Abstract

Wunderkammer: Scenes of Wonder, Speculation and Discovery

The Wunderkammer was a setting of reflection, research and discovery in early modern Europe, where the collection and its context together created a network of potential associations that acted as a tool for interdisciplinary experiment and active knowledge generation. This research uses the phenomenon of the Wunderkammer as a catalyst in the quest for new ways of approaching the design of contemporary settings of interdisciplinary research and discovery.

The focus of this research is the design of a National Centre for Wet Archaeology, a setting of research and discovery with particular relevance to New Zealand, within the context of the historic yet largely forgotten Auckland Domain reservoir. The Domain reservoir is situated directly to the south of the Auckland War Memorial Museum, a location which through this project has the potential to play a key role in relation to the existing museum complex.

Commencing with an investigation into the spatial, social, conceptual qualities of historic Wunderkammern, this research traces underlying themes and developments from the emergence of the Wunderkammer in the Italian Renaissance to the flamboyant Baroque heights of collections such as the Musaeum Kirchernarium. Their legacy will then be traced through more recent works of architecture that share similar spatial and conceptual approaches, from Sir John Soane's Museum to the Schaulager by Herzog and de Meuron. The relationships between social space and creative process will be explored, as will be the parallels between the experiments of visual association within the Wunderkammer and its architectural context.

Analytical drawing and modelling techniques will then be used to distil, reinterpret, and test the underlying spatial and conceptual strategies of selected precedents to see if they can be used to develop an architecture of speculation in the context of the Domain reservoir, one which accepts the uncertainty of knowledge and relates to the wonder, mystery and discovery of understanding. The intention is to create a design that shares the sense of discovery between different levels of expertise and involvement, from the public to researchers working directly with the artefacts, and bring hidden processes and a forgotten part of Auckland's heritage into the light.
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Fig. 1: Giovanni Stradano, Il laboratorio dell’alchimista, 1571. Oil, 127 x 93cm. Palazzo Vecchio, Florence.
Introduction

Wunderkammern, literally chambers of wonder, were an extension of the Humanist tradition of the *studiolo*, a small room for retreat and literary study. Predecessors of both the museum and the science institute, they were a point of fertile tension in Early Modern Europe, settings in which different ideas and ideologies were brought into direct reference and tested against each other through the collected items contained within, creating a dialogue between the verbal and the visual and between personal discovery and conventionally accepted knowledge.¹ An idea born in the Italian Renaissance, Wunderkammern evolved and expanded over the following two centuries, reaching the flamboyant heights of collections such as the Musaeum Kirchernarium, before being relegated to obscurity by the event of the Enlightenment and the rise of modern scientific methods of categorisation. There has, however, been a recent resurgence of interest in the Wunderkammer and its interdisciplinary techniques of visual association, driven by recent advances in technology such as the internet and the growing realisation that the border areas, overlaps, and thresholds of areas of knowledge can be some of the most fertile zones for creativity and discovery.²

In previous studies the phenomenon of the Wunderkammer has largely been examined from an art-historical or museological perspective, with the focus being on the nature of the collected objects and on its historical role as the predecessor to the institution of the museum. As a result, the question remains: if the Wunderkammer was also a setting as well as a collection, did its architectural context in some way reflect or assist the richness and complexity of the experiments being carried out within its spaces, and, if so, can the strategies of the Wunderkammer act as a catalyst for new ways of approaching the design of contemporary settings of interdisciplinary research and discovery?

The following research is an attempt to find some possible answers to this question, in the context of the design of a contemporary setting of research and discovery that is of unique significance to New Zealand: a National Centre for Wet Archaeology. This facility will incorporate the spaces and resources required for the conservation, storage, and interpretation of wet artefacts, within the physical context of the Domain reservoir, a historic vaulted mass concrete reservoir to the south of the Auckland War Memorial Museum which, through this project, has the potential to have an important role to play in relation to the existing museum complex.

In response to the growing awareness of the power of overlaps between disciplines to act as catalysts for creativity and discovery mentioned earlier, there is a need to find ways to design settings that facilitate such interdisciplinary interaction, research, and discovery. Also, in the context of this project, it is important to explore ways of developing spaces that foster discussion, accept the uncertainty of understanding, and bring people closer to the acts of discovery.

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and interpretation. Museums and other similar institutions have a tendency to aim for an effect of maximum revelation and display in their gallery spaces, often with the apparently implicit idea that all is solved and understood. Most, such as the Auckland War Memorial Museum, have a strong separation between the front of house and the back of house, with visitors to the galleries separated from the staff and researchers, left unaware of the questions being asked, the uncertainties of discovery, and the active dialogues and contentions going on behind the scenes. If there is a link, for instance a window into the conservation area, it itself is treated as a display.

There are two main paths of questioning that will be followed in this research: firstly, what exactly are the architectural characteristics of the Wunderkammer, does this architecture relate to the nature of the collection space within, and if so, how? The scholars and patrons who created the original Wunderkammern used the collected objects and books as tools for visual association, building larger ideas out of the conceptual network formed by the collected fragmentary evidence and imagining possible relationships, connections, and conclusions. Therefore there is a question as to whether this architectural context reflected these intellectual journeys undertaken in the Wunderkammer, creating an architecture of speculation. Secondly, does the relationship between retreat and socialisation evident in the collection spaces of Wunderkammern give clues as to ways of designing space for the creative process?

While many texts are, understandably, focussed on the museological and art historical aspects of the Wunderkammer, the following are of particular relevance to this project in that they look more deeply into the intentions and concepts surrounding the Wunderkammer, its possibilities and complexities: Paula Findlen’s book Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Europe,1 The Lure of Antiquity and the Cult of the Machine,4 by Horst Bredekamp, and Collection, Laboratory, Theatre: Scenes of Knowledge in the 17th Century,5 one of a series of eight volumes produced by the Free University Special Research Project on “Performative Cultures”. These texts discuss the social culture surrounding such spaces and the dialogue between ancient and new understandings of the world, the nature of the Wunderkammer as laboratory driven by a desire to comprehend the nature of the transitions between areas of knowledge, rather than by the need to separate in creating order, and the role of material and immaterial space in the creation of knowledge, in relation to the simultaneous development of Wunderkammern, laboratories and theatres in 17th century Europe. In regards to later precedents, Sir John Soane’s Museum is extensively written about by many authors, while information on Warburg’s library is a little more elusive; it has proven necessary to rely heavily on a paper by Sandra Karina Löschke, Potential Meanings: Warburg’s Library as Laboratory.6

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4 Horst Bredekamp, The Lure of Antiquity and the Cult of the Machine.
Wet archaeology is the subject of several texts that describe the process, limitations and possibilities of the discipline, of particular use being the English Heritage Standards, Wendy Robinson’s *First Aid for Underwater Finds,* and Paul Tapsell’s excellent investigation of *taonga* from a tribal perspective, *The Flight of Pareraututu* which helped greatly to develop a picture of the larger significance of such work. This research is also indebted to Marc Spooner, *Generating Integration and Complex Understanding: Exploring the Use of Creative Thinking Tools within Interdisciplinary Studies,* as well as *Creativity, Design and Education: Theories, Positions and Challenges,* which helped form an understanding of the creative process in relation to interdisciplinary study.

In regards to architectural precedent, there are both the original Renaissance Wunderkammern themselves to be investigated and other more recent works that share similar spatial and conceptual approaches; the Schaulager by Herzog and de Meuron, Aby Warburg’s library, and, most especially, Sir John Soane’s Museum. Most original Wunderkammern did not escape the past three centuries unscathed, damaged and dispersed by the changing tides of thought and convention; disappearing entirely or surviving as fragments in larger civic collections. The result of this is that the spatial analyses of early Wunderkammern within this text must rely for the most part on contemporary accounts and illustrations.

The research will continue with a close analysis of the spatial, social, and representative techniques in illustrations of Renaissance Wunderkammern, studying the contents of the images to discover the physical characteristics of the Wunderkammer but also paying close attention to how the Wunderkammern were portrayed, looking for clues as to the desires of their creators, how the virtuoso saw their spaces or wished them to be seen and what the implications of this might be. The legacy of the Wunderkammer will then be traced through more recent works of architecture that share similar spatial and conceptual ideas, looking for patterns and continuations of earlier themes, as well as changes to the collection space and the changing applications. A closer analysis of selected precedent will then be performed, using analytical drawings in plan and section to search for methods in which the strategies were manifested in the architecture of the precedent. These methods will then be modelled to see how they can be interpreted, synthesised and used in different scales and contexts in relation to the design project. Finally, these techniques will be used in the design of the project itself, to see if they can be used to help create an architecture of speculation, one which accepts with the uncertain nature of discovery, fosters creativity and interrelation, and brings hidden processes into the light.

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Due to the scale of this research project it cannot be fully conclusive as to the full characteristics and implications of the architecture of the Wunderkammer; rather, it is an indication of possible directions for future research.
Historical Context

Fig. 3: Speculative plan of Happel's Wunderkammer
The Wunderkammer as experimental space

Wunderkammern, also known as camere delle meraviglie or cabinets of curiosity, were “settings in which, from the sixteenth to the eighteenth century, scholars and patrons amassed collections of items considered significant for both their intrinsic and esoteric characteristics. At their height, Wunderkammern were much more than passive collections of the rare and the grotesque. They were places of reflection, research and discovery, encyclopaedic laboratories within which to experiment in merging form and meaning in an attempt to better understand the world through the interrelations between areas of knowledge now conventionally seen as separate: art, science, history, and spirituality.”

Wunderkammern belonged equally to the arts and the sciences, being the precursors to both the museum and the science institute, and their creators, the “learned and the curious”, are no easier to categorise than their creations due to their wide-ranging of interests and abilities. Thus they will be referred to as virtuosi, the early modern Italian honorific term for someone skilled in any intellectual or artistic field.

A large part of the following research has been drawn from “Wunderkammer: Scenes of Curiosity, Experiment and Spatial Fabulation in Early Modern Europe.”

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11 Arnika Blount and Christoph Schnoor. “Wunderkammer: Scenes of Curiosity, Experiment and Spatial Fabulation in Early Modern Europe”.
13 Arnika Blount and Christoph Schnoor. “Wunderkammer: Scenes of Curiosity, Experiment and Spatial Fabulation in Early Modern Europe”. 90-114

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Spread of Wunderkammern in Europe:

- 16th Century  
- 17th Century  
- 18th Century

Fig 4: Map of Europe, showing the spread of Wunderkammern from the 16th to the 18th Centuries
Fig. 5: Neickel’s Wunderkammer. Engraved frontispiece from Caspar Friedrich Neickelius, *Museographia oder Anleitung zum rechten Begriff und nützliche Anlegung der Museaum oder Kabinetten-Kammern* (Leipzig, 1727).

Fig. 6: Work space occupying the boundary between precedent and possibility.
The Renaissance Wunderkammer: A site of productive balance between precedent and personal discovery

In early Wunderkammern the wonder certainly appears to have been provided by the collection rather than by its architectural context. Despite in fact being a rather later example of a chamber of wonder, the simple well-lit rectangular room lined with paintings, shelves and cabinets filled with the combined works of nature, art and science depicted on the engraved frontispiece of German scholar Caspar F. Neickel's 1727 book *Museografi* 14 (fig. 5), demonstrates all the essential elements of a Renaissance Wunderkammer. It is possible to see the connection of this space to the Humanist *studiolo* in that the space is a retreat for solitary study and contemplation; it would have been a setting more private than the bed chamber, a concealed space designed as a setting of revelation and display. 15 The ceiling, left bare except for a stuffed crocodile, betrays this Wunderkammer’s relative youth, as does the use of a proscenium arch that separates the viewer from the scene, a device that first appeared in such illustrations in the late 17th century. 16

A key, recurrent theme is to be found in this image, one which is present in all but one of the following historical precedents and which is made easily visible by the simplicity of this example, is the “balanced divide between word and object” 17

The virtuoso’s personal library is on one side of the space with the collected items on the other, the virtuoso’s work area occupying the middle ground at the centre of the room. This can be seen to represent a “symmetrical, spatial division of knowledge”, 18 with the books signifying authority and precedent and the collected items representing the potential for personal discovery and interpretation (fig. 6). This balanced relationship between the two is used to create an environment of exchange, experiment and dialogue; from his central position the virtuoso can consult the two conditions of knowledge simultaneously.

