THE ARCHITECTURAL DRAWING

An investigation into the history and metamorphosis of the linguistic discourse of architectural drawing within the visual discipline of Architecture

MArch Thesis - Joe Travers-Jones

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An investigation into the history and metamorphosis of the linguistic discourse of architectural drawing within the visual discipline of Architecture

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9, 615 words

Contents

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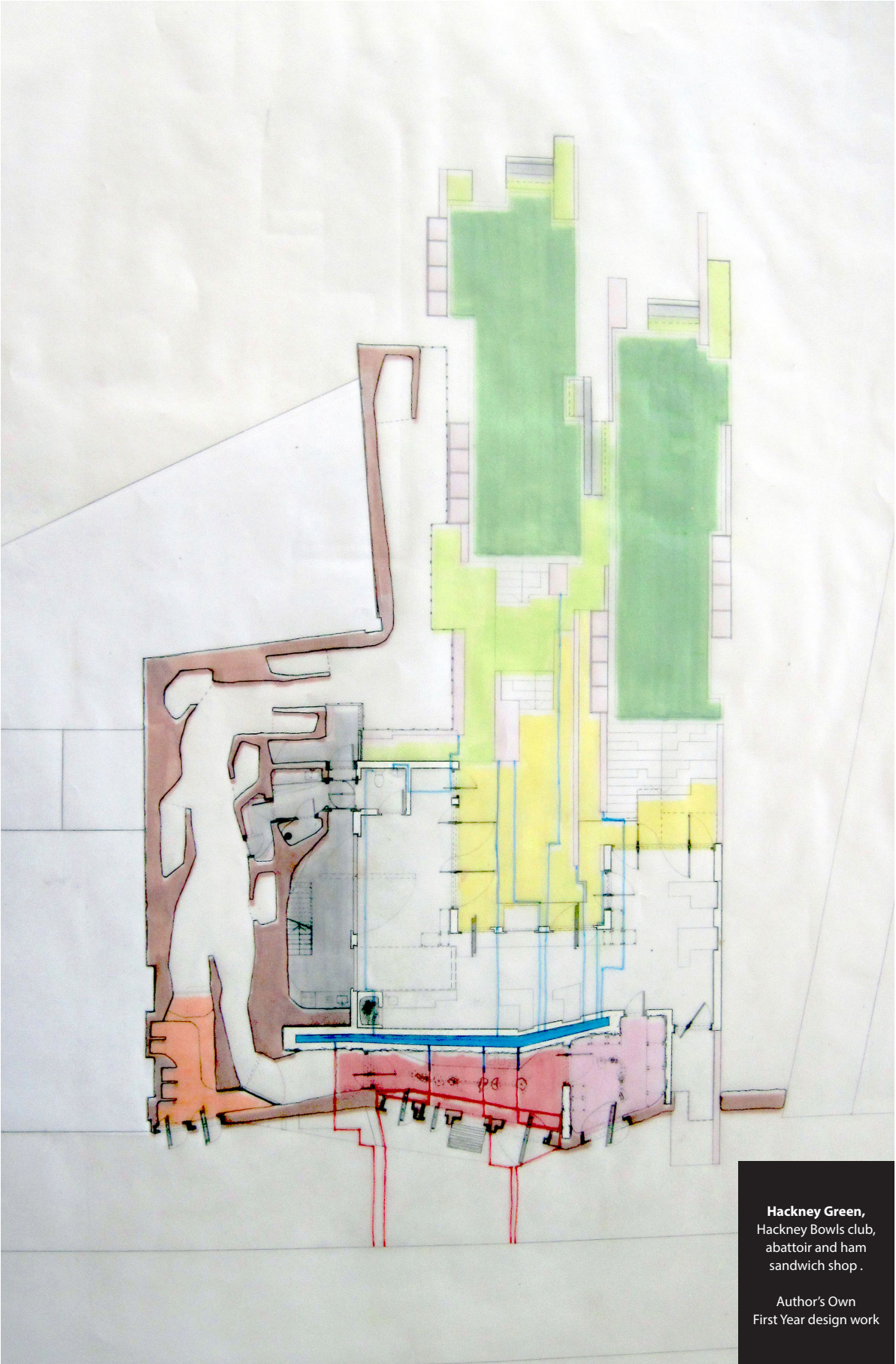Hackney Bowls club,
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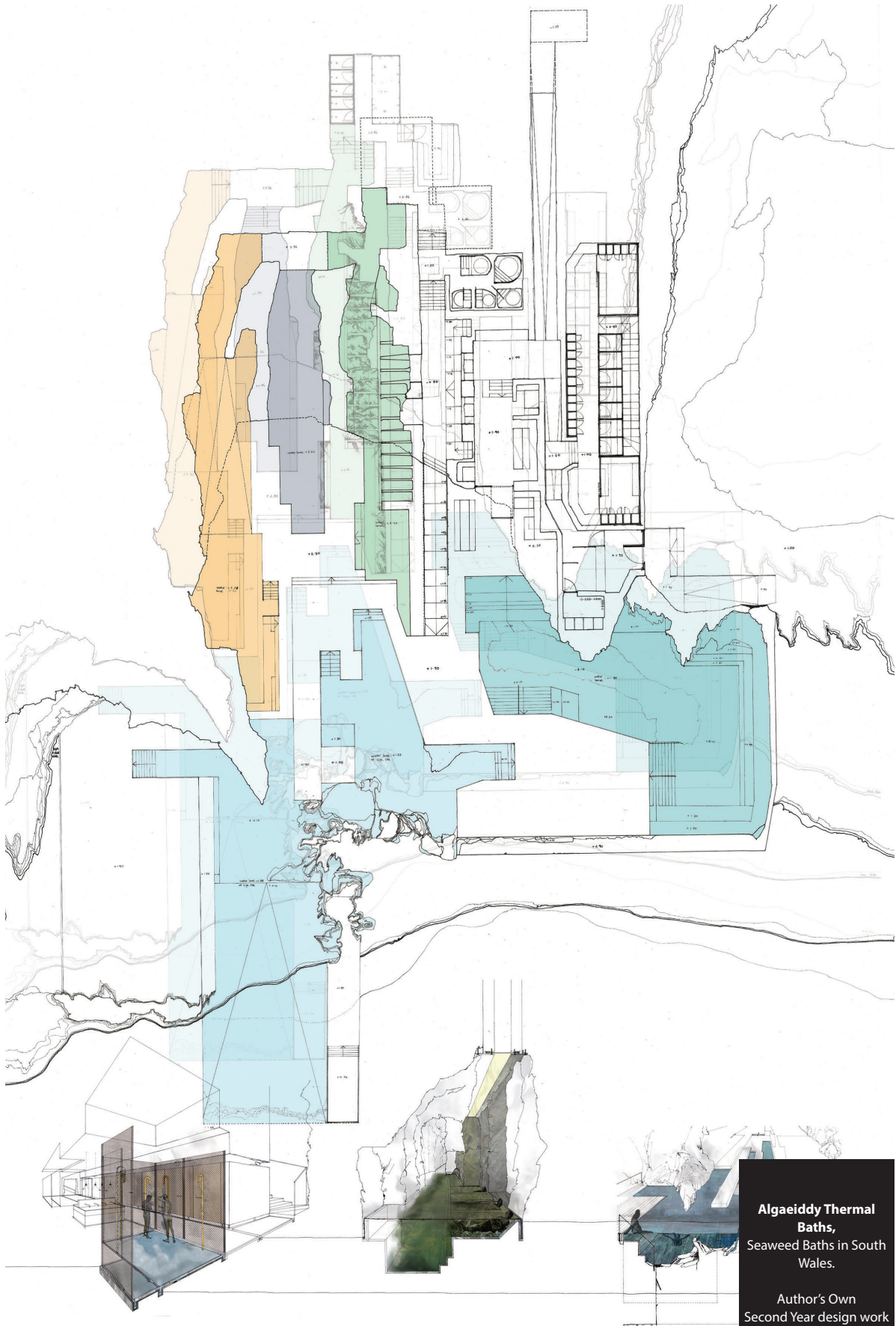
Author's Own
First Year design work

Abstract

The architectural drawing is a visual language that is rigorously used in both architectural practice and education, however there is little research and investigation surrounding this subject beyond the construction and presentation of a drawing. This document outlines the history of the architectural drawing and investigates the morphological shifts this language has undergone through time; questioning the language as we know it today.

The term drawing is derived from the Italian word 'designo', which was later adopted as the general phrase for design. Drawing coupled the practice of the visual arts with the sphere of ideas to conduct the process of design. It was during the Italian Renaissance of the fourteenth century that drawing transformed architectural practice, initiating a division between manual work and mind work. Thus, unlocking the status of the architect. Leonardo Da Vinci augmented the conception of painting and drawing as an honourable intellectual device that was an alternative to mathematics or writing. It could be distanced from the labours and mess of construction:

'the painter sits in great comfort before his work…He can be dressed as well as he pleases and his house can be clean and filled with beautiful paintings'[1]
Leonardo Da Vinci

Still today, the drawing serves as a linguistic device to communicate information from architect to patron and more importantly, records a series of morphological changes which the profession has undergone through time. Drawing offers a unique vantage point from which to view the profession, acting as both an impartial territory and tactical apparatus to mediate between the author and the audience. This thesis provides a concise historical account of the development of the architectural drawing, apportioned by several short essays that explore different subjects that have defined the architectural drawing to provide a comprehensive explanation of the purpose and processes that have shaped the architectural drawing.

1   *Robbins, E. (1997). Why architects draw. Cambridge, Mass.: The MIT Press, p.17.*

Algaeiddy Thermal Baths, Seaweed Baths in South Wales.

Author's Own
Second Year design work

01

Introduction:
The Emergence of the Architectural Drawing
Prior to the 14th Century

The role of the architect has changed significantly throughout history; a notion that remains constant is that architecture is the visual discipline within construction. This theory has been substantiated not through the concern for aesthetics but because of the architect's relationship with the drawing.

'Architecture is produced in three different registers, through three different texts: drawing, writing, and building.'[2]

Drawing is a sophisticated visual language that serves as the primary method of communication within architecture. This specialised language acts similarly to Bathes definition of literary criticism: *'a discourse upon a discourse; it is a second language, or a metalanguage…which operates on a first language'[3]*. The architectural drawing is independent from yet subservient to architecture; it is a reactive metalanguage that is responsive to the cultural and social changes within architecture.

To communicate information effectively it is paramount that this metalanguage is constructed in a legible manner. Therefore, within architectural education the drawing remains *'the bedrock for all architectural student's'[4]*. During the formative years of study, the 'core skill' of drawing is learned through speculative didactic exercise, to establish a repertoire and method free from the constraints and conventions of the professional world. This research affirms the importance of the architectural drawing and examines how this metalanguage can legibly communicate architectural information to an audience of varying visual literacy and training.

Akin to the written language, drawing has emerged over time as the product of significant morphological change. The first seminal change in the emergence of the architectural drawing was the movement from the depiction of narrative to the instructional. The Egyptians were first to communicate the narrative through drawing. A feather quill dipped in ink was used to mark-make over the surface of stone, and later with more technique and precision on papyrus. Drawing was used to illustrate stories of the Pharaoh, his enclosure in a tomb, and to speculate his chronicles in the afterlife(Fig.1.1).

Egyptian drawing underwent substantial change to enable the construction of the pyramids; shifting from the figurative to the propositional. Drawing fragments dating to 1500BC were found depicting plans and instructional information for reference onsite(Fig.1.2). Literacy of the author was imperative; calculations and drawings were compiled as a package of legible information for construction. Although flat and pictorial, drawing was used to solve the complexities of construction as an alternative to mathematics and writing. This formalised linguistic form acted as an impartial territory for the exchange of information; this was the beginnings of the architectural drawing.

Fig. 1.1: Egyptian Book of the Dead, 16th Century.

Fig. 1.2: Construction drawing for the Astronomical Ceiling within the Tomb of the Senemut, 16th Century.

2   Allen, S. (2000). Practice: Architecture, technique +representation, Routledge, p.164.
3   Barthes, R. (1972). 'What is Criticism?' in Critical Essays, trans. by Richard Howard. Evanstone: Northwest University Press, p.257.
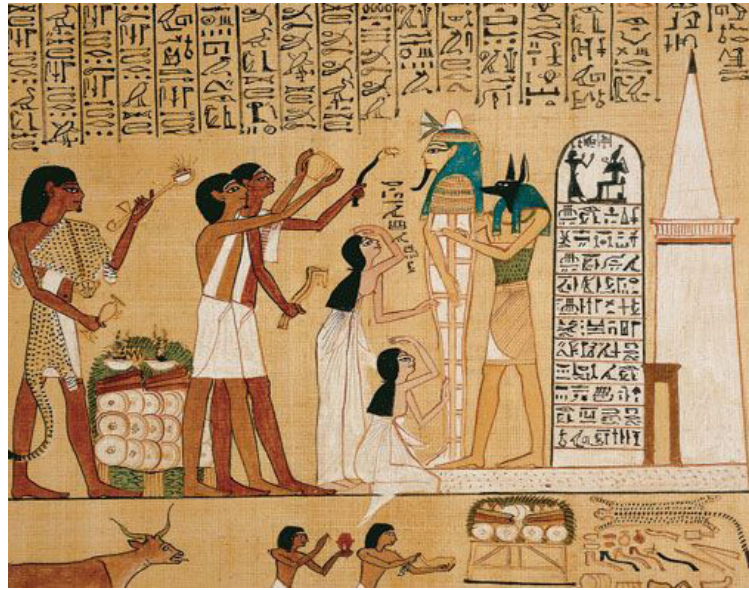4   Cook, P. (2008). AD Primers: Drawing the motive force of architecture, 2008.p.9.
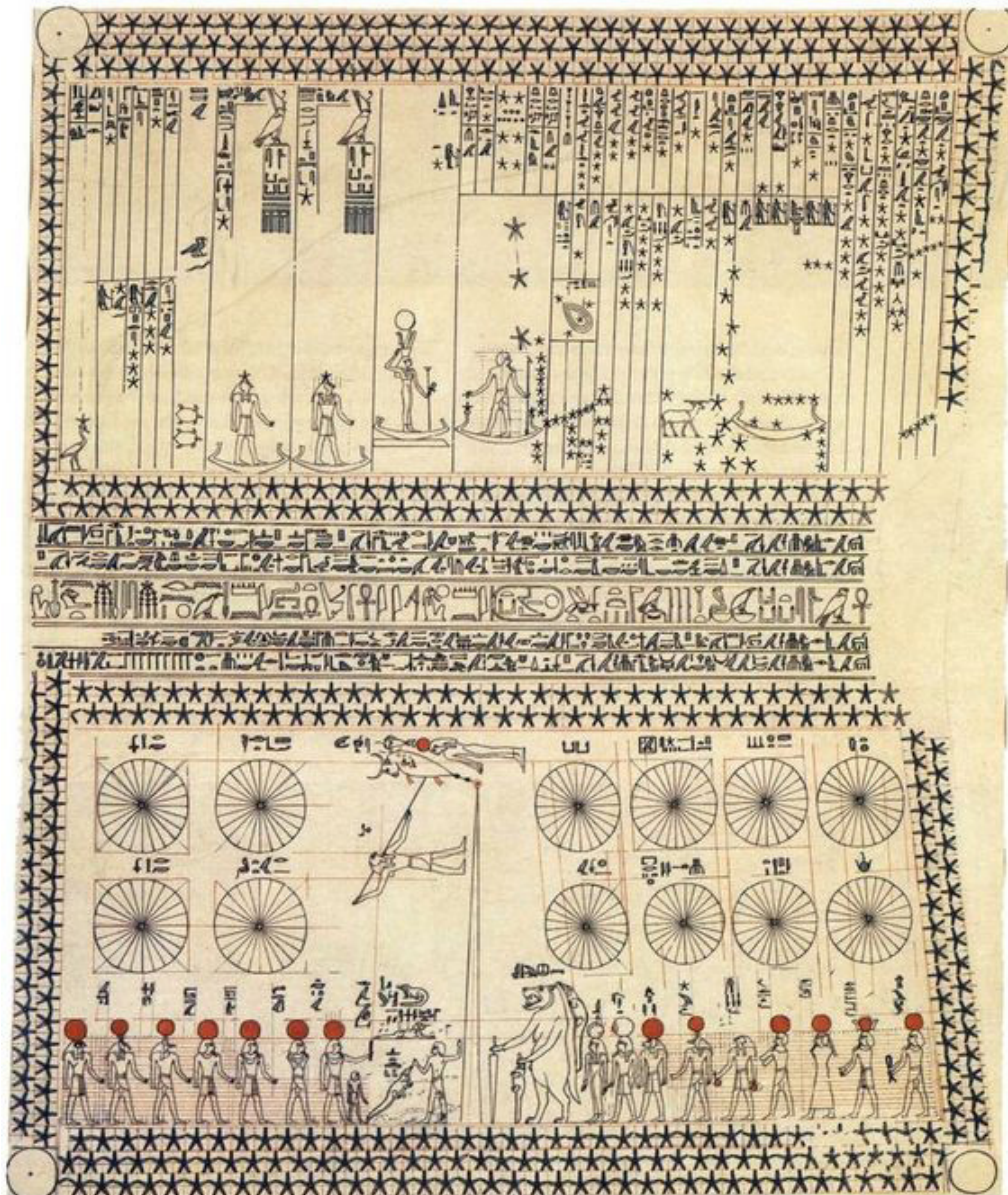
Fig. 1.1

Fig. 1.2

The representation of depth and three-dimensions within the image was the second seminal stage in the development of the architectural drawing. Three-dimensionality is intrinsic to the comprehension of space; a fundamental semblance that separates architecture from the arts. This shift is most apparent when examining early stained glass within Europe. Augsbury Cathedral's glass-1065AD(Fig.1.3) shows the Prophet Daniel as a flat image lacking depth; evidencing how drawing was used for storytelling and not to construct space. These qualities are also evident in the Bayeux Tapestry(Fig.1.4-1.5) whose embroidery showed no awareness of depth. The flattening of the image continued into the 13th Century.

It was the glass of Cathedral Soissons(1275)(Fig.1.6), that first showed comprehension of depth within an image. By the 14th Century the expression of the three-dimensional form was common; demonstrating great advancement for spatial consideration within an image(Fig.1.7), capturing a more realistic image. I propose that it was these qualities of spatiality and instruction that altered the perception of the drawn language for the visually literate artist and the untrained audience.

This thesis provides a concise historical account of the development of the architectural drawing apportioned by several short essays that explore different subjects that have shaped architectural drawing: *Drawing Systems and Convention* focuses on the legacy of the drawing; *Relationship with the Implement* explores the physicality of the drawing process; *Tactical Drawing* examines how the drawing can be calibrated to suit a specific purpose; *The Legibility of Drawing* investigates the successes and shortcoming of the architectural drawing; and *The Visualisation* considers the implications of the rendered image on the profession today. These notional essays extend from the chronology of the main text to provide a comprehensive explanation of the purpose and processes that have shaped the architectural drawing.

Fig. 1.3: Prophet Daniel Window, 1065AD, Augsbury Cathedral.

Fig. 1.4-1.5: Bayeux Tapestry, 11th Century.

Fig. 1.6: Saint Nicaise Window, 13th Century, Cathedral Soissons.

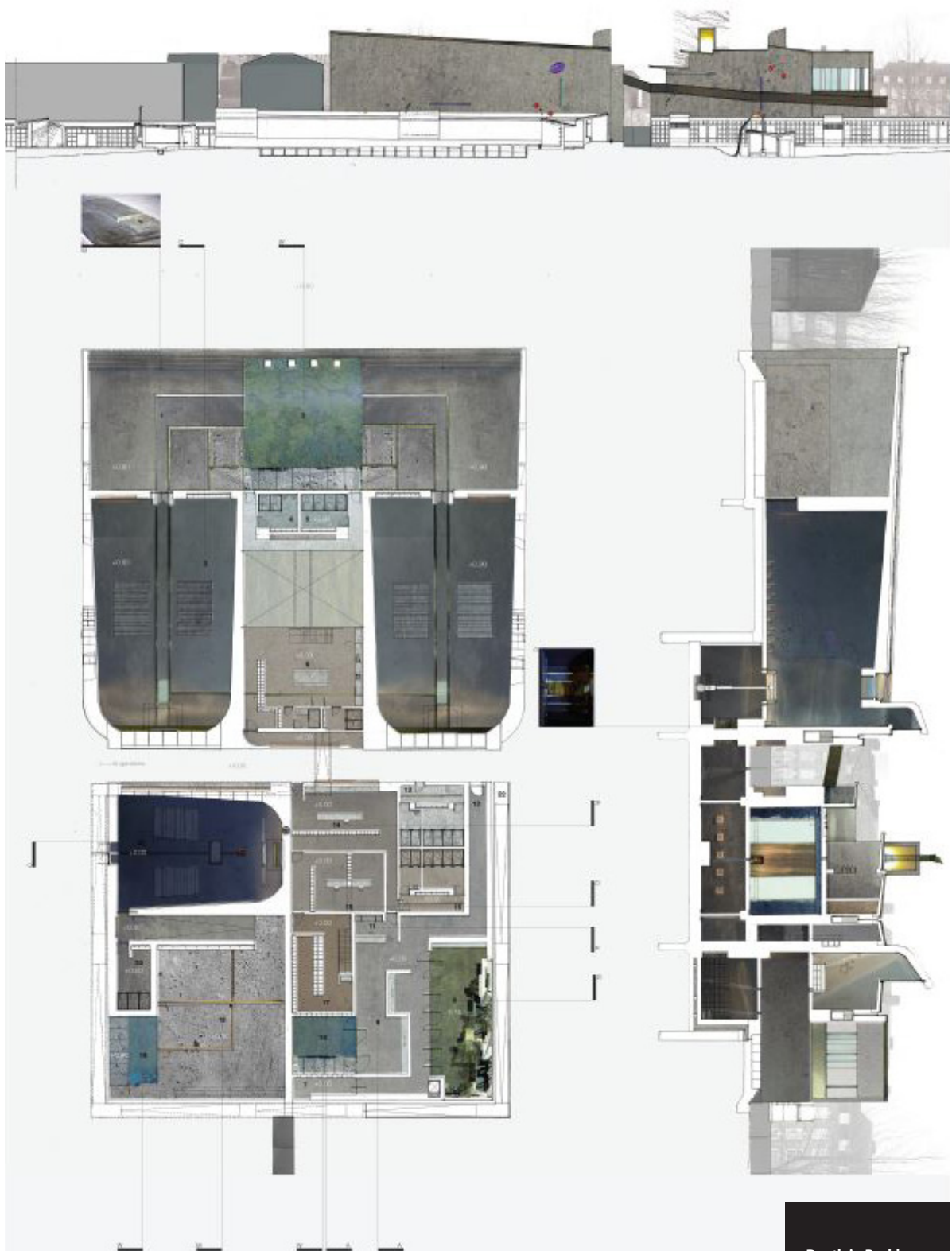**Fig. 1.7: Medieval Window, 14th Century, Troyes Cathedral.**
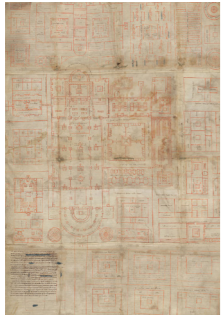
Fig 1.3

Fig 1.4

Fig 1.6

Fig 1.7

Fig 1.5

Death in Peckham, Crematorium and Columbarium garden landscape.

Author's Own
Third Year design work

02

THE EMERGENCE OF THE ARCHITECTURAL DRAWING
TIMELINE

820AD - Plan St Gall, Switzerland

14th Century - The Sansedoni elevation

Perspective theory: Giotto's

Leane Battista Alberti: Single Point Perspective

Leonardo Da Vinci: Design Perspective

St Peters Basilica: Orthographic Projective Drawing, Michaelangelo

St Peter's Peruzzi - Ideal Perspective Composite

Sebastiano Serlio's L'Architettura

Christopher Wren - Technical Details

Krafft and Ransonnet - Parisian Houses entitled Plans, Coupes, Elevations de plus belles maisons

Krafft and Ransonnet - Parisian Houses entitled Plans, Coupes, Elevations de plus belles maisons

Sir John Soane - Painting Public and Private Buildings (until 1815)

Antonio Sant'Elia - Design for Monza Cemeter

Antonio Sant'Elia - Section through typical Boulevard

Frank Lloyd Wright - The Robie House

James Stirling - Composite Section

James Stirling - Composite Section

Alison and Peter Smithson - Streets in the Sky

Archigram - Monte Carlo Competition

Michael Webb - Temple on the Island

Peter Cook / CRAB Studio - Kunsthaus Graz

Steven Holl - Maggie's Centre St Barts

PRIOR TO THE 13TH CENTURY

820AD - Oldest known drawings: Plan St Gall, Switzerland (pen and-ink on parchment). **820AD,** only surviving drawing was drawn concomitant with a detailed picture of what was then regarded as the ideal Benedictine monastery, never built but setting a standard for others to emulate P13, Powell, H.

Middle Ages - Builders were more capable than they are today and were more involved in the design process by thinking out large structures in 3D using geometrical calculations. Mark making and surface impressions were the predecessor to drawing as these were unnecessary to the process of construction. P12, Powell, H.

It is later in this period that there was more of a reliance on drawings as full scale templates for mouldings and form-work, full drawings of a construct were not drawn.
Prior to the 13th Century there is very little evidence of formal drawings of larger buildings and cathedrals. This could be due to the loss of evidence as drawing surfaces would have deteriorated over time even if stored. Full scale grand plans were laid out in the ground using stakes, cords and simple instruments by the master builder to set the parameters of a project, there was less concern for the numerical accuracy that is prevalent in practice today.

Reims Palimpset – Oldest project drawing for the overall façade **1240-60**.

13th Century - Gothic architecture considered to be an artistic genius with the 'skilful use of common tools' p20, Saint, A. There was a focus on the built with little counting for numerical accuracy. The execution also, the design process encapsulated perseverance, compromise and revisions – greatly respected profession.
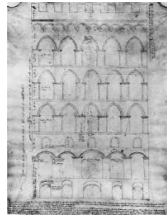
14TH CENTURY
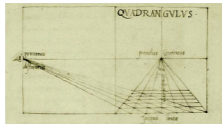
The redefining of the drawing was beginning to take place – 'The Sansedoni elevation…suggests a shift in the way architects worked concomitant with a change in the uses of the drawing' p13, Robbins. The drawing is not of sufficient detail to actually guide and control production of a building so therefore is supplemented with written instructions alongside. This drawing is the emergence of using drawings solely as a production method for construction.
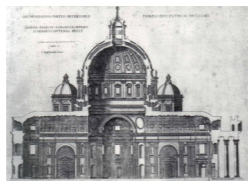
The Italian Renaissance brought with it the Renaissance sketchbook which formed the 'basis of architectural training serving as a memory aid, instruction manual and source of ideas' p11, Powell, H. This encouraged the idea of copying from the existing and recording life through study based drawing.

'The relationship between an architects thinking, drawing and seeing is highly complex, possibly because it links together these fundamental human activities'. Drawings were more than a graphic expression of ideas; architects thought and imagined through drawing, instilling this method of study as a widespread condition across the profession.

Emergence of the perspective theory: Giotto's paintings 'provide a key in the transformation of architectural drawing…by introducing depth and foreshortening into their architectural scenes' p15, Powell, H with non-mathematical pictorial representation that developed into a calculated systematic method of notation commonly known as the perspective drawing. Leane Battista Alberti was the first to codify this system of single point perspective and 'crystalise ideas on proportion, order, convention and planning' as a true scale working drawing for a building. Alberti's 'harmonic boxes' took the existing systems used in painting and projected objects onto a forward flat drawn plane to record an imagined design. Until this point the plan was primarily used as a construction guide. Building off-plan was supplemented with a verbal description from the architect on site.

15TH - 16TH CENTURY

Leonardo Da Vinci (1425-1519) was fascinated by the optical realism of perspective construction. Alberti's system did not deal with the curvature of line like the human eye. This distorted the true measurements and proportions of an object, he termed this type of drawing the 'design perspective' p16, Powell, H. The design perspective 'produced an idea of architecture that rejected the traditional distinction between the 'design' (on one plane) and 'structure' (in three dimensions)'. This method of drawing was limited and was confined to the design of buildings as they did not provide accurate dimensions or scale of an object, only proportion. This method of drawing is perceived as a flat picture from an ideal viewpoint. It was Bramante who manipulated this method of drawing to depict the front plane in section to communicate the 'body of the space, rather than the articulation of the walls'.

Alberti: 'the architect must of necessity design and builder must realise that design; the drawing would guide such a relationship. This relationship was not yet instituted: 'it is the role and function of the drawing to the buildings…suitable layout; an exact proportion; a proper organisation; a harmonious plan, such that the entire form of construction is borne fully within the drawing itself' Building is fully resolved on paper as a depiction or instruction manual not a design to be realised by builder. P17, Robbins.

