

ARCHITECTURAL PAINTINGS

Research on the role of painting in the architectural design process

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1. Introduction

Architecture is a creative craft within certain limitations of program, technical requirements, environmental aspects etc. and every project comes with a vast number of challenges that have to be tackled, giving the designer endless possibilities for solutions. A design tool used by many architects throughout the centuries to explore these possibilities is painting. Le Corbusier devoted half of every day over a 45 year period to writing, painting and drawing. During the first two decades of her career, Zaha Hadid has been primarily focused on architectural research through paintings. Painting can be a crucial part of the creative design process and Alvar Aalto explains this very well (Aalto, 1970):

“For a moment I forget all the maze of (architectural) problems, I erase them from my mind and busy myself with something which can best be described as abstract art. I start drawing, giving free rein to my instinct, and suddenly the basic idea is born, a starting-point...”

Before diving deeper into the explanation of painting as a design tool, it is important to clarify what the purpose is of making these architectural paintings. As Lawson explains, architects “do not draw for the sake of the effect they create, they are not artists in that sense. They are making marks on paper which represent something” (Lawson, 2004). Therefore, architectural paintings constitute a starting point with two dimensions: the projection of an alternate not realized but yet potential future and at the same time the projection of the thinking of the creator. In other words, they serve a double function - to communicate ideas and explore spatial thinking. Painting in that sense is a means to an end within the architectural design process.

Painting is used in the architectural design process as a ‘generative media’. Generative refers to a tool or medium that can inform the course of an architect’s thought process. Medium, following Marshall McLuhan’s explanation, is considered as “any extension of the self” (McLuhan & Lapham, 1994). Painting is a medium incorporating the process of embodied thinking. The act of painting creates a direct connection between the body, i.e. the hand, and the mind, i.e. the subconsciousness. While being emerged in the process, the architect forgets both his hand and the brush and the image emerges as if it were an automatic projection of the imagining mind. According to Pallasmaa (2010), “the capacity of our imagination does not hide in our brains alone. Our entire bodily constitution has its fantasies, desires and dreams”. Therefore, the hand and the head are not two separate entities and separating them would result in mental impairment (Sennett, 2009). Making paintings is a generative and interactive process as it involves seeing-moving-seeing, as Schön and Wiggins (1992) describe it. Working on a painting can result in a new painting or in accessing material from long-term memory which then produces a new painting.

A crucial aspect of understanding painting as a generative process is to understand the role of abstraction. Painting has ambiguous and unconstrained qualities as the final product is not perfect as a representation which triggers interpretation through abstraction and imagination. Abstraction is relevant not only within the field of painting but in the architectural design process as a whole. In the architectural design process, necessarily but also willingly we make abstraction of reality. Architects,

opposed to sculptors, don’t work on the final products which is why it is often impossible, as an architect, to be engaged in the design and construction process of real architectural artifacts. In the final stage of the design process the end result is production of representations of architectural intentions in the form of drawings, models and texts. In fact they represent nothing in reality and what they represent intentionally can only be imagined. I will come back to the meaning of abstraction within the architectural design process later in this research.

To fully understand architectural paintings it is important to look into drawing and sketching as well and clarify the difference between the three media. To paint is to apply color, using a wet medium, to a solid surface, e.g. paper or canvas. And paintings are made with a multitude of colors and focus both on color and form. Drawing, on the other hand, is the art of representing an object or outlining a figure or plan by means of lines and shading which is usually done using a dry media. Sketching can be done with both wet and dry media. This is the process of making studies and the results are usually used as reference material for drawing and painting. The reasons to further explore drawing and sketching in this research are twofold: firstly, painting can be limiting as a tool and more possibilities can be explored based on the type of exploration. Secondly, the process of making a painting requires more time and often times before making a painting architects and artists make sketches and drawings to explore different possibilities for compositions, color combinations etc. Therefore making drawings and sketches can be considered as part of the process of making a painting. Furthermore, the thought process, i.e. the embodied thinking, while making the drawings and sketches can be compared to the one of painting. The difference between the three media will also be further explored in the research.

2. Goal

What is essential to consider is that architectural paintings can help architects stimulate their creativity and imagination. Despite this, the ways in which architectural paintings can be used in the design process and the process of making an architectural painting is rarely explicitly investigated. Therefore, the aim of this research is to understand the implicit creative process of architects who use painting as a design tool. This problem will be addressed by answering the question “How can painting be used within the architectural design process and architectural development?”

This main question will be answered based on the following sub-questions that will be covered in the thesis:

- What are the different ways in which painting can be used in the design process?
- How are sketches and drawings similar to architectural paintings?
- What is the process ahead of making architectural paintings for a project?
- How is the architectural design process, in which painting is used as a tool, similar to the creative process of an abstract artist?
- In which part of the design process is used which painting style?

3. Method

The framework of the research is constructed around the analysis of architectural paintings made by architects for whom painting is an integral part of the design process.

The question of what the different ways are in which painting can be used in the design process is going to be answered by analyzing how five architects use painting in their design processes. The process ahead of making architectural paintings for architectural projects will be also analyzed from an artistic and architectural point of view, by looking at the composition, the various elements and forms in the drawing and the choice of color. Moreover, to get deeper understanding of the possibilities and limitations of the medium, the architectural paintings will be compared to architectural drawings and sketches. The analysis is going to be done by conducting a literature review. The aim of this analysis is to develop categories for the various painting styles depending on how the paintings are made, when they are made in the design process, why they are used, and what is achieved with them. To get a full understanding of how paintings can be used in the design process and understand the role of abstraction in it, the way painting is used as a tool within the architectural design process will be compared to the creative process of an abstract painter.