The Gallery of the Botanical Gardens in Pisa, founded by the Medici in the late 1580s, a century older than Neickel’s Wunderkammer, exhibits a similarly balanced relationship between objects and books, types of knowledge and understanding (fig. 7). As before it is possible to divide the simple rectangular room evenly in two, bookshelves on one side, specimen cabinets on the other, and the work space at its heart on the boundary between two.

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17 Arnika Blount and Christoph Schnoor, “Wunderkammer: Scenes of Curiosity, Experiment and Spatial Fabulation in Early Modern Europe”, 94
18 Ibid., 94
The gate was installed in the corridor in 1651 to prevent "free access" to the museum. The contents of the three side galleries are as described in the 1709 catalogue of the reorganized museum, which may have varied somewhat from the original.

Developments in scale, activity, and complexity in Renaissance Wunderkammern

The engraving of Neapolitan apothecary Ferrante Imperato’s Wunderkammer, taken from his 1599 book Dell’Historia Naturale [19] (fig. 8), demonstrates the full impact of the immersive environment created by the collection space of a Renaissance Wunderkammer. The viewer is brought directly inside the scene, the viewpoint being taken from the eye height of the occupants without the separation of a proscenium arch. Its spatial context is similar to that of Neickel’s Wunderkammer and the Gallery in Pisa in that the collection is the dominant aspect of the space, the architecture providing support, protection, and physical boundaries to the virtuoso’s collected microcosm. However, the division between book and object is not so clear; while the bookshelves are again on one side and the bulk of the collection on the other, the ceiling and the top of the cabinets are encrusted with collected items, blurring the conceptual boundaries between the two conditions.

The Wunderkammer is still a highly personal space but it is in the process of becoming a much more social and discursive environment; Imperato’s son Francesco is depicted in the process of showing his collection to a group of interested visitors. [20] In the illustration there is no clear distinction between collector and collected, and it is worth noting the intricate wooden cabinets that foreshadow later developments in the architecture of the collection space. They “perform a game of concealment and revelation that references the microcosmic nature of Wunderkammern, each door hiding further repositories at increasingly smaller scales, microcosm within microcosm. The inner cabinets revealed by the open the exterior doors appear overtly architectural, [with the] compartments arranged in the shape of classical niches and recesses” [21].

Ulisse Aldrovandi’s 1603 proposal for an ideal layout at the future home of his collection, the Palazzo Pubblico in Bologna, marked a further transition point in the journey of the Wunderkammer from a static space to a “space through which one passed” (fig 9). [22] He proposed a gallery divided into four spaces, each allocated different contents - manuscripts, printed books, large natural objects, and smaller natural objects in specimen cabinets. [23] Perhaps this division was born out of necessity due to the nature of building or the size of the collection, but it does divide the gallery in two along the same conceptual boundaries discussed earlier, preserving the balanced relationship between word and object. The Bolognese naturalist, like other virtuosi, placed himself at the centre of his creation in the form of his portrait, between the collected books and objects, the textual and the tactile.

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19 Ferrante Imperato, Dell’ Historia Naturale (Naples 1599).
21 Blount, Arnika, and Schnoor, Christoph. “Wunderkammer: Scenes of Curiosity, Experiment and Spatial Fabulation in Early Modern Europe.” 96
22 Paula Findlen. Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Europe. 115
23 Ibid. 122
Fig. 11: Kircher’s Wunderkammer.
Engraved frontispiece from Giorgio de Sepibus, Romani Collegii Musaeum Celeberrimum (Amsterdam 1678).

Fig. 12: Visitors at actual scale
Athanasius Kircher: The Baroque and the Beginning of Spatial Fabulation

Athanasius Kircher was a Jesuit priest at the Collegio Romano in Rome, a hugely creative polymath with a passionate interest in almost everything. His Wunderkammer, the Musaeum Kirchernarium, began its life in his personal quarters but reached its height between 1651-1672 after it was relocated to a large second floor gallery next to the college library. Kircher's Wunderkammer not only contained the customary items of art, science, nature and antiquity, but also marvels such as magic lanterns and a vomiting mechanical lobster. Kircher apparently delighted in using illusion and mechanics to make visitors wonder and question their understanding of the world around them.

Two resources shall be used to analyse Kircher's Wunderkammer in both plan and perspective: the frontispiece of Giorgio de Sepibus' Romani Collegii Musaeum Celeberrimum (fig. 11) and Paula Findlen's diagram of the gallery floor plan (fig. 10). The physical manifestation of Aldrovandi’s imagined succession of rooms, Kircher's Wunderkammer consisted of a long hall with three alcoves, all separated from the rest of the college by a low iron gate. It shared an entrance corridor with the college library, so despite there being no bookshelves visible in the engraving the world of books was still nearby.

Since Ferrante Imperato there had been significant changes in the internal experience of the Wunderkammer; the rise of the Baroque had brought with it an elaborate highly theatrical sensibility. The collection space is still of great interiority, but it is becoming deeper and more complex, with its full extents obscured. The astrological theme of the ceiling frescoes indicates the presence of a new vertical, spiritual axis, running from heaven to earth, ceiling to floor. The Wunderkammer was still a microcosm but growing ever larger.

Kircher himself is present at the centre of his creation in the foreground of the image, depicted in the act of receiving a letter of introduction from a visitor. This highlights another significant change in the representation of the Wunderkammer; while the architectural composition of the engraving seems to align with the with the floor plan, Kircher and his guests have been drawn at approximately half their actual scale, a technique popular with artists such as Piranesi, who used it to increase the grandeur of the setting (fig. 12). The illustration thus stands on the boundary between the actual and ideal: Kircher's Wunderkammer was depicted not as it was, but adjusted to how it was felt it should be, indicating a significant shift towards the ideal in the representation of the Wunderkammer.

24 Alison B. Kavey, ed. World-Building and the Early Modern Imagination (New York, Palgrave MacMillan, 2010), 69
26 Ibid. 30
27 Giorgio de Sepibus, Romani Collegii Musaeum Celeberrimum (Amsterdam 1678).
28 Robert Felfé, “Collections and the Surface of the Image,” 243
Fig. 13: Happel's Wunderkammer.

Happel’s Ideal Wunderkammer: Architecture as a means for the exploration of intangible networks of ideas

Neickel’s “chamber of treasures – rarities – objects of nature – of art and of reason”\textsuperscript{30} was a chamber of wonder at a domestic scale, like many early Renaissance examples. Since that point however, an expansion in scale, depth, complexity and movement has been traced through the works of Imperato and Aldrovandi, and a subtle yet significant use of spatial illusion in the illustration of Kircher’s Wunderkammer. The manipulation of scale and perspective visible in Kircher’s frontispiece signifies a transition point in the representation of the Wunderkammer in that it sits on the boundary between the actual and the ideal. In the illustrated frontispiece of his 1683-91 book \textit{Grosste Denkwürdigkeiten der Welt...}, \textsuperscript{31} German virtuoso Eberhard Werner Happel carried the possibilities of this development and changes in the nature of the collection space to their fullest extent, passing completely into the realms of the imagination.

Happel’s engraving shows an ideal, rather than an actual Wunderkammer, an image that represented how he wished to present the act of experiencing his collection to his readers (fig. 13). The result is a flamboyant vision of a realm of discovery, an example of imaginative paper architecture, unrestricted by any practical or physical real-world requirements. Manipulations of perspective techniques, style, and scale have been used to create a matrix of interconnected spaces of an unprecedented complexity, one that bulges at the seams of reality, convention, and physical possibility. From subtle distortions to Escher-like paradoxes, this is a Wunderkammer that does not subscribe to the conventional rules of space and perspective.

The illustration depicts three classically-inspired grand halls, lit by high windows and connected by doorways, each presenting “different vistas of intriguing possibilities.” The foreground of the left-most hall (fig. 14) contains displays of natural specimens, with stairs and a series of levels leading to a vaulted gallery in the Gothic style, partially separated from the foreground by a screen wall. The second hall (fig. 15) acts as an entry passage into a larger hall, on the far side of which is an arched doorway that leads onto a terrace, an opening that gives fragmentary views of a world beyond. This suggestion of an exterior context is exceptional, as the other Wunderkammern previously discussed were all depicted in a way that suggested extreme interiority, to the point of seeming almost context-less; as a rule the spectator looked into a Wunderkammer, rather than through. The third hall (fig. 16) presents the most enclosed environment, containing artefacts of a miraculous nature, with a stair at rear that leads to another chamber.

Happel’s Wunderkammer is an environment of movement, socialisation, and discussion, a palace of wonder being explored by visitors of both sexes and many nationalities. Kircher’s axis of heaven is present, represented by the armillary sphere hanging from the vault of the central hall, but other patterns of spatial organisation are not as apparent, although the halls could conceivably be


\textsuperscript{31} Eberhard W. Happel, \textit{Grosste Denkwürdigkeiten der Welt oder Sogenannte Relationes Curiosae} (1683-91).
divided according to artificial, natural or the miraculous nature of the collections. The virtuoso himself is no longer easily recognisable at the centre of his creation, which could imply that the viewer is in fact seeing the Wunderkammer from his point of view.

The illustration presents an unprecedented level of architectural detail and complexity in the context of the Wunderkammer, with the wonder now being provided at least as much by the architectural context as by the collection itself, the collection in fact seeming somewhat overshadowed by the grandeur of its surroundings. Perforated planes and multiple paths are used to suggest a labyrinthine network of spaces; a countless number of possible paths open to the visitor, the end goal tantalisingly close but always slightly out of view. The presence, location and visibility of the Gothic gallery creates a dialogue between past and present; it is significant to note that visitors are moving towards as well as away from the gallery, which evokes a sense of history and a sense of growth and development in a virtual space.

There are also several visual illusions present in the illustration. There is at least one vanishing point for each hall, making viewing the engraving an almost sequential experience, and several physical impossibilities, the most significant being the M. C. Escher-like paradox on the right hand side of the right-most hall: the cornice is lit so as to suggest the hall is one continuous space, yet the room behind is definitely wider than the hall, and the arch itself seems square to the viewer but the bases of the columns supporting the barrel vault are in fact at different distances from the viewer, despite forming an illusion of being positioned parallel to the picture plane. This distortion becomes most obvious at the front right of the engraving where a Chinese man is stepping through a door, covering with his body the perspectival distortion introduced by Happel which allows at the rightmost pillar to read as in line with the arch as well as becoming the step the over which the Chinese man enters the hall”. 32

The wonder, complexity and scale of the illustration is perhaps more than a marketing tool designed to exhibit the quality and interest of material within Happel’s book. A Wunderkammer offered “an opportunity for experimentation in merging form and meaning”, “a chance to explore the intangible connections between ideas represented by the objects in the collection as well as to examine the objects themselves. Entering the Wunderkammer, one entered into a dialogue between the seen and unseen, driven by an open network of possible associations based on the intrinsic and esoteric properties that linked the objects together in expected or surprising ways”. 33 There seems to be a relationship between the experiments in association carried out by the virtuosi and the architectural features of Happel’s Wunderkammer, presenting the possibility that Happel’s illustration is a visual representation of intellectual journeys possible within his Wunderkammer; interconnected ideas linking one space to the next, idea to idea, object to object, creating an architecture of speculation that manipulates spatial

32 Blount, Arnika, and Schnoor, Christoph. “Wunderkammer: Scenes of Curiosity, Experiment and Spatial Fabulation in Early Modern Europe.” 101
33 Ibid., 101
strategies to explore and communicate conceptual linkages. The implications of this hypothesis can be extended to other aspects of the architecture of Happel's Wunderkammer, to suggest for instance that the Humanist belief in underlying universal truths is apparent in the glimpses of another world beyond the Wunderkammer, the Wunderkammer itself taking the role of mediator between the known and the unknown. Ultimately all spaces are divided but interlinked, modelling the multivalent connections between objects in the Wunderkammer conceptual network, allowing the visitors to navigate a physical network between fact, fiction and speculation.