Change in Viewpoint
1483-1520 – During this period the classicist Raphael succeeded Bramante as the chief architect of St Peter's Basilica in the Vatican City. He was set with the task of translating and building his predecessors drawings, he 'insisted that architectural drawings should consist of the separate ground plan, elevation and section'p17, Powell, H. He chose to abandon the prevalent perspective and other pictoral views with their single viewpoint, which did not translate the moving user through space, in favour of orthographic drawings to communicate the inside of the space.
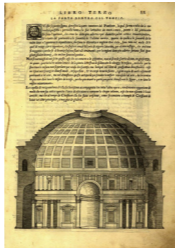
P18, Powell, H. St Peter's Peruzzi, 'ideal perspective' combination of ground plan (drawn in perspective), elevation (as seen) and section, did not make the separations required in views as recommended by Raphael. 'gave an impression of spatiality it did not represent the appearance of the interior, nor did it supply accurate measurements' offered clarity and readability to the viewer but not able to communicate design intentions accurately to the builder, 'reluctant to abandon the more visual practice of drawing in perspective for orthogonal projection which forced the artist and the viewer to accept multiple abstractions'.

'cavalier projection' concerned with picture-like visualization rather than accurate measurement – popularised through his assistants and the trickle of education through the project. Perspectives, optics, geometry, proportion, number, viewer's eye located within the perspective construction, 'deep connection between perspectivity and architecture' in the built sense.

Michelangelo became the 'first artistic 'celebrity' whose drawings were requested by admirers, 'during his lifetime the idea we now take for granted-that drawings can be collected as independent works of art-emerged as a notion of connoisseurship'. He deliberately destroyed many of his drawings in order to 'conceal the amount of effort he put into the development' wanting to retain his image as an artist who works from creativity and not a calculated formula.

16TH - 17TH CENTURY

Emergence of Formal Conventions
16th Century - Sebastiano Serlio's L'Architettura was published as a book in 1537 which was the 'first attempt to provide a parallel or comparative analysis for architectural orders'. The book 'used a number of praised drawings of Peruzzi as the basis for others' p22, Powell, H to create a manual for construction and design principles that also fetishized drawing as an art in their own right that was separate from the constructed architecture. Shortly after this in 1570 Andrea Palladio's Quattro Libri dell'Architettura was the first to publish drawings with numbers, letter and graphic elements to mark spaces and indicate the proportional and harmonic qualities of the building. This establishment of formal drawing conventions did little in terms of construction with many decisions still being made when on site. The Rontunda was the only building to be constructed exactly according to Palladio's drawings in the Quattro Libri. P22, Powell, H.

The earliest English architectural drawings as the professional architect began to emerge. Classes of drawing such as the plats (plans), uprights (elevations) along with crude indications of perspective projections were most common p29, Powell, H.

Elevation transcended rival viewpoints, although it was imperceptible it was geometrically correct.

17th Century
1621-1681 – French armies were a large employer of draftsman who contributed greatly to the production of standards and drawing conventions such as the scale bar and blackened windows. P27, Powell, H.

The 17th Century brought an increased regularity to drawing, frequency of publication – consistent language and legibility by the readership, filtered down to clients and those which drawings were accessible to.

1617 – The paintings of Issac Oliver encouraged the architect to move into more free line and delicate washed drawings, usually with a prominent pen line in sepia ink with cross-hatched shadows. Drawings began to have more life and variety in their colour and depth in representing the conditions of the buildings they communicated p29, Powell, H.

Christopher Wren (1632-1723), more concerned with the technical aspects of architecture, recorded the solidity of modelling and resulting shadows as a means to emphasis the harmonic proportion and measurements when drawing. Although much of his career was spent using the model as the main tool for communication (St Paul's Cathedral) p30, Powell, H.

18TH CENTURY

During the Rococo period there was much interest in the internal arrangement of spaces and expressive colours and finishes. The ability to reconfigure space in a toy-like manner was in fashion. Although usually illustrated with the model, these principles can be seen in drawings of the time with cut outs and unfolded drawings where elevations project out from the plan.

It is also during this period that drawings with colour became more widespread, not only serving as a representational or coding tool but in an accurate way with great attention paid to the interiors colour and detailing.

1750 – The number of drawing artists grew as a specialist profession due to the rise in commissions, publication and also frequently allowed artists to set up as teachers of the subject.

Late 18th Century – The picturesque movement focused on the aesthetics of the image more than the intellectual. Drawings became less geometric and abstract and more concerned with the ephemeral and atmospheric than ever before. With the addition of shadow, colour and landscape excitement could be added to the humblest of buildings. JM Gandy – Soane's Assistant focused on the construction, completion and ruination of the building within the geological and biological setting – Old Bank of England, London Fields, Tomb of Merlin.

In revolt from the picturesque a reductavist outline style approach took hold within education. Krafft and Ransonnette (Parisian Houses entitled: Plans, Coupes, Elevations de plus belles maisons (1802) p40, Powell, H. This style survived the test of time and is still greatly popular today due to its clarity and efficiency in production.

1850 – Tendency to separate the manual work and the mind work, p33, Saint, A.

1857 – Palace of Westminster Competition
The Gothic style brought with it archaic unsophisticated drawings which opposed to the style and symmetry of the neo-classical architecture before it. This conflict rose as The Battle of the Styles each with their own approach and working methods.
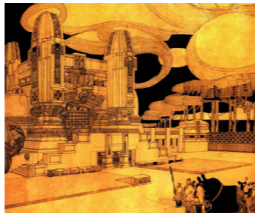
1870 – Gothic revivalists introduced the Queen Anne style which often was recorded with a series of details, designing buildings in perspective before working out in plan, something which is an anathema to the Classical style.

1880 – The rise in the number of 'ghosts' as a figure who produce attractive drawings to please a client, publicise an architect or to design the actual elevations. It was regarded that a good renderer could rescue a mediocre design and present it as something passable. This was through the manipulation of light, materials, landscape and composition to distract the attention from the inadequacies of the scheme p53, Powell, H.

Late 19th Century
Antonio Sant'Elia (1888-1916) – Emergence of the theoretical drawing. One of the most prominent members of the futurist movement is greatly 'remembered for his drawings of parts of an imaginary city, in which the scale is emphasized by exaggerated perspective' p55 Powell, H. Starting a movement of its own where architects could work solely on architecture without the intention of being built.

19TH CENTURY

Lack of formal education and prestige within the profession. Romantic youth were fed on Gothic churches and were disheartened when they were condemned to design replicas of debased styles and work from a palette of existing elements.

'Of the frustrations encountered by these architects at the commencement of their careers, poor training and lack of opportunity were the most immediate and galling. But these obstacles derived from the more basic misunderstanding about the nature of architectural practice.' P57, Saint, A.

Lack of industry across work to support design alone so architects took on many congenial tasks, best promise of design work was through commissions.

Soane helped build on the status of the architect within the industry such as the lack of formal education: 'Soane took dignity and educational responsibilities of the architect very seriously, and his office had a high as reputation as any' p42, Saint, A. His enthusiasm to teach promoted the profession and the idea of education where learning and skill was transferred from master to student.

Soane shaped the role of the architect to act as an impartial agent between the client and the builder. Detail became a tell-tail of the educated architect from the untrained operator, idea of architectural territory rose and a protective attitude towards the profession. Art architect to design and a practical architect to superintend and carry out the construction works alongside the contractor.

'Design was a literate and highly esteemed skill; it allowed close contact with the client rather than continuous haggling…it brought the chance of enhanced status' p58, Saint A.

20TH CENTURY

1900 – RIBA brought in an act to protect the name, title and role of the profession by excluding the untrained 'cowboy'.
The RIBA also decided that perspectives were unnecessary in competitions and by **1920** they had virtually disappeared with only orthographic drawings submitted for competition entries.

This was the first period in which architects created lavish and stylised drawings, devoting 'a great deal of effort into making beautiful, highly finished drawings which were intelligible to the lay public' p10, Powell.

1900's - Frank Lloyd Wright disturbed by the current state of the profession: 'Distinguishing the true professional from the businessman as one whose concern should be quality rather than profit' p16, Saint.

A sudden revolt in the paper architecture movement where architects such as Gaudi became dependant on the craft and techniques of fabrication. Other architects to move away from the purely aesthetic who championed classical simplicity in drawing was Peter Behrens. This was taken up by many of his pupils including: Water Gropius (1883-1969), Ludwig Mies van der Rohe (1886-1969) and Le Courbusier (1887-1966), whose work 'had been seen to dominate the first half of the 20thC. All rejected 'ornament in acceptance of a 'machine aesthetic' and in their interest in 'functionalism' and the possible uses of new materials, they stand as much at the end of a series of 19thC traditions as at the beginning of new ones'. P57, Powell, H.

These architects relied heavily on the simplification and contrast in scale in drawing, carefully choosing viewpoints and often the outline style whose 'views are as deceptive as 'renderers'' in making buildings attractive p57, Powell, H. This followed with a further split that made the divide between the poetic and technical aspects of design even wider.

1920's – Strangling regulations and conventions of the day – academic classism, Convention of big business
1931 – Beaux Arts Ball – The Fountainhead (1949), The Skyline of New York, p6, Saint A
1940's – A time of transformation with an emphasis on the design of the drawing, aesthetics and the development of a signature/ display of the image of the author. The idea of the Image of the Architect reasserted as pressures pushed on the profession.

FLW: 'He denied that an individual's style could ever be imitated' p16, Saint, A. He often said to the client: 'you will take what we give you.' 'I hypnotize him, There is nothing so hypnotic as the truth. I show him the truth about the thing he wants to do as I have prepared myself to show it to him, And he will see it. If you know, yourself, what should be done and get a scheme founded on sensible fact, the client will see it and take it, I can have found.' Hypnotise/ persuade the client – unwavering signature authorship. 'His buildings are designed on the principle 'treat the client rough'.

Michael Webb, a key player within the movement, was conceived to be the most talented out of the group with regard to spatial design and graphics. He developed a number of sophisticated drawing techniques, such as airbrushing and watercolour, which were more refined than the quick, graphic typical Archigram methodology. Webb demonstrated great skill and nuance with completely different techniques that were choreographed with the physicality of hand-eye coordination. Webb's literacy for drawing gave him the reputation as the leading graphic communicator within Archigram and acted as the primary method of testing and questioning the conventions within architecture during the 20th Century.

In **1982** the first CAD drafting tool was released, AutoCAD. By March 1986, only four years after it was introduced, AutoCAD was commonly used within the commercial sector of the profession. By this time a number of rival software was released by competitors.

LATE 20th CENTURY

Late 20th Century - Many contracts and much politics in getting work acted as aggressive pressures on the industry and created a very competitive market. Strict parameters were set by developers in the interest of finances, the industry became committed to 'commitment to profit and efficiency' p140, Saint, A.

1950 – Alison and Peter Smithson were careful to use drawing as an intentional tool for a purpose. They chose to express a narrative within architecture by drawing with clarity to illustrate context, inhabitation and use of the building with figures.

During the 20th Century there was great common influences within the profession, this created a parallel dialogue between architects who shared interests. Although there was much conformity and cohesion within the profession during this time some chose to move away from this homogeneity in attempt to push and shape the industry through drawing.

1960 - The Archigram avant-garde movement began in the 1960's with a group based at the architectural Association, London. The movement communicated the idea of a neofuturistic architecture though bold graphic drawings greatly influenced by comics and past graphic culture. In response to development of technology and robotics the movement was reactionary to the current climate.
'Archigram's agenda – was the domestication of technology by selective appropriation and the cultivation of an architecture attuned to the swinging sixties subject' p11, Crompton and Cook. The work was radical and non-political but set out to challenge the notion and understanding of architecture through a new anthology of drawing that was distributed through both the professional and public spheres in response to the conservative context. Drawing and collage were used as the primary language in which to employ mechanization and movement employing a method that was: 'ad-hock, nomadic and episodic. Archigram was not so much a group as a collection of exposed nerves/ firecrackers… occasionally colliding to form even larger bangs'. p4, Crompton and Cook.

2009 - By 2009 the percentage of companies using BIM had almost doubled since 2007 (28%) by reached 49% worldwide. In 2012 this figure had risen to over 71% making this the fastest shift in the working method within architectural practice since the ability to draw on the computer.
https://www.archdaily.com/302490/a-brief-history-of-bim -accessed 11/02/18

2013 – Conventional graphic forms such as the plan, section and elevation, are potentially melting away… as the formation of the image can be tailored to any particular design context or process' p5, Architectural Design, Drawing + Architecture.
Increased demands from the client and the public to produce an image that is more propositional and easily read has increased the demand for high resolution computer renders. Many offices outsource this work to highly skilled visualisation companies due to the skill and cost implications of producing such images and architects are often reluctant to completely stray away from the design process in favour of this presentational technique.

21st CENTURY

Digital programs and drafting tools became widespread within the profession and became an essential tool for the architect, even in the smallest of offices. The image of the architect is now sat in front of the computer instead of positioned at the drawing board.

The influence of technology within the profession has enabled complex design methodologies to emerge in the form of parametric and algorithmic design.

2003 - Peter Cook of CRAB Studio developed the Kunsthaus Graz building through specifically architectural practice-led processes that were 'evolving towards a 'paperless' design office where the project's concept was manifested via digital 3D data sets, materialized via computer-driven manufacturing processes'.
https://www.uc.uk/bartlett/architecture/research/kunsthaus-graz -accessed 11/02/18

It was in the 90's that BIM software, as we know it today, was developed and introduced to the first practices. This technology has pushed the industry to a design method that is rooted in the database. The development of a building in two-dimensional drawings has been pushed aside in favour of working in three-dimensional computer generated models which capture design decisions as live information that is shared between the design team within this model. This shared working environment brings the multitude of disciplines closer within a project and eliminates the focus put on the 'traditional' drawing. This is due to the building being developed at 1:1 within a Three-dimensional computer generated environment from which drawings can be generated as two-dimensional planar extractions as and when required, superseding the traditional iterative drawing process.

2017 - Steven Holl continues to work in his established design process through conceptual and technical drawing through all stages of the project. This is now supported with the production of rendered images to increase legibility and explicitly communicate the design intent, largely influenced by the practice's desire to take the project through to construction.
'The primary form of architectural drawing, reduced by the majority of professionals in practice, still follows the triadic system of plan, section and elevation. The codification of construction drawings is designed to prevent ambiguity or multiple interpretations by using a strict and abstract system of notation'. p104, CJLim, AD, Drawing + Architecture.

SUMMARY:

Little use of drawing to communicate the overall building. Drawings were used as a 1:1 design tool to work through the detail and formed a rudimentary template for mouldings and form-work.

Shift from two-dimensional orthographic drawings to come complex three-dimensional projections. These were used to better communicate the spatial tectonics and appearance of the building.

Drawing perceived as being the artistic device for architects to construct the body and feeling of space. Greater division between the artistic and the practical architect's approach, perspective as a tool for the technical applications and for the aesthetic qualities of the image alone.

Formal drawing conventions and systems emerge within the discipline, used equally for the technical applications and for the aesthetic qualities of the image alone.
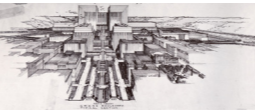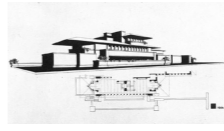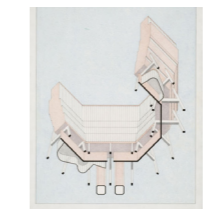
The rise in the number of perspectivists and renders employed for their talents at producing a beautiful image. Greater attention paid to the aesthetics of the drawing in order to communicate a true representation of the building to the public and professional.

Emergence of the theoretical drawing which was used as a conceptual tool for the investigation into the ephemeral and speculative qualities of architecture.
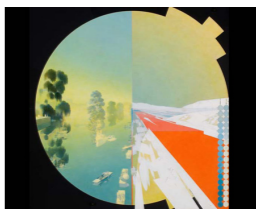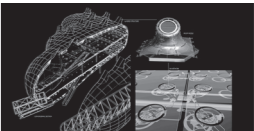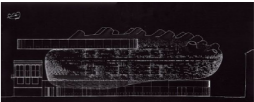
Greater awareness of the public's understanding and legibility of the architectural drawing. A higher consideration was paid to the sensibilities and sentimentality of drawing and architecture.

Drawings seen as being a radical tool to initiate dialogue and impart knowledge between the architect and the public, experimentation of the purpose, narrative and effects of drawing.

The drawing in the traditional sense seen as a subservient method of working for the professional. Outside of the architectural discipline the drawing is often seen as secondary to the rendered image and the embedded information attached to the digital.

The Systems of Drawing
14th-18th Century

The oldest surviving architectural drawing is the St Gall Plan of 820AD(Fig.2.1). This drawing clearly communicates information concerning context, proximity, and scale of a Benedictine monastery. During the middle ages the processes of design and construction were interwoven, drawings to communicate between disciplines were not required. For complex buildings like Cathedrals the master builder would lay grand plans on site using rudimentary instruments, sticks, and cord. Although based on calculations, there was little concern for measurement. Full plans, sections and elevations were never drawn, the master builder was capable of conceiving and constructing structures directly on site. The only drawings were produced as templates for mouldings[5]. In 1235 Villard d'Honnecourt was the first to consolidate design principles and technique into The Reims Palimpsest or Renaissance sketchbook(Fig.2.2). This document contained the Sansedoni elevation(Fig.00), the first drawing depicting an overall building. The Renaissance sketchbook documents a point of fundamental change in construction where drawing was undertaken before commencing construction[6]. '*Drawing took hold as the dominant instrument of design and as the symbol of what makes the architect unique*'[7]. Facsimiles of the Renaissance sketchbook became widespread and drawing became the intellectual language of construction, replacing the mathematical, written and spoken languages. Literacy skills were required to interpret this language, the Renaissance Sketchbook provided this cognitive visual training.

Although respected within architecture, drawing had connotations of illegibility and being nothing more than a personal pursuit for information. The Italian Renaissance challenged this perception by presenting drawing as a method to share accurate information of the three-dimensional world. By the 14thCentury the architect had adopted command over the drawing, polarising the construction industry and initiating the division between the manual and mind work, elevating the status of the architect.

Fig. 2.1: St Gall Plan, 820AD.

Fig. 2.2: The Sansedoni Elevation, 13th Century, The Reims Palimpsest.

14th - 18th Century

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5   *Powell, H. and Leatherbarrow, D. (1982). Masterpieces of architectural drawing. London: Orbis.p.13.*
6   *Powell and Leatherbarrow,1983,p.10.*
7   *Robbins, E,1997,p.18.*
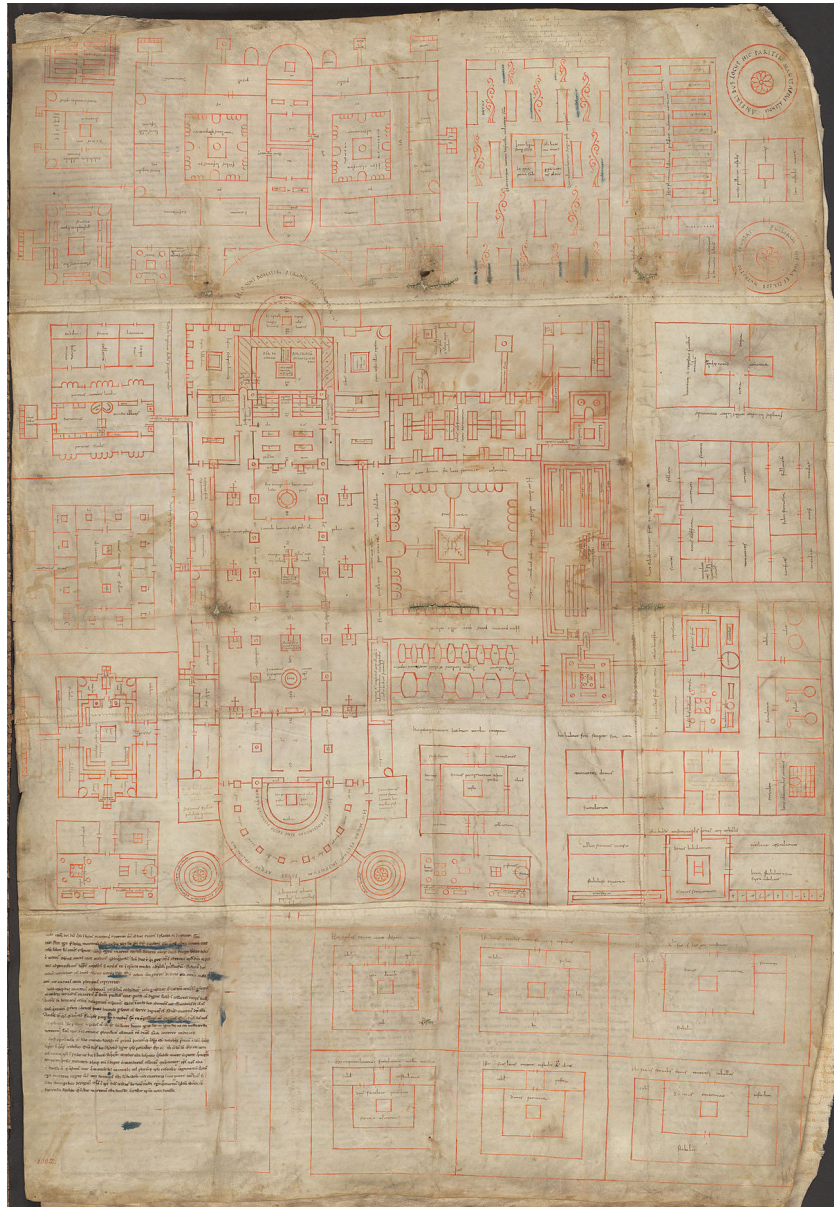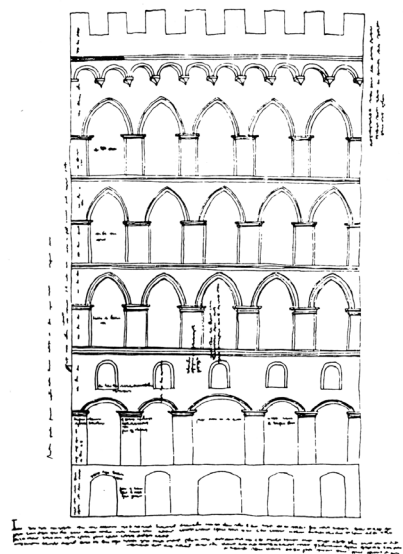
Fig. 2.1

Fig. 2.2

A Change in Viewpoint

One of the most significant shifts in the evolution of the architectural drawing was the formulation of the perspective. Giatto di Bondone's paintings were central in this transformation(Fig.2.3) by introducing *'depth and foreshortening'*[8] via non-mathematical pictorial representation. However, Leane Battista Alberti was first to codify perspective theory as a system of *'harmonic boxes…projected onto a flat plane'*[9](Fig.2.4). The *'cavalier projection'*[10], as it became known, was more concerned with pictorial visualisation in lieu of accuracy yet was inherited as a working method through Alberti's assistants. During the Italian Renaissance(14th Century) the plan was primarily used as a construction guide with the perspective and verbal descriptions providing supplementary information.

The perplexity and the potential of perspective construction fascinated Leonardo DaVinci. He investigated the optic limitations of Alberti's 'harmonic boxes' perspective theory through optometry(Fig.2.5). He concluded that by not dealing with the curvature of straight lines at the periphery of an image the 'true' proportion of an object was distorted. Also perceiving architecture from a fixed viewpoint, the drawing primarily served to exhibit the volumetrics of a space. To emphasise this quality the sectional perspective, which eliminated the projection of walls, became common[11]. Therefore, the perspective became known as a design tool rather than to construct a building.

Throughout the 15th Century, the perspective became a common visual register due to its comprehensibility. Most architects adopted this drawing format as it was perceptible to the untrained. However, during the 16th Century the perspective fell under great scrutiny, polarising the visual discourse. In 1514, Bramante favoured the central perspective to design StPeter's Cathedral from *'inside the space'*[12]. However, classicist Raphael Sanzio da Urbino, who succeeded Bramante in 1514 as principle architect of StPeter's, pioneered the abandonment of the perspective for its static nature and inability to communicate movement through the building[13]. He insisted that measured orthographic drawings should be used. Instructional drawings were separated into the triadic registers of plan, section, and elevation. Further to this, Baldassare Peruzzi who succeeded Raphael in 1520, preferred the combination of orthographic and perspective projection. Peruzzi's *'ideal perspective'*[14] laid the plan in perspective with the elevation and section projecting from this ground plane(Fig.2.6). Although this composite gave an impression of spatiality, it did not record measurement nor represent the true interior. Peruzzi stated this register offered greater readability however the 'ideal perspective' resulted in the abstraction of information onsite[15]. Until the 18th Century, orthographic and perspective projection were used in parallel to provide readable construction information and demonstrate the quality of the space. In combination these drawings set working parameters for construction.

14th – 18th Century

Fig. 2.3: Giatto di Bondone Painting, 14th Century.

Fig. 2.4: Leane Battista Alberti, 14th Century, Harmonic Boxes Theory.

Fig. 2.5: Leonardo Da Vinci, 14th Century, Perspective Construction.

Fig. 2.6: Baldassare Peruzzi, 1520. Ideal Perspective.

8   *Powell and Leatherbarrow,1983,p.15.*
9   *Ibid,p.15.*
10   *Ibid,p.15.*
11   *Ibid,p.16.*
12   *Ibid,p.16.*
13   *Ibid,p.16.*
14   *Ibid,p.18.*
15   *Ibid,p.18.*

Fig. 2.3

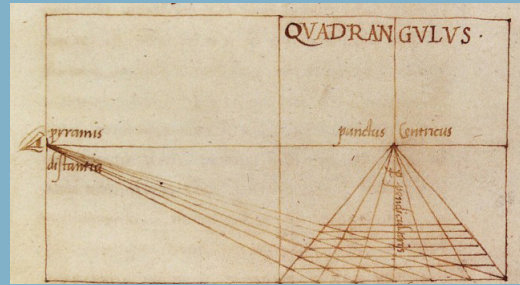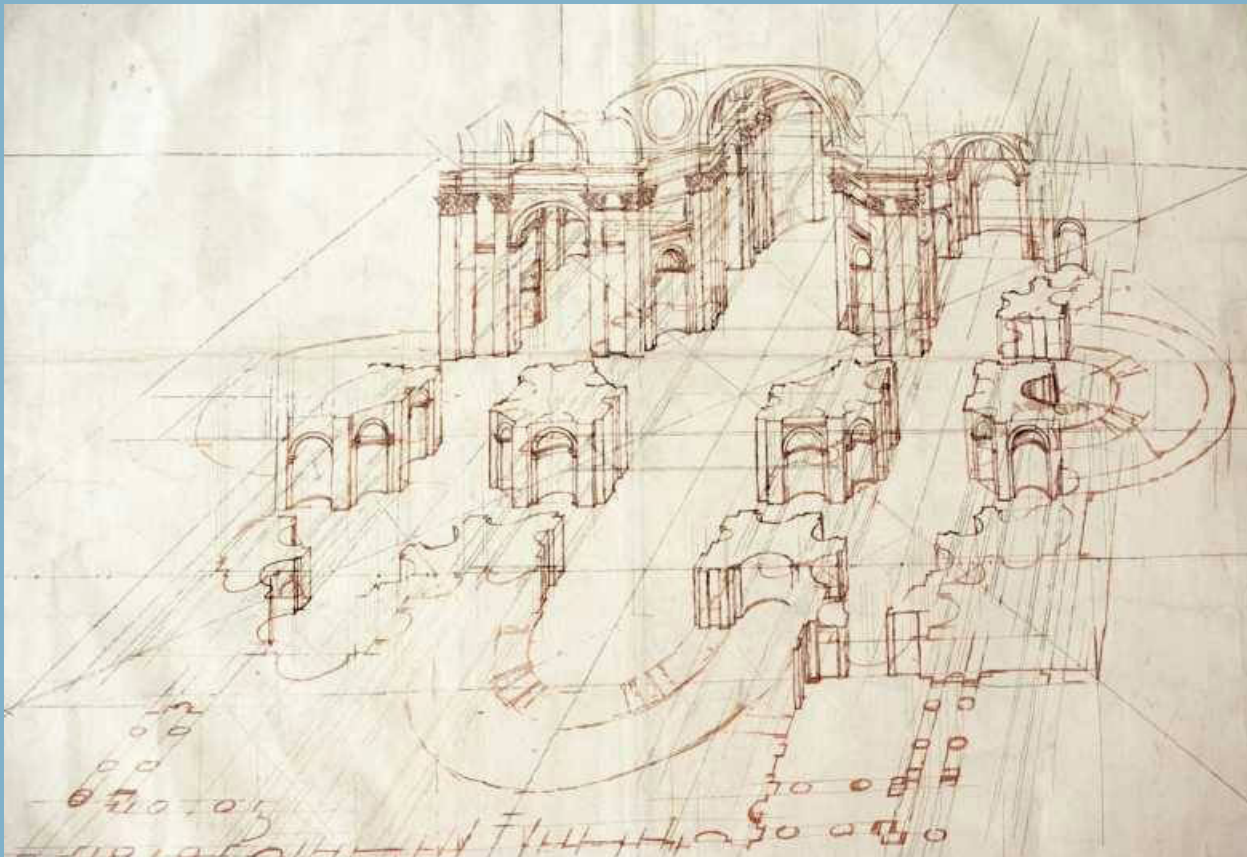
Fig. 2.4

Fig. 2.6   Fig. 2.5

The Formulation of Convention
16th -18th Century

During the 16thCentury there was a greater awareness of different formats and systems of drawing. It was during this period that more formalised systems and conventions began to emerge and the working method of the architect homogenised as a result. A vast number of publications featured woodblock printed drawings to provide a reference for standardised drawing systems. In 1537 Sebastiano Serlio's L'Architettura was the first book to *'provide a parallel or comparative analysis for architectural orders'[16]*. This material became the first formal visual resource for training the architect by promoting literacy through a set of common, legible standards. In 1570 Andrea Palladio published Quattro Libri dell'Architettura which featured numbers and letters to mark architectural features. This allowed for greater comprehension and understanding when reading drawings for both the architecturally trained and the visually untrained.