Based on the conclusions, the different ways of using paintings, will be implemented during the design phase of the graduation project, aiming to practically implement the outcomes and explore how this tool fits within my personal creative process.

4.1. Zaha Hadid

Introduction

For the first two decades of her professional career, Zaha Hadid was primarily focused on architectural research through paintings. The conventional architectural drawing was restrictive, so Hadid studied painters from the Russian avant-garde of the 1910's and 1920's (Zaha Hadid Architects, n.d.) in the search for new means of representations which allowed her to develop a specific form of abstract composition as an investigative principle. Through radical formal reduction, she managed to move away from certain dogmas about what architecture is, to break out of the orthogonal grid that was predominant at the time, and free up her thinking.

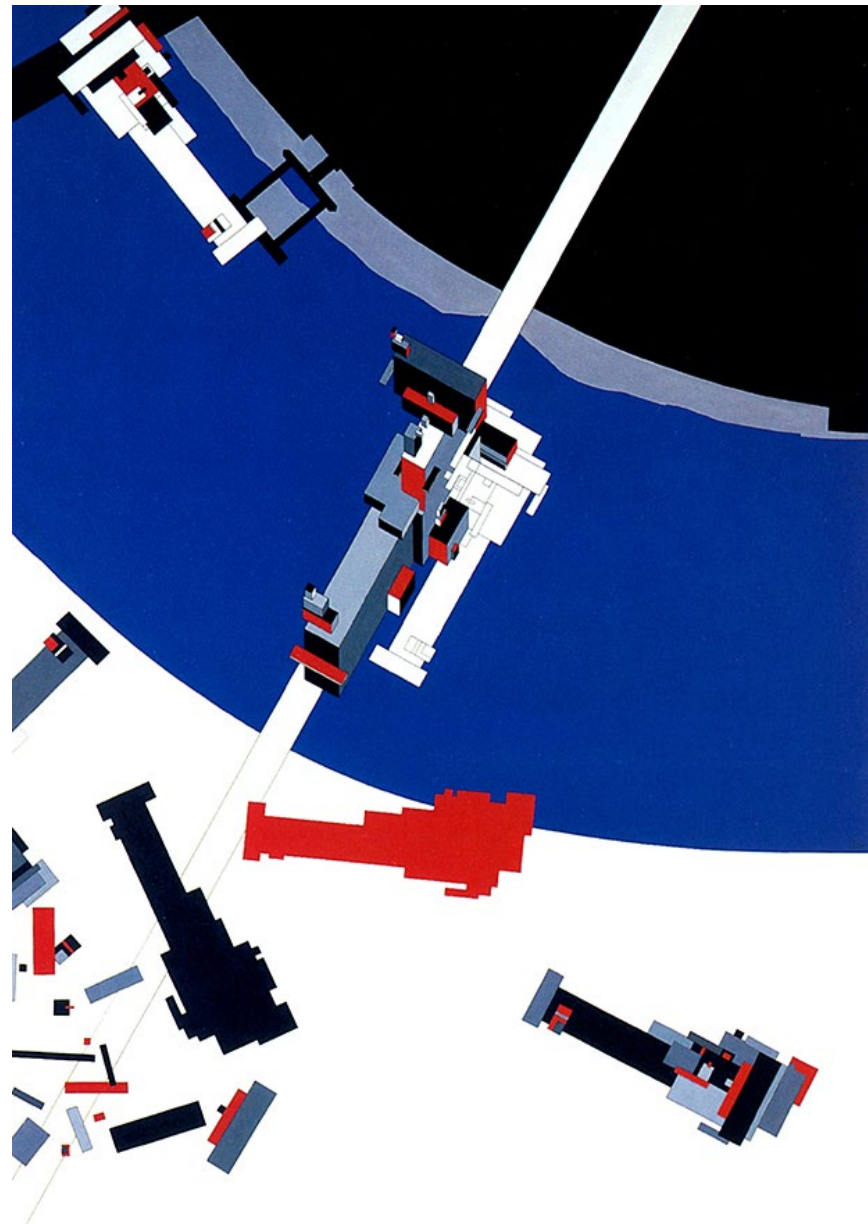


Image 1: Malevich's Tektonik, 1976-77, painting.
Source: The Pritzker Architecture Prize, 2004, Zaha Hadid

The role of painting in Hadid's work

Zaha Hadid's new ways of exploration are manifested in her graduation project at the Architectural Association – Malevich's Tektonik (Image 1). Hadid named the painting after the Russian supermatist artist Krasimir Malevich whose work had inspired her (Image 2). Suprematism promoted absolute abstraction disconnecting from all things physical, an idea that Hadid also used in her drawings. Hadid took Malevich's 1923 Arkitekton model (Rosenfield, 2014) and, giving it scale and function, turned it into an architectural project - a concept for a 14-story hotel of color-blocked, floating fragments over the River Thames. Already in this early painting, Hadid explores the notions of flotation, layering and fragmentation. Using color combinations, she develops variations of the structures that have multiple layers, represented with different colors, in the center, the bottom right and upper left corners of the painting. By deconstructing the whole architectural building into separate colorful layers in the bottom left corner, she creates a series of fragments, which allows her to explore possibilities to construct spaces, to analyze the relationships between the spaces and to "utilize the apparently random composition of the Suprematist tektonik forms to meet the unique demands of the construction and its urban context" (Zaha Hadid Architects, n.d.). That's how Hadid uses paintings as a design tool to explore new architectural ideas by creating abstract compositions.

