RATS ARE KILLED BY BOUNTY HUNTERS IN SAN FRANCISCO AND RAFTS OF CADAVERS ARE FLOATED INTO THE BAY [1832] DARWIN IDENTIFIES THE PLAGUE RAT IN AUSTRALIA [1908] BEATRIX POTTER PUBLISHES THE TALE OF SAMUEL WHISKERS [1915] RATS ARE SMOKED OUT OF THEIR HOLES IN TRENCHES IN FLANDERS AND CLUBBED TO DEATH [1789] JOHN BERKENHOUT CLASSIFIES THE BROWN RAT, RATTUS NORVEGICUS IN OUTLINES OF THE NATURAL HISTORY OF GREAT BRITAIN [1927] RENTOKIL IS FOUNDED AND INITIALLY USES SALMONELLA AND RED SQUILL AS RAT CONTROL MEASURES [1979] 255 RAT BITES ARE REPORTED IN NEW YORK [997] BISHOP WILDEROF IS CONSUMED BY RATS AFTER SUPPRESSING A CONVENT [2002] INFANT RAT HEADS ARE GRAFTED ONTO ADULT RAT THIGHS IN LABS IN JAPAN [1851] THE BRITISH CENSUS REVEALS 2256

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APPENDIX

These exhibitions illustrate some of the themes and research areas that have occupied me over the past 10 years and that have relevance to this study: museum display, taxonomies, and encyclopaedic systems.

BLACK BOXES LEARNING TO SPEAK (2002–2003)

Black boxes was an exhibition that focused on modes of cultural representation, specifically those of ethnographic display and the material manifestations of the tourist industry in South Africa. The project was premised on the viewpoint that culture is mutable, whereas cultural classification is an inorganic and divisive process. It presented 99 units, grouped by language and government departments and containing paper weapons constructed from recent government speeches. The role of labelling was central to the work, as the objects in each set of nine (department) boxes were identical, yet each box was labelled with one of the eleven official languages for each series, alluding to the arbitrary and imprecise relationship between language, object and meaning. Misclassification, inaccurate translation and misunderstanding are inevitable consequences of cultural ordering and were inherent to the project. These concerns were amplified in my 2003 exhibition, *Learning to speak,* that drew on the imaging, imagining and symbols of 'nation'. It was concerned with taxonomy and nomenclature and the inevitable conflation of nature and culture that this embraced. It used plants as a metaphor for shifting definitions of indigenous and alien and made visual reference to museum display and the sepulchral. It also relied on the reconfiguration and recontextualisation of found texts.

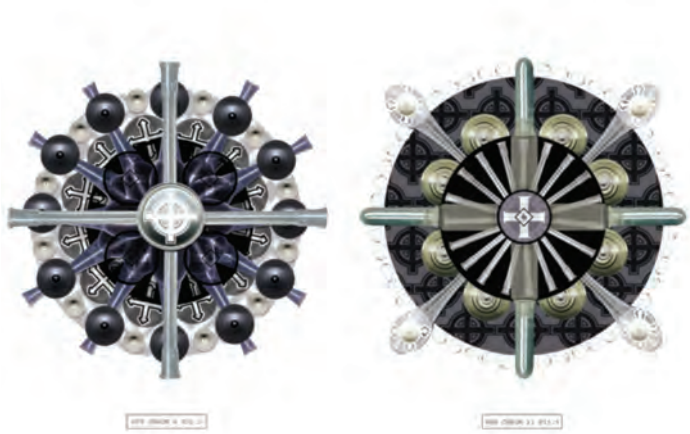
Friedman, H. 2003.Klein Karoo Festival. *Art South Africa* 01 (04): 54-55.

Shantall, L. 2002. Pandora's boxes. *Equinox Magazine* (4): 62-64.

LEXICONS AND LABYRINTHS (2003)

The publication of the human genome in 2003 raised international concerns about the uses of, motivations for, and control over human biological data. These issues became particularly sensitive in Africa, where disempowered communities were subjected to testing and gene harvesting. I started to work on a series of exhibitions at this time that developed these concerns.