By the 17thCentury, the rise in architectural publications positioned architecture as a subject of special interest beyond the profession. Drawings printed alongside text were often the most recognised record of an architect's work. The drawing became the calling card of the architect, not the building. The ability to comprehend architectural information filtered down to the public who showed interest in the visual discourse[17], audience shifted from the mono-centred to the multi-centred.

During the early 17thCentury the role of the professional architect arose in England. Orthographic 'platts'(plans) and 'uprights'(elevations) were common with the occasional crude perspective[18]. The architect received limited formal training in drawing, commonly using only simple linework. Painters such as Issac Oliver were greatly influential to architects of the time. Robert Smythson and Inigo Jones(Fig.2.7) attempted to use watercolour to provide greater clarity through drawing. Delicate washes, ink, and hatched fills introduced colour and shadow, architects soon developed a linguistic style, a feature used to differentiate one architect from the other[19].

Fig. 2.7: Inigo Jones, 1639, Elevation of the Queens House to the Park.

During the late 17thCentury the Rococo art movement greatly influenced the decoration and coding of the drawing. The fascination with toys and the ability to reposition and reconfigure space was translated into drawings to excite. William Kent exemplified this by projecting elevations from the plan, deconstructing a room into a set of modular scaled components(Fig.2.8). Continuing into the 18thCentury the architectural drawing became more perceptible to the public by using decorative techniques and conventions that were representative of real life. Hatching was used to communicate texture, and coloured wash to indicate colour and shadow. Through the establishment of formal systems and conventions the architectural drawing became a legible communication device, effective communication was dependent on the training and literacy of the audience.

Fig. 2.8: William Kent, 1735, The House of Commons, London.

16   Powell and Leatherbarrow,1983,p.21.
17   Ibid,p.24.
18   Ibid,p.29.
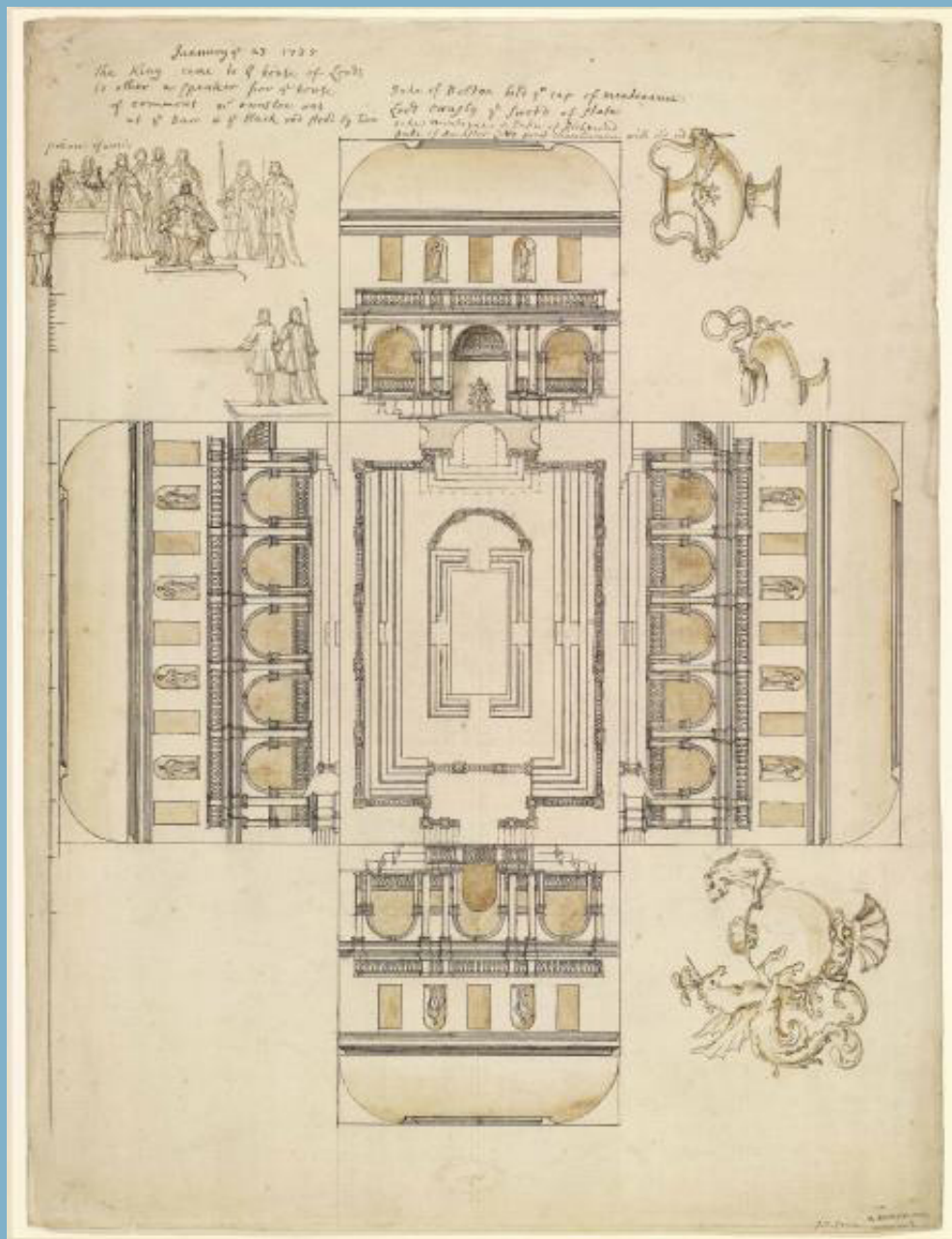19   Ibid,p.29.

Fig. 2.7

Fig. 2.8

Giovanni Battista Piranesi(1720-1780) was the first architect to radically challenge convention, using drawing as a narrative instrument to investigate architecture. Piranesi manipulated established conventions to create fantastical, ambiguous architectures that constructed discomfort. Piranesi revolutionised drawing through the manipulation of the vanishing point and positioning of the viewer in perspective. Drawing became a speculative language to construct new realities of exhilaration and horror not confined by the constraints of reality(Fig.2.9-10). Etienne-Louis Boullee also used the construct of drawing to test new and unchartered principles of design. His Cenotaphe for Newton project(1784) celebrated 'Newton's infinite genius'[20] and explored architecture as a schism between art and science. Through drawing, Boullee manifests the conceptual idea of manipulating form to capture star constellations within a hollow dome by day and projecting them out at night(Fig.2.11). The introduction of the conceptual to architectural drawing was not confined to the speculative. The drawings of Sir John Soane(1780-1815) explored abstract concepts which motivated a scheme through unambiguous painted perspective views. In pursuit of the picturesque and sublime, Soane would test his proposals at idealised moments in time, depicting ruination and the objectification of a building(Fig.2.12-13). Drawing became an exercise of fetish to test the *'immutable laws of proportion'*[21] by forecasting the effects of the domineering forces of nature. Soane saw drawing as a 'literate and highly esteemed skill'[22] which brought close contact to the client, advancing the role of the architect.

By the late 18ᵗʰCentury the standard of drawing was so high that office clerks were emboldened into assisting with drawings. This didactic exercise acted as a form of training and increased the literacy of those immediately surrounding the profession. Eventually, the difference between work of the architect and the clerk was indistinguishable. JM Gandy rose to fame in this position within Soane's office completing drawings for projects like the Bank of England(Fig.2.12), exquisitely depicting light, materiality, ruination and the immortalisation of the building as an object(Fig.2.13). The standard of drawing in England rose exponentially, the right draftsman could turn the humblest building into something dramatic. Drawings became revered by the professional and the public, the visual literacy required to engage with architectural drawings had decreased. Overtime, drawing developed as a spontaneous process to explore conception, intention, and instruction. The development of systems and convention partially regulated drawing to promote legibility and prevent the abstraction of information. Nonetheless, these regulations did not confine the architect within a singular prescribed methodology; Piranesi, Boullee and Soane evidence this by communicating complex narratives through radical yet comprehensible drawings.

Fig. 2.9-10: Giovanni Battista Piranesi, 1745-1750, Prisons Drawings.

Fig. 2.11: Etienne-Louis Boullee, 1784, Cenotaphe for Newton.

Fig. 2.12-13: Sir John Soane and Joseph Michael Gandy Gandy, Ruination of the Bank of England and A Compositio of Public and Private Buildings.

20   *Powell and Leatherbarrow,1983,p.39.*
21   *Ibid,p.36.*
22   *Ibid,p.57.*
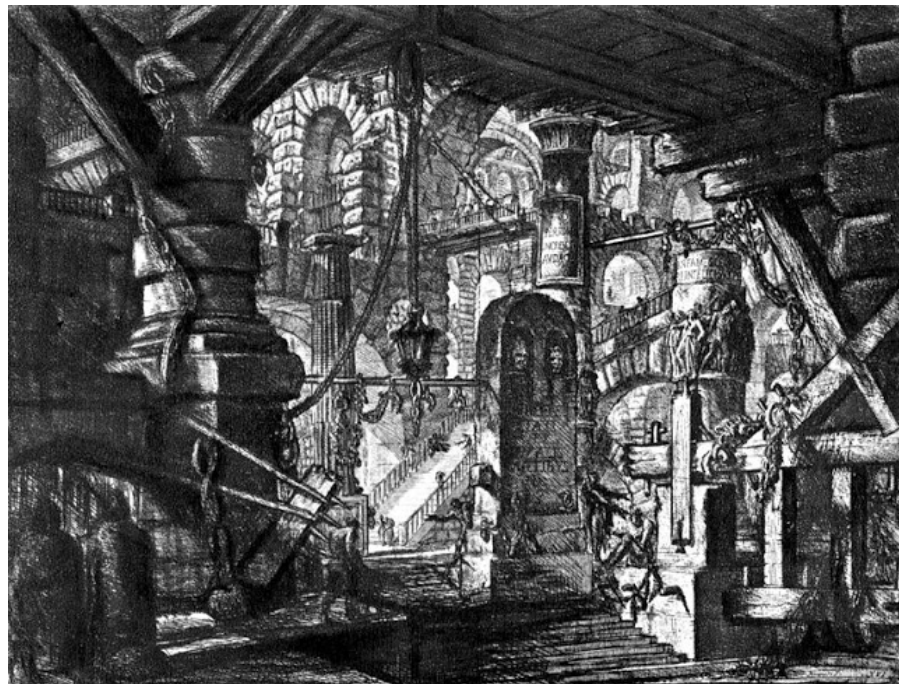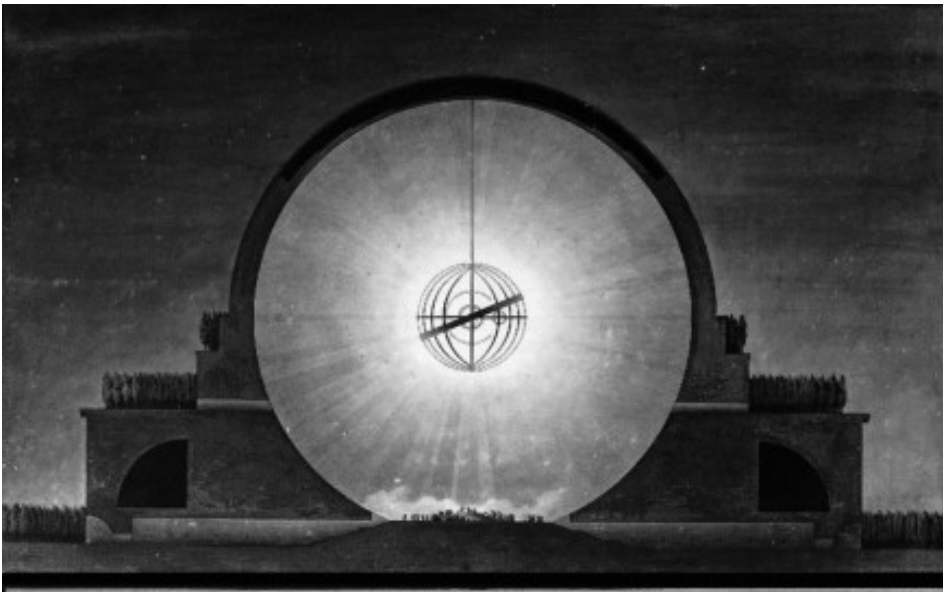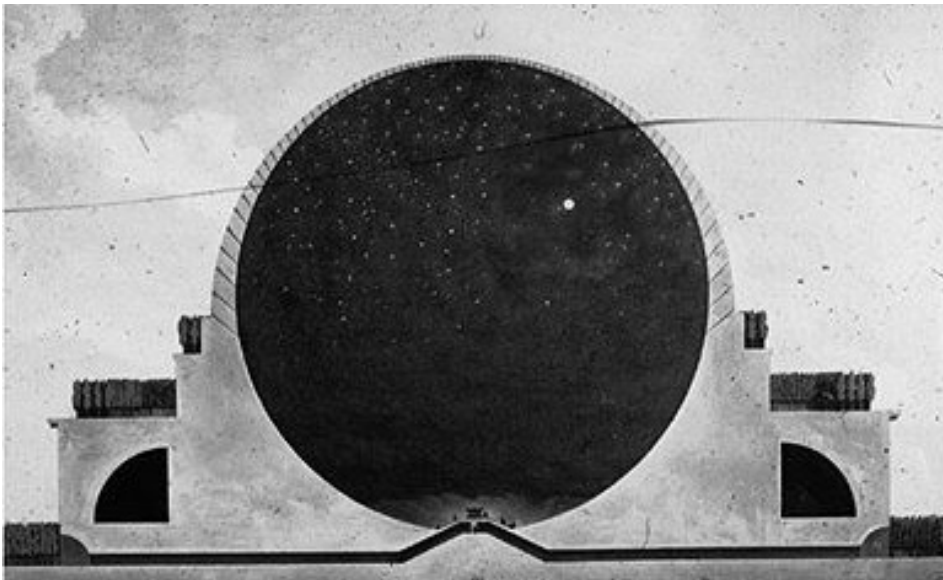
Fig. 2.9

Fig. 2.10

Fig. 2.11

Fig. 2.12
Fig. 2.13

San Francisco - Sit
Frequent Location: 22-29th Sept, Distance: 65,000m, Altitude: 49m

London - Eat
Frequent Location: 19-20th Sept, Distance: 5,500m, Altitude:312

N/A 3 Amtrack journey from Chicago

San Francisco Flight to London Gatwick by Sea train home

N/A 3 Amtrack journey to San Francisco
Sept, Distance: 107,200m, Altitude:150m

N/A 3 Amtrack journey to Chicago
Sept, Distance: 119,200m, Altitude: 318m

N/A 3- Entrance
+ 0.10

N/A 3- Outside Eat
Frequent Location:21th Sept, Distance: 1,400m, Altitude: 6m

N/A 2- Outside Sit
Frequent Location:15th Sept, Distance: 17,500m, Altitude: 66m

N/A 1- Outside Access
Frequent Location: 8-9th Sept, Distance: 32,400m, Altitude: 78m

+ 2.45
+ 2.60
+ 2.15
+ 2.00
+ 1.85
+ 2.05
w + 1.88
+ 2.05
+ 1.90
+ 1.75
+ 1.40
+ 1.90
+ 1.75
+ 0.00
+ 2.35
+ 1.90
+ 1.75
+ 1.30
1.88
+ 2.05
1.75
+ 0.00
+ 2.05
+ 1.75
+ 1.88
+ 1.90

Ogmore by Sea - Pool
Frequent Location: 8-9th Sept, Distance: 195,500m, Altitude:390m

Naburn - Sleep
Frequent Location: 6-8th Sept, Distance: 14,450m, Altitude: 409m

N/A 4 Journey from Wales to USA

03

The Processes of Drawing
19th - early 20th Century

During the 19th Century, architects began to devote great time and effort into beautifully crafted architectural drawings that were intelligible to a multi-centred audience. The Gothic style underwent a revival in the UK, attempting to defy the neo-classical aesthetic with a deliberate unsophisticated approach to drawing less concerned with formal convention. A greater value was placed on drawing as a design tool prior to construction to advertise a scheme to the client. The focus remained on the built as *'inspiration counted for little without execution'[23]*. The sketch became a common tool used to deconstruct a design at differing scales, not dissimilar to the way drawing was used before the 14th Century. Drawings were commonly reproduced for publication and exhibition, and the value of the image transcended art into architecture. Architecture became a venerable subject with a multi-centred audience. Drawing emerged as a social exchange of information between the architecturally trained and the visually untrained that was no longer purely concerned with mathematical and geometric accuracy. The drawing was slowly becoming the universal currency of the architectural discourse and had developed into a language unto itself.

Greater value was placed on the drawing to communicate iterative design, architects could interrogate singular elements and track design process, demystifying the process of design within the public sphere. Ernest George was a Gothic revivalist who used sketching to study details in isolation. He built a glossary of his travels through Europe, drawing for private didactic exercise with little concern for formal systems of scale and measurement(Fig.3.1). Returning to work in the UK, George re-used these sketches within his own designs; often undertaking *'buildings in perspective before working out the plan'[24]*, something of an anathema to the classical method. German neo-classical and neo-gothic architect Carl Freidrich Schinkel also worked through a premediated iterative approach. Often working with tracings and lithography Schinkel could re-work and re-examine a drawing. This technique suited the reductivist outline style used by Schinkel, clearly recording decoration and detail from the point of view of a user. The tonally flat perspectival drawings of the inhabited Altes Museum(Fig.3.2) carefully positioned people to communicate scale, interaction, and the 'softer' experiences that were comprehendible to a visually untrained public audience.

By mid 19th Century competitions were regularly held for all new public buildings[25]; entries were shared with the public and had great potential to propel an architects' reputation. For an architect to communicate effectively with the contractor, public or judge legibility was paramount. The perspective was the preferred visual register to communicate a user's experience. During this time, the role of the architect had become more business orientated and a good perspectivist was essential for all competition entries, as the architect had *'neither the time or skill to make them'[26]*. This led to the employment of *'ghost renderers'[27]* who were sought after to sell a project through a single image, comparable to Gandy's role within Soane's office. Stylish and exaggerated perspectives gave an unfair advantage[28]; consensus was that over-embellishment of a design could be misinterpreted, distracting from the substance of orthographic drawings. Competitions placed strict constraints on the number and position of

Fig. 3.1: Ernest George, Sketch from his travel journal.

Fig. 3.2: Carl Freidrich Schinkel, 1830, Altes Museum, Berlin.

23   Saint, A.(1983).The image of the architect.New Haven:Yale University Press.p.33.
24   Powell and Leatherbarrow,1983,p.48.
25   Ibid,p.53.
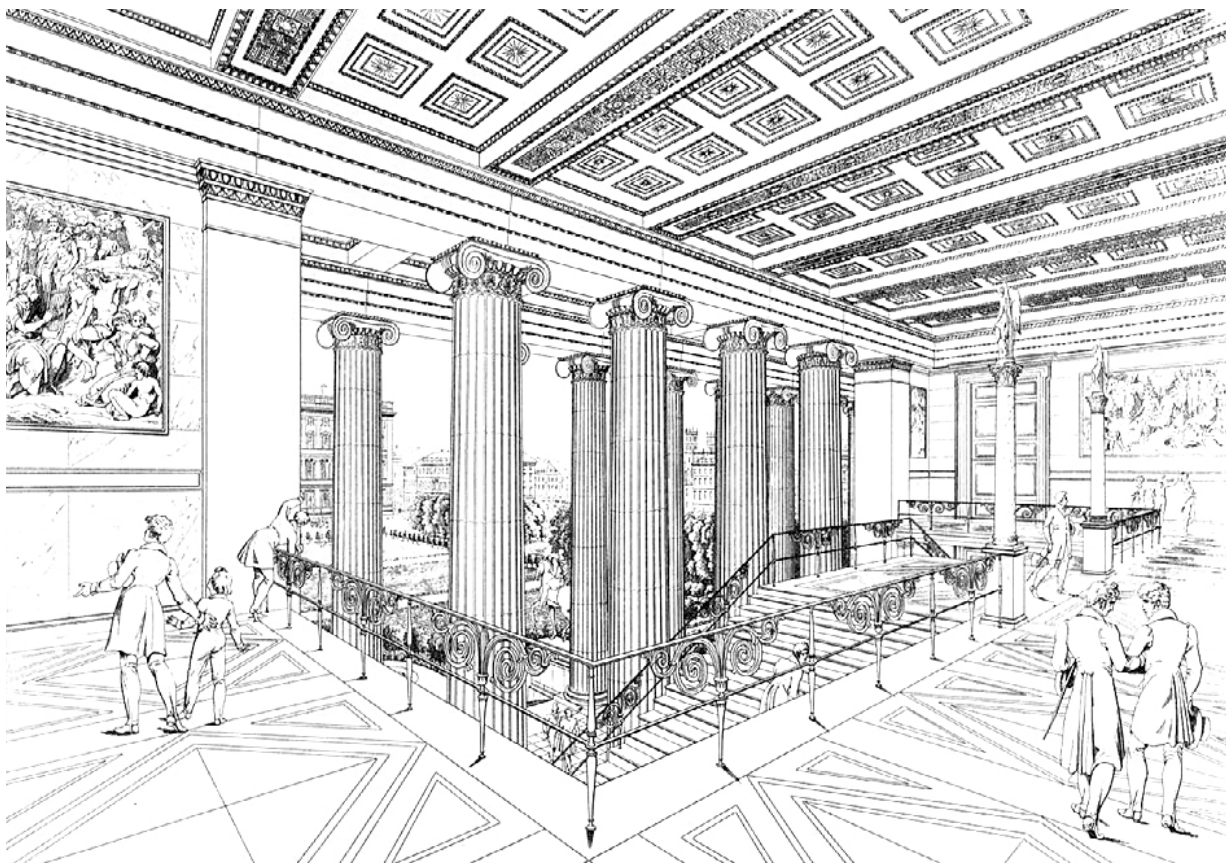*26   Ibid,p.52.*
27   Ibid,1983,p.52.
28   Ibid,p.52.

Fig. 3.2   Fig. 3.1

perspectives. In 1835 the Palace of Westminster competition, which received over ninety-seven entries, limited each submission to three perspectives which were to be drawn from specific viewpoints and rendered in monotone in attempt to level the playing field.

The Architectural Drawing

Tactical Drawing
early 20th Century

The regulation and control of information was not exclusively used to enforce fair practice. Concealment and accentuation through drawing often served as tactical motive. The Skogskyrkogarden project designed by Erik Gunnar Asplund and Sigurd Lewerentz tells a story of persuasion and disagreement. The architects winning entry for the woodland cemetery beat fifty-two others in the 1914 competition by proposing a harmonious balance between architecture and nature. The project drawings record a confluence and conflict of interests when working in collaboration after winning the project. Both were architecturally trained and highly literate in the common language of drawing. However, over the course of the project Lewerentz used colloquial tactics to deliberately withhold information through illegibility and misdirection[29].

Lewerentz, designer of the classicist Resurrection Chapel and overall landscaping, exerted control over the project through the landscape (Fig.3.3-6). By adjusting the height and positioning of hills and pathways he obscured Aspund's Woodland Chapels and directed users to his chapel. Overtime Asplund noticed subtle changes at the intersections between their proposals and forensically compared the two schemes. In response, Asplund made revisions of his own, substantially changing his design numerous times to keep up with the onslaught of changes.

The drawings grew more explicit and insistent throughout the project in a bid to track changes and reach an agreement through drawing. This dispute through drawing resulted in huge delays and the pencil-drawn linework plan was agreed upon as a neutral register to debate explicit changes in a legible way (Fig.3.9-13). Asplund's drawings record many schemes designed in response to the onslaught of changes although many of Lewerentz's drawings (Fig.3.7-8) were thrown away and damaged in frustration. Understanding the intellectual and cultural value of the drawings Lewerentz's assistant retrieved and preserved them. Today these drawings are priceless and archived in Asplund's Stockholm Library.

Lewerentz was dismissed from the project in 1930, also withdrawing from the Stockholm 1930Expo which the pair had also undertaken together. Lewerentz became disillusioned and turned away from architecture for many years[30]. The only contribution of Lewerentz retained in the 1930Expo was his stacking of logos positioned on Asplund's advertising mast. Asplund's drawings used vivid colours and joyous inhabitation, evidencing visible change in his attitude and approach after parting ways with Lewerentz (Fig.3.14-19).

Fig. 3.3 / 3.6: Skogskyrkogarden Landscape,2017, Google Earth.

Fig. 3.4 / 3.5: Authors Photo of Resurrection Chapel.

Fig. 3.7-8: Sigurd Lewerentz's perspectives of the Resurrection Chapel.

Fig. 3.9-10: Erik Gunnar Asplund'd Iterative pencil studies of the Crematorium and Chapels of Hope and Faith.

Fig. 3.11-13: Sigurd Lewerentz's Masterplan drawings of the Site.

Fig. 3.14-19: Erik Gunnar Asplund, Stockholm 1930 Expo, Sweden.

29   'The Architects' (Stockholm Stad, 2018) <https://skogskyrkogarden.stockholm.se/in-english/architecture/history/the-architects/> accessed 6 March 2018.
30   Daniel Fernandez, 'Asplund Versus Lewerentz' (OA UPM, 2018) <http://oa.upm.es/32664/1/HECTOR_DANIEL_FERNANDEZ_ELORZA.pdf> accessed 6 March 2018.