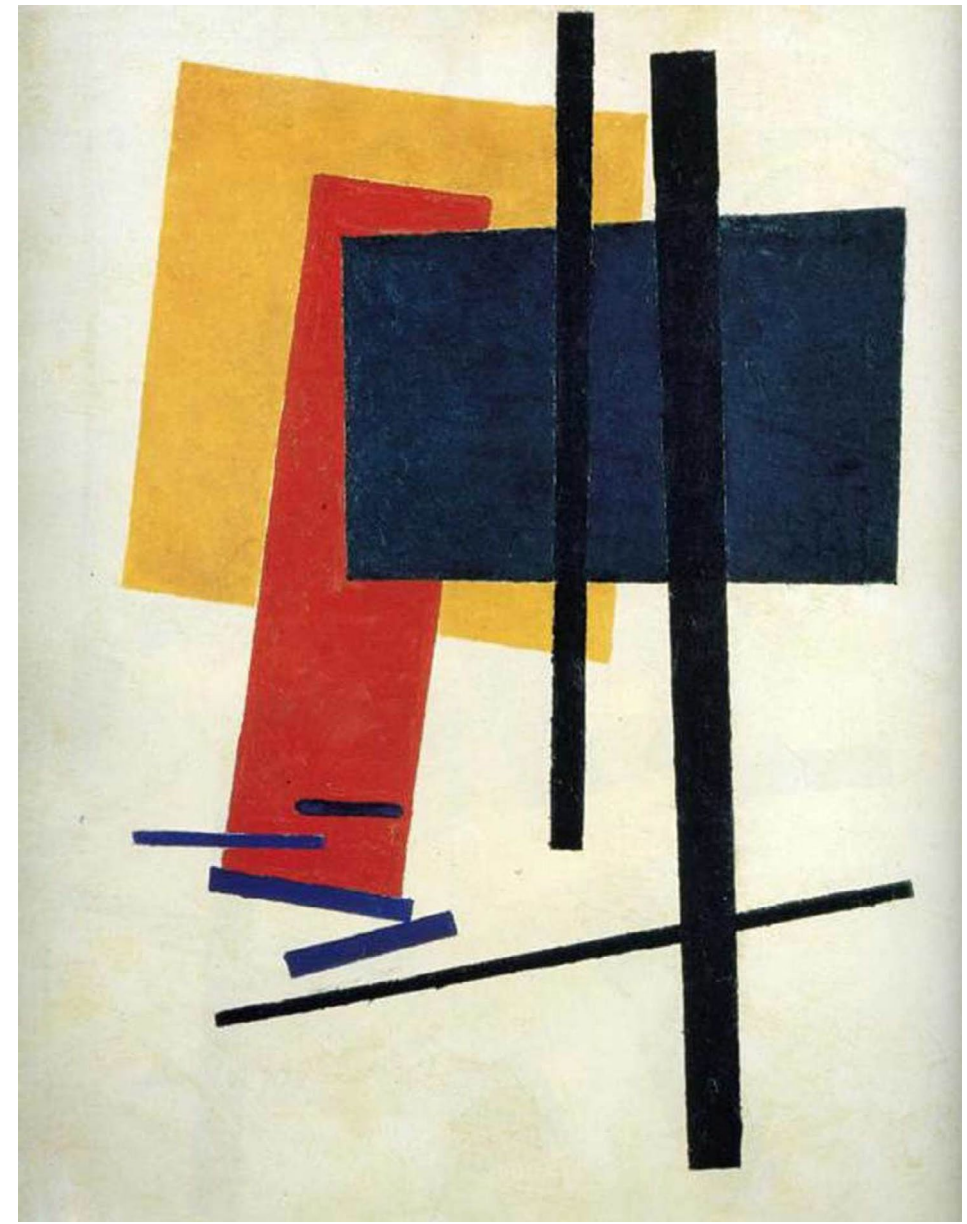


Image 2: Kazimir Malevich - Suprematist Composition (with Yellow, Orange and Green Rectangle), 1915-16. Source: Art Salon Holland, n.d. Abstract geometric art put on the map

The purpose of painting in Hadid’s work

Based on the available information about Hadid’s design process, she usually made paintings for a specific projects, i.e. she had a brief, based on which she developed the design through paintings. As Zaha used painting as a tool for spatial exploration, she used painting in the initial design phases, i.e. conceptual and schematic design, and worked on various scales from the building scale, e.g. The Vitra fire station (Images 3 and 4), to the urban scale, e.g. The World (Image 6). The main idea embodied in the project for the Vitra Fire Station is depicted in a very simple sketch which is then translated to a painting, namely that the structure of the fire station has been cut and bent to portray ‘a collision of directions’ and the program of the building inhabits the spaces between the walls, which puncture, tilt and break according to the functional requirements.