In 2003 I was commissioned by the African Genome Initiative to curate an exhibition at ISAM that explored the iconography of the human genome. *Lexicons and labyrinths* invited artists, including amongst others, Willem Boshoff, Sandile Zulu and Alan Alborough to consider the implications of the visual representation of the human genome as well as to contextualise their work within the ISAM collections on display. My own work, *Model-making*, consisted of an 8 metre-long fluorescent 'model'. This was a symbolic unravelling of Watson and Crick's 50-year-old double helix model. By constructing the work from disposable pharmaceutical paraphernalia I implicated pharmaceutical companies in benefitting from the results of the human genome map – for being the new model-makers.



Following this I produced a series of digital prints that reflected on the dangers of scientific determinism and the binaries created in the popular imagination by genetic research. Specifically, I made images titled *HFE, Chrom 6: P21.3* (Haemochromatosis) and *HBB, Chrom 11: P15.5* (sickle-cell anaemia) which pointed to the use of genetic markers by racist groups to determine purity of race. This was followed by the installation of a commissioned work in the Pharmacology Department at UCT where a series of nine chromed steel discs formed an 'index' or compendium of departmental research.

Langerman, F. 2003. *Lexicons and labyrinths: the iconography of the genome*. Cape Town: HSRC Press.

Klopper, S. 2003.Lexicons and labyrinths. *Art South Africa* 01 (04): 60.

CURIOSITY CXIIV (2004)

This exhibition, curated together with Pippa Skotnes and Gwen van Embden, was designed to coincide with the University of Cape Town's 175th anniversary. Research for the project entailed trawling through staff, departmental and university collections of material and oral archives, and finding visual structures by which to make these collections speak of the complex and varied activities and histories of the university. The project included the curation of 175 cabinets that brought together disparate collections in a dialogue that celebrated both scholarship and the narrative power of objects. My particular interest in this project was in both the analogies and the taxonomies that could be applied to an encyclopaedic body of objects. In some instances I found analogies that united various collections (in cabinets I titled *Effluvia*, *Capacitance*, *Positioning* and *Marking*), in other cases I created taxonomies that brought a diverse range of objects together neutralising their disciplinary content and flattened their meaning. An example of the latter was the cabinet *Similitudes* in which I ordered objects according to formal similarities – long thin things. This display included spiral glass tubes from the Chemistry Department, flutes and clarinets from The S.A. College of Music. These seemingly innocuous objects were activated by the inclusion of an arrow embedded in a skull and a torch labelled as a murder weapon from the forensic pathology collection. This proximate association undermined the innocence of the flute and glass tubes, leaving the viewer with a disrupted sense of expectation.

Skotnes, P., van Embden, G. & Langerman, F. 2004. *Curiosity CLXXV: a paper cabinet.* Cape Town: LLAREC Series in Visual History.

Rossouw, H. 2004. Love letter to a university. *The Chronicle of Higher Education,* 51 (17): 56-8.

THE KNOWLEDGE CHAMBERS and SYMMETRIES AND OXYMORONS (2007–2008)