Fig. 3.3
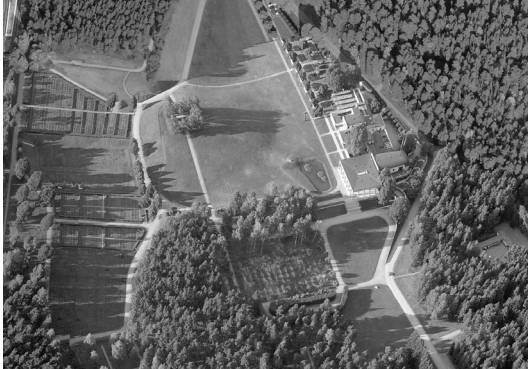
Fig. 3.6
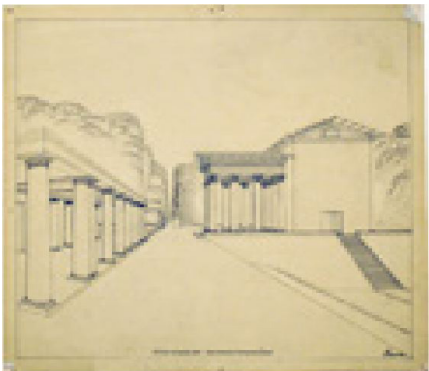
Fig. 3.4

Fig. 3.5

Fig. 3.7
Fig.3.8

Fig. 3.9
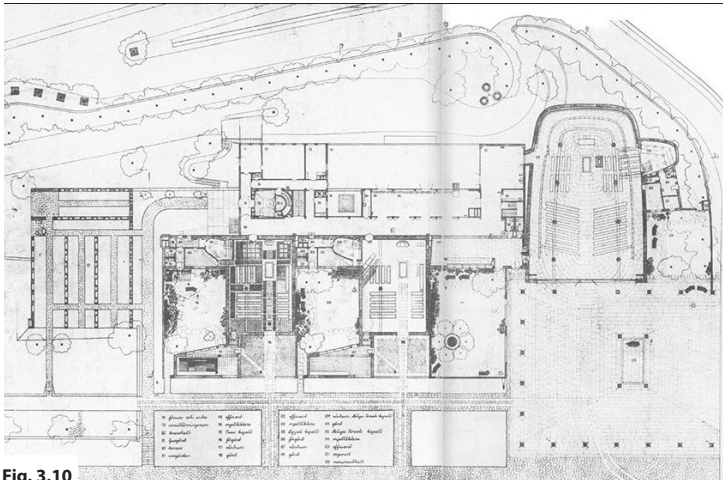
Fig. 3.12
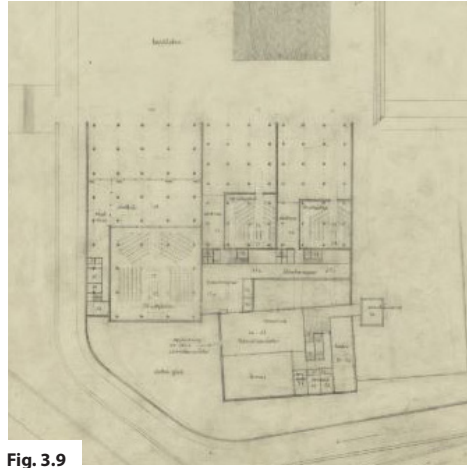

Fig. 3.10

Fig. 3.11

Fig. 3.13

Fig. 3.14

Fig. 3.15

Fig. 3.16

Fig. 3.18

Fig. 3.17

Fig. 3.19

The Architectural Drawing

Relationship with the Implement

Fig. 3.20 - 3.22: The
Ruling Pen and early
drafting equipment,
1890.
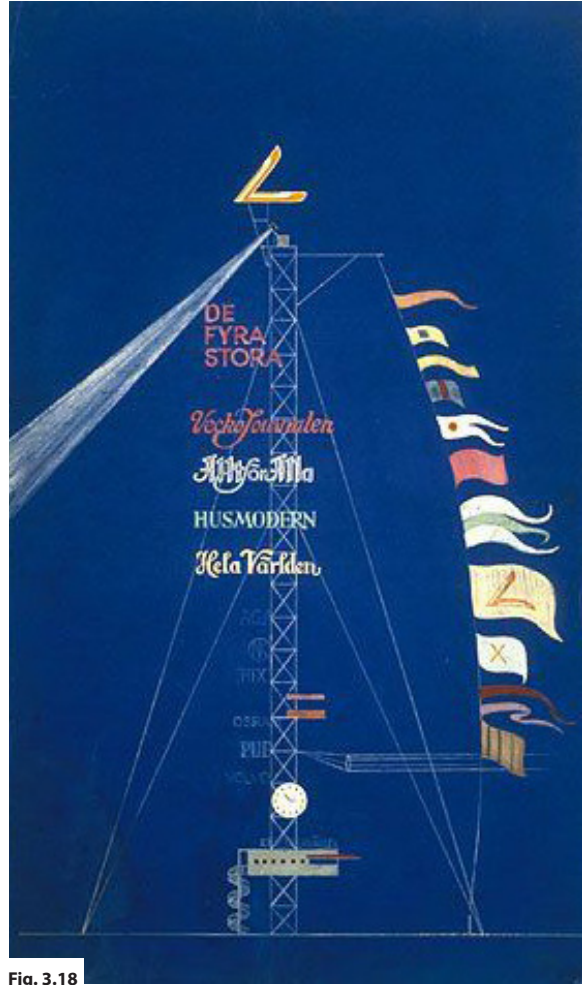
The preceding research evidences how one cannot preconceive what will be discovered through drawing, many interferences disrupt the outcome. Since the development of the ruling pen in 1890(Fig.3.20-21), the process of drawing was further distanced from the physical act of laying grand plans onsite. The relationship with an implement introduced a new consciousness to the process of drawing. These pens were specifically designed for drafting and consisted of a pair of calipers, one leg flat and one bowed, applying pressure at the grip of the pen created an opening between the calipers and released a steady stream of ink. The pen must be kept at a right-angle to the paper to produce the best clarity of line as these instruments were incredibly sensitive and required absolute control; piercing the meniscus of the ink could result in the haemorrhage of ink onto days of work. The architects' positioning was dictated by their dexterity and which direction they would move through the drawing. The proximity to the drawing was dependant on the working area; the draftsman could maintain a posture for only seconds, hovering above the chair to stretch to the top of the drawing board, or stepping from the chair altogether to extend down to the bottom of the page. Drawing was a process of revealing, protective masking would prevent direct contact to avoid moisture marks and smudging as the architect tipped from the balance of the nib.

In the 1950's fountain pen was developed which held a compressed ink shaft that could draw lines consistent in diameter[31]. Drawing remained a physical task although less control was required; the consciousness of the implement lessened although inking a drawing was the final stage in a long process of iterative study and required patience and precision, often inducing anxiety. This self-awareness often manifests as moment of irritation that halts the cognitive process of drawing, resulting in failure to express a thought on paper. Contemporary architect, professor and writer Sir Peter Cook suggests that to appease *'self-doubt…the architect spends time developing the skill and defining a repertoire'*[32]. This development of a signature technique provides comfort through a known visual register and familiar implement. Often it is the crudest sketch drawn with a familiar implement which creates momentum and begins the didactic process of drawing. This *'thrust'*[33] is critical in the crystallisation of an idea and subsequent drawing, rapidly advancing the project although unfortunately often fails to communicate to others.

Today, architects turn to formal methods of presentation earlier in the project to exert control over the legibility and persuasive qualities of a drawing. The relationship with the implement has changed substantially since sat at the drawing board using lithographic pens through the digitalisation of drawing. The *'machine becomes an extension of the mind as the pencil once did'*[34], acting as an electronic brain which overrides the human physicality of drawing. Today, the architect sits perched at a computer, paper is switched for a digital monitor and the pencil a handheld mouse. The physicality of the exercise is no longer a human representation of a drawings' scale, instead the physicality of drawing is a digital action whereby a building is physically maneuvered on screen. The draftsman of today transcends scale by building a three-dimensional world that can vary in scale

31   Saint,1983,p.58.
32   Cook, P. (2008). AD Primers: Drawing the Motive force of architecture, 2008.p.9.
33   Cook,2008,p.14.
34   Ibid,p.9.

Fig. 3.20

Fig. 3.21

Fig. 3.22

The Architectural Drawing

from the masterplan to the minute. With a single scroll the architect can zoom from the inconsequential detail back to the urban. This capability accelerates the maturity of drawing, potentially introducing great risk. This is not dissimilar to the overspill of ink, sacrificing the architect's most precious resource, time.

Vienna based Coop Himme(l)blau make the transition between the conceptual representation of intention and the intelligible drawing seamlessly through a close relationship with the implement. To begin a project founding partner Wolf Prix will sketch; energetically swinging and punching his thoughts onto paper using techniques more akin to art than construction(Fig.3.23-24)[35]. This is evident in the Rooftop office project where the building perches in contraction ready to take flight; a concept so surefooted in the sketch that this linguistic quality becomes objectified within the building(Fig.3.25). For Prix the sketch and the building are one; his buildings objectify the dexterity and dynamism of the initial pencil sketch achieved through many, more technical drawings undertaken on the computer. Prix exploits his relationship with the implement, advancing the building through known processes of drawing, retaining absolute control of the project through the maturity and explicitly of computer drawings.

Fig. 3.23 - 3.25: Coop Hime(l)blau, Rooftop Office, Vienna.

19th – early 20th Century

35   Cook,2008,p.17.

Fig. 3.23

Fig. 3.24

Fig. 3.25

Strategic Ground Floor Plan - PHASE 1.1
1:100 @ A1

Entrance
Arriving Vista - Charks
Chapels of Faith
Woodland Chapel - Retail Main Display
Woodland Main - Shop Courtyard Garden 1
Pillar Hall of Pine 1 - Shop Courtyard Garden 2
Visitor Centre - Framing Walls / Beehives
Chapel of Resurrection - Postcard Archive
Pillar Hall of Pine 2 - Staff Rooms
Hilltop Vista - Courtyard Approach
New Construction - Basement Road Connection
Departure - Viewing Platforms

- - - - Site Boundaries / Phasing
- - - - Postcard Movements
- - - - Postcard Elements
- - - - Experiential Journey
- - - - UNESCO Critical Criteria

Bee Wall - Visitors Center
Bespoke glazed bee hive modules are inserted within G-EW-B to provide accommodation for bees in the hope of housing the existing bee colonies that currently live parasitically within the pine trees, promoting the preservation of the pine trees for a longer period of time, ensuring that UNESCO criteria iv continues to be met. This process will be assisted by the presence of a bespoke training gym to assist in the rapid evolution of the bee species on site, satisfying criteria ix.

PHASE 1 - POSTCARD SHOP
The postcard shop will be constructed to allow for the visitors of the site to fully enjoy their experience of the cemetery, offering a unique experiential architecture that is reflective of moments within the Skogskyrkogården site.

The architecture will be of a more formal nature that critically exhibits the site and offers the opportunity to reflect on these qualities in active, immersive environments that evoke qualities of the journey through the site, concluding in the opportunity to purchase a micro-experience of the site in postcard form.

Main Display - Woodland Chapel
In order to meet Criteria vii of the UNESCO Selection Criteria the building must contain superlative natural phenomena or exhibit areas of exceptional natural beauty and aesthetic importance. The roof will act as a skyscape, a viewing instrument allows for visibility through the built fabric to the sky outside. This building component will be used to showcase the unique lighting conditions that exists within Stockholm and Scandinavia, creating an ever-changing skyscape all year round. This glass roofscape will allow for the calibration of the 'superlative natural phenomena'. By recording the light projections within, photographs then applied to the floor build up, satisfying UNESCO criteria vii.

Postcard Archive (Basement) - Chapel of Resurrection
In order for the project to meet the aspirations of UNESCO and have a positive effect for the site three new critical criteria must be satisfied upon the completion of the first phase. To meet criteria viii the building must record significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features. To do this the postcard shop will structurally realign each year, lowering by 1.3mm/ year in response to the 11mm/year Scandinavian tectonic uplift. This means that although the ground is continuously rising the structural level of the building will remain unchanged throughout its lifetime. This uplift will be exhibited within the postcard archive beyond the triple glazed retaining wall that exposes the continuously moving granite bedrock that sits alongside the building, creating a unique experiential feature that showcases the geological process.

PHASE 3 - PHOTOGRAPHY GALLERY
The gallery is envisaged to be the final stage in the project acting as a conclusive statement by UNESCO to promote sustainable development on World Heritage Sites and act as a means of education and memorial of the sites who have been de-listed. For this reason it is proposed that UNESCO will fund this stage in the project but only once both preceding buildings have been completed and operation for a number of years, having showcased the benefits of development on World Heritage Sites.

The architecture will be of a formal nature that is accessible to the public and experts alike. It should be inclusive in nature and present a blank canvas to enjoy the photography exhibited whist also presenting more passive directional moments to enjoy the site.

PHASE 2 - STAFF FACILITY AND VIEWING DECK
This second phase will provide accommodation and storage for the staff and services of the Skogskyrkogården master plan. The aim is to support the existing staff of the site and encourage the employment of more people, something encouraged by UNESCO to progress maintenance and protection of the site.

This building will primarily serve as a retreat and shelter for the employees and also act as a place to socialise. This building will be unlocked through the existing postcard shop and will be eligible for additional UNESCO funding. It is proposed that the spaces be sunken beneath the earth extracted from the ground in the first phase to adjust the current fall and offer a greater deck to view the park, creating new long vista.

04

The Value of Drawing
20th Century

In the 16thCentury Michelangelo became the *"first artistic celebrity"[36],* introducing the notion of connoisseurship to the profession. Michelangelo's drawings were the first to be collected as works of art that communicated *'the mood of his mind at the moment of creation'[37]*(Fig.4.1). The value was in the hand that touched the paper, immortalising the point of conception and motivation within an image. Even with greater publicity through competitions and publication during the 19thCentury, the cross-over from architectural to artistic remained uncommon until the 20thCentury when higher financial and intellectual value was placed on the architectural drawing. This dramatically changed the culture surrounding the drawn metalanguage. Cook suggests that the *'most definitive architecture comes forth at a moment when a set of ideas exists as a form of attack'[38].* This was true of the 20thCentury Italian Futurists who used drawing to depict narratives with an underlying spatiality that exaggerated and monumentalised, demonstrating the power and dominance of Fascism. Public interest in the image allowed drawing to gain equal power to writing and speaking as a disruptive political device. Futurist Antonio Sant'Elia greatly influenced later generations with his imagined cities that emphasised scale through exaggerated perspective(Fig.4.2). Sant'Elia used drawing to play a cognitive role in sharing knowledge to assert and influence public opinion. His drawings were explicit and extreme, depicting future cities which extended discussion the realm of architecture. Drawing became a radical device that extended conceptual theory beyond the architectural audience.

Throughout the 20thCentury if architecture was to go beyond the drawing board there was a need to *'compromise, by the insistent demands of what is real and what is practical'[39].* The value placed on conceptual drawing within the profession diminished, draftsmanship for construction was the most valued skill. The architectural drawing was a consensual agreement paid for by the client, indulgence in the process of drawing was a distraction[40]. In the 30's-40's the profession became divided and gradually the more individualistic designers were whittled away. Some remained defiant against the prescribed way of working, using drawing as a tool of amplification. Drawings were perceived as the image of the architect; at 'The Skyline of New York' themed 1931Beaux-Arts Ball architects modelled their own drawn elevations, impersonating their most famous building to protest the depreciated value of architecture[41].

Some architects escaped the trappings of business and focused more on the narrative potential of drawing. Bruno Taut became more known for his unique representation of intention(Fig.4.3-4) than for his buildings of precision and technical resolution. This marked the end of the cultural conformity within drawing, LeCorbusier equally stands at the end of this period whilst at the forefront of something new. Rejecting ornament in favour of the functionalist, modern, machine-aesthetic LeCorbusier brought forward a preference for the outline style, overtly rejecting the 'envogue' flat, washed Art Nouveau international movement. LeCorbusier's used drawing as a simple tool for communication. His pencil sketches were soft and tactile in comparison to other drawings of the time, showing great concern for the narrative aspects of a project.

Fig.4.1 : Michelangelo, 1508-1512, Sistine Chapel Paintings, Rome.

Fig.4.2 : Antoino Sant'Elia, 1910, Grand Boulevard.

Fig.4.3 : Bruno Taut, Alpine Architecture, 1917.

Fig.4.4 : Bruno Taut, in collaboration with Walter Gunther and Kurz Schutz, 1932, Chicago Tower Competition.

36   *Powell and Leatherbarrow,1983,p.55.*
37   *Ibid,p.55.*
38   *Cook,2008,p.10.*
39   *Saint,1983,p.6.*
40   *Ibid,p.8.*
41   *Ibid,p.7.*

Fig. 4.1
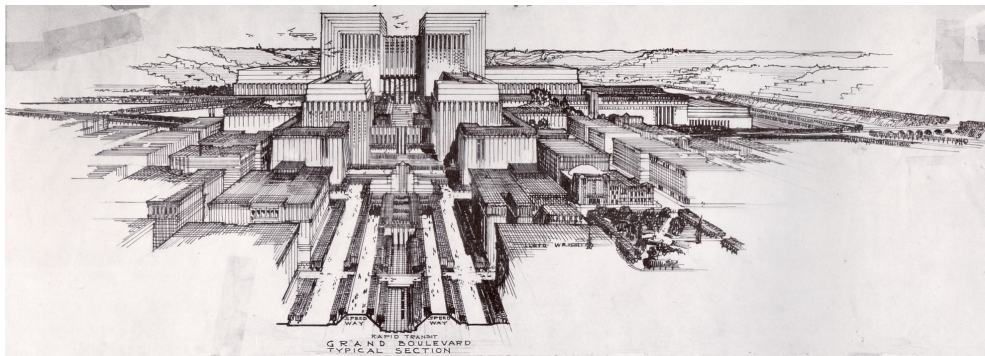
Fig. 4.2
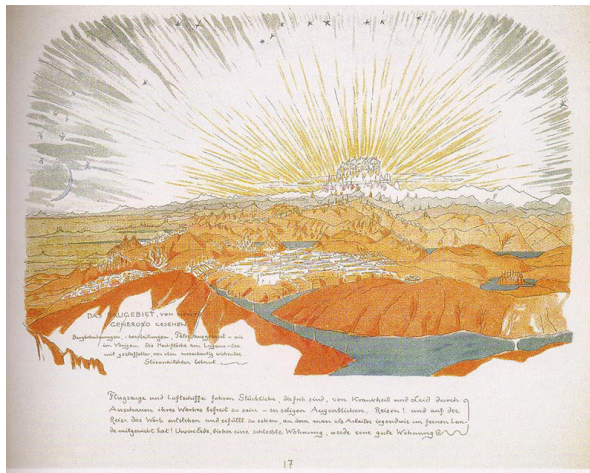
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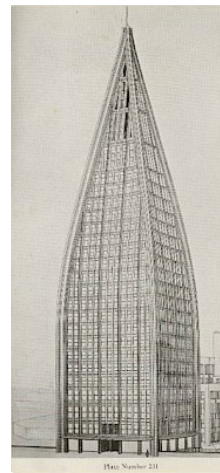
Fig. 4.4

LeCorbusier demonstrated how drawing could vary in tone and information in response to the temperament of an audience; those who were not architecturally trained were reassured with a scheme that was personal, explicit in inhabitation, soft furnishings and open books(Fig.4.5). His construction drawings did not carry the distraction of persuasion, they were concerned with mathematical and geometric accuracy, designed to instruct(Fig.4.6). This exaggerated the division between the poetic client drawings and the instructional construction drawings; both registers were legible yet targeted a specific audience. Arne Jacobsen, architect of Aarhus Cityhall, also followed this trend(Fig.4.7-4.9). Drawing formed a consensual agreement based on invested interest; the client saw experience and the builder instruction. This tactical structuring of information became common.

By mid-century architects looked internationally for influence and exchange. This was most apparent in Vienna, a city which had profound influence on the architect through intense cross-pollination between all aspects of the arts. This small city became a hotbed for talent and was greatly influential to foreign architects, hyper-aware that this cultural exchange did not occur elsewhere. Key players within this architectural interchange carried enhanced status, thus the intellectual and financial value of the visual metalanguage increased. Raimund Abraham did not take on the full professional role of an architect yet his project House without Rooms(Fig.4.11) investigated the architectural atmospherics of space, acting as a provocation through drawing. Similarly, Walter Pichler was able to greatly push the visual discourse through his expression of intellect within his ferociously gentle drawings that carefully manipulate media and surface(Fig.4.12). Pichler has since constructed several small buildings paid for from the sale of drawings of those same buildings[42]. Pichler's *"Austrian'…drawn form of attack"[43]* was also evident in Gunther Domenig's work. Alike the 19th Century Gothic architects, Domenig communicated the dynamics of space and constructed through sketching. His sketches acted as primitive visualisations for buildings like the Z-Bank, radically communicating the perceived tension and excitement of a space(Fig.4.13-17).

One of the best examples of this change in the value and status of drawing can be seen in the late 1960's with the Archigram movement in London. Born out of frustration for the profession and questioning the unyielding political dogma of the time, the non-political movement tempted change within the public sphere with a high-tech future captured through a new anthology of drawing. Their success was in the ability to legibly communicate with the public *'using and exploiting the power of the drawn image years before anyone else'[44]*. Maximum impact was delivered through legible graphic images inspired by comics and graphic culture[45]. Archigram's drawings challenged the current understanding of architecture, attempting to reshuffle contemporary urban constructs. The biggest criticism of Archigram was that the drawings were pseudo-scientific and not technically substantiated, although their legibility provoked *'debate that is usually*

Fig.4.5 : Le Corbusier, Villa Savoye Sketch, 1925.

Fig.4.6 : Le Corbusier, Villa Savoye Construction Detail, 1930.

Fig.4.7 - 4.8 : Arne Jacobsen, Texaco Gas Station, 1932.

Fig.4.9 - 4.10 : Arne Jacobsen, Aarhus Cityhall, 1930's.

Fig.4.11 : Raimund Abraham, 1974-75, The House without Rooms.

Fig.4.12 : Walter Pichler, 1979, Augenschmerzen, St Martin, Germany.

Fig.4.13 - 4. 4.17: Gunther Domenig, Assorted Sketches and Photos of the Z-Bank project.

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42   *Cook,2008,p.154.*
43   *Ibid,p.155.*
44   *Cook et al.,1985,p.8.*
45   *Crompton and Cook,2002,p.4.*
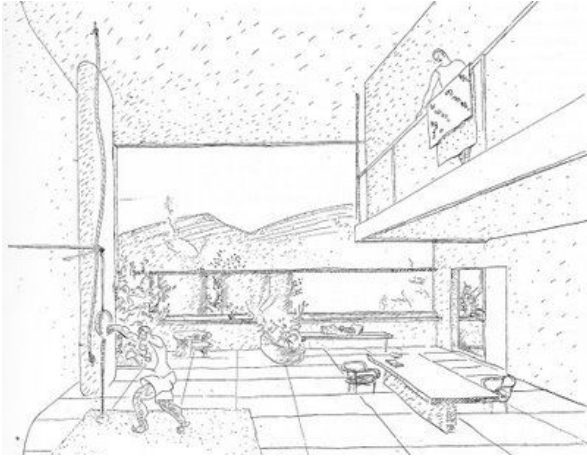
Fig. 4.5
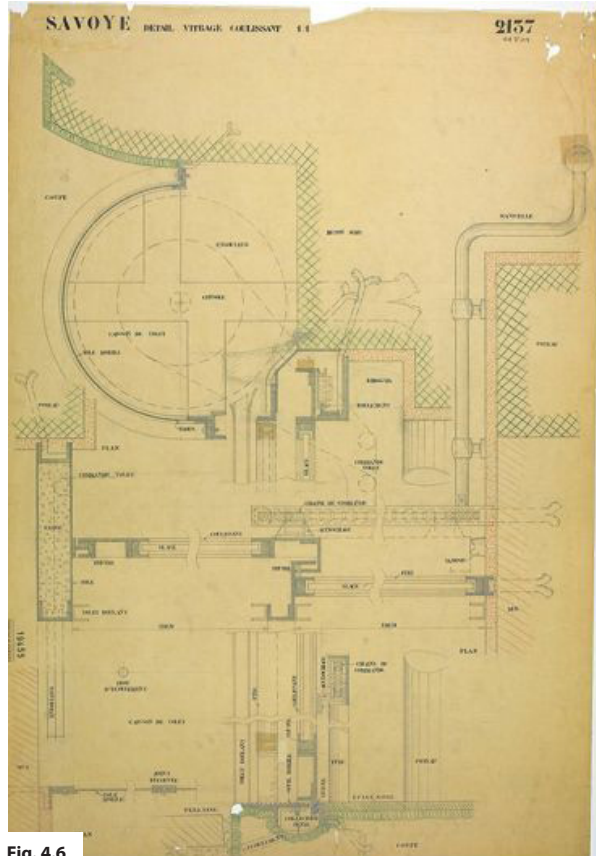
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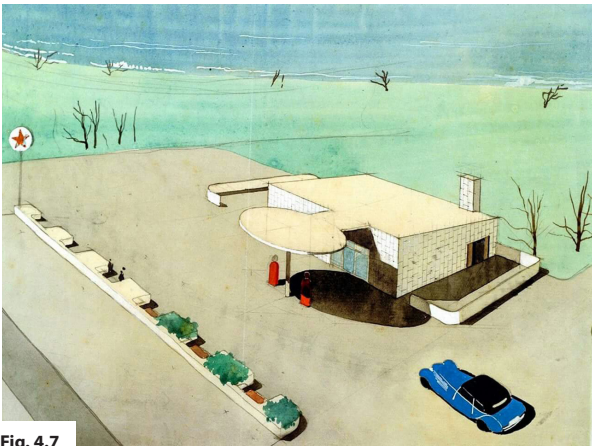
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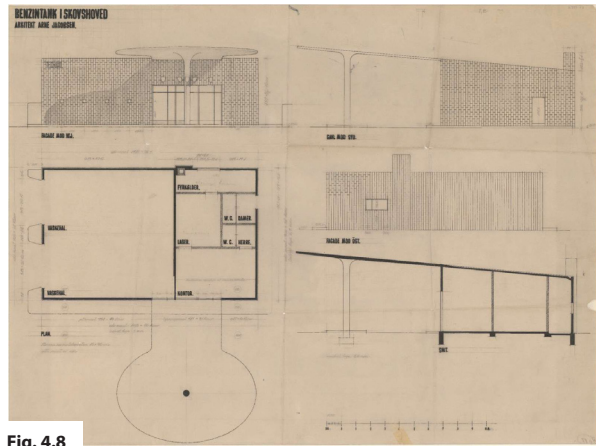
Fig. 4.8
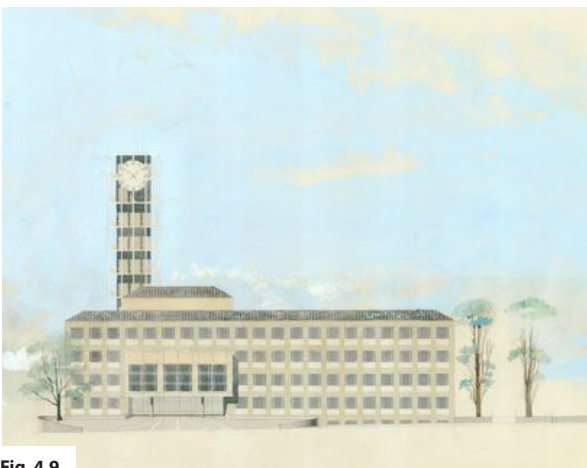
Fig. 4.9

Fig. 4.10
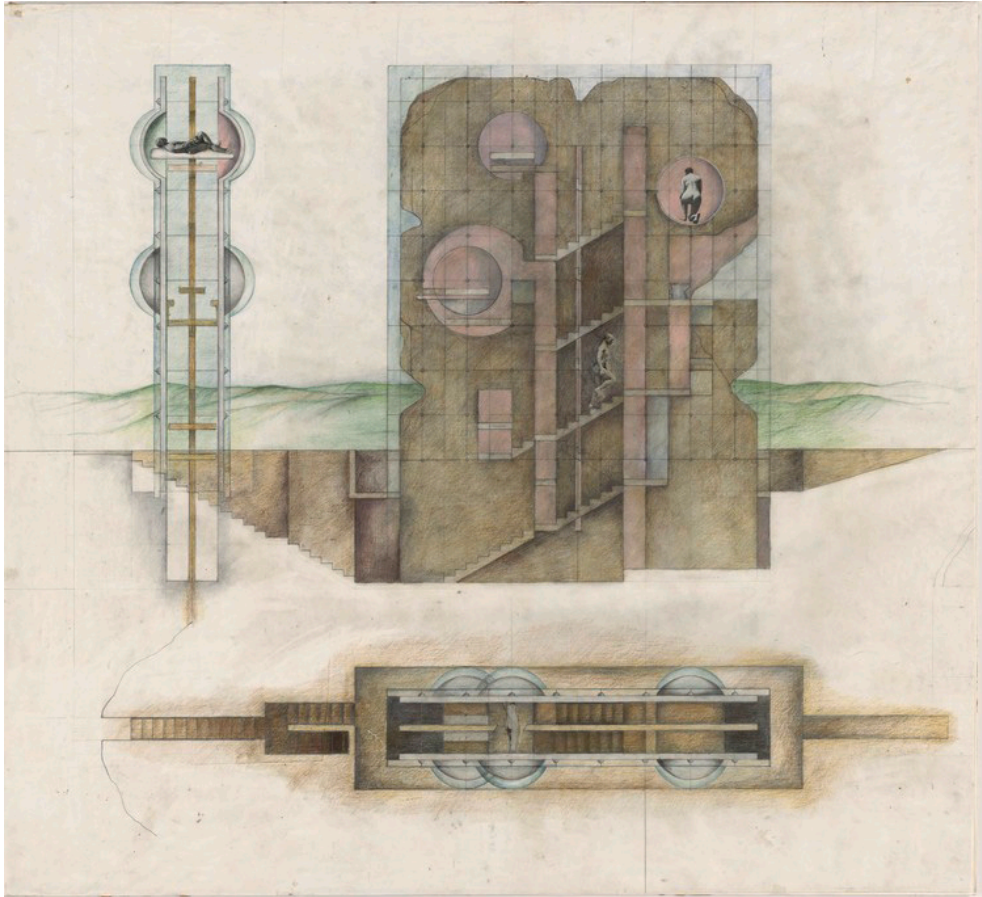
Fig. 4.11

Fig. 4.12
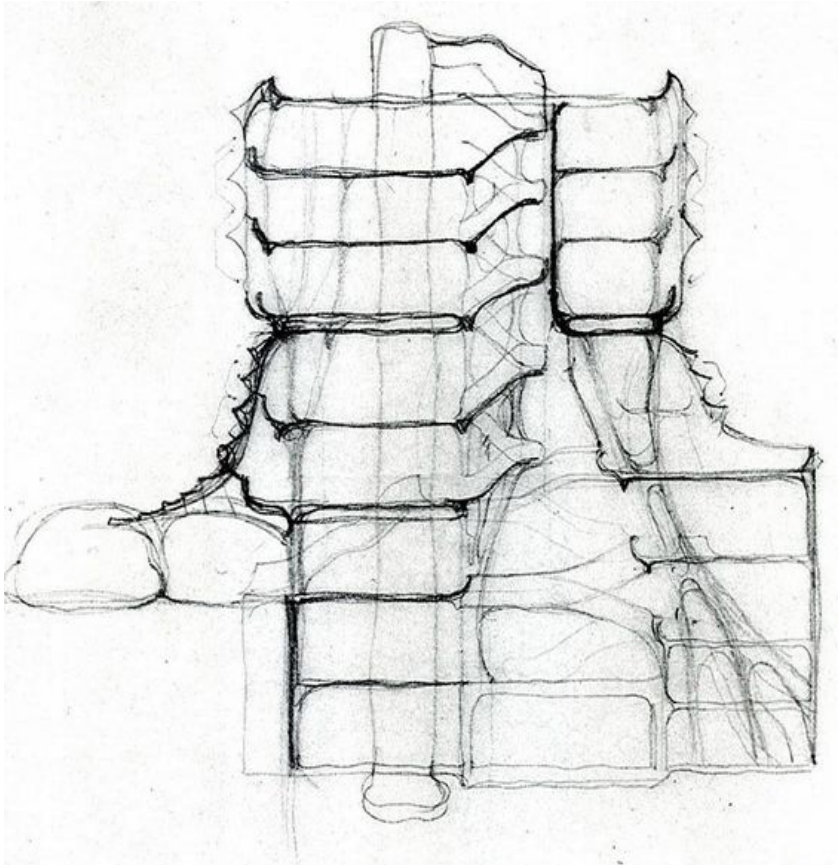
Fig. 4.14
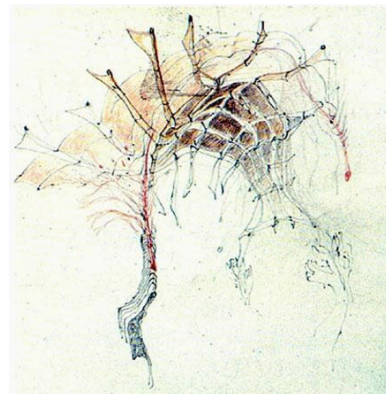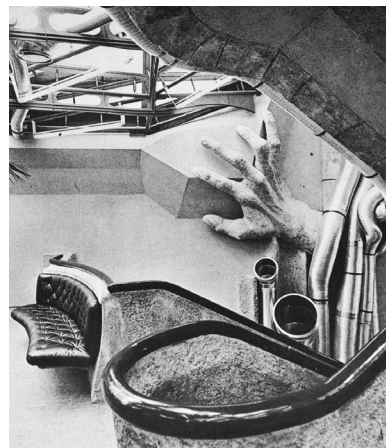
Fig. 4.13

Fig. 4.15

Fig. 4.16
Fig.4.17

more constructive than bricks and mortar'[46]. The Monte Carlo project(Fig4.18-19), was developed technically, pre-empting the world we live in today with the *'departure into an organic analogy and sensory allusion'*[47] via mechanised service systems. Even with a determination to build the drawings did not change in accessibility. The work of the collective set out *'to elevate architecture and the contribution of architects to society'*[48], amplifying the message more than if they had operated alone. Of the Archigram collective Michael Webb was considered the most talented regarding spatial design and graphic dexterity. He developed sophisticated drawing techniques, which were more refined than the typical Achigram methodology. This is most evident in Webb's Temple Island drawings which are forensic and seductive in equal measure. In this project Webb examines observation, perception and geometry of the seen and unseen as one moves along the Henley River(Fig.4.20). Webb's drawings demonstrate how the construction of drawing can add intrinsic value to a drawing. His visual literacy and persuasive talents gave him the reputation as the leading graphic communicator within Archigram[49].