For every project based on the brief, she developed abstract, architectural paintings which then informed her architectural designs. Using painting as a design tool allowed Zaha Hadid to explore a few main ideas (Table 1) that come back in a majority of her projects.

| Idea | Explanation | Paintings |
|---------------|---|--|
| Dynamism | Representing constant change and motion of elements and spaces | Vitra Fire Station |
| Fragmentation | Deconstructing elements and representing them as fragments | The Peak, Malevich’s Tektonik |
| Fluidity | Seamlessly connecting elements with each other | The World, Metropolis |
| Explosion | Collision of spaces, resulting in fragmentation of inner elements | The Peak, Irish Prime Minister’s Residence |
| Flotation | Spaces and elements float in and out of each other | Irish Prime Minister’s Residence, The Vitra Fire Station |

Table 1



Image 3: Preliminary sketch, Vitra Fire Station, 1991. Source: Zaha Hadid Architects, n.d.



Image 4: The Vitra Fire Station. Source: Zaha Hadid Architects, n.d.

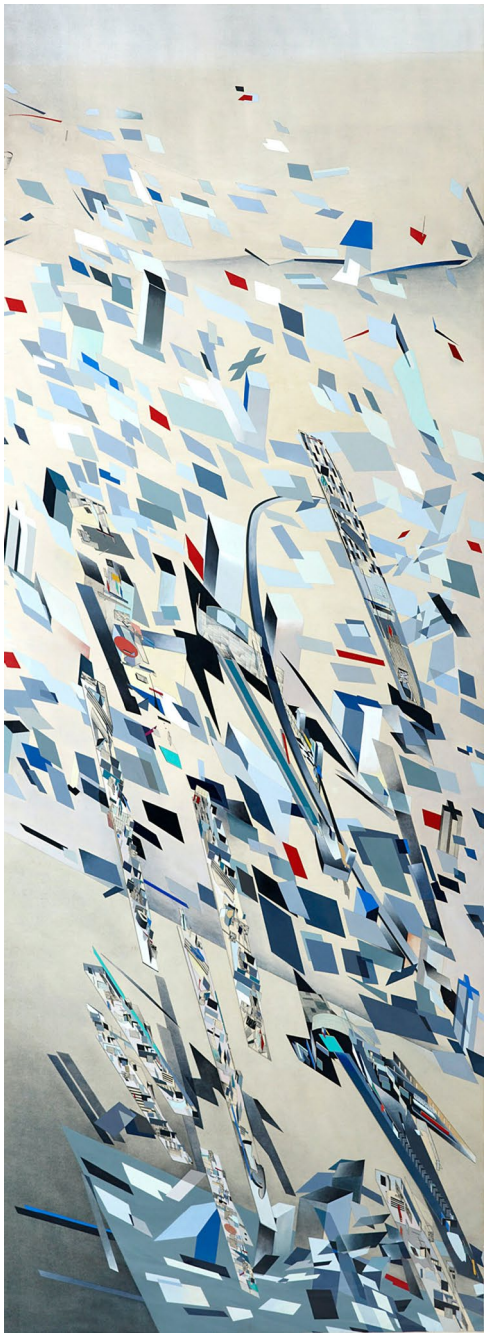


Image 5: Confetti ‘The Peak’, Hong Kong, China 1982/1983. Source: Zaha Hadid Architects, n.d.