Although it was not absolutely fundamental that the architecture of the Wunderkammer matched the richness and complexity of the collection and experiments that it supported, as can be seen by the utilitarian simplicity of early Renaissance chambers of wonder, it appears that there was certainly a desire to enhance and enrich the collection space. The architectural context became steadily more splendid over the centuries, eventually reaching a level of magnificence, depth, and variety that equalled if not outshone the wonder of the collection itself. There are significant and persistent underlying themes of spatial organisation to be found in the early precedents, relationships that used divisions and balances between forms of understanding to create fertile areas for experimentation. There was a steady development from the Wunderkammer as private retreat to a social discursive environment, from simple room to sequential experience through a network of spaces. Architecture of Happel's Wunderkammer was a culmination of developments, an imaginative vision unhampered by the constrictions of
reality that used spatial techniques to model intellectual space as physical space, to create an architecture of speculation, curiosity in built form. These on-going changes in the nature of the Wunderkammer and the tensions between retreat and sociability were undoubtedly influenced by greater shifts in the socio-political climate and by changing attitudes towards scholarship and mass education.34
The Legacy of the Wunderkammer

Fig. 17: Visual perception study, Soane's Museum
Sir John Soane’s Museum - An Architecture of Possibility

London, England, 1792-1824

After the event of the Enlightenment and the rise of the museum as a civic institution, the Wunderkammer faded into obscurity. New accepted systems of ordering the world had been adopted; seen as obsolete oddities, Wunderkammer collections were dispersed and rooms converted to other uses. However, while the encyclopaedic approach of the pre-Enlightenment Wunderkammer had lost some of its relevance, its ideas about creating a setting for reflection and discovery through visual association and other underlying philosophies continued on in different forms and contexts in later locations of knowledge storage and generation.

Sir John Soane (1753-1837), was a prominent British neoclassical architect and a Professor of Architecture at the Royal Academy. A passionate collector of antiquities and classical fragments, he was deeply influenced by a visit to Italy as young man, where he met and was given engravings by Piranesi from his Vedute di Roma\(^{35}\), and paid a visit to the curiosity cabinet of the Bishop of Velletri, Stefano Borgia.\(^{36}\) Twenty years later, Soane embarked on his house-museum project, demolishing and rebuilding three neighbouring houses in succession, commencing with No. 12 Lincon’s Inn Fields between 1792 and 1794, then rebuilding No. 13 in two phases in 1808-9 and 1812, and concluding with No. 14, rebuilt between 1823 and 1824.\(^{37}\) Soane’s Museum simultaneously fulfilled many roles, acting as a home, an office, a setting for his collection, an didactic tool for his students, as well as the hopeful founding of a monument to an architectural dynasty - although this ambition was later disappointed.\(^{38}\) While the upper three floors of Soane’s house-museum were devoted to Soane’s office and private living spaces, the ground floor and basement levels combined spaces for the display of his extensive collection with dining areas, a private dressing room, a mezzanine studio and study. The design of the building demonstrates an architecture of curiosity that seems to relate to Happel’s Wunderkammer at some level through the manipulation of views and space along the circulation paths, the combination of projecting thresholds, objects and perforated planes to define and manipulate space, and the use of light as a device for centring and modulating space. Soane juxtaposed Gothic and Classical artefacts and motifs to evoke a sense of history and development, and played games of scale and depth: a model of a dome from Soane’s Bank of London becomes the capping of a skylight, picture frames fold out to reveal hidden spaces, and long diagonal views stitch together internal and external space in surprising combinations. These and other techniques are to be discussed more extensively later.

An architectural Wunderkammer, a built lecture, Soane’s house-museum is not strictly speaking a Wunderkammer in the traditional sense but shares some underlying philosophies. In her paper “Lost Worlds: How the Museum Remembers,”\(^{39}\) Michela Giebelhausen discusses the relationship between

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\(^{38}\) Tim Knox. *Sir John Soane’s Museum, London.* 28

intellectual and physical space in the context of Soane’s Museum: “Spaces are interpenetrated, outside and inside blur, floors are grills or seem sediments rather than true foundations, mirrors reflect structures, make them permeable, seemingly impermanent, hallucinatory. Maybe Freud was wrong when he asserted that we’re unable ‘to illustrate the peculiarities of mental life by visual means’. The Sir John Soane’s Museum’s complex use of space and its riotous displays seem like a three-dimensional model of the creative mind. Objects fuse with the multivalent narratives on offer. They are tied into a rich framework of association, fact and fiction. A framework, as Soane himself knew, that is best enjoyed in the speculation of discovery. This is exemplified in the antiquarian’s visit to the ruined site. The ruins and fragments inspire an imaginative response that attempts to tease out as well as to invent meanings. Association, fantasy, fiction and fragment rule.”

17. - Front Facade of Soane’s Museum
18. - Main stair, showing glimpses of different levels, spaces beyond
19. - Dining room. Portrait of Soane appears suspended in the air, facing mirrors on either side of the room duplicate his portrait to infinity (Kirecher’s Pope in a box), while the fish-eye mirror collects the entire room, shrinks it to the scale of the collection contained within, folds the space back on itself, viewer becomes viewed
20. - Games of scale. A model of a dome from Soane’s Bank of England project becomes a capping for a skylight

Fig. 22: Collonade
Fig. 23: Breakfast room
Fig. 24: Hall
Fig. 25: Recess from Picture Room

Fig. 26: First Floor, Soane's Museum
N. Haberstock and I. Detlefsen

Fig. 27: Basement, Soane's Museum
N. Haberstock and I. Detlefsen
While Soane focussed his attention on architecture, Aby Warburg turned the methods of association and inquiry present in historical Wunderkammern inwards on humanity itself. Aby Warburg (1866-1929), was a German art historian and cultural theorist who studied Renaissance art in Florence at the Kunsthistorisches Institut and lived there for a time. A book collector, he founded a library and research centre in his home city of Hamburg, the purpose of which was to discover the functions of collective memory in the history of human culture. Instead of using a conventional classification system, Warburg attempted to develop a new system for his books and other media that used colour and proximity to show interconnections between different areas of knowledge, suggesting possible intellectual paths for researchers to follow. A demanding system to use for the uninstructed, Warburg held the belief that “the book one knew was often not the book one needed”. His library represented an “open network of potential associations” that was “conceptually suspended between floors, shelves and ideas”. He continually rearranged his collection, as the action of making one connection between ideas stronger inevitably meant severing another, an ongoing struggle of attempting to align the conceptual with the actual. The most exceptional architectural manifestation of Warburg’s vision in the purpose-built building that held his collection, designed and built by Gerhard Langmaack with participation by Fritz Schumacher, is the the ovoid reading room (fig. 28). Warburg placed his work space in centre, much like the virtuoso-centric arrangement of the Renaissance Wunderkammern. In her paper, Loschke says ‘The elliptical shape of the room was Warburg’s main requirement and the relevance he assigned to it was both allegorical and practical. Warburg believed the ellipse articulated “the progress from the pictographic to mathematical, sign-based thinking”; it represented the “drama of how the ellipse overcomes the circle, as a highlight of modern man’s struggle for enlightenment”, and that “Unlike the static centeredness of the circle, the form of the ellipse unified two opposing conditions: at the ends the narrow radii provided a tight spatial enclosure, but the wide radii along the sides offered a sense of expansiveness.”

Warburg died in 1929 and his library was shipped to the United Kingdom from Germany shortly before the advent of World War II; Warburg’s carefully refined and systematised colour coding system was damaged in transport and by fading due to age and so his great work was lost. Warburg’s library is still a significant collection, but without its intended organisational framework or architectural context.

42 Ibid., 10.
43 Ibid., 8.
44 Ibid., 4.
Schaulager

Basel, Switzerland, 2002-2003

The Schaulager is a unique art storage and exhibition venue that, like the Wunderkammer, defies easy categorisation; it is a public museum, art storage facility, and art research institute. Designed by Herzog and de Meuron under commission of the Laurenz Foundation, the Schaulager is primarily directed at a specialist audience, although the broader public are able to visit during the annual exhibitions and special events. It is an example of a new architectural solution arising from an unusual programme.

However, the architectural result is a departure from previous examples in the sense that it seems to be based on the principle of visual separation rather than integration, although this is likely to have been driven to some degree by practical concerns such as modern conservation requirements. While there is an interesting unexpected relationship between the cafeteria and the loading bay, an analysis of drawings of the building suggests that it is not possible to see any of the works in storage from the public atrium. The storage levels are a matrix of white corridors that close down rather than open up vistas and the artworks are stored in separate cubicles.

Fig. 28: Reading room, Kulturwissenschaftliche Bibliothek, 1926.

Fig. 29: Schaulager, exterior view
Path, Threshold, Light, and Void - strategies for an architecture of speculation from the architectural legacy of the Wunderkammer

Earlier in this document Soane’s Museum was introduced as a key architectural precedent for the underlying themes of the Wunderkammer due to its clear links to other, earlier precedents. In the architecture of his house-museum Soane deals with questions only explored scientifically 70 years later by theorists such as Wölflin; there is something about the perceptual qualities of space in Soane’s Museum that relates both to Happel’s ideal Wunderkammer and Kircher’s games of depth and scale, and so it is important to perform a closer analysis of Soane’s Museum in order to more clearly define some of these underlying spatial strategies.

Sophia Psarra devotes a chapter in her book Architecture and Narrative: The formation of space and cultural meaning to an in-depth analysis of the role of views, paths and reflections in Soane’s Museum. Her purpose was to understand how Soane linked the space of the intellect with physical space, showing obvious parallels to the hypothesis about the architecture of Happel’s Wunderkammer as a representation of the journey of the intellect posited earlier in this work. She discusses Soane’s design as a multilayered sequence of spaces, unexpected vistas, and optical effects, and sees the chiaroscuro lighting effects as part of a strategy to imply that each room was part of a larger space, combined with “undulations of ceiling that increase number of steps one traverses in a sequence while at the same time intensifying the multiplicity of visual connections”. She also comments on the circuit-like nature of circulation paths within the museum.

All these ideas are very useful and form a good base from which to work. However, Psarra’s analyses do not fully demonstrate how specific combinations of the aforementioned techniques are brought together to create the evocative spaces of the museum, nor do they fully explore the connection between path and visibility - the way in which the museum reveals itself to the visitor. Further investigation is required into how sight lines correspond to the sequential nature of experience and the crucial role of light as a means for modulating and centring space.

Path, Threshold, and Void

Soane’s museum shares some of the labyrinthine qualities of Happel’s Wunderkammer in the sense that, once inside, there is no clearly defined point of entry or exit; instead there are multiple potential exits and entries, paths leading onwards through a network of spaces. Soane’s Museum has a strong spatial hierarchy with three levels: the smallest being tertiary spaces, and the largest primary spaces. Primary spaces, large spaces that are often unable to be occupied on at least one level (commonly a multi-storey void), have an almost gravitational pull on the smaller secondary and tertiary spaces which cluster around them, although they may share secondary spaces with other primary spaces (fig. 30). As Psarra highlights, each individual space is symmetrical, but the overall arrangement in plan is asymmetric, with strongly marked thresholds that hold the spaces and give them an individual presence. There are two main scenarios for
the relationship between space and circulation:

- Scenario 1: Clustered space (fig. 30). A central primary space with a cluster of associated smaller spaces; the visitor circulates around the edge of the primary space through the secondary spaces, able to view other levels and spaces beyond and through the primary space. This creates a pinwheel circulation path without a clear axial route to other destinations (fig. 32). The centres of primary space, and often the secondary spaces, are indicated by light from above, either via a skylight or, in the case of external courtyards, open to the sky. Examples of this in Soane’s Museum are the Monument Court and the Dome void on the first floor (p.31).