To explore unprecedented latent opportunities Lebbeus Woods(Fig.4.21) similarly uses hand crafted techniques to assemble conceptual thought and legitimise an idea through the speculative formulation of space. Woods trained as an engineer although was more valued for his hand-crafted pencil renderings. Woods demonstrated power in the investigation process combining the visual processes of thinking, drawing and analysis. In 1978 Rem Koolhaas's Delirious New York was originally published. Madelon Vriesendorp illustrated the text producing some of the most iconic and well-recognised drawings, which have possibly become more influential than the text(Fig.4.22). Her literal interpretation of the writing brought wit and humour to the visual discourse by substantiating academic theory and promoting cumulative understanding. Today, Perry Kulper similarly augments ideas through a *'visual field of study that is discovered in the act of drawing'*[50]. Kulper constructs formal depictions of concept and space which lack an identifiable architecture. His drawings place value on a space of construction, rather than the construction of a building, broadening the scope of study through the visual discourse. Ultimately this interplay between architectural academia and practice reveals new lines of enquiry that extend beyond the traditional ideology of architecture(Fig.4.23). This way of working generates drawings that are intriguing and dynamic although the focus and agenda are not immediately evident. Due to illegibility these drawings are often classified as art, undermining the importance and contribution which the visual discourse.

Over a period of forty years the drawing underwent a transition from a simple tool of communication to august artwork and venerable socio-political stimulus. By late 20thCentury the hand-crafted drawing from architects like Zaha Hadid became an art commodity internationally(Fig4.24). The financial value was in the hand of the architect, a signature that could not be replicated. The architect would relinquish complete ownership of the drawing; all preliminary sketches and development were handed over

Fig.4.18 - 19 : Archigram, 1967, Monte Carlo Competition.

Fig.4.20 : Michael Webb, 1988, Temple Island.

Fig.4.21 : Lebbeus Woods, 1991, Zagreb Free Zone.

Fig.4.22 : Madelon Vriesendorp, 1976, Manhatten Transcripts Illustrations.

Fig.4.23 : Perry Kulper, Contingent, v.2, in progress.

Fig.4.23 : Zaha Hadid, 1982-83, The Peak: Blue Slabs.

46   *Cook et al.,1985,p.6.*
47   *ibid,p.1*
48   *Crompton and Cook,2002,p.4.*
49   *Ibid,p.36.*
50   *Kulper, P. (2013). A WORLD BELOW. Architectural Design: Drawing + Architecture, 05:2013, p.59.*

Fig. 4.18

Fig. 4.19

Fig. 4.20

The Architectural Drawing

with the drawing to ensure it could not be reproduced. In 1982 the first digital drafting software was released. AutoCAD became widespread within the profession, superseding the hand-drawn. The digitalisation of drawing immediately erased the financial market for architectural drawings as the digital could be printed infinitely.
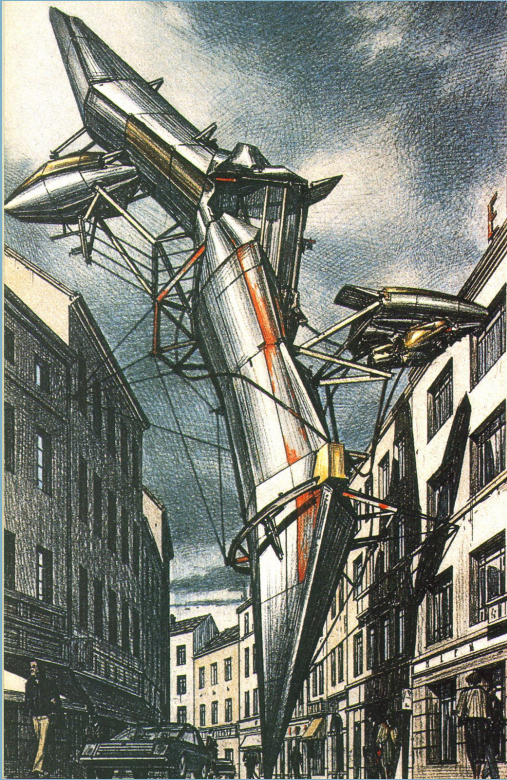
Fig. 4.21
Fig. 4.22
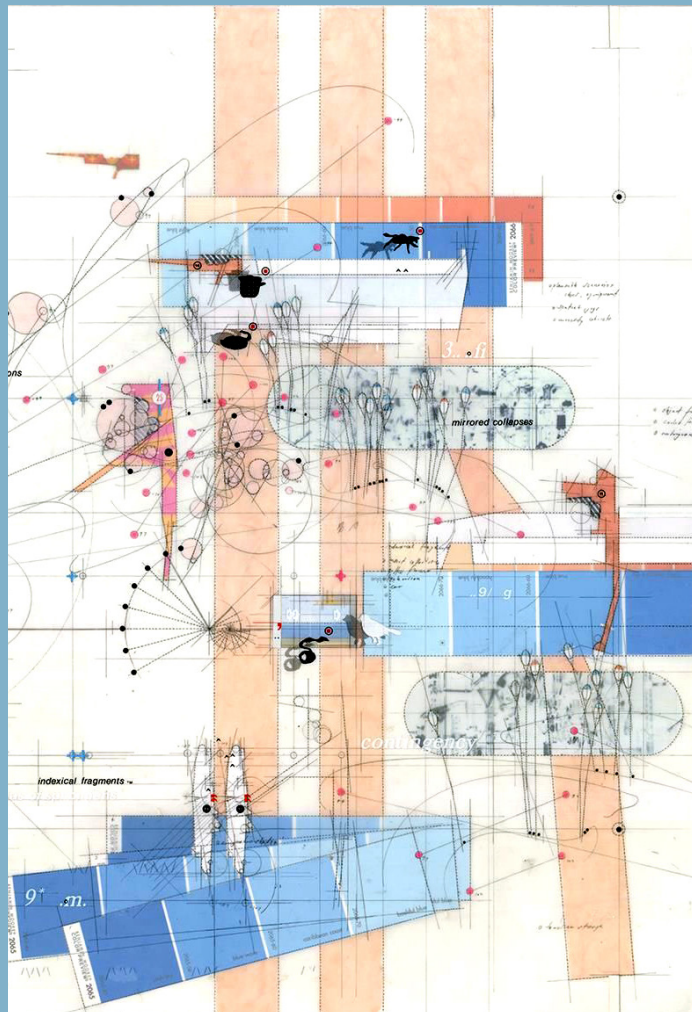
Fig. 4.23   **Fig. 4.24**

The Legibility of Drawing
Drawing a Pedagogy

By reaching the end of my education and moving into practice, I am currently at a unique intersection within my career. Throughout education, I have developed core values that are inherent in my working methodology that will remain visible for the duration of my career as shown by my predecessors. Education, creates a microcosm within architecture wherein *'architects speak more about the drawings than about architecture itself'*[51]. The Ecole des Beaux Arts,Paris commenced formal architectural education in the early 19th Century. Primarily teaching through drawing, the school valued atmospheric graphic convention over individuality[52] and set precedent for education(Fig.4.25). The education system today is a direct outcome from the traditions of the Ecole des Beaux Arts. A century later London's Architectural Association(AA), led by Alvin Boyarsky, positioning education as a global concern, revolutionising drawing. The school became a hub for innovation and exchange. Boyarsky initiated a unit system and culture that had a magnifying effect, re-shaping the method and style of drawing within education[53]. Cooper Union in NewYork underwent a similar transformative process at this time; it was *'difficult to separate the physical and mental existence when describing the state of the school'*[54]. The work of preceding students and professors was palpable, a huge focus was placed on the legibility of drawing, promoting a philosophy of intellectual thought through unconventional didactic exercise[55]. By late 20th Century the Bartlett had replicated this culture, emerging as a school of international outlook that used drawing as a critical tool for innovation. A strong studio culture and lasting influence of tutors, such as Laura Allen and Mark Smout's(Fig.4.26) unit 11(Fig.4.27-28), exaggerated the central ideals inherent in the ethos of the school, propelling the reputation of the school. The biggest criticism of the Bartlett is that drawing is a tool of over-indulgence and fetish. I believe this denomination is a result of the audience. At the Bartlett drawing is a pliant pedagogical process to provoke intellectual and social discussion within a mono-centred, highly literate audience.
 This licences students to deviate from conventional grammatical logic to communicate using experimental registers of drawing. The output is seductive and can transform the audience *'into a form of séance'* although carries a dense sediment of record and intellect that ultimately can be completely illegible to those who are not presupposed.

Fig.4.25 : Paul Bigot, 1900. A Thermal Bathing Establishment and Casino.

Fig.4.26 : Smout Allen, 2011. Waterscapes and mechanised topographies.

Fig.4.27: Margaret Bursa, 2009 - Unit 11. The New Local.

Fig.4.28 : Chris Delahunt, 2017 - Unit 11. Archiving the Intangible.

51   Robbins,1997,p.28.
52   Ibid,p.43.
53   'AA History' (https://www.aaschool.ac.uk/AASCHOOL/LIBRARY/aahistory.php, 2015) <https://www.aaschool.ac.uk/AASCHOOL/LIBRARY/aahistory.php> accessed 10 February 2018.
54   Hejduk, J. and Diller, E. (1996). Education of an architect. New York, NY: Rizzoli, p.21.
55   Morris, M. (2013). ALL NIGHT LONG. Architectural Design: Drawing + Architecture, 05:2013, p.31.

Fig. 4.26
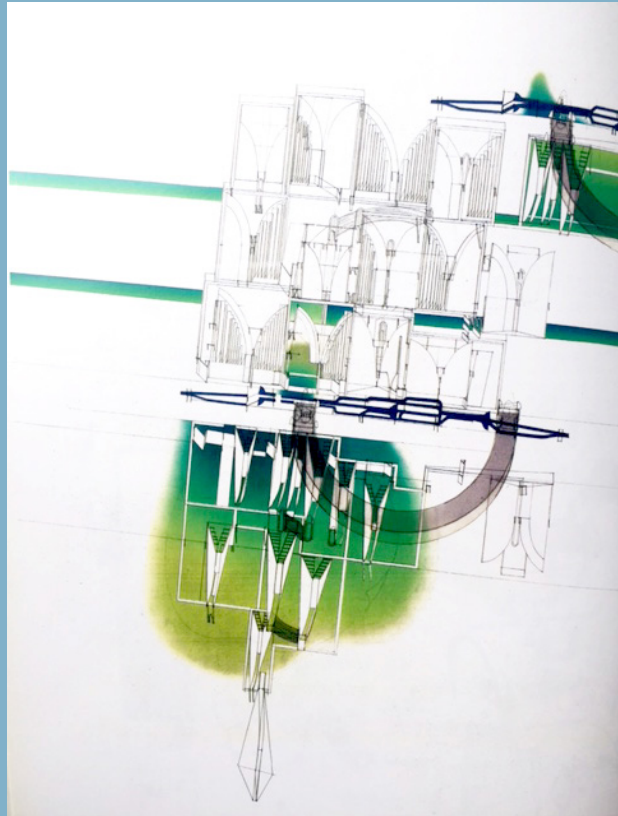
Fig. 4.25
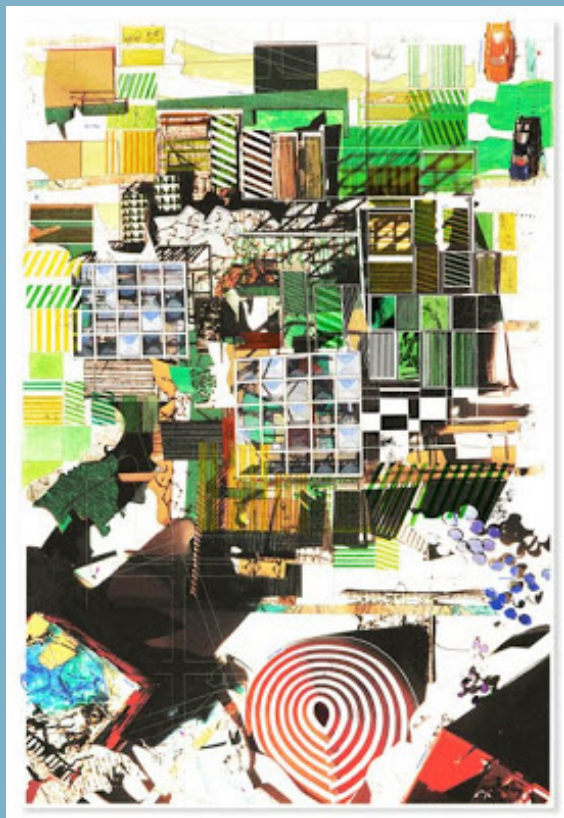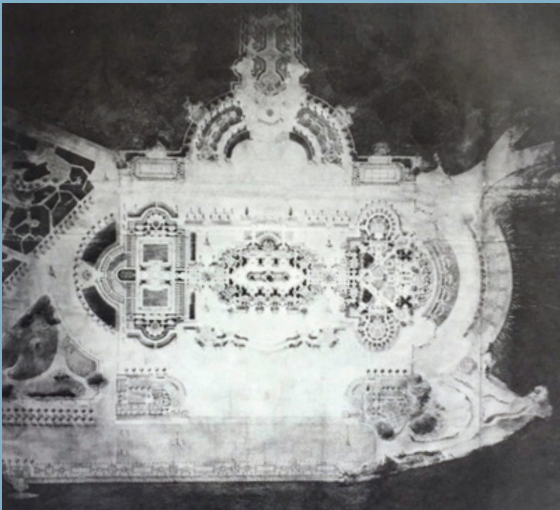
Fig. 4.27

Fig. 4.28

The Legibility of Drawing:
Audience Perception Study
Full transcript located within Appendix

To further question the successes and failures of the architectural drawing one must examine the audience. Upon examining the history of the architectural drawing, it is evident that the audience's visual literacy and training is the biggest influence when gaining knowledge from a drawing. Drawing within education plays to mono-centric audience, however in practice the audience is multi-centred, varying in level of literacy and visual training. To investigate the influence of the architect and the impact of literacy on the legibility of drawing I have undertaken a series of comprehension studies with three individuals of varying visual training and literacy. The participants included: an architect who had received formal
architectural training; a textile designer who had high levels of visual training; and a geneticist who had no visual training. After completing the study, I discovered the geneticist was actively interested in architecture and design, consequently having a much higher literacy level than expected. To prevent bias and ensure that I had a wider field of study I introduced a fourth participant; a social worker who had no visual training and no interest in architecture. Each participant represented an audience who would engage with the visual discourse in a different way, as client, public consultant, architect or user. The opinions of these participants are subjective and provide only a glimpse into each respective group, however as a comparative study the four participants form a singular cross-section of society.

The study asked participants to complete a comprehension exercise for thirteen independent architectural drawings. The participants observed each drawing individually, then was asked to describe their perceptions of the drawings legibility by answering seven questions concerning the systems used to impart knowledge: focus, purpose, logic, composition, interest, originality; the participant was lastly asked if additional information was required to aid their understanding. The selected drawings(Fig.4.29-41), a combination of my own and select architects work, varied in terms of visual format, system and convention. The drawings ranged in maturity from early conceptual sketches to construction drawings to provide a comprehensive examination of the successes and shortcomings in communicating information throughout the lifetime of a project.

Results

The drawing ranked most legible by all participants except for the geneticist, who ranked it fifth, was a verified view rendered for Steven Holl's Maggie's Centre (Fig.4.41). This drawing was deemed to be clearly legible by all, explicitly showing an image that was true to reality. Nevertheless, the participants felt that the drawing was ambiguous, lacked hierarchy and was *'disorientating'*[56] without a clear focus. The architecturally untrained felt that an image of the whole building was lacking and would provide more clarity.

The second most legible drawing was an arrangement of sketched perspectives from my design project(Fig.4.34) which was ranked highly by all participants excluding the architect. The social worker, without visual training or interest in architecture, suggested that the three-dimensionality helped to communicate *'how it would actually look'*[57]; later stating that this would be the preferred register over the visualisation if the difference in cost was high[58]. Other participants cited that colour was an effective coding tool. The only participant who did not rank this drawing highly was the architect, although demonstrating good understanding of the drawing additional information was requested in plan better
communicate the location of the perspectives.

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56   *Appendix,p.94.*
57   *Ibid,p.84.*
58   *Ibid,p.84.*
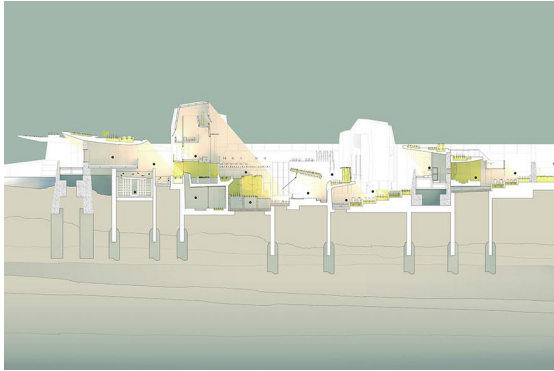
Fig. 4.29: Authors own, 2014. Long Section.

Fig. 4.30: Authors own, 2013. Composite.
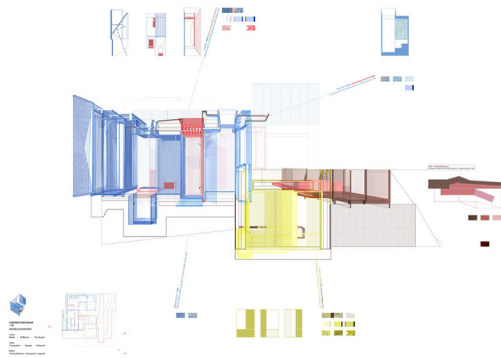
Fig. 4.31: Authors own, 2017. Perspective section with diagrams.
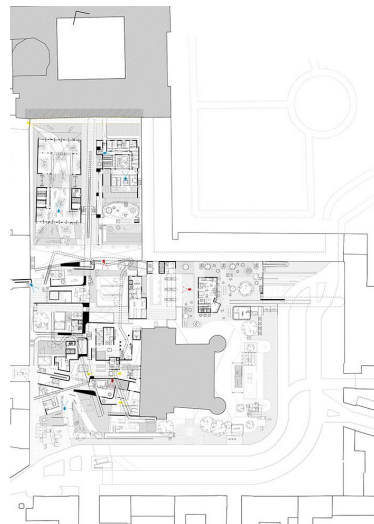
Fig. 4.32: Authors own, 2018. Masterplan.
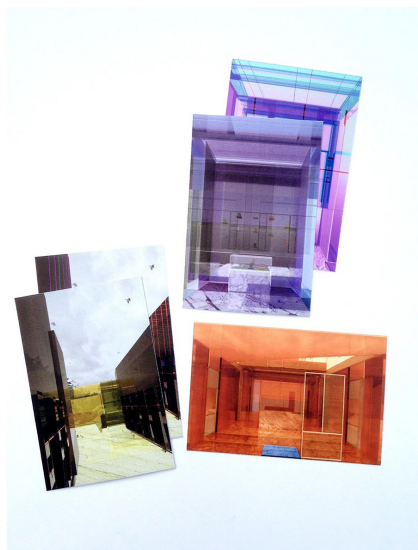
Fig. 4.33: Authors own, 2017. Rendered Views.

Fig. 4.34: Authors own, 2018. Sketched Views.

The Architectural Drawing

The third most legible drawing was a detailed construction drawing of Hutteldorf's façade by Otto Wagner(Fig.4.36). This drawing was ranked highly by everyone except for the geneticist despite demonstrating very good understanding of the drawing[59] and describing it as *'very explicit'*[60]. All participants could comprehend the external elevation, although struggled to understand the relationship between the surrounding plan and sections. The architect, though the use of known conventions, could understand *'projections from the façade…size, depth, and how they relate to internals'*[61], crediting the *'highly logical and rationalised'*[62] presentation, *'making it easy to read'*[63].

The lowest ranking drawings were unanimously Coop Hime(l)blau's Open House conceptual sketch (Fig.4.39) and Carlo Scarpa's Castelveccio Setting Out drawing(Fig.4.37). Both exhibit ambiguity through the sketched quality, although were produced for very different purposes. All participants agreed that they would not typically see drawings depicting *'thinking'*[64]. All participants noted the appearance of a logic created by the grid and colours in Scarpa's drawing although felt this too ambiguous to interpret.

The non-architecturally trained all demonstrated good literacy skills in reading explicit notational systems to codify and explain. Colour and pattern were especially good mechanisms for delivering information, although was more effective when vivid, more contrasting colours were used. Text also promoted legibility, especially when large and used sparingly as this was clearly legible and fast to interpret(Fig.00). The visually untrained had difficulty deciphering information that lacked the context of the whole, also failing to translate information that was not orthogonally folded from a reference point(Fig.00). The geneticist and the textiles designer were more capable in interpreting abstract information, however the social worker and architect favoured explicitly.

Findings

The non-architectural audience experience limited exposure to architectural drawings, typically the visual formats of visualisations, plans and the occasional section or elevation are beheld. This restricts the accessibility of the visual discourse; schooling the public into perceiving the architectural drawing as proposition, the publics comprehension of the conceptual and narrative is very limited.

 Albeit the public do have a greater understanding of the sketch and the detail; both viewed apprehensively for public discussion. To communicate effectively, understanding the audience is paramount and evades the misinterpretation of information and disinterest within an audience. Students master this skill for a mono-centric audience although fail to extend dialogue beyond the architect, a deficiency that is taken into practice. Education should enable student to move beyond the institution to develop a register of drawing that creates a comprehensible dialogue.

59   *Ibid,p.87.*
60   *Ibid,p.87.*
61   *Ibid,p.93.*
62   *Ibid,p.93.*
63   *Ibid,p.93.*
64   *Ibid,p.94.*

Fig. 4.35: Peruzzi, 1502. St Peter's Ideal Perspective.

Fig. 4.36: Otto Wagner, 1901. Hutteldorf Facade Details.
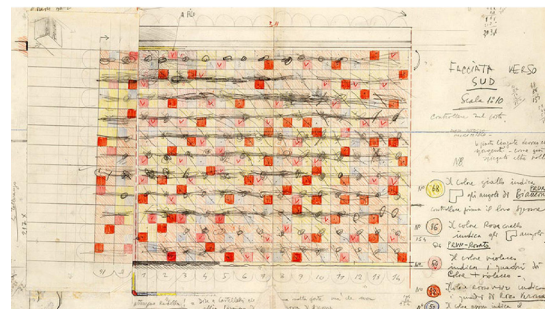
Fig. 4.37: Carlo Scarpa, 1920. Castelveccio Setting Out Drawing.

Fig. 4.38: Archigram, 1964. Monte Carlo Conceptual Axo.

Fig. 4.39: Wolf Prix, Coop Hime(l)blau, 1983. Open House Plan.

Fig. 4.40: Lebbeus Wood, 1995. Inhabiting Quake City.

Fig. 4.41: Steven Holl, 2015. Maggie's Centre, Rendered Verified View.

The Architectural Drawing

2

F
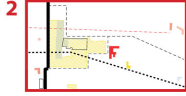
V1

NAVIGATING THE PIAZZA - 1:1000 DEVELOPMENT STUDIES

Piazza Castello sits at the boundary of the old Roman City of Turin adjacent to the 16th century Palatzzo Madama (1) and alongside the Royal Palace (2), both residences for the Dutchy of Savoy which form part of the Villas of Savoy UNESCO World Heritage Site listing within Turin.

The Piazza is expansive (160m x 80m) but bare with little activity and relationship to the surrounding streets and close lying significant cultural landmarks.

In addition to this the square sits at a key anchor point of tourist activity where the physical landmarks and digital activity intersects. This site could be exploited to enhance the tourist experience.

UNESCO WORLD HERITAGE SITES | RESIDENCES OF THE ROYAL HOUSE OF SAVOY
PALAZZO REALE DI TORINO

Gardini Reali Superiori

Piazzetta Reale
(access controlled)

Bordering of Piazza currently used as Car Park
(Required as part of the City Development Plan)

Palazzo Private Garden
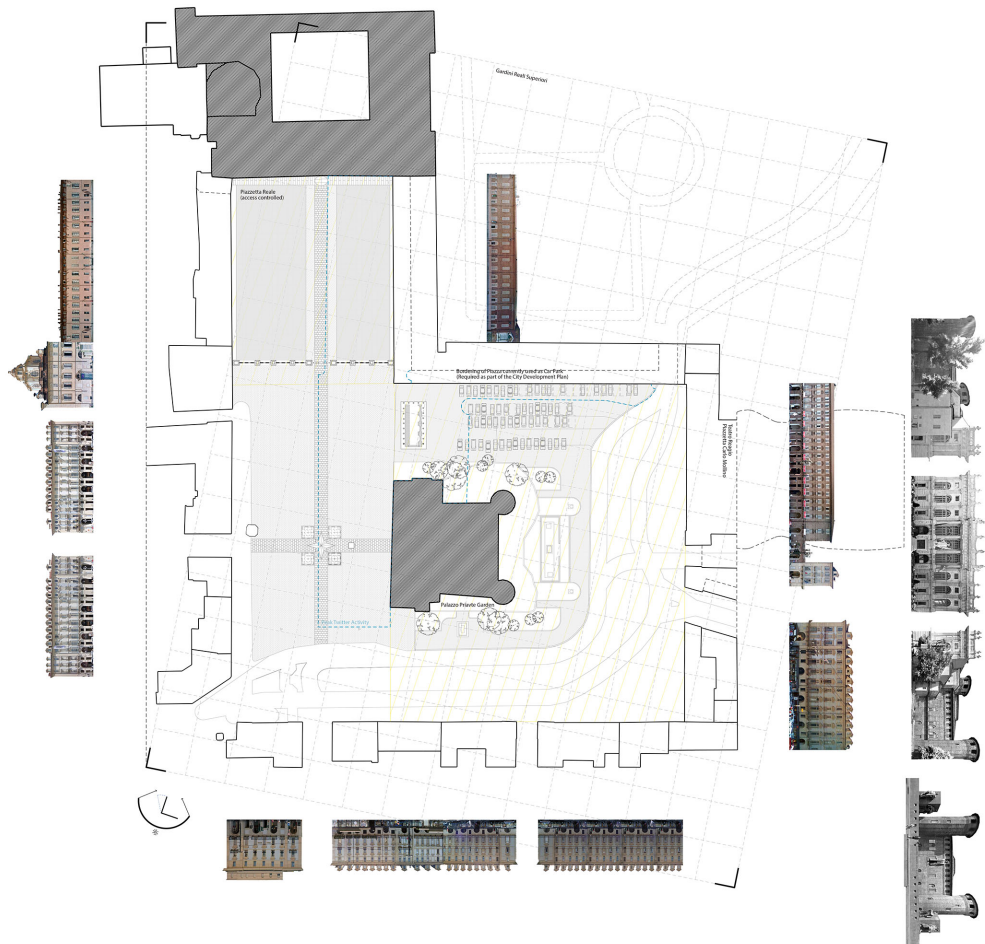
PALAZZO MADAMA

RESIDENCES OF THE ROYAL HOUSE OF SAVOY

Top: Palazzo Madama
Bottom: Palazzo Reale Di Torino
Right: Concept Model capturing the existing connections on site and possible interventions

PIAZZA CASTELLO - PHYSICAL CONDITIONS

05

The Digitalisation of Drawing
21st Century

Since the invention of AutoCAD in 1982 the computer has become the principal implement for drawing within architecture. The digitalisation of drawing has created a whole new raft of opportunities for how the architectural drawing can be executed. High-speed processing and the digital sharing of information no longer confines the architect to the drawing board, instantly sharing files across continents. The once intransient solitary task of drawing is now remote and collaborative. The computer can work simultaneously through thousands of processes, presenting innumerable predetermined solutions for each problem. Parametric design software such as Grasshopper calculates the complex manipulation of parameters through algorithmic equations to conceive a solution that best aligns with the design intent and desired response(Fig.5.01-2). This method of drawing enables the architect to review many inconceivable design solutions that are directly responsive to structural, urban and environmental requirements[65]. The role of the architect has become more like a driver, navigating through this binary trajectory to screen a series of potential outcomes and select the most desired result. The architectural drawing has evolved through this depiction of data to a sophisticated linguistic library of mathematics and geometric accuracy that symbolises high financial investment.