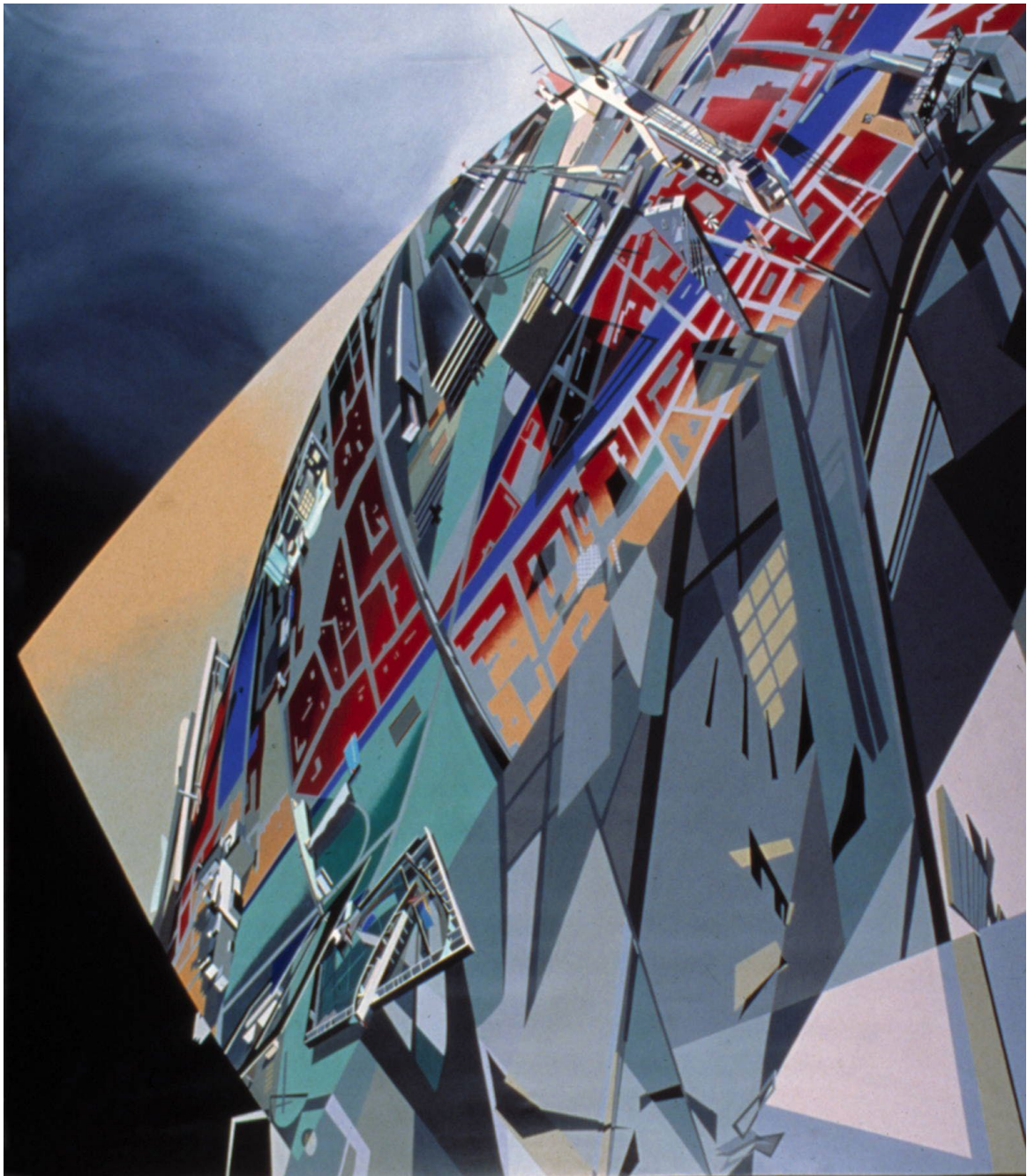


Image 6: The World (89 Degrees). Source: Zaha Hadid Architects, n.d.

Painting as part of the creative design process

By working on architectural paintings, Hadid focused more on the compositional aspect and the relations between the elements in the space rather on the architecture itself. This becomes evident by observing her process drawings and sketches for the competition entry of the Irish Prime Minister's Residence (Image 7). Through these process drawings Zaha explores the composition of the spaces and the idea of flotation and explosion. The drawings depict how the composition of the painting and the arrangement of the elements in the space progresses until it reaches the final state.

In her first drawings (Images 8-16), Zaha explores different compositions and arrangements of the elements in space both as abstract plans and in 3D. In the beginning (Image 8) she uses simple shapes – triangle, parabolic axis and a square, but then she gradually develops the drawing by adding more elements (Images 11, 12, 13), making the composition more dynamic. Another important aspect of the process drawings is the interaction between the elements – Zaha carefully positions every element in the space considering the intersections between the elements, which allows her depicting the ideas of flotation and explosion. Wherever some of the geometries overlap, Zaha uses a different color but yet similar to the one of the element which also results in fluidity between spaces and elements.

Drawings 17 to 26 show how Zaha explores the ideas of flotation and layering – she not only does this on a single sheet but she makes every layer on a different piece of paper and cuts out the part of the paper where there are no elements or ground. That's how Hadid represents the different floors of the architectural objects. This way of layered exploration also allows her to analyze the composition from an artistic point of view by laying the focus on specific elements (Images 22 - 25).

In the last set of process drawings (Images 26-35), Zaha explores the composition from different perspectives. In this phase where the majority of the elements are present and the arrangement is almost final, color starts playing bigger role. In the first set of drawings (Images 8-17), the triangle is blue, while in these last drawings, Hadid draws the triangle using different shades of blue. Here she also starts defining the color of the ground surface and lays the focus on the parabolic axis which plays a central role in the painting (Image 33), splitting the composition in two parts.

Even though this is a small part of all the drawings and sketches that Zaha made for this project, they explicitly show Zaha Hadid's creative process when developing an architectural painting for a project. Through the process of developing the final composition of the painting, Zaha zooms in and out to different elements, explores various compositions and creates the arrangement by working in different layers and from different viewpoints on the same composition.

An important observation is that through the process of developing the architectural painting, Hadid uses primarily sketches and drawings, while the painting itself is the final product. The process of making the painting can be categorized as explorational and the painting itself becomes representational. Even though the painting is the final product of this creative process, Hadid uses painting as a means to an end within the architectural design process because her paintings inform and inspire her architectural designs.



Image 7: Final painting for the Irish Prime Minister's Residence. Source: Zaha Hadid Architects, n.d.