- Scenario 2: Sequential progression (fig. 33). A linear arrangement of a series of primary spaces joined together by secondary and tertiary spaces, with a second circulation path that runs along the outside of the arrangement. This gives the visitor the option of either passing along the central axis through the pattern of primary and secondary spaces, or along the external path, viewing the spaces from the outside. Two spatial experiences, one observing, the other participating. The smaller spaces get narrower the closer they are to the primary space, which increases the frequency of their thresholds, a rhythm that builds to the crescendo of the primary space. Examples of this in Soane’s Museum are the Entry hall, the Crypt in the basement of the museum.

Fig. 30: Clustered space  
Fig. 31: Sequence of clustered spaces  
Fig. 32: Radial circulation around primary space  
Fig. 33: Sequential progression
Fig. 34: First floor - circulation paths

Fig. 35: Basement - circulation paths (servants' access in brown)

Fig. 36: First floor - circulation paths & spatial pattern

Fig. 37: First floor - circulation paths & spatial pattern
View and Path Analysis

Three paths forming a circuit around the central monument court have been selected for further in-depth analysis. The intention is to understand how sight lines correspond to the movement through space and discover what that implies about how the museum is experienced and discovered. Each time the viewer crosses a significant threshold the quantity and depth of museum visible from that point is assessed and areas of the building visible from that point shown shaded. The diagrams will focus on what is visible, how long it stays visible, the depth of view, and the overall understanding of surrounding space.

Path A: Entry Hall - Inner Lobby - Stairwell - Breakfast Parlour

1: Long view to the other end of the house-museum from entry.
2: Entrance hall closes into an inner lobby, the space constricts and the long view becomes obscured.
3: Opens into the staircase. An awareness of levels above and below; a contained void with brief view of dining room and monument court beyond, long view disappears.
4: Navigates around the stair and through the threshold into breakfast parlour; the space opens out again, showing initial view but much
Figures 39 and 40: Studies of the duration of visibility of space and structure along Path A. Fig. 39 shows that the distant views remain in sight the longest and that partial glimpses into other spaces occur briefly. Fig. 40 demonstrates that the threshold markers remain visible for the longest period of time during the journey; door frames and columns project into the view line, making the viewer aware of the number of spaces being looked or passed through. The overall effect of which is greater than the sum of parts, and appears to increase the size of the building.
Path B: Dome - Colonnade - Museum Corridor - Picture Room

Path B begins with a similar scenario to the previous analysis, a long view that runs from end to end of the house. The journey intersects with three cross axes that provide brief glimpses of the spaces beyond, views getting progressively deeper into the building to the point that the world outside becomes visible through a window in the library at the far end of the building. These cross views do not intersect nor make clear the exact relationship between the different spaces viewed. The path moves through a variety of different spaces that open up and close down. Columns form perforated planes, through which the final destination remains partially visible at all times.
Path C: Museum Corridor - Study - Dressing Room - Dining Room

Path C continues the journey around the Monument Court, passing through the small rooms where Soane would work and prepare himself to receive visitors. Once again, there is a rhythmic pattern of openness and enclosure, the route intersecting with a series of cross views to the exterior and interior of the museum. Views overlap and the spaces are less grand.

The significance of this slow revealing of the house-museum is that what the building might be is privileged over what it is. What it is exactly is not immediately clear, but is hinted at with narrow, diagonal views into far parts of the building. Long views open up, spaces close down, there are surprising glimpses of other spaces. The visitor is not intended to have an immediate understanding of the building, but instead to enjoy imagining what it might be and the process of discovering what it in fact is.
The same view analysis techniques can be reversed; visibility lines used to construct a speculative floor plan of Happel’s ideal Wunderkammer from the three main vanishing points in the engraved frontispiece (figs. 43, 44). This demonstrates how multiple views can build up an idea of the surrounding spatial structure, in the same way that a single view can dissolve a plan into the limited amount that is actually visible. Happel’s Wunderkammer consists of simpler, larger spaces than Soane’s Museum, but there are similar motifs in the use of thresholds, paths, glimpses of other spaces beyond, and lighting from above. Both also use a mixture of Gothic and of Classical styles to suggest history and growth, old blending with new.
Fig. 45: Understanding of immediate space along Path A (p.38).

Fig. 46: Composite understanding of Soane’s museum, as built up by passing along the three routes described earlier.
Light as a device for defining, centring and modulating space

Soane’s Museum is a highly interior structure, penetrated with vertical light voids that act either as interior spaces or exterior courtyards which offer limited views of the outside world. Figure 47 shows the chiaroscuro patterns of light on the first floor of Soane’s house-museum. It is important to note that the continual rhythm of light and dark that intersects with the path of movement and that often the lightest points coincide with the centres of voids, the darkest with thresholds. Every light space has a neighbouring dark space, and light from concealed sources suggests a world beyond; making the view clear or obscured depending on its intensity. Different qualities of light are used in conjunction with strong thresholds and perforated planes to emphasise the number and variety of conditions being looked or passed through, which in turn makes the view seem deeper, to contain further possibilities or paths between the viewer and the destination.

While Soane’s collection itself is not the focus of this analysis, objects from his collection are also used to mark thresholds, catch light, cast shadow, arranged as much for effect as for any specific categorisation.
Light and threshold in the vertical axis

The void of the Dome allows the viewer to see the same spatial and optical effects, discussed previously in plan, in play vertically over three levels (fig. 50), with views down to the sepulchral chamber, along the colonnade to the picture room, and a glimpse upwards into the mezzanine, where Soane’s students would have once worked, through a high rectangular opening. There is a high level of visual penetration, but it is fragmentary and evocative rather than clear and cohesive. These relationships will be explored further on the following pages (figs 51-55).
Fig. 51: Section along Path B - void and threshold study. Note rhythm of thresholds in relation to larger primary voids, getting closer together prior to a primary space.

Fig. 52: Section Path B - Dawn to dusk light movement study. Note use of alternating colour to add variety, skylights and top-lit spaces.
Fig. 53: Section Path B study - depth of spatial perception from the edge of the Dome void (matches view in fig.). Long views along the entire length of the building, with partial views down into the crypt and up to the studio mezzanine. Fragmented views of every space possible.

Fig. 54: Section Path B study - thresholds intersecting the view line.
Fig. 55: Section Path B - Rhythm of thresholds, light and darkness used to modulate space, give emphasis to larger spaces.
Derived visual and spatial strategies:

- Clustered space

- Circular / radial circulation

- Linear progressions through sequential spaces

- Strong thresholds between spaces / held space

- Long distance length views to full extents of building, maximise apparent size

- Threshold markers penetrating into view line - partial views of many spaces.

- Thresholds between spaces marked by contrasts of light and shadow for further emphasis

- Light hue (e.g. white, yellow, orange) used to accentuate changing nature of spaces, add variety.

- Reflective surfaces used to increase light and/or size of space, either increase or decrease visibility.

- Long-distance direct view, indirect route
Fig. 56: A *waka* undergoing treatment
Wet Site Archaeology

A suitable programme for a contemporary interpretation of the principles of the Wunderkammer in the context of this research is one that fosters interdisciplinary study, is actively involved in discovery and knowledge generation, and is relevant to the New Zealand context. One such programme, one which is virtually unknown outside of its own area of expertise, is wet site archaeology. Wet site archaeology is an area within the discipline of archaeology that, as is suggested by its title, deals with marine, freshwater or bog sites. Wet sites are especially valuable for the preservation of organic artefacts such as wood, bone, skins, and textiles, which are best preserved in either very dry or in waterlogged conditions. Organic artefacts are therefore fragile and relatively rare, due to the specific environmental conditions needed for their survival, and as most pre-European artefacts in New Zealand are made of either stone or organic materials, wet archaeology has crucial role to play in New Zealand context. Archaeology is intrinsically interdisciplinary; the effort of stabilising, conserving and interpreting archaeological finds requires the combined efforts of specialists in archaeology, chemistry, anthropology, photography, computer science, history, psychology, and textiles, to name but a few, and then there are others who also benefit from the work carried out, such as academics, artists, and the descendants of the original creators.

The processes of stabilisation and recording begin immediately upon the discovery of a wet artefact, as extensive damage occurs if the artefact is not treated and dried in extremely controlled conditions, resulting in the loss of vital information. The treatment method used is dependent on the individual size, materiality, shape and condition of each object, and its duration varies from months to decades (fig. 57). An example of the journey of an artefact is that of the Omaui waka. In December 2011 a 3.5m long incomplete waka was found half-buried in the sand at Omaui beach and immediately underwent a process of stabilisation to prevent warping and cracking by soaking in a tank filled of a mix of salt and fresh water. Once stabilised, it was moved to a purpose built tank, within which it will be chemically treated for approximately three years, followed by one year of controlled drying, with its ultimate destination being the Southland Museum and Art Gallery.

Wet artefacts in the New Zealand context are largely taonga whakairo, ancestral physical items crafted through the artistry of weaving or carving. They are not only “physical manifestations of tribal knowledge but also spiritual representations of certain ancestors whose wairua [spirit; essence of being] they have become associated with over time.” These taonga have two main aspects of importance in relation to knowledge generation and preservation:

Fig. 57: Wet archaeology process
− Their intrinsic physical qualities, those which can be deduced from the artefact itself, such as carving techniques.

− The associated knowledge. Taonga whakairo can be cloaked with the stories of the tribe, a layering that grows generation after generation, as the taonga are used as tools for association, as prompts for korero. This associated knowledge is easily lost or separated from the artefact if it is sold, forgotten or otherwise removed from its cultural context.\(^{52}\)

In *The Flight of Pareratutu: An Investigation of Taonga from a Tribal Perspective*,\(^{53}\) Paul Tapsell equates the journeys of taonga to either the flight of the Tui or that of a comet, one reappearing and disappearing throughout the history of the tribe, the other disappearing beyond the tribe’s horizons for an extended period of time, to return one day in a blaze of recognition. In the case of the artefacts dealt with by a facility for wet archaeology, their journey often resembles a loop, from the site of discovery or storage to the facility for conservation and then a return to the community, instead of a direct line running from dig site to a national museum or gallery. Education and involvement of the local community in the conservation process is therefore essential, as they will often be the long-term caretakers of the artefacts (figs. 57-58).

\(^{52}\) Ibid., 332  
\(^{53}\) Ibid., 325
The return of Pukaki to Ngāti Whakaue in 1997 after 120 years, by the Auckland War Memorial Museum and Ngāti Whatua. This taonga, while not a wet artefact, is a well-known example of the return of a taonga to its tribe. The story of Pukaki also highlights the importance of the education of the caretaker community; after his return Pukaki was displayed for some time at the Rotorua City Council building in damaging direct sunlight.

Fig. 58: Pukaki at the Rotorua City Council
The National Conservation Laboratory for Wet Organic Materials at Auckland University is one of 80 specialist facilities in the world, committed to “providing professional conservation for recovered artefacts and in-situ preservation of wetland archaeological sites.” It currently offers assistance with field and laboratory conservation projects for Iwi, Runanga, government agencies and museums, archaeologists and other heritage professionals. Their services include wet site evaluation and management, artefact assessment, chemical and/ or physical analysis, documentation, collection surveys, treatment and archival packing. The laboratory is currently involved in monitoring the sustainability, in-situ preservation, and the resource management of important wet sites in Taranaki, Hawkes Bay, and the Bay of Plenty, and has access on campus to scanning electron microscopy, radiography, electron microprobe, x-ray diffraction, and x-ray fluorescence for the analysis and examination of artefacts.