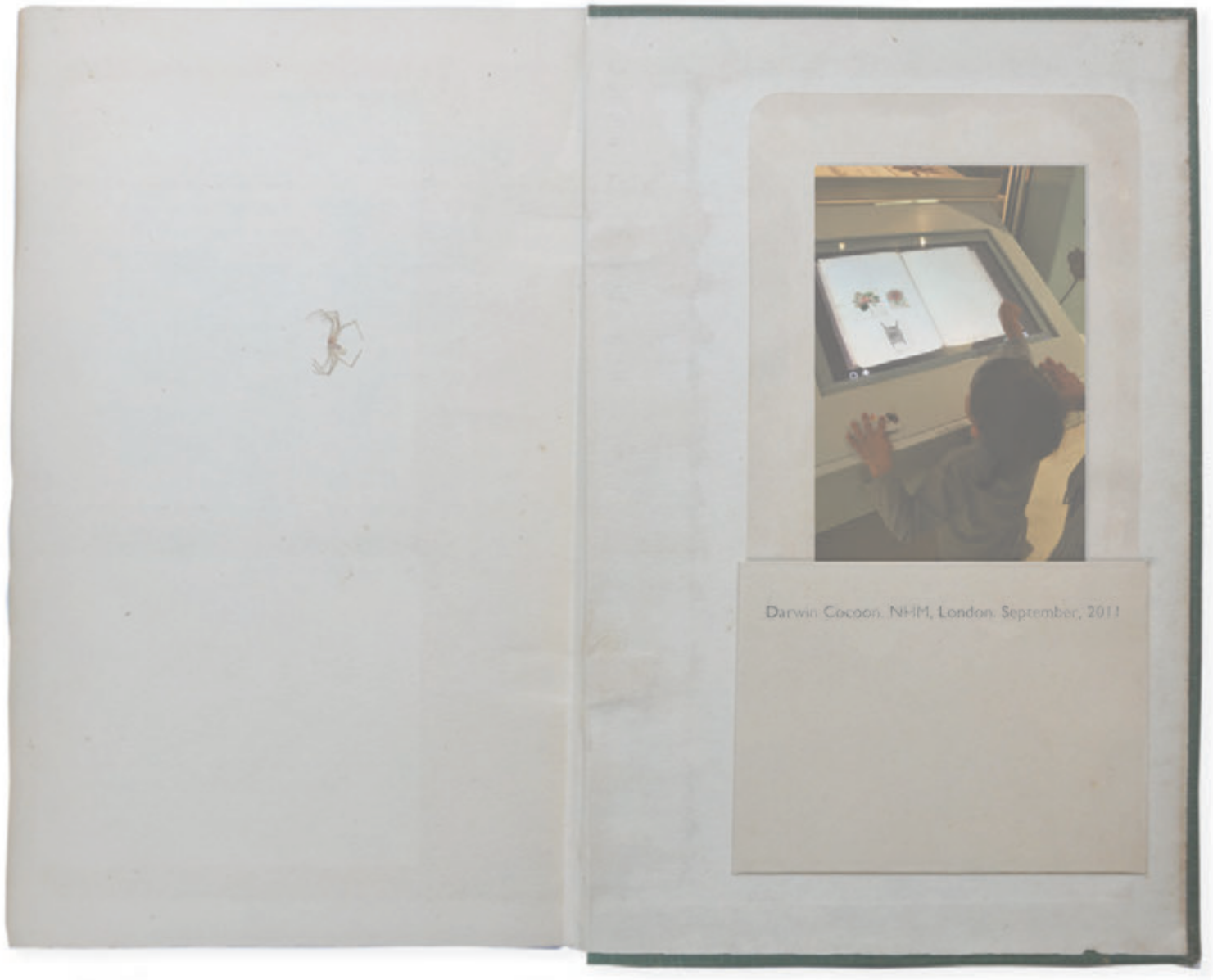
This exhibition referenced the history of print and its legacy in the contemporary world. It brought together three great knowledge systems, the medieval rose window, Diderot's Enlightenment *Encyclopédie*, and the consummate contemporary reference – the *Google* search engine – in a series of prints and laser cut works. This exhibition was initially inspired by Diderot's and Jean le rond d'Alembert's contents page in their *Encyclopédie* (1751–1766), which they called the 'tree of knowledge'. In its comprehensive taxonomy the structure of this contents page defied previous hierarchical divisions between manual and skilled labour, state and church. Although this tree makes reference to a hierarchical tree, much of its ascendant structure is undermined by its content. My exhibition focused on processes of translation and mistranslation between text and image and worked with post-script errors, illegibility and lost references. The project originated with an arbitrary selection of images and its self-referential construction did no more than amplify this randomness, its design making strong reference to the cathedral as a means of undermining the authoritative church. This project was particularly significant for my approach to curating within museums.

Langerman, F. 2008. *The knowledge chambers*. Michaelis School of Fine Art: Cape Town.

Langerman, F. 2008. Colophon. In *Artworks in progress: Journal of the staff of the Michaelis School of Fine Art.* Langerman, F. Ed. Cape Town: University of Cape Town.

Epstein, E. 2007.The knowledge chambers. *Art Papers*. Sept 2007: 59-60

McIntosh, T. 2007. The knowledge chambers. *Art South Africa*. 06 (01): 96-97.



right: DVD: panoramic walkthrough of *Subtle thresholds*[1]

[1] This gives some sense as to the layout of the exhibition, although the over-exposure of the images dilutes the atmosphere experienced in viewing the exhibition itself.