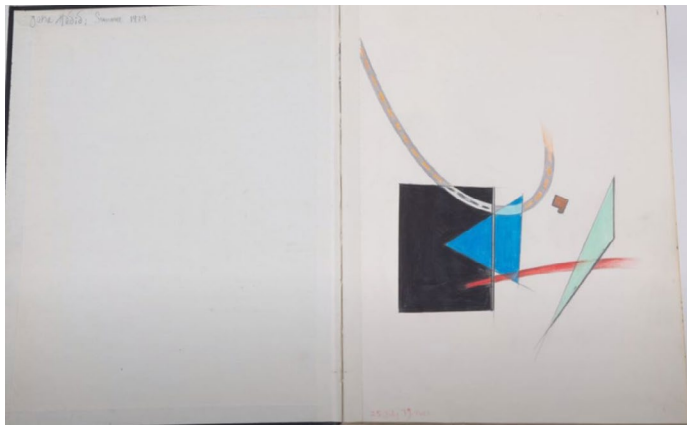


Image 8

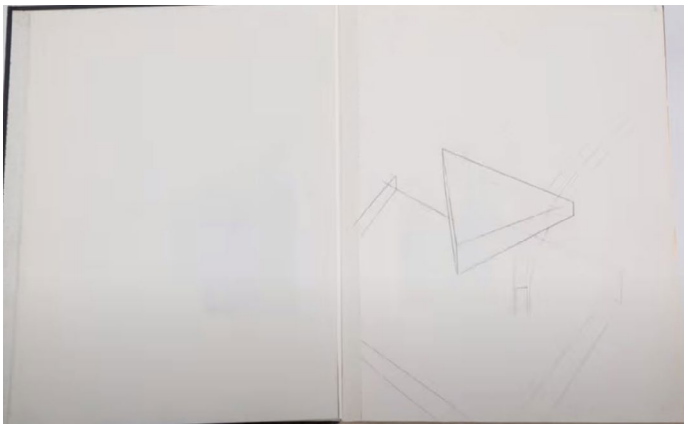


Image 9

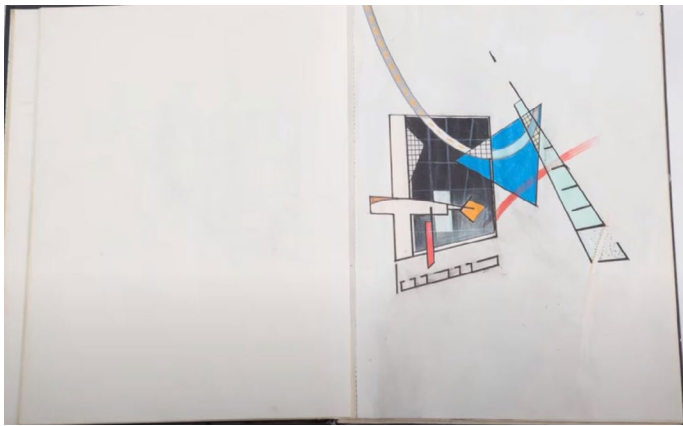


Image 16



Image 17



Image 10

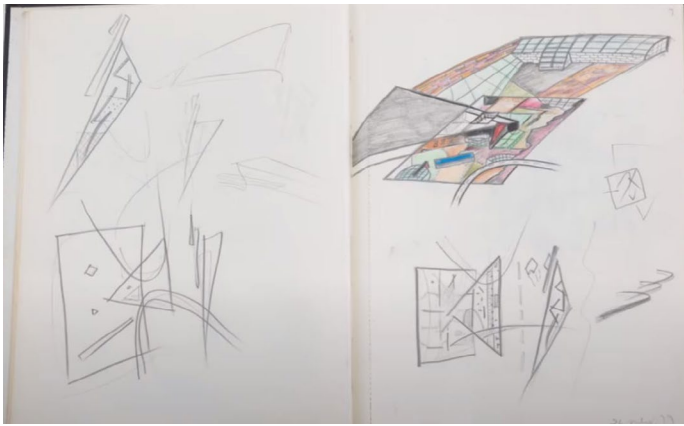


Image 11

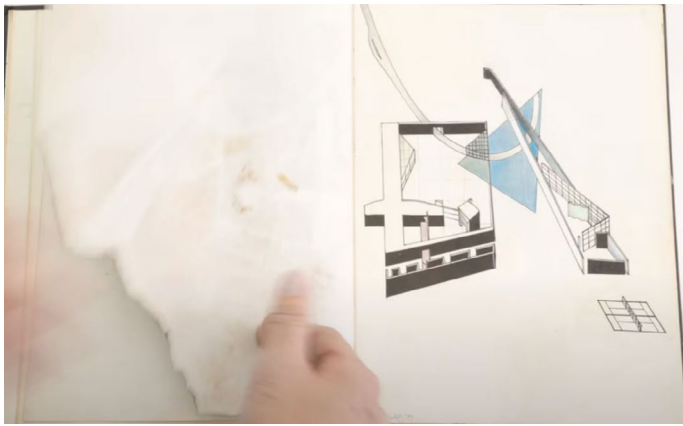


Image 18

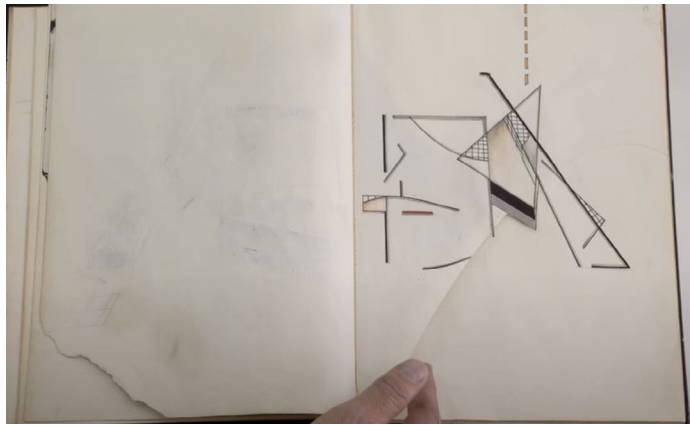


Image 19

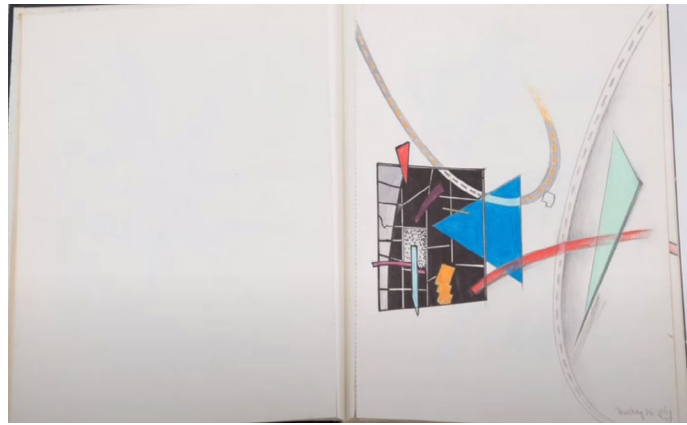