The laboratory was purpose-built over 20 years ago on the 8th floor of the Human Sciences Building, a single space lined with work benches (fig. 59), and three rows of stainless steel tanks down the centre, with an adjoining record room for data collection (fig. 60). The other items of note are a freeze dryer, a small hoist for moving artefacts, and a fume cupboard, although these days toxic processes are hardly ever used. A day-lit works pace is crucial, as aspects of artefacts can only be examined in natural light. The laboratory is currently taking care of over 700 objects at the Auckland facility and in satellite facilities around the country. The current need for the satellite storage and treatment facilities originates from the less than ideal location and insufficient space in the current laboratory; for instance, only objects two metres or less in length are able to be taken in up the elevator. While the satellite facilities have a role to play in the relationship between the laboratory and local communities, there is also a pressing need for a larger central base to consolidate knowledge and equipment, provide more security and better resources.
Fig. 60: Floor plan of the National Conservation Laboratory, showing key layout

Fig. 61-63: National Conservation Laboratory in use. Source: Dily Johns, The University of Auckland, Conservation Laboratory.
An international precedent for a national centre of wet archaeology is The National Museum of Denmark’s Department of Conservation, which is based in Brede Works, a historic mill complex in Lyngby. A large purpose-built facility, it includes a much larger freeze dryer than the one at the Auckland Conservation Laboratory and also a gantry crane that tracks around the edge of most spaces, allowing for the easy transport of heavy tanks and artefacts. (fig. 64) Other facilities in Denmark, such as the Viking Museum at Roskilde, send objects to this central facility for conservation, in a similar relationship to that which is intended for this project (fig. 65).

The Auckland War Memorial Museum collection store

A precedent for methods of artefact storage is the collection store at the Auckland War Memorial Museum, which was constructed as part of the recent addition by Noel Lane Architects. A subterranean space next to the loading bay, it is a conservatorial situation, a clean environment with racks for large items such as canoes, and sliding archive shelving systems like those at LAARC (fig. 66), with tools for assisted lifting such as small forklifts and cherry pickers. The layout space, the empty floor area for the inspection and arrangement of collection items, is at least as important as the quantity of actual storage space, and there is also a need for spaces to receive donors and visitors to the collection. These visits can be quite emotional and the current areas within the museum’s collection store do not do it justice.
From top right: storage racks for large objects, assisted lifting equipment (small forklifts and cherry pickers), rail-based storage systems, canoe store area
The programme against which the spatial and conceptual strategies of the Wunderkammer will be tested is therefore a National Centre for Wet Archaeology, a facility for the treatment, preservation and interpretation of wet artefacts designed to be an expansion of the service currently provided by the National Laboratory for Wet Organic Materials at Auckland University.

Facilities required for the treatment and conservation of wet artefacts:

- Wet, ‘archaeological’ laboratory for the cleaning, stabilising and treatment of artefacts
- Dry, ‘conservatorial’ laboratory. Clean space for work with treated, dried artefacts.
- Variable term storage for artefacts of variable size, condition, materiality, and weight. Allowing for artefacts of up to 10m, as larger objects are rare and will need a specific facility. Majority will be at a human scale, from small weaving fragments to around 7m. Highly secure.
- Environmental issues - stable temperatures, humidity, light control
- Large freeze drier
- Chemical analysis laboratory

- Data recording equipment - a moveable setup included in a part of the laboratory space. Often easier to move this than the object, providing photography, drawing and 3D scanning equipment.
- Vehicle access for the transport of artefacts and equipment
- Gantry crane or other lifting device to move heavy tanks containing artefacts from transport and around the facility and remove large artefacts from tanks for inspection and cleaning
- Workshop for building transport cases, packing materials, custom tanks
- Consideration of the intangible aspects of taonga, such as the need for a place for ceremonial welcoming and visitation

Facilities for the interpretation and discussion of wet artefacts:

- Facilities for researchers users of the facility - private study, cafeteria, meeting rooms
- Facilities for public interaction and presentation - large space, similar to auditorium, with associated display areas, paths that connect the public to the process
- Associated spaces, bathrooms and storage
Spaces for knowledge generation and dissemination

The National Centre for Wet Archaeology is a research institute rather than a museum, a facility whose primary purpose, besides from the conservation of the wet artefacts themselves, is to be a setting for active knowledge generation, discussion and dissemination, rather than for the display of accepted understandings. There is a question as to how, therefore, to design spaces to facilitate active knowledge generation and dissemination. Some possible clues are to be found in the dual nature of the Wunderkammer collection space as shown in the historic precedents; spaces for retreat and personal reflection and discovery, and also spaces for exchange and discussion. Much has changed since the Renaissance, but some threads have remained constant.

Graham Wallis’ creative process model, one of the first and perhaps the most well-known of such models, lists four key stages of the creative process:

- **Preparation** - Understanding the field of inquiry, observing and clarifying the problem at hand, followed by a period of exploration and analysis. Purposeful preparation

- **Incubation** - leaving the problem alone to develop in the subconscious mind. Not actively engaged, but unconscious mental activity

- **Illumination** - A sudden insight that produces a potential solution

- **Verification** - testing the new idea or solution against the problem, see if it solves the issue. Evaluation, critical analysis

The above stages can occur concurrently and often multiple times throughout the greater creative process. There is also an important further step at the end of the process, the communication and application of the results. Considering the social and spatial implications of these stages, the qualities of spaces that would facilitate the various stages of the creative process (fig. 73) are as following: the first three stages, preparation, incubation, and illumination, seem to indicate a combination of spaces for solitary work and for informal discussion and presentation to smaller groups. The verification stage works on a more formal level, a forum for presenting conclusions and results to be discussed, analysed, accepted or rejected by peers, as well as for communicating ideas to a wider audience. Bringing these ideas together in context (fig. 85), the following spaces will be at the heart of exchange and discussion in the Centre for Wet Archaeology:

- **Observatorium**: the nexus of the project, the venue where paths cross, ideas are presented formally and hypotheses tested. It has a close relationship with collection store for discussion of and around

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the objects on display.

- **Mensa** - cafeteria, also a place for socialisation and relaxation. Meetings both by chance and intention.

- **Terraced courtyard** and associated meeting space - smaller, more informal spaces for meeting and discussion, inside and outside of the building. A break out space from the intensity of the studioli

- **Studioli**: The studioli are small spaces of varying size for private study, given to longer term users of the facility. Due to the interdisciplinary nature of this facility, and thus the wide range of disciplines involved and interests of the researchers, the studioli have been left somewhat open-ended, able to be made completely private and the interiors of which are intended to be able to be shaped by the occupier (resident for variable periods, guest or employee), into the most useful environment to their work. Closest of all the spaces to the Renaissance Wunderkammer.
Physical context

Fig. 74: Domain reservoir under construction

Source: Auckland City Archives, photograph, From *Auckland Star*, 17 May 1952.
The Domain Reservoir

_Auckland, New Zealand, 1949-1952_

The Domain reservoir is a historic structure that deals with the contemporary issue of the preservation of history, a fascinating site that, while it does not directly parallel the Wunderkammer in its architecture, relates to the previous precedents through its interiority and its network of columns with their promise of potential spatial implications. The reservoir also works well with the requirements of the programme of the archaeological facility, having the potential to create a mutually beneficial relationship between the new archaeological facility, the reservoir itself, and another reservoir of knowledge, the Auckland War Memorial Museum - home to one of the largest collections of Maori and Pacific artefacts in the world.

A historic vaulted mass concrete structure on Observatory Hill to the south of the Auckland War Memorial Museum, excavated into the crater ridge of the Domain volcano, the Domain reservoir is a 4 million gallon service reservoir that acts as a buffer reservoir for the Parnell area and parts of the Auckland CBD (fig. 75). This reservoir ensures continuity of supply during peak times of demand; water is pumped into the top of the reservoir and drawn out in pipes from the base of the reservoir through a tunnel on the western side. The Domain reservoir is also a unique structure in the New Zealand context, designed by the Auckland City Council Engineer’s Department and based on the 10 million gallon Meriden reservoir completed in Coventry, England, in 1932.

It was one of three new service reservoirs that were planned for Auckland City in 1947, the others being Mt Hobson and Three Kings. Due to logistical issues and post-war steel shortages, the construction of the first two reservoirs was delayed and it became a matter of critical importance for the city water supply that the Domain reservoir was completed with utmost urgency. As steel was scarce and geological investigations of the site indicated it was suitable, the decision was made to build the reservoir using vaulted mass concrete construction techniques. With a construction cost of approximately £61,000 with £2000 extra cost, the structure consists of nine rows of parabolic arches crowned with a barrel vaulted roof, and with a central dividing wall to allow each half of the reservoir to be drained for maintenance (fig. 77).

Construction began in 1949 and 1,000 tons of cement was being used to build the reservoir, with minimal additional steel reinforcing. On completion in 1952, the reservoir roof was covered with soil to a minimum depth of 18”, leaving the only visible feature the concrete valve chamber that acts as the entry point to the water main tunnel. When full, access into the reservoir has always proved somewhat problematic as the only way into the reservoir is through two manholes, down an iron ladder and into the water. An article published in the _Auckland Star_ on the third of October 1952, _5 Men In A Boat - Below The Ground_, relates the difficulties faced by the assistant engineer and foreman when they wished to inspect the interior of the newly-completed reservoir, ultimately borrowing a life raft from a Catalina flying boat and fully inflating it only once inside. (fig 87).

57 A. J. Dickson, City Engineer, to the Town Clerk, Auckland, 19 August 1949. Auckland City Archives
58 A. J. Dickson, City Engineer, to the Town Clerk, Auckland, 19 August 1949. Auckland City Archives
Fig. 76: Aerial view of reservoir, outlined by bollards to prevent vehicle access

Fig. 77: Reservoir dimensions
After completion, the reservoir faded from public interest and memory, unseen and unnoticed, an important hidden piece of the city's infrastructure. Today its outline is only faintly visible from aerial photographs of the Domain, where the grass is stunted by shallowness of the soil above the vaulted roof (fig. 88). The reservoir is a unique part of Auckland's heritage, a remarkable space to be able to experience, as can be seen in the image to the right. The following are international projects that have dealt with reservoirs, although the reservoirs themselves were admittedly no longer in use:

- Basilica Cistern, Istanbul, Turkey: The Basilica Cistern was built by Justinian in 532 AD, the largest surviving Byzantine cistern in Istanbul and one of the city's most popular tourist attractions (fig. 88). Approximately twice the volume of the Domain reservoir, it once held 80,000 cubic metres of water, delivered via 20km of aqueducts from another reservoir near the Black Sea and is constructed with columns, capitals and plinths taken from ruined buildings. Cleaned and restored in 1985 and opened to public in 1987, the reservoir is mostly drained, with little modification to its structure besides from the access and circulation areas. Visitors descend a stair from street level and explore

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Previous page: Figs 78-86: Heritage photographs of the Domain Reservoir under construction. Source: Auckland City Council Archives and the Sir George Grey Special Collections at Auckland Libraries. 580-557, 609

Fig. 87: Five Men In A Boat - Underground
Source: Auckland City Council Archives. From Auckland Star, 3 October 1952
the reservoir on timber boardwalks suspended above the water surface. A small cafe, and a performance area was included in the restoration, the reservoir is an attraction rather than a re-use, a space to be visited rather than occupied.

Paddington Reservoir Gardens, Sydney: The conversion of the heritage listed ruins of a Victorian water reservoir into sunken public gardens and community venue by the architects Tonkin Zulaikha Greer. (figs 89, 90). The historic reservoir constructed of cast iron, brick and timber, designed by city engineer Edward Bell, had suffered a roof collapse in 1990 and the architects were commissioned to convert the reservoir into a public park. Rather than recapping and building a new structure on top, the architects instead decided to reveal the historic reservoir as a ruin for the public to explore and experience the “dramatic spaces and play of light across the remnants of historic walls and vaults.”