Today, the architect has an inherent preoccupation for the numeric information and has moved away from the sketch and other visual registers of conjecture, predominantly working through a true scale three-dimensional virtual model. The architect is no longer required to incrementally work through a layering of two-dimensional drawings, alternatively orthographic information is extracted as planar cuts through the digital model. These drawings follow the same universal linguistic systems and conventions established in the 16thCentury although they are deployed from a from a predefined digital palettel(Fig.5.03). In extreme cases this vocabulary is not formally taught but instead acquired through osmosis whilst operating digital software; bypassing basic design principles that are learned through hand-drawing. This knowledge gap can inhibit the process of design and eliminate self-critique through an unawareness of the limitations of digital drawing. In contrast, those trained in the 'traditional' approach to design exhibit an obstinate reluctance to exclusively work on the computer. Drawings are printed in frustration and examined in a review process that takes place away from the inhibitions of the screen. This hand-drawn marking-up process is imperative in controlling the binary nature of the computer. The mark-up is *'creative and reflective'*[66], forming a consensual agreement within the mono-centred design team hereby enabling the architect to regain control over the linguistic form of drawing (Fig.5.04).

The main pressure on the architectural drawing today is efficiency, the clients unyielding pursuit for financial viability. The financially driven market now reduces the architect's drawings to basic metrics; a digital screening process undertaken using specialist software which enables the quantity surveyor and client to examine efficiency and cost.

Fig.5.01 : Zaha Hadid Architects, 2012. Grasshopper Script and Model Outcomes - Haydar Aliyev Centre.

Fig.5.02 : Zaha Hadid Architects, 2012. Completed photos of Haydar Aliyev Centre.

Fig.5.03 : Peter Cook and Colin Fournier, 2000. Kunthaus Graz Structural Cut-away.

Fig.5.04 : Peter Cook and Colin Fournier, 2000. Kunthaus Graz, Hand-dawn elevation.

65   Cook,2008,pp.190-193.
66   Ibib,p.152.

Fig. 5.01
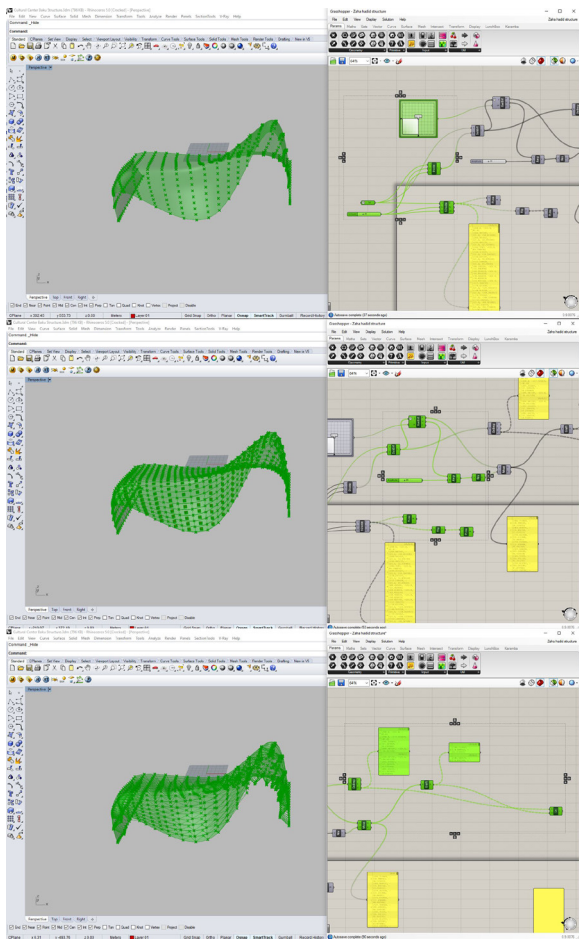
Fig. 5.03
Fig.5.04
Fig.5.05
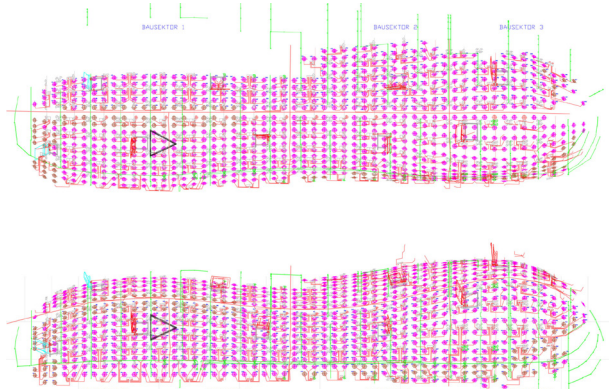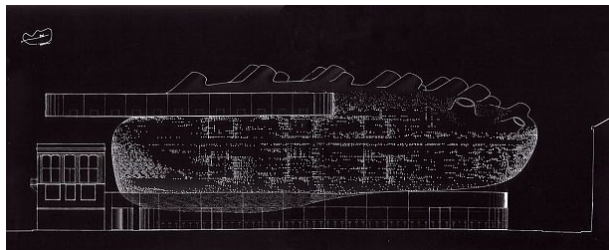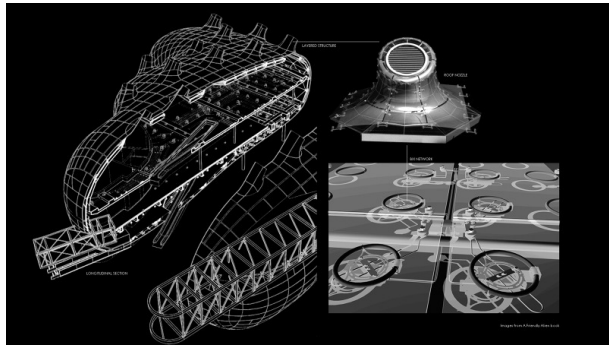
Fig. 5.02

Fig. 5.06

These advanced analytical programs exert intense stress on the architect to pare down a design in pursuit of a numerical ideal. The traditional approach to architectural drawing is obliterated during this process and is often dispelled by the financing authority in favour of Building Information Modelling(BIM). This software was introduced to architects in 2004 and has since become more widespread within the profession forming a second digital revolution. Initially developed by engineers in the late 20[th]Century for the coordination and management of information relating to infrastructure and services, the software provides three-dimensional drawing capabilities for the architect and concurrently records numerical descriptions of every building component, this information can be extracted as schedules, programs and drawings[67] (Fig.5.05).BIM software caters to a blinkered multi-centred audience of trained professionals, however output information is typically non-visual. Information can be extracted in formats chosen from predefined list that adhere to professional conventions and strict systems of economic testing[68].

Many clients demand BIM capabilities as a prerequisite to win a job, encouraging the use of BIM earlier and earlier in the design process. This software was not intended as a design or public communication tool therefore is not sophisticated enough to capture the nuances and subtleties of architectural information that cannot be condensed into numerical data. This process devalues the architectural drawing through the standardisation of space and has allowed the drawing to slip from the hands of the architect; questioning the position and role of the architect within the design team and disregarding the human considerations explored through architectural drawing. These changes enforce quicker progression through the program, reducing the amount of time and money spent drawing for conjunction and information purposes. This is true of the detail drawing, which is now commonly novated to a delivery architect. Traditionally the detail was the ultimate means of regulating information; symbolising the control of the architect[69]. Carlo Scarpa preferred to work through the detail drawing early in a project, demonstrating absolute commitment to the integrity of a project(Fig.5.06-7)[70]. This process is not dissimilar from Otto Wagner's methodology. In a ritual more akin to paganism than architecture Wagner developed the basic, unadorned design of a building through a premeditated system of drawing and thinking, later Wagner would applicate intricate detail that emerging from the bare bones of the building. Finally, the whole building was constructed through drawing, communicating presentation and measurement to a multi-centred audience(Fig.5.08-9)[71]. BIM-centred practice could present opportunities for the architect to re-introduce the detail as a way of regulating information earlier in a project, resulting in greater coordination between disciplines and eliminating the abstraction of information. BIM enables the architect to reinvest in the detail drawing to set design parameters which can be positioned and examined within the shared model.

<div style="text-align: right">

Fig.5.05 : Peter Cook and United Architects, 2000. Kunthaus Graz, BIX Communicative Disaply Skin.

Fig.5.06 - 07 : Carlo Scarpa, 1960. Castelveccio Details.

Fig.5.08 : Otto Wagner, 1886 Villa Wagner Detail sketches.

Fig.5.09 : Otto Wagner, 1886 Academy of Fine Arts View.

</div>

21st Century

67   *'Building Information Modelling. (NBS, 2018). https://www.thenbs.com/knowledge/what-is-building-information-modelling-bim. accessed 6 March 2018.*

68   *'BIM and the Future of AEC'. (Autodesk, 2018). https://www.autodesk.com/solutions/bim. accessed 6 March 2018.*

69   *Saint,1983,p.67.*

70   *Murphy, R. (1990). Carlo Scarpa and the Castelveccio. London. Butterworths Architecture, p.11.*

71   *Cook,2008,p.55.*

Fig. 5.06
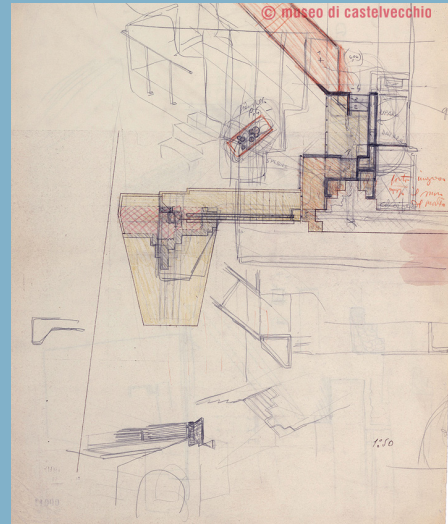
Fig. 5.07
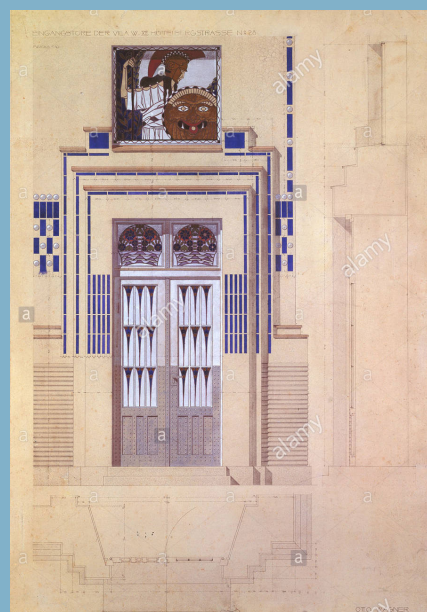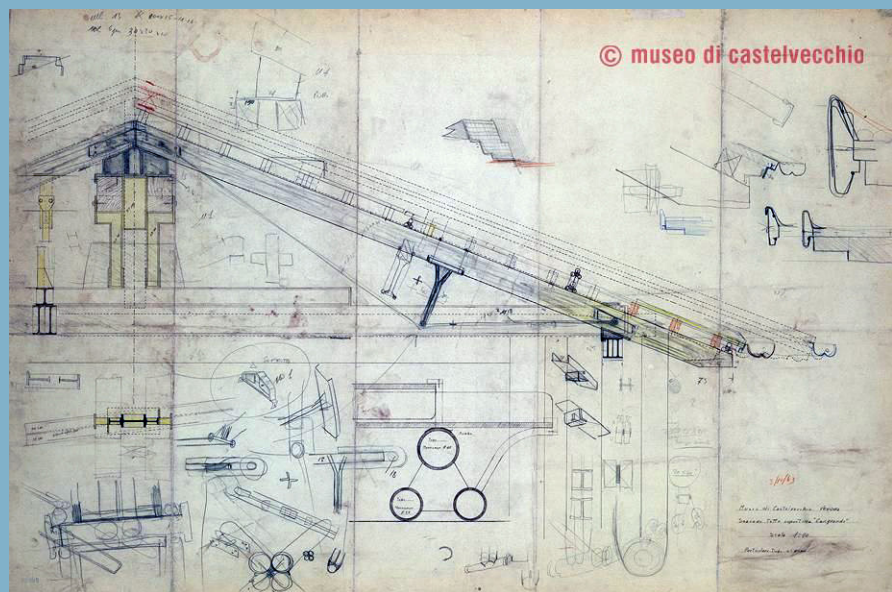
Fig. 5.08

Fig. 5.09

The Visualisation

The acceleration through the drawing process can also sidestep the architect's *'superfluous'[72]* conceptual and presentation drawings, favouring the outsourced visualisation which absorbs little time from the architect. The visualisation captures a snapshot from the model and accurately wraps the three-dimensional form with pre-defined materials and light. Favoured by clients and planners for their explicitly these refined drawings produce photo-realistic images that provide universal legibility, although can rival the cost spent of the design of a building. Nevertheless, if undertaken too early in a project the visualisation can bypass pivotal design decisions initiated through architectural drawing. Peter StJohn states that the visualisation is *'inevitable in the profession, there is a demand for the finished image earlier and earlier in the project'[73]*. To combat this, early in the project Caruso StJohn satisfy the requirement for rendered images but circumvent the confines of an erroneous image by choosing to render in a style that is more illustrative(Fig.5.10). These more presentational drawings can be much more telling of the design intent and does not force the architects hand in making critical decisions early in a project. Cook proposes that by undertaking these more nuanced drawings the author can *'ratchet forward the discovery of the architectural character'[74]*. Thus, enabling the architect to regain control of the visual language and take ownership of intimate yet critical design decisions; *'The desire to manipulate the metal is developed through the drawing'[75]*(Fig.5.11). Equally Cook sees the benefit in drawing to reveal the rendered realities of a proposal, although suggests approaching with caution; *'After all, the computer can get it to look very real-only then can we step back from this near-reality any number of steps we care to?'[76]*. This notion of proximity is fundamental for the construction and observation of the rendered drawing. Whilst the photo-realistic visualisation has its merits, the harsh-realities of this premature depiction of the building can have heavy restrictions on a project. By calibrating the visualisation in-house and introducing appropriate notational systems the architect can regain control of the architectural drawing. Architects likeMorphosis (Fig.5.12-13) and Zaha Hadid (Fig.5.14) mastered this sophisticated language tool to communicate in a language that is comprehensible yet does not commit to an uncompromising image of the building. This analytical augmentation of an idea is neither abstract nor exact, commanding drawing as a responsive linguistic form in the same way they did before the digital revolution.

Fig.5.10 : Caruso St John, 1900. A Thermal Bathing Establishment and Casino.

Fig.5.11 : Peter Cook and Christine Hawley, 1986. Museum of Stained Glass Pencil, Ink and Watercolour elevation.

Fig.5.12: Morphosis, 2005 . Cooper Union Atrium studies.

Fig.4.28 : Zaha Hadid, 2006. Phado Science Centre.

72   *Cook,2008,p.152.*
73   *Caruso, A. and St John, P. (2018). Architecture on Stage: Adam Caruso and Peter St John.*
74   *Cook,2008,p.167.*
75   *Ibid,p.167.*
76   *Ibid,p.108.*

Fig. 5.10

Fig. 5.12
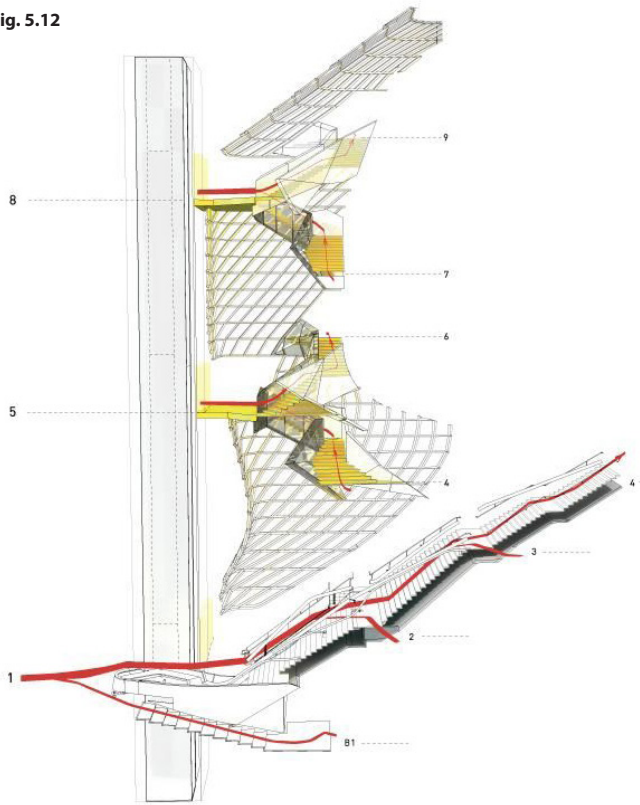
Fig. 5.11

Fig. 5.13

Fig 5.14

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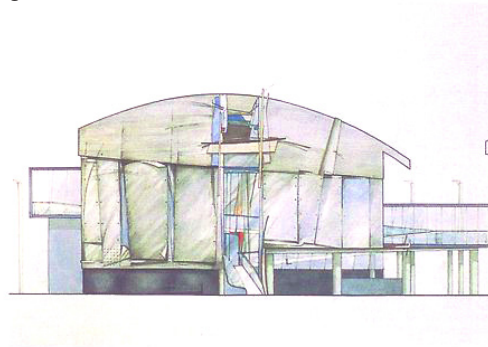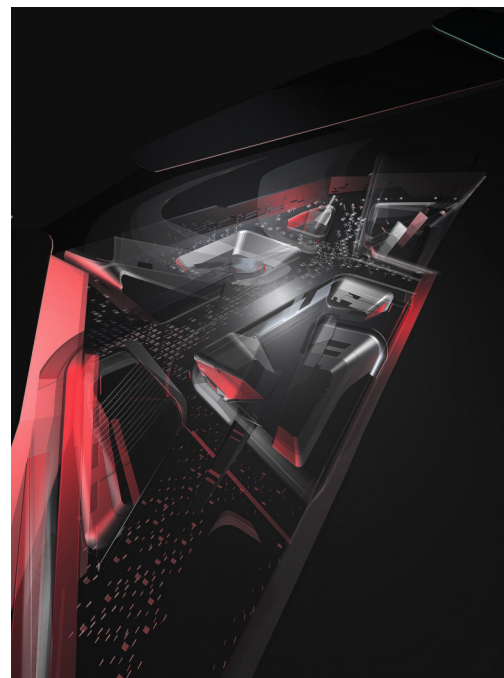
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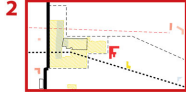
SITE 2 | PIAZZA CASTELLO

STRATEGIC DIAGRAM - 1:1000

The scheme can be split into three distinct phases and characters. The first phase, Piazza Castello, is highlighted in red. This part of the masterplan primary comprises of a landscaped terrain that serves to navigate the tourist through the site and the wider city through the engagement in a number of open and partially closed spaces and also provides a number of facilities to enrich the tourists and residents day to day life and experiences. These facilities and services include a public baths, spa, postcard and ice cream shop. Spaces below ground are marked with a dashed line.

The second component shown in blue sites within the Piazzetta Reale perimeter that sits adjacent to the main Palazzo building. This provides raised access to the Palazzo itself and provides a large market hall and publicly owned accommodation from camp site to hostel and airbnb accommodation.

The final part of the proposal, marked in yellow, extends the cultural Teatro Regio into the Piazza landscape with the addition of a open air amphitheatre, bar and restaurant and formal council owned garden to provide the opportunity to for the visitor to experience a day of arts and fine dining on site and within the surrounding area.

■ Piazza Castello
Landscaped terrain, public facilities and services

■ Piazzetta Reale
Resident owned market hall and tourist accommodation

■ Piazza Teatro Regio
Cultural Corridor

UNESCO WORLD HERITAGE SITES | RESIDENCES OF THE ROYAL HOUSE OF SAVOY
PALAZZO REALE DI TORINO

Section E-E

Section F-F

Section A-A

Section C-C

P3 - PIAZZETTA REALE
The Piazza Castello now directly joins the Palazzo Reale di Torino via a new raised bridge that forms a new entrance to this significant cultural landmark. The Piazzetta Reale forms a sub divided permeable intermittent space between the two. It is intended for the City Council to gift the use of this space to the residents of Torino. This new sub new subterranean basement condition forms site for a new intimate space to be used for civic purposes and to also generate income for the locals. This will be achieved with the establishment of a market and the letting of small air bnb units (which can also relieve pressure on the dense poor quality factory housing when required).

P2 - PIAZZA TEATRO REGIO
The current car park (required as part of the City Developm level to free up space above. This will Piazza to the Teatro Regio. This will a performing arts from day tonight wil supporting facility, a restaurant and a by the city which directly connect to a

Section D-D

PALAZZO MADAMA

P1 - PIAZZA CASTELLO
The larger, more prominent, Piazza Castello will facilitate the Torinese tourist with a supportive data landscape that will respond to their current experiences and preferences by highlight key interests and navigate the city of Torino. This landscape will be self-supporting and engaging as a feature and tourist hotspot within its own right by providing a variety of activities and supportive facilities for the passer-by and the lingering visitor.

Section G-G

WORKING ENVELOPE - DEVELOPMENT OF FORM
Altogether - Aerial of whole Piazza and new massing additions
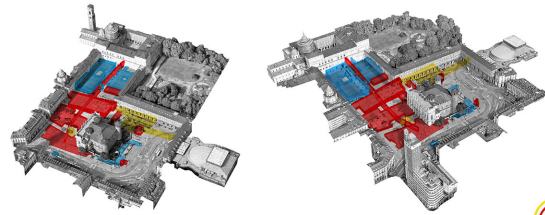
Tour-in Heritage Masterplan, Tourino's first post-industrial cultural landscape.

Author's Own
Fifth Year design work

PIAZZA CASTELLO - STRATEGIC DIAGRAM

06

Drawing a Conclusion

To begin this essay, I proposed that architecture was the visual discipline within construction as drawing is the architect's primary method of communication. However, upon reflection I believe that this is because the metalanguage of architectural drawing constructs a visual dialogue between the architect and the audience. It is this dialogue through drawing which makes the discipline of architecture a visual one. Cook suggests that this System is comparable to *'the musical score and the music itself'*[77]; two interdependent systems that together construct music. Alike music, drawing is a reactive system that is responsive to itself and external circumstances simultaneously through the processes of thinking, testing, observing, reassessment, and discussion(Fig.6.1-2). The exchange of information from architect to audience promotes a sustained dialogue through visual comprehension and interest; developing a reasoned argument of persuasion through drawing. Although this has not always been the case, the architectural drawing, and the resulting dialogue, has undergone many morphological changes through history that have been pivotal in shaping the role and position of the architect and their relationship with an audience.

The language of architectural drawing initially evolved through the depiction of the narrative to a linguistic form used to communicate information and instruction with mathematical and geometric accuracy. Overtime drawing has gone from a simple tool of communication to august artwork and back again. One of the best examples of the change in the status of the architectural drawing can be seen between the 20th and 21stCentury where the hand-crafted drawings of the 60's, 70's and 80's were supplanted by the digital drawings of the 90's and onwards. The intrinsic value of the discourse transformed, high financial value placed on the hand-crafted drawing became high corporate investment embedded within the digital. The resulting effect on the role of the architect was a shift from a position of venerable public status to a servant of the client[78], each defined by a centralised audience and respective dialogue.

The constant characteristic within this process has been the role of drawing as a conceptual and linguistic form of communication. The former a tool of instruction and accuracy and the latter a cognitive device of conjecture. The dialogue created through this communication promotes the complex cognitive exchange of information from the architect to an audience. Alike the drawn language, the audience has also undergone substantial change from the mono-centred to a multi-centred audience of varying levels of literacy. Therefore, the dialogue between the architect and the audience must *'assume it's degree of rhetoric according to it's presumed audience'*[79]. For the architect to communicate effectively several factors must be considered: *existing visual training, level of literacy, precise visual register, appropriate timing, and most importantly the legibility of the architectural drawing itself.* This ability to regulate the degree of rhetoric within a drawing can be inhibited with the use of software such as BIM and Grasshopper, pose the risk of removing drawing from the hands of the architect. By condensing architectural information into basic metrics, drawing becomes a dialogue that requires

Fig.6.1 - 6.2 : Peter Cook, 1988. Way Out West-Berlin.

77   *Cook,2008,p.179.*
78   *Saint,1983,p.15.*
79   *Cook,2008,p.105.*

Fig. 6.1

Fig. 6.2

The Architectural Drawing
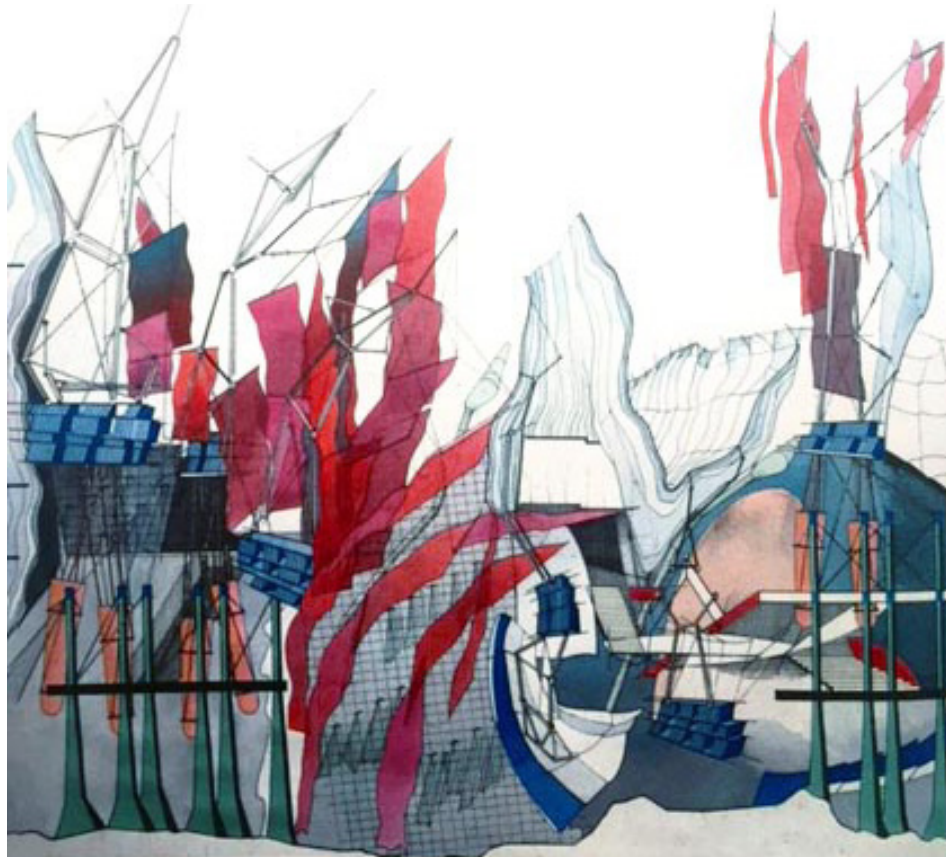
translation by the presupposed. Therefore, the prerequisite knowledge required to engage with drawing would return the audience back to a mono-centric one.

To retain a dialogue with the audience it is essential that the architect reasserts control over the linguistic form. Frank Lloyd Wright evidenced this strongly during the early 20th Century, a time when the profession was under strangling constraints and the status of the architect was low[80]. Wright refused to succumb to the pressures of big business and used drawing as a persuasive tool to *'hypnotise'*[81], reasserting the status of the architect. Since the turn of the century there has been an emerging culture for the abstract image not only as a tool of conjuncture, but also one of escape as the constraints on practice tighten and the role of the architect diminishes. This enables the architect to position drawing as an apparatus that communicates the circumstantial benefits of architecture that are designed beyond numeric data.