Image 12

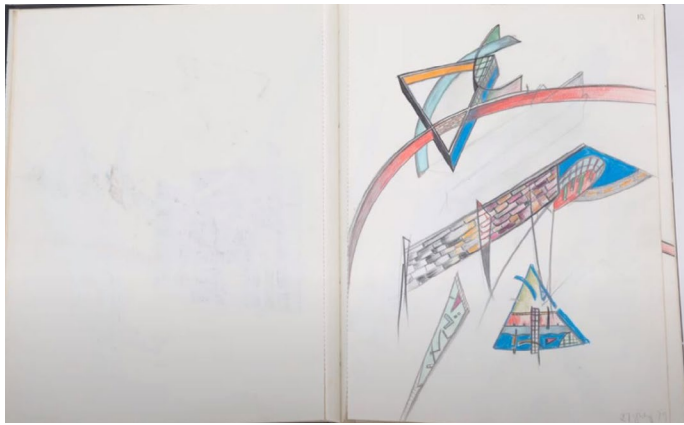


Image 13



Image 20

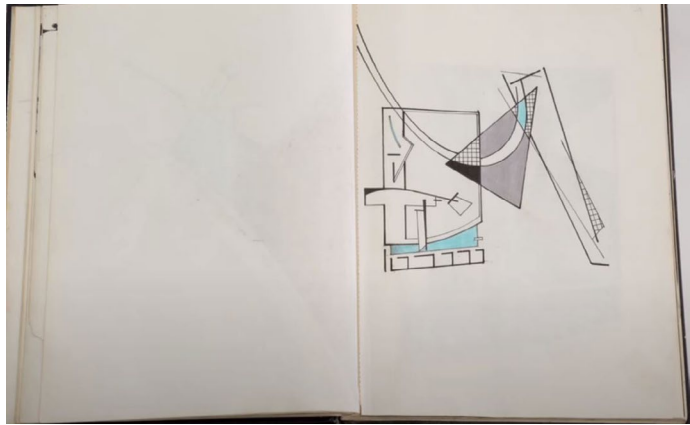


Image 21

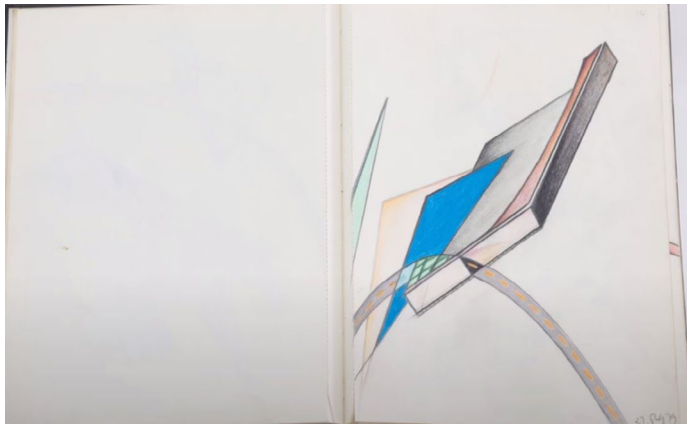


Image 14

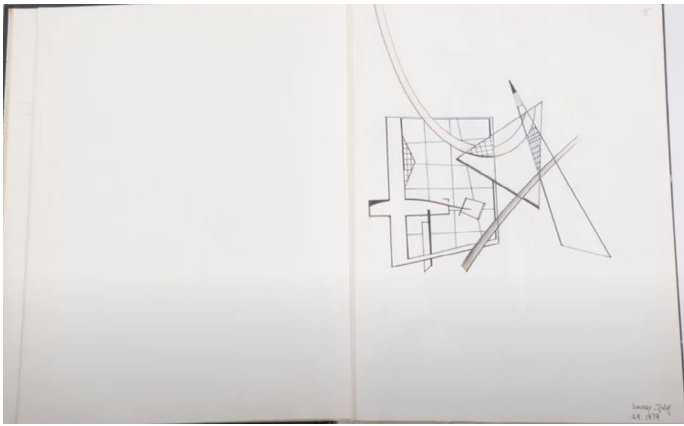


Image 15

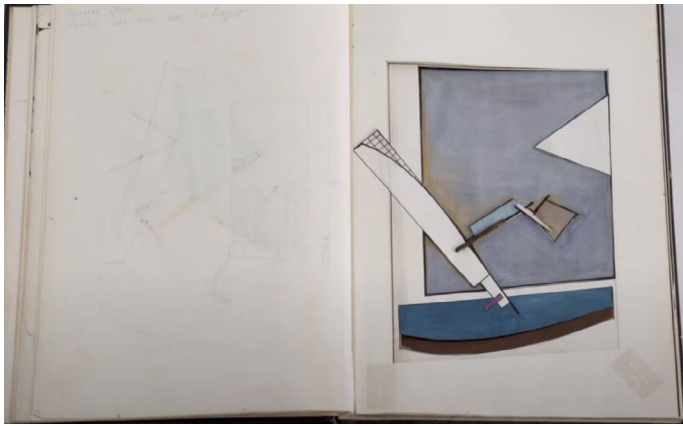


Image 22

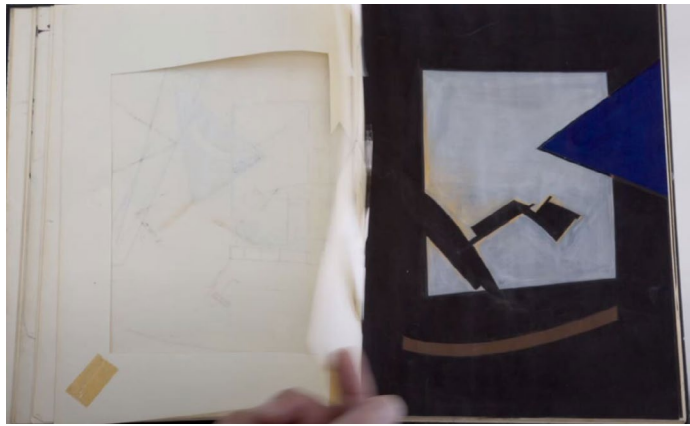


Image 23