The new structure is minimal, used as entry markers, constructed from a restricted pallet of materials selected for their raw finish (steel, aluminium, concrete). This is an example of a successful re-use, the new reservoir gardens becoming a highly popular space to visit.

The underground environment of the Domain reservoir is beneficial to the proposed archaeological facility in several ways. It is a secure environment,

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62 Tonkin Zulaikha Greer, Paddington Reservoir Gardens
Fig. 91: View over Auckland City and the Hauraki Gulf from the roof of the Auckland War Memorial Museum.

Fig. 92: View of buried reservoir from roof of the museum, reservoir roof outlined by bollards to prevent vehicle access.
its thermal mass acts as a temperature moderator, and it can supply water for the artefact tanks, the water also acting as a heat exchanger system for the freeze drier and general environmental control. Another advantage is that as proposed by Watercare to the Auckland Museum, an electricity turbine and generator will be placed on the reservoir outflow to provide power for the facility.

There is a further dimension that makes the reservoir an ideal location for a facility for wet archaeology in the New Zealand context. The forgotten reservoir shares Observatory Hill with one of Auckland’s most iconic institutions, the Auckland War Memorial Museum. This well-loved structure, a Greek revival neoclassical monument designed “in the round”, with legislation-protected sweeping views of the city and the Hauraki Gulf (figs. 91, 92), is the reservoir’s discussion partner in terms of the design, both setting the scene with problems and suggesting possible solutions.

The Auckland War Memorial Museum

While the Auckland War Memorial Museum appears as single white basilica in a rolling green landscape, the building is in fact a conglomerate of structures and alterations that reflect its multiple functions as both memorial and museum (fig 93). The Cenotaph and the Court of Honour outside the front entrance of the museum is consecrated ground, the Cenotaph itself—a replica of the Cenotaph in Whitehall by Edward Lutyens, the design of which was taken from newsreels as the original blueprints were deemed too expensive. The northernmost part of the museum is the original neoclassical building designed by Grierson, Aimer and Draffin and funded by subscriptions paid by Aucklanders to commemorate war dead. This was completed in 1929 and built from Portland stone and other high quality materials, with skilful integration of Maori motifs and classical detailing. The museum was then expanded after World War II to hold the growing collections and to provide further memorial space. The semicircular extension, completed in the 1960s, effectively closed off the museum to further expansion southwards along the ridge line. The location of the Domain reservoir and the nature of its construction stymied plans to construct a long ceremonial avenue from George Street to the rear of this newly-built museum extension.

Between 1994 and 1999 there was a programme of refurbishment, seismic strengthening and replacement of services and exhibitions, led by Noel Lane Architects. Noel Lane Architects also headed the latest addition, the seven-storey infill of the southern courtyard between 2000 and 2006. This work increased the floor area of museum by 60%, and provided a secure loading bay and larger back of house area, with all collections now stored on-site. Careful work had to be carried out during the construction of the new underground car park to prevent damage to the reservoir.

The museum’s thematic programme is divided vertically by floor into Cultural History, Natural History, War History and Archives. The Museum has the largest and most important collection of Polynesian and Maori artefacts 63. Salmond Reed Architects, *Auckland War Memorial Museum: Revised Conservation Plan*. 2011.
anywhere, and despite aiming to contain the entire collection with an additional 20 years storage, the new subterranean collection store is nearly full, with the lower floor of the underground car park already partitioned off to store the largest artefacts. Considering that the car park is not a money-earner for the museum, having been built to fulfil Resource Consent requirements, it is highly conceivable to project that the car park will in future be converted into a further extension of the museum.

Fig. 94: Site plan

Fig. 95: Auckland Museum main entrance. From Jasons, http://www.jasons.co.nz/parnell/auckland-museum (accessed March 20, 2012)

Fig. 96: South facade of the museum from top of reservoir

Fig. 97: View towards the rear of the museum
Design

Fig. 98: Sketch study
Some questions of methodology

What design methodologies should be used to design a contemporary interpretation of a Wunderkammer? To be driven solely by responses to functional requirements seems inadequate, as such an approach does not do justice to the complexities and relationships involved in such a setting. However, since Wunderkammern were intended to be used as thought laboratories, to choose to go consciously against the function of the spaces involved to the point of making them virtually impossible to use is equally inadequate. In the programme of the Centre for Wet Archaeology there are few absolutes, few spatial relationships that are completely inflexible. Bare practicality suggests that the Observatorium must not be completely within the reservoir itself, as the column grid would block the view lines of the audience, and it is of vital importance that the potable water in the reservoir is not compromised.

At the heart of the facility is the wet archaeology itself, the linear process of stabilising, treating, and interpreting the wet artefacts. The decision was therefore made to take this fundamental process and build outwards from its linear flow, illuminating aspects of the process and bringing other facets of the design into its influence, creating a dialogue at the interfaces between the different areas. Not fighting function, but allowing other relationships to develop. Then there are the architectural, spatial strategies derived from Soane’s Museum to be put into play, to attempt to create an architecture of speculation.

The overlap between precedent and possibility demonstrated in early historical precedent is no longer so clear cut; it is possible to carry the virtual world on a hand-held device and use it to make comparisons in conjunction with the physical artefacts. Thus in this context it is more useful to take from the Wunderkammer the relationship between retreat and socialisation and see what can be done with this relationship, investigating the link between social spaces and the creative process.
Site: Fundamental relationships

1. The site is elevated and highly visible, with sweeping views from Mt Eden to the Auckland CBD, and is also located next to one of Auckland’s most significant buildings. There is therefore a requirement for careful consideration of the visual impact of the design.

2. The water supply enters the reservoir from the southern side and outflows through an access tunnel. The reservoir has demand-based tides, at their highest during working hours.

3. Pedestrian access to the reservoir will be via two points; a connection at the ridge line for access in relationship to the museum, and at the crater base via the existing tunnel for access from the central city. A stitching of levels.

4. The reservoir has a different orientation to the museum’s strong external north-south axis. An element to work with or against, but some connection needs to be made.

5. Vehicle access to reservoir. Artefact arrival via road transport will be on the eastern side of reservoir due to existing road access.

6. Secure underground access between the centre and the museum collection store extension (existing underground carpark) is needed for movement of artefacts for treatment, discussion, and inspection.

7. The Observatorium needs to be on the edge of reservoir, due to its large size and view requirements.

8. Laboratories require natural light, but must also allow for light controlled spaces for artefacts.

9. Humidity is not a problem for wet artefacts or the wet lab, but must be controlled in dry areas.

10. The water in reservoir can be used as a heat exchange for artefact tanks, the freeze dryer, and general heating and cooling. The thermal mass ensures stable temperatures.
The Axis [interrupted]

Due to the location of the facility on Observatory Hill there is an inevitable question as to how to respond to the strong axis that drives the symmetrical geometry of the Auckland War Memorial Museum. As discussed earlier, despite its appearance as a pure white object in the landscape, the museum is in fact a conglomerase of additions and modifications; like the architecture of the museum, its axis is also more complicated than it first appears. To walk along the axis is to be perpetually deviated from it, first by the cenotaph, then, after entering the museum, by Hotunui, the historic wharenui at the heart of the museum, and finally by Noel Lane’s recent bowl-shaped addition, around which the circulation flows towards the rear exit. (fig. 101). This convoluted path distorts space, making the museum seem much larger than it actually is and highlighting the importance of the interrupting objects, but denies the experience of being on a long ceremonial axis within the building itself. The experience of the axis is therefore almost entirely external.

The structural grid of the Domain reservoir has an orientation, rather than an axis, which is aligned with the contours of the land, the crater ring of the Domain volcano, and oriented towards Rangitoto rather than true North. There is the potential to work to the advantage of both the museum and the new facility in the reservoir with these two geometries, one imposed by the cardinal points and dominant above the surface, the other born of the landscape and almost entirely invisible to the external eye.

It is important to provide a pedestrian access point to reservoir and conservation facility from the top of Observatory Hill, opposite the southern facade of the museum to provide access for visitors and for events from that direction. Keeping the public entry point separate from the museum indicates the semi-independent nature of facility, allowing visitors to become aware of the transition between the two. This point of entry can also be used to give a suitable termination point to the existing museum axis which currently becomes diluted at the southern end of museum, terminating somewhat incongruously in an underground carpark vent. Currently the south side of the museum is somewhat of an anticlimax, one exits the Grand Atrium into a parking lot, with the convex rear facade of the 1960s addition making any awareness of a greater orientation difficult.

With all this in mind, the entry has been placed on the point of intersection between the two orientations, creating an intervention that passes into the ground, balancing the upward thrust of the cenotaph (fig. 100), and using the collision point between the two orientations to introduce an element of uncertainty. The new facility is about experiment, questioning the current state of being, so it seems fitting that the visitor enters along one axis and then becomes aware of a shift in structure, a change in the framework of their environment as they pass down into the reservoir.

Several alternatives were considered for the intervention. Firstly, entry as an axis marker (fig. 102); a stair aligned with the orientation of the reservoir that winds down into the reservoir through a void that is aligned with the museum.
Advantages: A highly visible, easily experienced transition that strongly reinforces the continuation of the external visual axis through the use of a vertical marker or projecting void edge.

Disadvantages: Abrupt. Once the entry point was moved inside the reservoir to allow more space for a public plaza between the museum and the entry, the stair became too tight and the alignments no longer worked to advantage.

The second alternative was the entry as a journey along the axes (fig. 103), a stair that passes into the reservoir along first one, then the other axis.

Advantages: A gentler, subtler transition with a good view of the rear of the museum when climbing up the stairs and an awareness that there is a journey ahead.

Disadvantages: The path seems almost a little too direct. The resolution of the change in axis by a kink in the path dilutes the impact of the experience of moving from one to the other, although not as much as it would have done if the transition was circular.

The ultimate resolution is a combination of the two, taking the best from each: A stairway that begins on the museum axis, passing into a sunken courtyard aligned with reservoir that exposes the upper extents of several rows of arches. The stair changes alignment to the reservoir orientation, passes into reservoir, continuing to play one axis off against the other for effect (fig. 105, 106).

A separate, secure underground connection between the proposed museum collection store extension (underground car park) and the new facility will also be provided for the internal movements of artefacts and people. The area between the rear of the museum and the new reservoir entry point will be redesigned, removing the car parking and converting the area into a public space less formal than the Court of Honour on the northern side of the museum.

Fig. 101: Plan showing lines of axis and path deviation
Fig. 102: Entry as axis marker (indicated by white square)

Fig. 103: Entry as journey along axes

Fig. 104: Model of alternative 1, entry as axis marker

Fig. 105: Model of final design, a combination of the two alternatives
Fig. 106: diagram of flow and axis lines through the reservoir, red indicating the public path from the sunken courtyard (role and placement discussed on p.80-81) to the tunnel entry.
Reservoir - design strategies

The Domain reservoir itself is in many ways the largest artefact of the collection. A forgotten piece of historic infrastructure that has been virtually impossible to visit. The biggest single move that can be made therefore is to reveal it, to make it possible for the people of Auckland to discover and experience the power of the space and to gain a glimpse of one of the city's fundamental services.

Accordingly, the aim of the new interventions is to complement and enhance the existing heritage structure; the rows of arches to be left completely intact, with only the upper barrel vaults modified by penetrations for light and access. All interventions within the reservoir itself, with the exception of the entry stair, are to be kept at or below high water level (no higher than five metres from the floor of the reservoir), so that the full effect of the repetition of the arches is not obscured; from the upper levels the reservoir will still be able to be appreciated in almost all its spatial entirety (fig. 107). In a similar vein, the northern half of the reservoir is to be left largely undisturbed, besides from a pedestrian access way and the strategic use of lighting to illuminate the spatial qualities of the reservoir. The reservoir grid is repetitive, rhythmically monotone, so light can be used to modulate the spatial qualities within the grid. The relationship between the artefacts and the reservoir is to be kept somewhat ambiguous, the reservoir having the dual roles of both setting and object of display.