The investigation into The Legibility of Drawing, summarised in Section 4, outlines the sketch as being a legible visual register to communicate information. This affirms that a high value should be placed on the sketch as a tool of conjecture that could escape the constraints of practice. Over this period the status of the sketch has been questioned within the profession, often used as a primitive form of visualisation. As outlined in Section 4 the architecturally untrained responded well to this register for its accurate depicting in demonstrating how the building *'would actually look'*[82]. This evidences that there is scope within the profession to shift from the prescribed working methodology to a visual language that can be more responsive to the target audience. As the sketch is one of only a few forms of the hand-crafted drawing remaining within practice its value could be considered perversely high.

Alvaro Siza calibrates the visual register of the sketch to the literary requirements of an audience, as *'everyone understands the perspective-and not only architects.'*[83] Siza employs *'a posteriori'*[84], a superimposition of the sketch to the accurate proportions of the more technical computer drawings(Fig.6.3-4). He undertakes the posteriori at critical times to produce legible information that is true to both experience and measurement; demonstrating how the sketch can be used to exert control over the visual discourse as a persuasive tool of conjuncture and escapism. Another architect who successfully uses the visual metalanguage of drawing for persuasion is Steven Holl. Holl breaks the traditional conventions of the sketch by candidly introducing colour to *'demonstrate a huge level of precision and formal correspondence for the building'*[85], undermining the modern relationship between drawing and building. His sketches have a *'direct link'* and cooperation with the more conventional drawings and visualisations through a common vocabulary of colour, patina and convention(Fig.6.5-9). This legible visual language transcends through the entirety of the project to increase the literacy and understanding of both the conceptual and linguistic forms of communication.

Fig.6.1 - 6.2 : Alvaro Siza, 2002-2010. Sao Victor project development.

Fig.6.5-6.9 : Steven Holl, 2008-2016. Maggie's Centre St Bart's.

80   Saint,1983,p.15.
81   Ibid,p.16.
82   Appendix – social worker
83   Siza, A. and Fleck, B. (1994). City sketches . Basel: Birkhäuser.p.8.
84   Robbins,1997,p.157.
85   Steven Holl (2008-2014). (2014). 172, El Croquis, p.25.
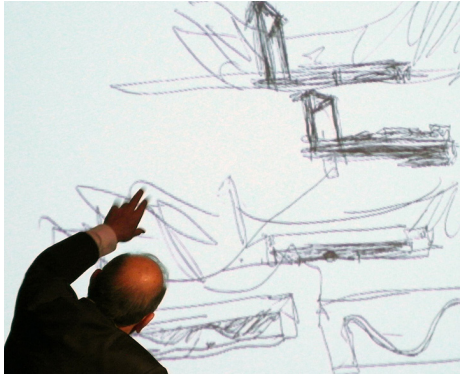
Fig. 6.3

Fig. 6.4
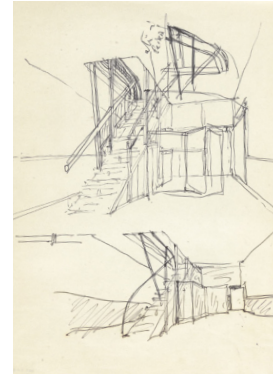
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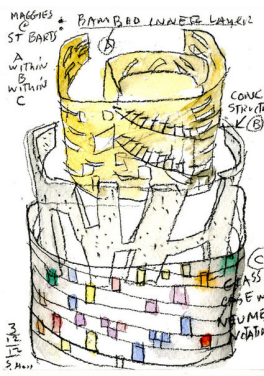
Fig. 6.6

Fig. 6.7

Fig. 6.8
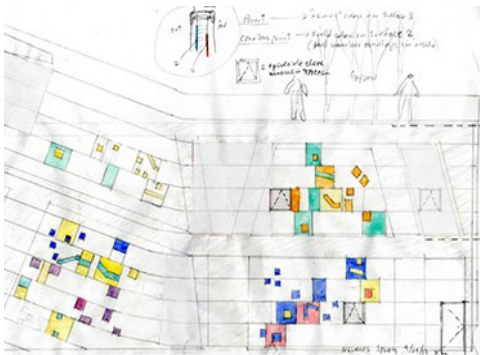
Fig. 6.9
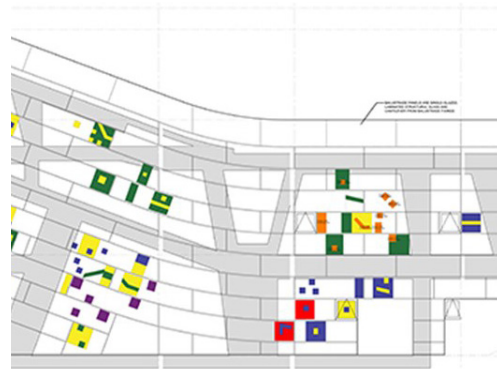
The Architectural Drawing

The metalanguage of architectural drawing has undergone many complex morphological shifts throughout its history in response to a variety of social and cultural circumstances. Drawing remains a fundamental core skill for the architect as it constructs an impartial cerebral dialogue between architect and audience that is beyond numerical data. The importance of the architectural drawing lies in its reactive ability to communicate with a multi-centred audience of varying levels of literacy and training. This powerful apparatus should be exploited for its potential to escape the constraints of practice and reshape how information is delivered to a multi-centred audience. To achieve this drawing should be used as a pedagogical device to educate: the architect in how to legibly construct this reactive linguistic form; and the audience in how to better comprehend architectural information. The ability to communicate information effectively using the dialogue constructed through the language of drawing will enable the architect to re-affirm their value within the construction industry and to argue the strengths of a proposal at times of intense pressure and constraint.

Fig.6.10 : Authors Own Sketched Views.
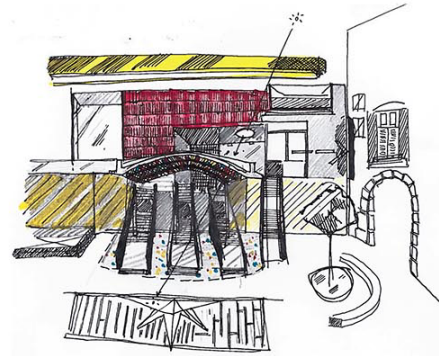
PIAZZA ENTRANCE - CULTURAL CORRIDOR
The third piazza addition to the whole site introduces a series of buildings embedded within the landscape to create a new cultural corridor from Mollinio's Theatro Regio. This part of the scheme is more formal in appearance with printed terracotta wall cladding and painted glazed tiles to create a tactile welcoming entrance.
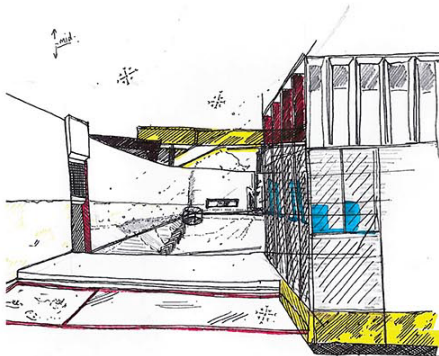
HERITAGE ENCLOSURES - SUPERLATIVE NATURAL PHENOMENA
As part of the adaptations to the site it is proposed that further UNESCO criteria are satisfied as part of the new design to further evidence the significance of the site in order to retain the current listing. The extreme range in weather conditions and climate can be experienced and recorded in the heritage enclosures that undergo their own change and weathering process according to the climate throughout the year from burning, cracking sun to frozen, shattering ice.
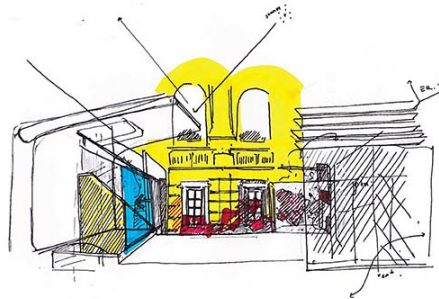
HERITAGE ENCLOSURES - SUPERLATIVE NATURAL PHENOMENA
It is proposed that these spaces are dynamic and can be reconfigured with the use of moveable elements of repurposed and fake heritage to allow the user to experience first hand the tactile nature of these materials and the legacy and narrative they capture. These materials record the temporal changes by being exposed to people and the elements, creating a designed ruin.

ACCOMMODATION FOR THE TOURIST - HOSTEL ROOMS
The hostel is positioned directly in front if the Palazzo to allow for the visiting guest to experience these parts of the city which are usually only experienced during peak hours of activity where access is controlled and restricted. By introducing local resident owned accommodation revenue is generated and the process of tourism can be regulated by the people of the cit rather than governing bodies.

FRAMING HERITAGE - VIEWING DECKS
The raised viewing decks offer a vantage point to spectator and enjoy the site also providing moments to reach out and touch the tactile artefacts and surfaces that surround the user. Some of these are preserved historic elements whilst others are newly inserted stone and other materials that provide texture and interest, creating heritage of the future.
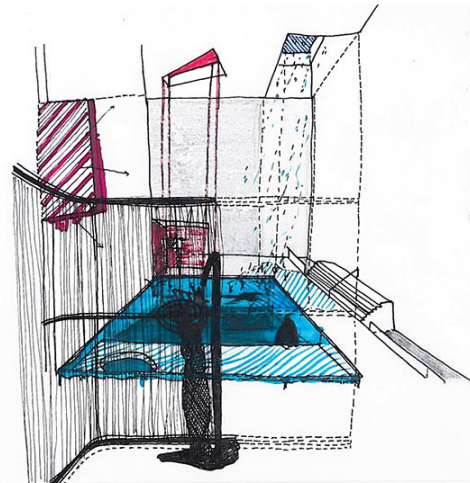
GEOLOGICAL EXHIBITION - SUBTERRANEAN PUBLIC BATHS
The basement level of the proposal offers a unique look at the geological history of the city and records the active seismic activity that exists below the surface of the ground. These properties are best seen within the subterranean public baths that allows users to bathe in a Roman Piazza.
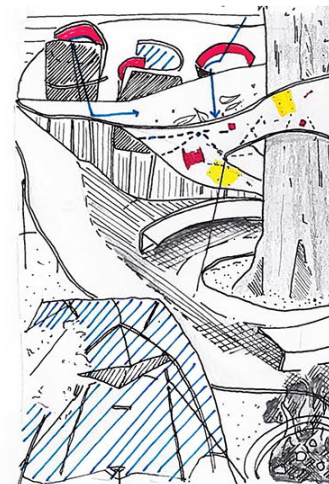
ACCOMMODATION FOR THE TOURIST - CAMPSITE
In addition to the hostel the site offers a unique inner city campsite to allow for tourists to sleep within the oldest part of The City of Torino. Natural and digital trees create a canopy that allows to guest to sleep below a natural canopy that also acts as an interface to light the space and plan future activities for the upcoming day ahead.

Fig. 6.10

List of Drawings

Figure 1.1: https://www.emaze.com/@AOWQCQIZ (Accessed 15/03/18)
Figure 1.2: https://en.m.wikipedia.org/wiki/Decan#/media/File:Senenmut.jpg (Accessed 15/03/18)
Figure 1.3: http://passion-medievale.com/vitraux_roman.html (Accessed 15/03/18)
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Figure 1.6: http://enacademic.com/dic.nsf/enwiki/5373802 (Accessed 15/03/18)
Figure 1.7: https://sistersheila.files.wordpress.com/2013/12/visitation-41.jpg (Accessed 15/03/18)

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Figure 2.9: http://arthistoryblogger.blogspot.co.uk/2011/08/imaginary-prisons-of-piranesi.html (Accessed 15/03/18)
Figure 2.10: Powell, H. and Leatherbarrow, D. (1982). Masterpieces of architectural drawing. London: Orbis. p.39.
Figure 2.11: Powell, H. and Leatherbarrow, D. (1982). Masterpieces of architectural drawing. London: Orbis. p.105.
Figure 2.12: Powell, H. and Leatherbarrow, D. (1982). Masterpieces of architectural drawing. London: Orbis. p.107.

Figure 3.1: http://www.victorianweb.org/art/architecture/petogeorge/studiopart5.html (Accessed 15/03/18)
Figure 3.2: Robbins, E. (1997). Why architects draw. Cambridge, Mass.: The MIT Press. p.41.
Figure 3.3: http://www.googleearth.com (Accessed 15/03/18)
Figure 3.4: Authors photo
Figure 3.5: Authors photo
Figure 3.6: http://www.googleearth.com (Accessed 15/03/18)
Figure 3.7: https://www.moma.org/artists/24452 (Accessed 15/03/18)
Figure 3.8: ibid.
Figure 3.9: https://www.moma.org/collection/works/146?artist_id=27&locale=en&page=1&sov_referrer=artist (Accessed 15/03/18)
Figure 3.10: https://i.pinimg.com/originals/e0/53/2e/e0532ee952045213657d40b27aafc8e6.jpg (Accessed 15/03/18)
Figure 3.11: http://www.estudoprevio.net/en/papers/46/dossier-teses-joao-ortigao-ramos-.-building-a-temple-sigurd-lewerntz-three-case-studies (Accessed 15/03/18)
Figure 3.12: https://www.moma.org/artists/24452 (Accessed 15/03/18)
Figure 3.13: ibid.
Figure 3.14: Cook, P. (2008). AD Primers: Drawing the motive force of architecture, 2008. p.125.
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Figure 3.18: https://www.metmuseum.org/art/collection/search/336901 (Accessed 15/03/18)
Figure 3.19: https://www.moma.org/collection/works/134 (Accessed 15/03/18)
Figure 3.20: https://www.etsy.com/uk/listing/265474961/edwardian-draftsmans-set-in-the-original?ga_order=most_relevant&ga_search_type=all&ga_view_type=gallery&ga_search_query=technical%20drawing&ref=sr_gallery-1-33 (Accessed 15/03/18)
Figure 3.21: ibid.

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Figure 4.1: https://en.wikipedia.org/wiki/Sistine_Chapel#/media/File:Rome_Sistine_Chapel_01.jpg (Accessed 20/03/18)

Figure 4.2: Powell, H. and Leatherbarrow, D. (1982). Masterpieces of architectural drawing. London: Orbis. p.151.

Figure 4.3: http://socks-studio.com/2015/05/27/alpine-architecture-an-utopian-city-by-bruno-taut-1917/ (Accessed 20/03/18)

Figure 4.4: http://skyscraper.org/EXHIBITIONS/PAPER_SPIRES/chitrib01.php (Accessed 20/03/18)

Figure 4.5: http://elarquitectohamuerto.blogspot.co.uk/2012/11/croquis-dibujos-arquitectos.html (Accessed 20/03/18)

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Figure 4.7: https://i.pinimg.com/1200x/2a/dc/78/2adc789444fb190ae3fa1d86fde3e9e0.jpg (Accessed 20/03/18)

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Figure 4.10: https://i.pinimg.com/originals/e0/53/2e/e0532ee952045213657d40b27aafc8e6.jpg (Accessed 15/03/18)

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Figure 4.20: Cook, P. (2008). AD Primers: Drawing the motive force of architecture, 2008. p.31.

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Figure 4.22: http://socks-studio.com/2015/02/02/madelon-vriesendorps-manhattan-project/ (Accessed 22/03/18)

Figure 4.23: Cook, P. (2008). AD Primers: Drawing the motive force of architecture, 2008. p.114.

Figure 4.24: Kulper, P. (2013). A WORLD BELOW. Architectural Design: Drawing + Architecture, 05:2013, p.56.

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Figure 4.27: http://www.presidentsmedals.com/Entry-24811 (Accessed 23/03/18)

Figure 4.28: https://www.chris-delahunt.com/ (Accessed 23/03/18)

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Figure 4.30: Authors Own

Figure 4.31: Authors Own

Figure 4.32: Authors Own

Figure 4.33: Authors Own

Figure 4.34: Authors Own

Figure 4.35: Powell, H. and Leatherbarrow, D. (1982). Masterpieces of architectural drawing. London: Orbis. p.71.

Figure 4.36: http://www.interiordesign.net/articles/13356-josef-hoffmann-museum-shows-rare-drawings-of-otto-wagner-monument/(Accessed 15/03/18)

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Figure 4.37: http://visicert.tumblr.com/image/16352269886(Accessed 15/03/18)
Figure 4.38: Crompton, D. and Cook, P. (2002). Concerning Archigram-- (Archigram Archives 2002). p.133.
Figure 4.39: https://www.archilibs.com/drawing/open-house-coop-himmelblau/(Accessed 15/03/18)
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Figure 5.10:http://www.drawingcenter.org/en/drawingcenter/5/exhibitions/293/otto-wagner/ (Accessed 15/03/18)
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Lectures

Architecture on Stage: Adam Caruso and Peter St John
In-text: (Caruso and St John, 2018)
Your Bibliography: Caruso, A. and St John, P. (2018). Architecture on Stage: Adam Caruso and Peter St John.

Steven Holl film drawing:
https://www.youtube.com/watch?v=qnp3g-6VoaU
Steven Holl
Wednesday, April 17, 2013 – Campbell Sports Center
Drawing as Thought

Field Research / Visits

Sir John Soane Museum and Drawing Archive – Lincoln's Inn Fields, London
Museo di Castelvecchio – Verona, Italy
Drawing Archive at the Carlo Scarpa Study Centre – Verona, Italy

Appendix
The Legibility of Drawing:
Audience Perception Study

Thank you for agreeing to take part in the study. The interviewer has set up this study to investigate the legibility of the architectural drawing.
Legibility: The quality of being clear enough to read
Brief: The study asks for participants to complete a comprehension exercise using a number of different architectural drawings. These drawings are to be treated as independent of one another, the participant need not relate the drawings to one another in a comparative study unless they so choose.

Drawings:
1. Authors own, Rendered long section, Year 3 - 2014
2. Authors own, Plan, Section, Elevation composite sheet, Year 2 - 2013
3. Authors own, Perspective section with diagrams, Year 4 - 2017
4. Authors own, Masterplan, Year 5 - 2018
5. Authors own, Rendered Postcard moments, Year 4 - 2017
6. Authors own, Sketched moment sheet, Year 5 - 2018
7. Peruzzi, St Peter's Ideal perspective: plan, section, elevation, 1502
8. Otto Wagner, Hutteldorf Façade Details, 1901
9. Carlo Scarpa, Castelveccio Setting out drawing, 1920
10. Archigram, Monte Carlo conceptual axo drawing, 1964
11. Wolf Prix, Coop Himme(l)blau, Open House, 1983
12. Lebbeus Woods, San Francisco Project: Inhabiting the quake: Quake city, 1995
13. Steven Holl, Maggies Centre verified rendered view, 2015

The study is separated into two parts:
Firstly: The participant will have 30 seconds to observe thirteen architectural drawings individually before a set of 7 questions are asked of the participant. The participant will have as much time required to answer these questions before moving into the next drawing. The questions can be answered with either yes, somewhat or no; however, the participant can expand on this should they choose to.
Secondly: After the set questions the participant will then be asked to then rank the drawings in terms of legibility. The participant is asked to order the drawings from the most legible to the least legible, taking into account their thoughts during the first part of the study

A - *Questions:*
1. Does the drawing have a clear focus?
2. Do you think the drawing has a defined purpose?
3. Is there a logic to the way information is communicated?
4. Does the composition influence how information is communicated?
5. Do you find the drawing appealing/ of interest?
6. Does the drawing communicate architectural thought in an original way?
7. Do you require additional information to be able to understand this drawing?

B - *Please order the drawings from the most legible to the least*
The participants verbal answers will be recorded and later typed up as a manuscript to document this session and printed as part of my MArch Thesis.

Example: The Red French Door, Mary Tuomi (https://fineartamerica.com/featured/the-red-french-door-mary-tuomi.html)

Questions:
Does the drawing have a clear focus?
Yes, the door.
Do you think the drawing has a defined purpose?
Yes, to show the house from the outside as if you were walking past.
Is there a logic to the way information is communicated?
 Yes, the details of the house have a thick outline and are white bringing these to the foreground. The door is red - drawing your attention.
Does the composition influence how information is communicated?
Yes, the viewer is positioned within the drawing to look directly at the front of the house.
Do you find the drawing appealing/ of interest?
Somewhat
Does the drawing communicate architectural thought in an original way?
No
Do you require additional information to be able to understand this drawing?
No

A

Results: TEST 01

No visual training, no interest in architecture – Social Worker

Authors own, Rendered long section, Year 3 - 2014

Subject: Yes, the size and shape of the building, showing levels.

Purpose: Yes, show the outline of the building.

Logic: Yes, Colour coding, sky and other green colours could have more variation – more opposing colours would translate better. The colour is useful but not clear, needs more contrast.

Composition: Yes, it is clear because there is only one thing you are looking at.

Interest: Somewhat, the shape of the building is interesting, and the visible structure is interesting but the colours are too flat.

Originality: Somewhat, the use of colour is something I haven't seen before.

Additional Information: No

Authors own, Plan, Section, Elevation composite sheet, Year 2 - 2013

Subject: Yes, showing the building layout.

Purpose: Yes, the layout of the building.

Logic: Yes, in the annotation.

Composition: Somewhat, it is not clear what the connection is between the different rotations of the pieces, can't easily compare.

Interest: Somewhat, the colours are quite dull.

Originality: Yes, never seen the positioning of drawings like it.

Additional Information: Yes, how the drawings relate to the overall building.

Authors own, Perspective section with diagrams, Year 4 - 2017

Subject: No

Purpose: No, it's not clear.

Logic: Yes, it's colour coded.

Composition: No, because I don't understand how one piece corresponds to another.

Interest: No, the lines and shapes are too close so I can't understand what's going on.

Originality: Yes, the use of colour and that it is so busy.

Additional Information: Yes, a lot.

Authors own, Masterplan, Year 5 - 2018

Subject: No, too many things on it.

Purpose: No, there is some things as outlines and others in detail – I'm not sure what it is.

Logic: No

Composition: No

Interest: Yes, there's lots of things to look at, but I don't know what they mean.

Originality: No

Additional Information: Yes, Clear distinction of inside and outside, less busy.

Authors own, Sketched moment sheet, Year 5 - 2018

Subject: Yes, specific features and details of that building.

Purpose: Yes, showing specific details of certain parts of the building, showing what I wanted from the last.

Logic: Yes, it's 3-dimesnional so I understand what goes where and it's easily understandable. I can see how it would actually look. The contrast in colour is good.

Composition: Yes, it's clear – there's not too much going on, each individual drawing is clear in it's own right.

Interest: Yes, I understand it.

Originality: Yes, understand it.

Additional Information: No

Authors own, Rendered Postcard moments, Year 4 - 2017

Subject: No

Purpose: No

Logic: No

Composition: No

Interest: No

Originality: Yes, it's unusual with the colours.

Additional Information: Yes, the colours are uniform so it's not clear what is in the front and back. It is not clear why something is in front, the ones behind are not clear – all merge together. Can't distinguish one room from another, one building from one another.

Peruzzi, St Peter's Ideal perspective: plan, section, elevation, 1502

Subject: No

Purpose: Somewhat, to show the layout.
Logic: No
Composition: No
Interest: No
Originality: No
Additional Information: Yes, Is it one building, is it indoor or outdoor.
Otto Wagner, Hutteldorf Façade Details, 1901
Subject: Yes, front view.
Purpose: Yes, to show what the front of the building will look like.
Logic: Yes, simple and realistic.
Composition: Somewhat, but I am not sure what is going on around the edges.
Interest: No, to dull.
Originality: No
Additional Information: No, not the bit in the middle, but on the edges, yes.
Lebbeus Woods, San Francisco Project: Inhabiting the quake: Quake city, 1995
Subject: Yes, the strange looking building.
Purpose: Somewhat, to show the building in it's surroundings.
Logic: No, I don't understand it if there is.
Composition: No, it distracts from the main drawing; the scribbles and lines.
Interest: Yes, it's unusual, there's a lot to look at.
Originality: Yes
Additional Information: No, not the main drawing but yes if I should be understanding the lines and what they mean.
Archigram, Monte Carlo conceptual axo drawing, 1964
Subject: Somewhat, the middle of the drawing.
Purpose: No, not clear.
Logic: No, not that I am aware of.
Composition: No
Interest: Yes, it's unusual and I like the contrast in colours.
Originality: Yes
Additional Information: Yes, it's not clear what it is suppose to be.
Wolf Prix, Coop Himme(l)blau, Open House, 1983
Subject: No
Purpose: No
Logic: No
Composition: No
Interest: No, I don't know what it is, it's just scribbles – it could be a spider; it could be a building.
Originality: No
Additional Information: Yes, what's the subject matter?
Carlo Scarpa, Castelveccio Setting out drawing, 1920
Subject: No
Purpose: No.
Logic: Yes, it looks logical, it is all in rows and there seems to be a coding with the colours and numbers. If I understood the key then yes it would. The colours are not distinct or contrasted enough to make them out.
Composition: Yes, the fact it is on a grid.
Interest: No.
Originality: No
Additional Information: Yes, I need to know what the code/ key is.
Steven Holl, Maggies Centre verified rendered view, 2015
Subject: Yes, but there is two – you don't know if you're looking at that building or the other one.
Purpose: Somewhat, I assume it is to show the setting of the building, which I am assuming should be the brightly lit modern one. If that is the focus then I don't think it focuses enough on that building.
Logic: Yes, it's realistic. All of the building, which I assume is the focus, is shown whereas the other one is obscured. If I was building something then this is how I would like to see it. If I was paying for a building this is the most clear and realistic way of seeing it and this is the drawing I would choose but if it was a big difference in cost then I would be happy with the earlier drawn one too.
Composition: No, there is too much of the first building.
Interest: Somewhat, it is realistic and clear.

A

Originality: No, it's like a photo.
Additional Information: No, it would be more clear if the subject matter was more the focal point.

Order of Legibility:
1.   Steven Holl, Maggies Centre verified rendered view, 2015
2.   Authors own, Sketched moment sheet, Year 5 - 2018
3.   Otto Wagner, Hutteldorf Façade Details, 1901
4.   Lebbeus Woods, San Francisco Project: Inhabiting the quake: Quake city, 1995
5.   Authors own, Rendered long section, Year 3 - 2014
6.   Authors own, Plan, Section, Elevation composite sheet, Year 2 - 2013
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8.   Authors own, Perspective section with diagrams, Year 4 - 2017
9.   Peruzzi, St Peter's Ideal perspective: plan, section, elevation, 1502
10.   Archigram, Monte Carlo conceptual axo drawing, 1964
11.   Authors own, Rendered Postcard moments, Year 4 - 2017
12.   Carlo Scarpa, Castelveccio Setting out drawing, 1920
13.   Wolf Prix, Coop Himme(l)blau, Open House, 1983

TEST 02
No visual training, an interest in architecture and design – Geneticist
Authors own, Rendered long section, Year 3 - 2014
Subject: Yes, the structure of the building shown through the cut through of it, and also the different rooms or spaces.
Purpose: Yes, showing the different functions within each space.
Logic: Somewhat, there appears to be in the way that it is cut-through, but I am not quite sure how.
Composition: Yes, the way it is cut-through you can see underground and the way that different structures protrude underground which gives a better sense of the buildings function.
Interest: Yes, I guess this is the same as my previous point with the levels and the way that it is cut-through.
Originality: No, I don't think so because I have seen different drawings which have been cut like this before.
Additional Information: Yes, a key or a legend to indicate what the rooms are if that is what is supposed to be communicated.
Authors own, Plan, Section, Elevation composite sheet, Year 2 - 2013
Subject: Yes, it's a building plan, structure of different floors and levels from the outside and inside.
Purpose: Yes, architectural planning for different space and layout.
Logic: Yes, very standard, and homogeneous throughout, the inside, this is one section that's the roof and there is good, clear labelling throughout.
Composition: Yes, the way it's structured. It's a bit confusing how this is laid sideways to the top bits.
Interest: No, it's a lot of information and it's not that appealing to look at.
Originality: No, I don't think so.
Additional Information: No, I don't really think so.
Authors own, Perspective section with diagrams, Year 4 - 2017
Subject: Somewhat, its different materials used in different rooms
Purpose: Yes, to structure out how you put materials out, for planning but not visually more for what I put where. If it was for visual purposes I think you would have the glass there and the fabric more visible, this is coloured by material.
Logic: Yes, it's very well thought out, I think the colours relate to a specific type of material.
Composition: Yes, the composition does give the information, but I think as someone who's not an architect I see the colours more in more of an abstract way until I read the fine print I don't get the information from the context.
Interest: Yes, it's very appealing and visually attractive and I think the colours it gives it a clear purpose and thought process of how you can convey this to people. The more I look at it, the more I understand the schematic, although I'm not sure what that is there.
Originality: Yes, I think it does, I don't think I have seen anything like it before.
Additional Information: Somewhat, I think I'd need more time with it to look and ask questions.
Authors own, Masterplan, Year 5 - 2018
Subject: Yes, It's a bit building, an estate, or a factor of some kind. It appears to be the planning of

the buildings and where they are by the roads – like on an industrial estate or something.

Purpose: Yes, to visually see where everything is in relation to everything else. The colours do something different which I'm not sure, but they stand out.