The reservoir is a vaulted mass concrete structure with minimal steel reinforcing, this lack of reinforcing in fact protecting the concrete from rust expansion damage in the damp reservoir environment. However, with its slender columns and heavy roof the reservoir would be inherently unstable without the bracing and support provided by the surrounding earth, and, in its current state, it is not well placed to withstand the added load of a seismic event. A programme of seismic strengthening will be implemented, including the strengthening the column shafts with FRP (fibre-reinforced plastic) wraps and reinforcing the connections between the bases of the columns and the footings below. Where the supporting earth is excavated from the edge of the reservoir as part of the project, for example in the vehicle access bay, large arched concrete lateral restraints and vault ties will be used to restrain and transfer the loads.

The reservoir will continue to function as a buffer reservoir for the Parnell area, with an allowance for a future extension to the south of the existing reservoir if required. This is possible because of its role as a buffer reservoir that compensates for peak flows, rather than as a reservoir for long term water storage. It is possible to improve the flow of the pumps to compensate for the reduction in volume, and the project will strengthen the structure of the reservoir, providing greater security to Auckland's water supply. Potable water will be protected from contamination by transparent barriers at sensitive points, where walkways pass on and through the water surface, although the impact of this separation will be minimised.
Fig. 107: Sketch proposal, exploring how the spatial qualities of the reservoir could be preserved / enhanced while modifying the structure for other purposes.

Fig. 108: Sketch proposal, exploring possible relationships between the edge of the reservoir and additional structures, utilising concrete lateral restraints to support the arches.
The Domain reservoir, while structurally an open vaulted grid, is essentially a sealed black box environment buried beneath the ridge of Observatory Hill. The first essential move therefore in the adaptation of the reservoir is the provision of points of access and of illumination. It is practical and appropriate to combine these two in a manner that aligns with Soane’s techniques of light, path and void, specifically the use of light voids as primary spaces that control circulation. There are to be two public points of entry into the reservoir, via the sunken courtyard on the museum axis (page 81) and through the existing outlet tunnel at the base of the hill. In total 14.5 metres of vertical circulation is required to connect the existing tunnel to the crown of the ridge, running between four levels: ridge ground level, the upper level of the facility, the floor of the reservoir, and the level of the outlet tunnel. A series of three primary voids will be used to connect these various levels and to bring light into the reservoir (fig. 109):

11. Sunken courtyard entry void (surface to upper level of facility (0.0m to -6.0m))
12. Tunnel entry and Observatorium void (tunnel level to upper level of facility, -6.0m to -14.5m)
13. Reservoir level transition void (upper level to base of the reservoir, -10.0m to -6.0m)

Both the wet and dry laboratories require day-lit work spaces and therefore will be closely aligned with voids 1 and 3, whereas the artefact stores need controlled light conditions and so will be kept further into the reservoir (fig. 110).
Sectional views through voids:

1. Slipped void - path circuit within and around void, reflected light into the reservoir, contrast of space size

2. Large fragmented void - views down into the void from high levels, rhythm of light and shadow, variety of views and condition

3. Slipped void - views between the two voids, path circuit around top edge of lower void, reflected light

Fig. 111: Reservoir voids

Fig. 112: Vertical circulation paths (in red) aligned with and supported by voids
This study is an exploration of the visual and spatial characteristics of the reservoir, using the strategies previously applied to the view paths of Soane’s Museum to perform a similar exercise on a plan view of the Domain reservoir, testing qualities of view depth and perception within the reservoir space in relation to three main view conditions: corner (1), centre (2) and side (3). The following diagrams use shading to denote visible areas, white areas being the parts of the reservoir in view shadow. Assuming viewer is standing at water level, 5m from reservoir floor.
1. Corner view. A clear view down the corner rows gives a sense for the full dimensions of the reservoir. There are a variety of diagonal views as arches overlap.

2. Central view. The reservoir at its most permeable. Almost all of the space is visible. Very even, very symmetrical, balanced, almost static.

3. Side view. A clear view down the central aisle, reservoir space becomes obscured towards the far end of the reservoir by the columns.
Despite being essentially an open grid, the spatial conditions within the reservoir seem quite different when viewed from the three different viewpoints (figs. 113-119). The structure appears open and balanced from the central position (2), but dense and complex from the corner position (1). It would be relatively easy to form a picture, an idea of what the whole is within a short time of entry, but the composition of the space itself changes dramatically in relation to movement through the space.

It therefore seems desirable to experience these multiple conditions when visiting the reservoir. The diagonal view (2) is the most complex view, with interesting overlaps of arches and columns and long diagonal views across the reservoir. When full, the water surface is either a reflective or transparent surface, depending on the light conditions, allowing for a drop in apparent floor level from 5 to 10m.
An exploration of the reapplication of the techniques earlier derived from Soane’s Museum, path, light, void and threshold, in a much larger, civic environment, tested against the scenario of the largest space in the project, the Observatorium, an auditorium-like space for the presentation, discussion and communication of ideas, and keeping in mind the underground nature of the project and that it will be partly penetrating reservoir.
The experience of space from key viewpoints (white areas are parts of the section in view shadow):

1-3: Progression down stepped seating from smaller external court to large interior void, with an initial long view into the reservoir that disappears as large void opens up. Top lighting used to indicate changes in height and as threshold marker.

4: Fragmented view down into the void from the surface (on the roof of the reservoir)

5: Diagonal glimpses of the void and courtyard spaces from an intermediate circulation level
From the views analyses, it seems that it is certainly possible to use strategies from Soane’s Museum at a larger scale. The Observatorium is a larger and in some ways simpler environment, but enough is still concealed, hinted at, and changing for not everything to be immediately obvious. Spaces and vistas close down and open up with movement.

In a comparison of the study model with the section of Soane’s Museum (figs 123, 124), there are obvious parallels between the rhythm of space and threshold, light and shade, and long diagonal views, between the two sections. The large primary void in the model equates to the Dome void, and the sunken courtyard relates to the left-most gallery space in the Soane section. Not a direct copy, but a reinterpretation. The study model is successful because it shares qualities of Soane’s Museum without directly transplanting (long views, use of thresholds, voids, shade and light, decreased width and increased height of spaces used to build up to the big space). An improvement would be to increase the overlap of the reservoir and the auditorium space.
A study model in plan of the upper level of the facility, combining previous analyses of Soane’s techniques of view, path and void, using them to hide and reveal internal world of reservoir, to create spaces large and small, separate and integrated, external or internal. Intended as an intervention based around two voids on the western side of the reservoir. As discussed previously, voids act as visual link between levels, source of light. As with Soane’s Museum, circulation is around the edge of these primary spaces.

1-4:
Sketch diagrams, starting with the voids and adding circulation paths. Looking at view lines, increasing variety in view termination points so as to increase variety of perceived possible destinations, steps in view path.

5:
Resultant sketch model
Analysis of view lines within the model, moving north-south:

6.: Space integrated with the reservoir, long vistas down path, diagonal view of another path in the far distance

7.: Open space, views both into the reservoir and out to Auckland City. A sense of being at a centre of things

8.: Contained space, rejects large void of the reservoir, views to outside and along reservoir buttress arches

9.: Contained space, but major orientation along the E-W path rather than N-S path


Note: there is the potential to have an intervention inside reservoir that is visible from most angles but physically remote, much like the dome in Soane’s Museum. This is suitable for a highly visible yet secure area, for instance the wet artefacts store.
Fig. 125: Overlaying light as space and threshold marker, light used to mark thresholds rather than shadow.

Fig. 126: Density and duration of visibility. Like in Soane’s Museum, the longest views and the threshold markers remain visible for the longest period of time.

Fig. 127: Development model.
Fig. 128: Conceptual section through studioli space
The public route through the National Centre for Wet Archaeology runs between two entry points that connect the Domain crater with Observatory Hill; the sunken courtyard behind the museum (as discussed on page 81) and the original outlet tunnel entrance at the base of the hill. The emphasis of this path is the discovery and exploration of the reservoir, while becoming aware of wet archaeology and the process and discussions taking place within the facility. The Domain reservoir is treated as both a setting and an artefact, incorporating the discovery and display of both the contents and the container. Using the public path to blur of the front and back of house areas, negotiating the boundary between protection and exposure of the artefacts. A slow revelation of complexity and wholeness.

The journey from the public plaza at the top of the hill to the base of the crater begins with the descent via a stair, aligned with museum axis, into a sunken courtyard orientated with the reservoir and bounded by the exposed upper extents of arches. The floor of the courtyard is a reflection pool which acts as a skylight to the wet laboratory beneath, although this link is not visible during the day. The path then aligns itself with the courtyard, passes down and through an exposed row of arches into the reservoir itself. Arriving at the edge of the artefact store, the space doubles in size, dropping away five metres below the walkway to the base of the reservoir. The walkway then passes along the top of the central wall that divides the reservoir in two, with views of artefacts undergoing treatment and the suggestion of further spaces beyond the reservoir. Then it turns back into the northern half of the reservoir, on a diagonal (the museum axis) so as to be able to appreciate the effect of overlapping rows of arches. Skylights and darkness obscure full extents of the reservoir; during the day the water surface is dark or mirror-like, at night fully transparent and lit from below. The path ramps downwards, passing under the access way between the archaeological facility and the museum collection store, continuing downwards and passing into darkness. After turning a corner, the path opens up into the large top-lit void of the Observatorium, either empty or full of people. The path then continues down into the constriction of the tunnel spaces and finally out into the wide spaces of the Domain crater, with views of the city beyond. When entering into the reservoir from the tunnel entrance, the main view is centred on one of the large columns formed by bases of the lateral restraint vaults, then, as the visitor emerges into the large Observatorium space, the void opens up to the left and the path swings around to consider the focal point of the Observatorium itself; the base of the gantry crane, top-lit from above.
Fig. 129: Lower level partial plan of facility, showing public access route from tunnel entry to the rear of the museum via the Observatorium and the reservoir
Figures 130 - 133: Analyses of the public path through the reservoir, showing how the varying view conditions from the previous analysis of the reservoir have been accommodated, taken advantage of. Light entering from the sunken courtyard and lift shaft obscures the full extents of the reservoir at certain times of the day.
Fig. 130: Path diagram showing changing view conditions of the reservoir during the journey. Entry from the sunken courtyard, moving east to west. Central, diagonal, linear views, taken from earlier analyses.

Fig. 131: Path diagram showing changing view conditions as before, but from tunnel entry, moving west to east.

Fig. 132: Path diagram showing visual interference caused by the sunken courtyard and lift well (sources of bright light) when moving east to west.

Fig. 133: Path diagram showing visual interference caused by sunken courtyard and lift well (sources of bright light) when moving west to east.
Path - Users

Archaeologists, academics, and other users of the facility enter the reservoir through the same points of entry as the public, as well as an additional access from the artefact entry threshold on the eastern side of the reservoir. All paths lead to the Observatorium, the nexus of the project, from where a stair winds up the exterior and through the interior of the westernmost circulation void to the upper level of the facility. The upper level of the project is primarily for the users of the facility, a more secluded setting than the Observatorium, with spaces for concentration and relaxation. An evolution of the earlier plan study, its design demonstrates a reinterpretation of the spatial techniques derived from Soane’s Museum. Like in Soane’s Museum, the light voids act as primary spaces, encircled by circulation routes that pass around and through a blend of clustered and sequential spaces, varying rhythm of thresholds, light and shadow.

Fig. 134: Plan of the basement level of Soane’s Museum, showing circulation paths

Fig. 135: Plan of the basement level of Soane’s Museum, showing circulation paths combined with spatial pattern
Fig. 136: Centre for Wet Archaeology - circulation paths at the upper level of the facility. Paths above and below shown dotted.

Fig. 137: Centre for Wet Archaeology - circulation paths and spatial pattern at the upper level. Orange indicates primary spaces, yellow indicates voids.
Path - Artefacts

Wet artefacts arrive at the National Centre for Wet Archaeology through a two-fold threshold that, while providing vehicle access to the reservoir, is much more than simply a loading bay. Beginning with an external public space on the eastern side of the reservoir facing an existing road, the entry way passes down through an initial threshold and then out into an enclosed intermediate courtyard that occupies the boundary between the public realm and the internal world of the archaeological facility, providing a neutral ground, a common meeting place (fig. 138). This relationship acknowledges the often formal nature of the arrival and departure of taonga and the act of entrusting it into the care of the facility for the duration of its conservation. A space for ceremony and performance, there is a staircase on the southern side of the courtyard, which is designed to have a dual role as outdoor seating. The gantry crane that runs inside the length of the reservoir is extended out through the reservoir threshold into the internal courtyard to aid with the loading and unloading of artefacts, and the workshop on the eastern side of the courtyard contains materials and equipment for building tank frames, display cases, and other packaging material for the transport, storage and display of artefacts.

Fig. 138: Artefact threshold model, showing progression from the outer to inner courtyards

Fig. 139: Movement - revealing and concealing secondary threshold into the reservoir
Fig. 140: Wet archaeology
The process of wet archaeology:
Laboratories, artefact store and gantry crane

As the project is a centre for wet archaeology, it seems appropriate that the process of conservation itself is at the core of the design. In the context of the reservoir, therefore, the arrangement of space within the reservoir follows the linear nature of the conservation process, marked by the line of the overhead gantry crane (figs. 142, 143). The gantry crane runs east-west along a central bay of the reservoir, from the eastern threshold to the Observatorium, providing assisted lifting throughout the facility, and working in conjunction with the artefact tank storage system: three units per bay that run on tracks north-south to intersect with the axis of the crane, the shelves themselves sliding out in draw system for gantry crane access (fig. 141). The crane also provides a connection to the Auckland Museum collection store access way, transporting large artefacts between the two levels.

The wet ‘archaeological’ laboratory has a direct relationship to both the storage and treatment of the wet artefacts, all of which is separated from the dry, clean space of the conservation lab. The storage for treated, dry artefacts requires a humidity-controlled, clean environment, which is provided through the sealed design of the storage system in that part of the reservoir. It is difficult to strike a balance between the exposure and the protection of precious objects, but through movement along the public path, visitors will, at a minimum, become aware of the existence and the process of wet archaeology. The alcoves around the Observatorium will have a more explicit didactic role, with information displays and access to digital records, the most traditionally museum-like aspect of the project.
The above diagram shows the physical relationships between the different social spaces for different aspects of the creative process, developed in the discussion on page 62. These include:

- Formal + Intended = Observatorium
- Formal / Informal + Intended = Smaller meeting spaces, terraced courtyard
- Informal + Intended / Unintended = Mensa (cafeteria / relaxation areas), also circulation spaces.
- Private = Studioli, smaller spaces for personal study

The more formal areas for intentional discussion are centred around the Observatorium, the large void, in an arrangement that radiates outward in a gradient of social interaction to the most relaxed and informal space of the design, the Mensa. Different social spaces are allowed to intermingle through the use of organisational and social gradients rather than clear-cut divisions. While the design of the facility is intended to encourage interaction with the wider community, the users are not overtly placed on display; private areas are placed well away from the public thoroughfare.
The Observatorium

The Observatorium is a forum for the discussion, presentation and evaluation of ideas generated from within and beyond the facility; it is the nexus of the design, a setting where researchers, public, and artefacts are brought together. It differs in several ways from a traditional auditorium. Firstly, it is an inclusive rather than exclusive environment; the Observatorium has been placed so that the main circulation paths run along the edge of the forum space in order to capture a transient audience. Passers-by can pause and listen, pass on or join in the discussion, a relationship which aids the awareness of the work been carried out and the spreading of ideas. The events occurring in the Observatorium are visible from many other areas of the facility, due to circulation routes passing around, behind and through the large fragmented void on different levels.

The Observatorium space has also been designed to accommodate variable audience sizes, ranging from small groups of 10-50 to 150, by using the colonnade formed by the bases of the arched lateral restraints as a means of visual separation, a move that creates a more intimate setting for discussion on the reservoir side of the larger area (fig. 145). The gantry crane passes overhead, able to lower objects for discussion directly into the forum space from the artefact store, the contents of which are visible as part of a long view into reservoir from the top of the terraces. A setting for discussion rather than instruction, the forum space is most similar to a conventional auditorium in the sense that it has a central focus point, but this does not denote any automatic authority on the part of the speaker. It acts quite simply as a point of focus; by occupying this central position, a speaker indicates he or she has something they would like to discuss with or present to others. Offering multiple foci as in the reading room of Warburg’s library was considered, but the relationship became too adversarial.
Surface

The Centre for Wet Archaeology is almost entirely underground, never to be seen as a fully comprehensible object in the round like the Auckland Museum building. Its entire presence therefore is always to be either unknown or implied by penetrations of the surface. The idea of the implied whole relates to Soane’s work, *Crude hints Towards A History of My House*, written while his house-museum was still under construction. In his text, Soane imagines a future antiquarian attempting to piece together the ruins of his house-museum, speculating on its past uses and occupants based on the remaining fragmentary evidence, treating a ruin as Wunderkammer. This suggests that the British architect had a strong interest in the idea of designing possible pasts and future ruins.

Michaela Giebelhausen remarks on how Soane’s Museum can be seen as an attempt to capture the spirit and experience of archaeology, the “chaos of discovery.”

At present the only way to detect the full presence of the reservoir is through aerial photographs, where the stunted grass makes the outline of the vaulted roof discernible; an effect that is virtually invisible at ground level. This existing effect has possibilities in regards to creating an architecture of discovery, speculation, and association. The design continues with this idea, implying a buried presence below ground by fragmentary evidence above - penetrations into the reservoir that unearth some of the vaults, large concrete retaining walls that emerge from the ground, leaving some ambiguity as to whether these structures are part of a greater presence under the surface, or ruins of what was once built on top, fragments or possible wholes. The new evokes the old, the old enhances the new and there is some play of different understandings: as the column in the engraving of Happel’s Wunderkammer became a stair, a large retaining wall in this project that supports spaces deep within the earth becomes a low bench when it reaches the surface. At night the relationship between visibility and concealment is reversed; light shines up through gaps in the earth, patterning walls with the moving reflections of light on water.

Direct analogies can be made between the unearthing of wet artefacts and the partially buried nature of the facility, but the relationship is intended to be much more subtle and nuanced than solely this. It is a dialogue, an iceberg-like relationship with the surface; there is something in the hill behind the museum but what it is exactly is not immediately clear, a mystery that invites exploration. From the surface there are views into sunken courtyards where people appear and disappear, and oblique views into deep cavities below; visual relationships that relate to the strategies employed by Soane and Happel, the only difference being that the partial glimpses of spaces beyond have become instead partial glimpses of spaces beneath. A sunken courtyard exposes the top arches of a much larger structure, and a small tunnel leads through shafts of light and darkness into the vast subterranean space of the Observatorium. The yellowed grass is to be preserved as an elusive hint to what lies beneath, one that fades from view during the wetter times of the year.

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66 Ibid.
Fig. 147: Conceptual surface view of design
Conclusion

The idea of the Wunderkammer has been used as a catalyst for an unusual combination of site and programme, a synthesis that employs underlying connections to bring together into an evocative whole several apparently disparate elements, all in mutual need of support and promotion. Through its design the project brings the process of wet archaeology into the public eye; promoting the discovery of an area vital for New Zealand’s heritage and future understandings. It reveals the historic Domain reservoir, a remarkable yet largely forgotten piece of engineering heritage that has previously been virtually impossible to experience, and engages in a mutually beneficial dialogue with the Auckland Museum.

Underlying spatial strategies from historical Wunderkammern have been used to create a building that accepts the uncertain nature of discovery. Spaces have been designed to relate to the wonder, the mystery, and the discovery of understanding. The journey through the structure itself is a slow revelation of complexity, ambiguous and fragmented, one that hints at other possibilities. Unlike the conventional museum environment, this building is not about maximum revelation and display, there is no sense of an implicit idea that all is solved and understood.

An intentionally ambiguous relationship has been developed between the artefacts themselves and the structure that contains them, in that the reservoir is both the protector of the artefacts and perhaps itself the largest artefact of the collection - one fitting inside the other like the drawers in the cabinets of Ferrante Imperato’s chamber of wonder. The social dimension of the Wunderkammer, the tension between retreat and sociability in the process of discovery, has led to an investigation into the link between social space and creative process in regards to knowledge generation and dissemination, one which resulted in a design that aims to balance multiple conditions of intention and interaction that relate to the journey of ideas from their conception to their validation in an interdisciplinary context.

This design project is an attempt to translate the Wunderkammer into a contemporary context, a ‘for instance’. It is one possibility; there are many others yet to be explored. The idea of the Wunderkammer is a useful tool to help reconsider conventional design methodologies, as it is a concept that privileges different aspects simultaneously, one that originates from a different time and way of seeing and is not driven entirely by functional requirements. It is something to test ideas against, to force the consideration of other possibilities and with which to question accepted relationships and conventional understandings, which was indeed one of the original purposes of the Wunderkammer.

Does an architecture of speculation alone result in a space of knowledge and discovery? No, not necessarily, but, as with the historic Wunderkammern, while it is not fundamental that the architectural context reflects the richness and complexity of the experiments and collection contained within, it is certainly desirable. The architecture can work in partnership with the experiments, to elevate the environment and set the scene for exploration and discovery. In the context of this project it helps to share the experience of discovery throughout the
different levels of expertise and involvement, from the public to those researchers working directly with the artefacts, without resorting either to a superficial or a conventionally didactic experience.
Bibliography


Glossary

Chiaroscuro ______ The interplay of light and shadow involving clear tonal contrasts
Fabulation ______ The act of inventing
Iwi _____________ Maori tribe
Karakia __________ Maori incantations and prayers
Korero ___________ A talk or discussion; meeting
Mensa ____________ Eating space; setting of informal socialisation and relaxation.
Observatorium ___ Forum for the presentation, discussion and evaluation of ideas
P.E.G. ___________ Polyethylene glycol
Pukaki ____________ Carved representation of a Ngati Whakaue ancestor
Taonga ___________ A treasured thing, whether tangible or intangible
Taonga whakairo _____ Taonga crafted through the artistry of weaving or carving
Tui _____________ Native New Zealand song bird
Virtuoso __________ Someone skilled in any intellectual or artistic field
Wairua ___________ Spirit, essence of being
Wharenui __________ Meeting House
Waka _____________ Canoe

Wunderkammer ___ (pl. Wunderkammern) Lit. Chamber of Wonder; A place where a collection of curiosities and rarities is exhibited
Studiolo ________ (pl. studioli) Personal space for solitary study
Appendix A
2. Further conceptual models
-14.5m level, early conceptual plan

-5m level, early conceptual plan
Appendix B: Wunderkammer

1. Surface view of project looking towards the southern facade of the Auckland Museum
2. Aerial view depicting the main paths of movement (public, users, artefacts) through the project

3. Exploded perspective diagram of project showing light penetrations, arch grid, core light wells and circulation paths, crane and artefact tanks, reservoir flow, and upper level of project

4. Soane’s Museum analysis diagrams
5. Conceptual visualisation of project

6. View of sunken courtyard entry
7. Long section, facing east

8. Long section through Cenotaph, Auckland Museum and reservoir
9. View of Observatorium from lower level
10. Cross section through sunken courtyard entry, facing north

11. Cross section along gantry crane, facing south

12. Interior view of reservoir, showing artefact tanks
13. Night view of Observatory Hill