Logic: Yes, you are drawn to the centre where you can make out different buildings and stairs.

Composition: Yes (see above)

Interest: Yes, but there is a lot of information, so I don't know what I should be looking at in comparison to the other images.

Originality: No

Additional Information: Yes, I would need a lot more information to understand it.

Authors own, Sketched moment sheet, Year 5 - 2018

Subject: Yes, the focus is the different spaces of the places I was shown in the last drawing.

Purpose: Yes, to convey, I don't think its colours per say, but I think it's how spaces work and their purpose. Cultural parts of the building.

Logic: Yes, different areas are colour coded depending on what their function is.

Composition: Yes, it does, obviously there is different colour coding, there is text to explain, its visually attractive, so the way it is constructed gives me that information.

Interest: Yes, it's interesting in terms of the colours and text, which I can read what that means, but also its visually attractive and a bit abstract but I can still understand what is being said.

Originality: Yes, I think so, yea.

Additional Information: No, I don't think so.

Authors own, Rendered Postcard moments, Year 4 - 2017

Subject: No, I don't think so. I don't know what that is.

Purpose: No, I don't know what it is if there is one.

Logic: Yes, I think there is a logic – it is all very similar in what is being shown, it is very colourful, almost transparent.

Composition: Yes, the way the pictures are on the page, but I don't know what I am supposed to get from looking at it.

Interest: Yes, it looks great, I like the colours. But I think this is something I would look at and think I don't know what's going on.

Originality: Yes, I think so, yea.

Additional Information: Yes, definitely.

Peruzzi, St Peter's Ideal perspective: plan, section, elevation, 1502

Subject: Yes, I think this is the inside of a church. It's showing the columns and the spaces inside.

Purpose: Yes, to show space inside this building, like where the entrance is.

Logic: Yes, I think this has been draw to specifically show this nave or whatever it is. The columns are distinct even when the drawing fades out.

Composition: Yes, the way it has been drawn draws me to look at the back wall and I can interpret what I think it is.

Interest: Yes, I think it's interesting in how its drawn abstractly, where there is no roof. It's not what you would normally see from an architectural point of view in terms of the layout in a bird's eye view. The way its conveying the information is interesting.

Originality: Yes, I'm not sure historically if this was the way, now I think yes.

Additional Information: No, I would like more information, but I think I know.

Otto Wagner, Hutteldorf Façade Details, 1901

Subject: Yes, It's like the façade of the building.

Purpose: Yes, to show the how the new fits in with the original building.

Logic: Yes, you can see the façade and there is an extra part on the side.

Composition: Yes, I think it is very explicit, you can see the windows and the drawing is split where the new bit enters, which is the bit they are adding on. The drawing is split into three, no four parts, to add extra information. It's showing how the expansion fits in and how the levels work. The gap gives me the assumption that it's not actually there but it gives clarity on what is added on.

Interest: No, It doesn't really appeal to me – that's what it is.

Originality: No

Additional Information: Yes, for me.

Lebbeus Woods, San Francisco Project: Inhabiting the quake: Quake city, 1995

Subject: Somewhat, I think the focus is the sculpture in the middle but its very abstract what changes the focus. It's more like art with the scribbles. It doesn't tell me much about the sculpture.

Purpose: No, I don't know.

Logic: Yes, you can see the façade and there is an extra part on the side.

Composition: No, it's not giving me anything about the image.

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Interest: Yes, I think its really intriguing – what's it made of. The scribbles are interesting.
Originality: Yes
Additional Information: No, I could take my own interpretation of what that is.
Archigram, Monte Carlo conceptual axo drawing, 1964
Subject: Yes, a quirky French restaurant and nightclub.
Purpose: Yes, I don't think it is ment to be architectural, but it is the theme of the room; red and opulent or green and outside.
Logic: Yes, with the colours and the drawings and how its styled with the chameleon and the back drop, it's more of a style based drawing rather than a technical one.
Composition: Yes, definitely with the different colour schemes used, the little people, the structure. The way that it looks doesn't make me think that someone is going to sit down and construct this. It's creative.
Interest: Yes, the colours are very interesting. I like that there is text on it, it gives you a sense of what the purpose and space of the building would be, it would make me want to go to it.
Originality: Yes
Additional Information: No
Wolf Prix, Coop Himme(l)blau, Open House, 1983
Subject: No, very ambiguous.
Purpose: Yes, it looks like scribbles that an architect would do at the very beginning to work it out in their head to plan something and conceptualise their ideas.
Logic: No
Composition: No, it is well composed and like the person who did it knew what they were doing but I don't get any information from that.
Interest: Yes, I would be interested to know what it's supposed to be. I will use my imagination because I know that it is architecture, so I will kind of guess myself and I like that. I think it makes me appreciate the drawing as its own thing and if there was text on the wall then I could read that too after thinking about it.
Originality: Yes, I think it's interesting but if you are going to design something then you probably sketch it out a lot but I wouldn't normally see that, I'm not an architect. I would like to see more of that stuff.
Additional Information: No, I would need more information to understand what it is, but not for the drawing.
Carlo Scarpa, Castelveccio Setting out drawing, 1920
Subject: No, is it a calendar?
Purpose: Yes, it probably does, but I can't find out what it is.
Logic: Yes, there is colours and boxes and a key with colours and ticks but I still don't understand it.
Composition: No, not to me.
Interest: No, I don't think so.
Originality: Yes, I think so
Additional Information: Yes
Steven Holl, Maggies Centre verified rendered view, 2015
Subject: Yes, what a new building would look like in between existing ones.
Purpose: Yes, I think it's to show how something fits together, so if someone was paying to build this what would it look like? You would show this to people and say I'm going to building this building.
Logic: Yes, it seems like a photograph of what it will be.
Composition: No
Interest: No, very standard.
Originality: No
Additional Information: No

Order of Legibility:
1.   Authors own, Sketched moment sheet, Year 5 - 2018
2.   Authors own, Perspective section with diagrams, Year 4 - 2017
3.   Authors own, Plan, Section, Elevation composite sheet, Year 2 - 2013
4.   Archigram, Monte Carlo conceptual axo drawing, 1964
5.   Steven Holl, Maggies Centre verified rendered view, 2015
6.   Otto Wagner, Hutteldorf Façade Details, 1901
7.   Peruzzi, St Peter's Ideal perspective: plan, section, elevation, 1502
8.   Authors own, Masterplan, Year 5 - 2018

9.   Authors own, Rendered long section, Year 3 - 2014
10.   Authors own, Rendered Postcard moments, Year 4 - 2017
11.   Lebbeus Woods, San Francisco Project: Inhabiting the quake: Quake city, 1995
12.   Carlo Scarpa, Castelveccio Setting out drawing, 1920
13.   Wolf Prix, Coop Himme(l)blau, Open House, 1983

TEST 03
Visual training – Textiles Designer
Authors own, Rendered long section, Year 3 - 2014
Subject: Yes, it's about depth, foundations and how far down you would have to dig.
Purpose: Yes, it's about foundations and structure.
Logic: Somewhat, it seems to be colour coded, it looks like there must be a logic in the colour coding.
Composition: Yes, you can tell that it's a big building.
Interest: Yes, the colouring helps with that and there are obviously some very high bits in it.
Originality: No, I think I have seen one of these before.
Additional Information: Yes, I would need more information to see what it is like on the outside. I think it's sociable and I want to see that.
Authors own, Plan, Section, Elevation composite sheet, Year 2 - 2013
Subject: Yes, it communicates that it's a big sociable space with big halls or something.
Purpose: Yes, I's trying to split the building to see the different floors and the uses inside and in the outside bit.
Logic: Yes, but I am not sure what it is. It looks like this part of the building is for this and that is for something else, breaking it into sections.
Composition: Yes, because of the way it's been drawn, sectioning it off.
Interest: Yes, the colouring.
Originality: Somewhat, it's different in the way it is coloured.
Additional Information: Yes
Authors own, Perspective section with diagrams, Year 4 - 2017
Subject: Somewhat, showing how something is constructed.
Purpose: Yes, to show construction in certain areas.
Logic: Yes, but I don't know what it is.
Composition: Yes, the colouring shows the different areas of construction.
Interest: Yes, I haven't seen one done like that before, its different – I like it.
Originality: Yes
Additional Information: Yes
Authors own, Masterplan, Year 5 - 2018
Subject: Yes, It is showing where a building is.
Purpose: Yes, to show the building on site and how the other buildings lie around it.
Logic: Yes, but I don't know what it is.
Composition: Yes, it's very intricate, it is more difficult to read than others but it's very clear how it sits o site.
Interest: Yes, I want to know more.
Originality: Yes, I would say so.
Additional Information: Yes, definitely.
Authors own, Sketched moment sheet, Year 5 - 2018
Subject: Yes, I think it's showing where it lies on the site.
Purpose: Yes, to show the spaces on site.
Logic: Yes, it's picked little bits out of the plan to show how it might work.
Composition: Yes, In the way that there are the little diagrams to zoom in, it is much clearer.
Interest: Yes, it looks like it is hand drawn and freer.
Originality: Yes
Additional Information: No, the drawing is quite clear in what it is trying to communicate.
Authors own, Rendered Postcard moments, Year 4 - 2017
Subject: Yes, I think it's about space.
Purpose: Yes, to show how different spaces might work.
Logic: Yes, I think there is but I don't know what it is.
Composition: Yes, in the way they are ordered and the colour.
Interest: Yes, it looks like a fine art painting.
Originality: Yes

A

Additional Information: Yes
Peruzzi, St Peter's Ideal perspective: plan, section, elevation, 1502
Subject: Somewhat, To show the ruins.
Purpose: Yes, to show what might have been there before.
Logic: Somewhat, it could show how things looked before and where they disappeared.
Composition: Somewhat, it is equal both sides with the entrance is darker, so you look at it.
Interest: Yes, I think it's interesting.
Originality: No, because it is more like a historical document.
Additional Information: Yes
Otto Wagner, Hutteldorf Façade Details, 1901
Subject: Yes, It's what was there.
Purpose: Yes, to show how the same use has changed over time.
Logic: Yes, it is showing the façade clearly.
Composition: Yes, It is nice to look at.
Interest: Yes
Originality: No
Additional Information: No
Lebbeus Woods, San Francisco Project: Inhabiting the quake: Quake city, 1995
Subject: Yes, that shape.
Purpose: Yes, to show the materials of the building.
Logic: Yes, break up the materials of the building, but I don't really understand it.
Composition: Yes, it draws your eye.
Interest: Yes, It's mad, quite artistsic.
Additional Information: No, I think its clear in its own right.
Archigram, Monte Carlo conceptual axo drawing, 1964
Subject: No, it could be about eating.
Purpose: Yes, it shows different sections.
Logic: Yes, It's showing different sections, but to me it's not that clear, it's more graphic – not easy to tell
Composition: Yes, I like it, it doesn't make it clearer to me, particularly.
Interest: Yes, I haven't seen anything like that before.
Originality: Yes
Additional Information: Yes
Wolf Prix, Coop Himme(l)blau, Open House, 1983
Subject: No, a quick sketch of how it might work
Purpose: No
Logic: No, to me it's not clear – maybe they are working it out themselves.
Composition: No, its confused.
Interest: Yes, I like it, there's a lot of energy.
Originality: Yes
Additional Information: Yes
Carlo Scarpa, Castelveccio Setting out drawing, 1920
Subject: No, a calendar
Purpose: No
Logic: No, not to me.
Composition: No, I'm looking at it and it's like somebody is writing music,.
Interest: Somewhat, I am interested to know what it is because I don't know at all.
Originality: No, I don't know what it is.
Additional Information: Yes
Steven Holl, Maggies Centre verified rendered view, 2015
Subject: Yes, the old and new.
Purpose: Yes, to show how the new building sits on a site next to the older buildings,
Logic: Yes, to show if it works, if it doesn't, it's clearer.
Composition: No
Interest: No
Originality: No, it's much more ordinary, I have seen lots of things like that before.
Additional Information: No

Order of Legibility:
1.   Steven Holl, Maggies Centre verified rendered view, 2015

2.		Otto Wagner, Hutteldorf Façade Details, 1901
3.		Peruzzi, St Peter's Ideal perspective: plan, section, elevation, 1502
4.		Authors own, Rendered long section, Year 3 - 2014
5.		Authors own, Sketched moment sheet, Year 5 - 2018
6.		Authors own, Masterplan, Year 5 - 2018
7.		Authors own, Perspective section with diagrams, Year 4 - 2017
8.		Authors own, Plan, Section, Elevation composite sheet, Year 2 - 2013
9.		Authors own, Rendered Postcard moments, Year 4 - 2017
10.		Lebbeus Woods, San Francisco Project: Inhabiting the quake: Quake city, 1995
11.		Archigram, Monte Carlo conceptual axo drawing, 1964
12.		Wolf Prix, Coop Himme(l)blau, Open House, 1983
13.		Carlo Scarpa, Castelveccio Setting out drawing, 1920

TEST 04
Architectural training - Architect
Authors own, Rendered long section, Year 3 - 2014
Subject: Yes, a really huge building in context including ground and geology and structure to accommodate that.
Purpose: Yes, massing, heights and levels of platforms and it's relationship in context.
Logic: Yes, colours representing different spaces and the light as a graphic representation, a key for the spaces. The section cut in white is very clearly marked, elevation falls to the back.
Composition: Yes, you can tell that it's a big building but balanced on the page with no singular focal point.
Interest: Yes, it's very emotive and tactile as one complete idea.
Originality: Yes, in the way that it's drawn.
Additional Information: Yes, I would need more information to understand the details and workings of the building.
Authors own, Plan, Section, Elevation composite sheet, Year 2 - 2013
Subject: Yes, showing clear cut throughs in plan and section.
Purpose: Yes, to communicate the qualities of space and how the sections are elevated from the plan, how it sits in site.
Logic: Yes, coloured textural layering conveys another level of information from the drawing; light, use of rooms. Common scale and language used to communicate plans and sections coherently, although they are not orientated the same way.
Composition: Yes, organised with smaller diagrams of a different scale which are less important helping to explain the drawing.
Interest: Yes, because they are similar colours and the same scales it is clear but because of the orientation shifts there is more explanation needed.
Originality: Yes, as a composition, not as drawings.
Additional Information: Yes, there needs to be more space between them to be readable.
Authors own, Perspective section with diagrams, Year 4 - 2017
Subject: Somewhat, showing how something is constructed.
Purpose: No, abstracted diagram to represent spaces and functions in plan.
Logic: Somewhat, pulled out diagrams with architectural conventions in the way they are drawn show door swings, furniture layouts are used to describe things in detail but the scale is so different that there is no clear indication to why they are there.
Composition: Yes, the colour but I'm not sure what this is used for though
Interest: Yes, definitely an energy to how its read and as an overall quality. There is a consistency in the language and the level of detail in the drawing that is categorised by colour but to actually understand the image it is not clear.
Originality: Yes
Additional Information: Yes
Authors own, Masterplan, Year 5 - 2018
Subject: Yes, it's a masterplan.
Purpose: Yes, a site in use, a lot of overlaying in information but not to the extent where I can't read it because there is such a contrast in how it is shown in each layer.
Logic: Yes, easy to read by line weights, wall types, floor finishes with grey which is what I look at first as landscape then the filled in walls that show buildings then the rest as more open buildings. Shows what is open and closed. A hierarchy that I can clearly and rationally read.
Composition: Yes, it is clearly covering a large site. ¾ of the page is filled with the masterplan and

A ¼ of the page is blank and I guess that it adjacent landscaping. It is easy to read by the amount of white space.

Interest: Yes, there is a lot of information and detail that could be saying so many things, but I would need more time to work out, but I think it's about a city in motion.

Originality: No, a conventional plan

Additional Information: Yes, fine as a masterplan drawing but not to understand the information within it.

Authors own, Sketched moment sheet, Year 5 - 2018

Subject: Yes, hand drawn perspective views that are quite abstract, which are related to dots on the plan, this is quite small (the plan) so makes this a bit harder to read.

Purpose: Yes, a series of expressive ideas, objects and colours to relate to the context, movement and it kind of conveys the idea of chaos that the plan conveys.

Logic: Yes, the text and headings make it easier to understand. The small camera diagrams are good because they make it clear where each view is coming from, there is zero error for me to make. I am automatically drawn to read the left-hand side first because there is more white space, and they are more recognisable – I can see this is a space you enter, like an atrium space. Here is an external space, again, here, and here. These (on the right) you are not immediately pulled in – I can't relate to these spaces as much. So, these (the left) are immediately more legible than those. I think it would be good that you could read the plans bigger first, so I can reference back to that when looking at the drawing. I can see that all views relate the plan and to each space.

Composition: Yes, they are not centred, and that is really bugging me. Basically, they are all very focused drawings, the 4 on the left work very well together – they are all landscape and that is why they have been organised together – orientated views are on top of each other. The portrait views are orientated on top of each other. It's the plans at the bottom that don't give enough white space around them, the plan is grey and very heavy, so I don't have enough space to look at the sketches, especially at the bottom. There's not enough white space around the right-hand side of the page.

Interest: Yes, the colours are interesting and also the sequence of spaces.

Originality: Yes, actually what I think is original is the use of colours to create a narrative that you can read through the drawings. The only thing I haven't established in the time I have looked, because there is a lot going on, is what the colours actually mean. I can pretty quickly read now I'm looking though if that's what they are.

Additional Information: Somewhat, I need the plan bigger but it is already there, just needs to be bigger.

Authors own, Rendered Postcard moments, Year 4 - 2017

Subject: Yes, looking through buildings as a thoroughfare to see a destination or focal object.

Purpose: Yes, the quality of space and materials.

Logic: Yes, Images of the same intent behind each other are like a draft with the final one on top – make it easily read. The different colours give a clear language between each image.

Composition: Yes, they are laid out very clearly in harmony and in a nice arrangement which gives hierarchy from the front, the composition is really good. It's very easily legible – but although I understand what I am seeing I don't necessarily know if that is what it is.

Interest: Yes, using tones of one colour to represent different surfaces, so I understand the quality of space and the materials. The materials are all similar in each picture, kind of glass and marble.

Originality: Yes, I see it as a composition of objects that relate to each other – it's a neat composition that's attractive – the background frames it.

Additional Information: No

Peruzzi, St Peter's Ideal perspective: plan, section, elevation, 1502

Subject: Somewhat, ruins or futuristic objects.

Purpose: Yes, focus on certain elements with the exaggerated perspective. It looks unfinished so I think the style of the drawing invites the reader to fill in the gaps and decipher what's going on.

Logic: Somewhat, there are a series of extruded shapes that are elevated from the plan that also looks ruinous and futuristic.

Composition: Yes, the layout is classical also the building elements, arches, columns.

Interest: Yes, It looks like it is something in progress, it's sketched so could be ongoing – the plan. But also it's pieces of a puzzle which don't show if the surrounding pieces are designed – so I want to know more about those bits.

Originality: Yes, it's really original. It's an old drawing in that the lines are faded which makes it ambiguous. It is not a conventional way of representing the building as such, it uses the plan and section but in a way I haven't seen used before.

Additional Information: No, It is legible but I can't read all the information or identify the building. I can see common features, but I don't understand how they relate to each other and I think that's okay for this drawing.

Otto Wagner, Hutteldorf Façade Details, 1901

Subject: Yes, a detailed elevation study, with detailed plan and sections projected off it.

Purpose: Yes, it's a measured drawing so I can understand the projections from the façade. I can understand that in size, depth and how they relate to the internal floors and ceilings.

Logic: Yes, you can see where they are taken though the building. It is highly logical and rationalised, well presented. Yea, it's easy and clear to read but what is missing is the detail - it's so faint. Because it has so many dimensions and stuff on it I think it was used for something more detailed that what I cans see.

Composition: Yes, What I read first is the elevation in the middle because of the dark shadow that gives depth, I can understand the building more by looking at this first. The drawings round the edge are very light so are more technical and less obvious, they are quite faint – I can't read them clearly.

Interest: Yes, it's a very systematic way f drawing.

Originality: No

Additional Information: No

Lebbeus Woods, San Francisco Project: Inhabiting the quake: Quake city, 1995

Subject: Yes, it's the futuristic man-made object on the existing harbour. But you can't really tell what it is and that is the point.

Purpose: Yes, I have a preconception to what this may mean. I know it is very abstract and animated and that the layering may show snippets of reality of the ideas to ground the conceptual in the real physical – which I think is great!

Logic: Yes, there is definitely a hierarchy in how the image goes from a complete fully formed idea on the right to the bottom left of the page, which is ideas in motion and scribbles that are not realised at all.

Composition: Yes, it's like a series of postcards that fold out revealing different levels of information and detail within an overall concept.

Interest: Yes, the difference in how finished the things are on each side of the page create a tension t hat is really obvious and really interesting. It gives the reader understanding that maybe it's not real.

Additional Information: No, I think its clear in its own right.

Archigram, Monte Carlo conceptual axo drawing, 1964

Subject: Somewhat, it's the different platforms that step up like stepped raised levels. The spatial differences between levels.

Purpose: Yes, describing the themes of each spaces and the levels of each space, the themes of the spaces too.

Logic: Yes, very bold colours defining each space. The thin line technical drawing shows what it is like within the context then the abstract overlay add the colours, and crazy things – and there is a chameleon on the page, I don't know why.

Composition: Yes, it's a clear perspective that breaks down the spaces of the building.

Interest: Yes, the perspective shift in the spaces and the colours give a feeling of wat it would be like to be there, which I focus on straight away.

Originality: Yes, really original.

Additional Information: No

Wolf Prix, Coop Himme(l)blau, Open House, 1983

Subject: Someone, it's an idea, the energy and ambiguity to it, it could be a section, it could be a plan, makes this less obvious.

Purpose: Yes, it's a development drawing

Logic: Somewhat, there are ink or charcoal scrabbly sketches that are overlaid in a quick fashion to work things out more technically in the workings in someone's head.

Composition: Yes, strong, bold – it feels like a snippet in time of the development. I feel like it's going to change again. It's a concept drawing that is not completely clear or resolved, it is not a concept plan but the overlaying of it has an energy of developing an idea.

Interest: Yes, the background vs foreground is very interesting it shows how the idea has moved on.

Originality: Yes, it's someone's style of drawing – that makes it unique.

Additional Information: No

Carlo Scarpa, Castelveccio Setting out drawing, 1920

A

Subject: No, I have no idea.

Purpose: No, I don't know, thinking through something.

Logic: Somewhat, I can see there is a logical grid system with colours and sequential numbers, so that means something. But, it is not clear that there is a key; the drawing is constructed of coloured squares but what appears to be the key is done with circles on the right. The colours seem to relate, but it is done by hand so the difference in colours is very varied. But, then there is hand scribbles over the top which implies that they are crossed out or that it means something else – I don't know. Maybe it's been a ticking off exercise.

Composition: No, it's an overall composition that shows someone's working out or an analysis. There is a lot of information on the page which makes me think that all the information on the page relates to one concept. There is obviously a logic to how the information is laid out on the page, although I don't understand what it means.

Interest: Yes, it has an energy I think that is because of the red, it's very strong.

Originality: Yes, it's the thought process of someone's mind.

Additional Information: Yes

Steven Holl, Maggies Centre verified rendered view, 2015

Subject: Yes, the new, it's distinct even though the colours are similar, it's very clear, the proposed is alien in the existing but standing out so much in colour and effects on the render.

Purpose: Yes, the outward proposal of a building in context. It's a tick box exercises for planning rather than representing the strength of the building. By showing it in street context it tries to show what it will look like at the end – a completely forced view.

Logic: Yes, it looks like a computerised building that is rendered, it's boring. The colour composition, even on the existing is really disorientating.

Composition: No, the full building can't be seen – that makes me uncomfortable. It looks like a dead end where you can't see the whole building.

Interest: No, it looks so flat and boring, it's really uninteresting.

Originality: No, very conventional, so standard as a view in street context.

Additional Information: No

Order of Legibility:

1.   Steven Holl, Maggies Centre verified rendered view, 2015
2.   Archigram, Monte Carlo conceptual axo drawing, 1964
3.   Otto Wagner, Hutteldorf Façade Details, 1901
4.   Authors own, Rendered Postcard moments, Year 4 - 2017
5.   Lebbeus Woods, San Francisco Project: Inhabiting the quake: Quake city, 1995
6.   Peruzzi, St Peter's Ideal perspective: plan, section, elevation, 1502
7.   Authors own, Masterplan, Year 5 - 2018
8.   Authors own, Sketched moment sheet, Year 5 - 2018
9.   Authors own, Rendered long section, Year 3 - 2014
10.   Authors own, Plan, Section, Elevation composite sheet, Year 2 - 2013
11.   Wolf Prix, Coop Himme(l)blau, Open House, 1983
12.   Authors own, Perspective section with diagrams, Year 4 - 2017
13.   Carlo Scarpa, Castelveccio Setting out drawing, 1920
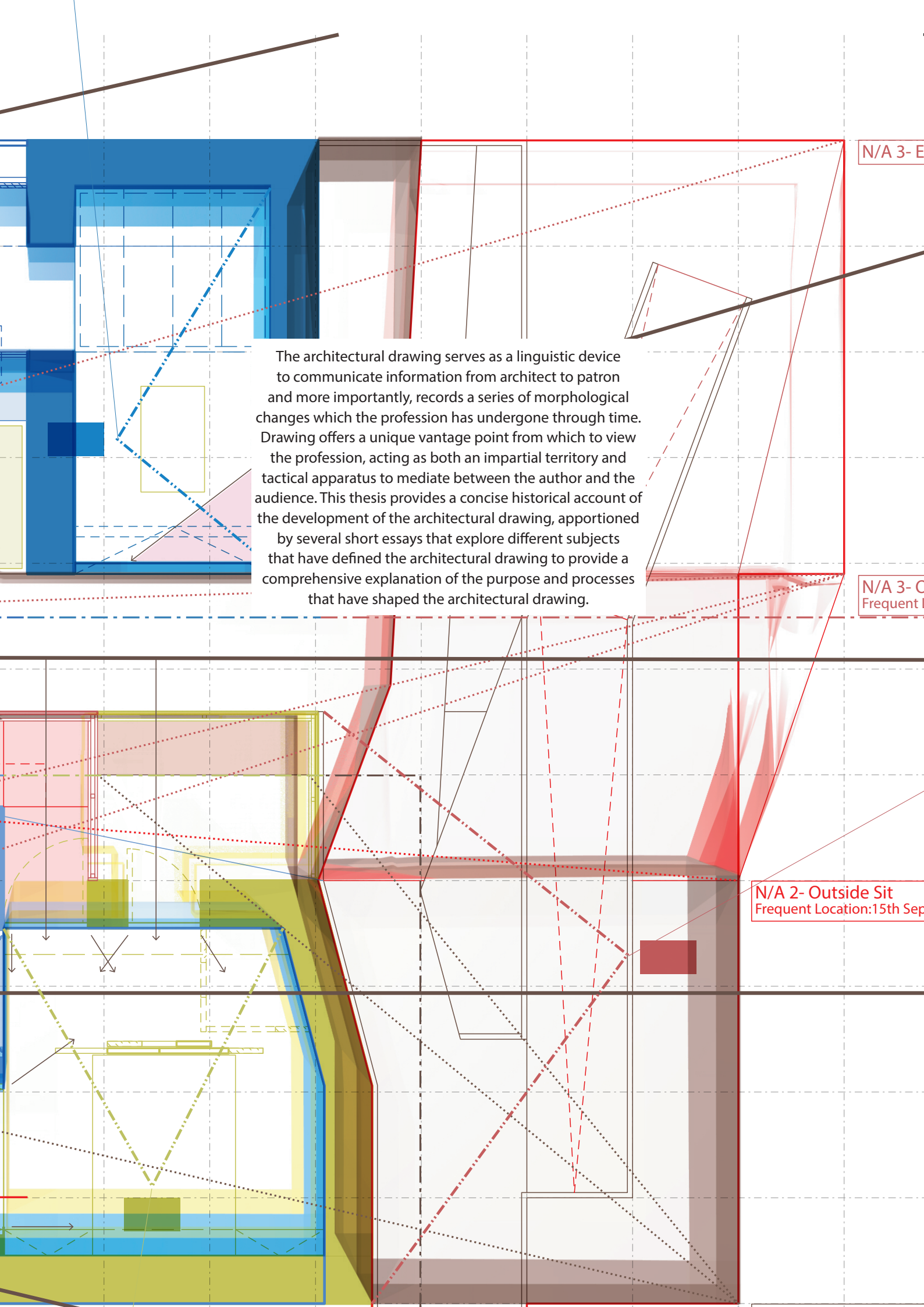
The architectural drawing serves as a linguistic device to communicate information from architect to patron and more importantly, records a series of morphological changes which the profession has undergone through time. Drawing offers a unique vantage point from which to view the profession, acting as both an impartial territory and tactical apparatus to mediate between the author and the audience. This thesis provides a concise historical account of the development of the architectural drawing, apportioned by several short essays that explore different subjects that have defined the architectural drawing to provide a comprehensive explanation of the purpose and processes that have shaped the architectural drawing.

N/A 3- E

N/A 3- C
Frequent L

N/A 2- Outside Sit
Frequent Location:15th Sep