Images 8-15: Series of sketches Irish Prime Minister's Residence. Source: Tate Talks. (2014). Zaha Hadid and Suprematism.

Images 16-23: Series of sketches Irish Prime Minister's Residence. Source: Tate Talks. (2014). Zaha Hadid and Suprematism.

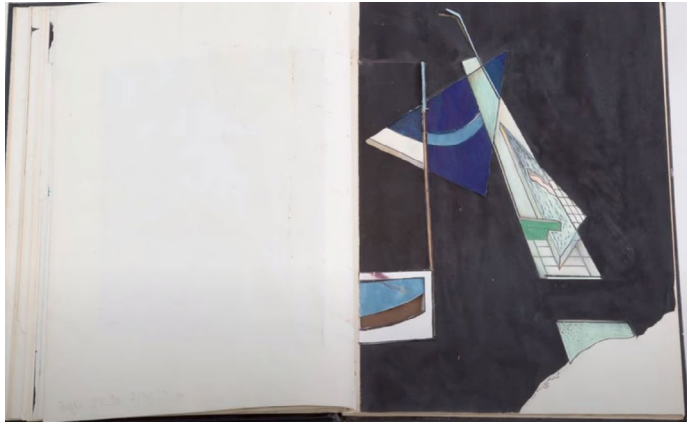


Image 24

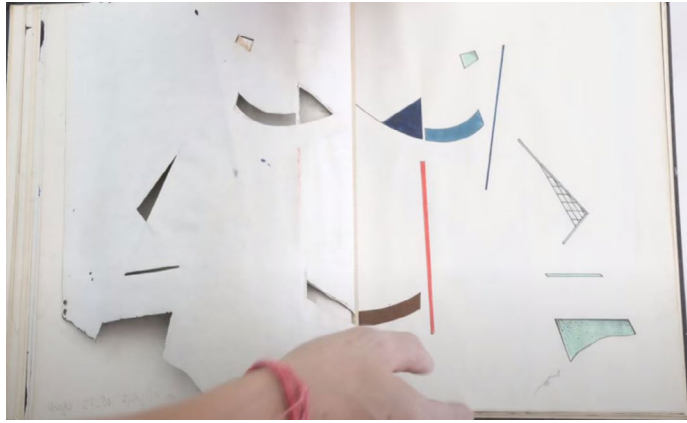


Image 25

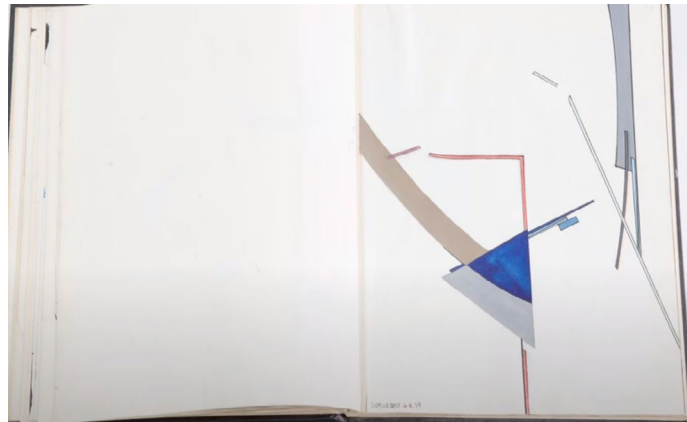


Image 26

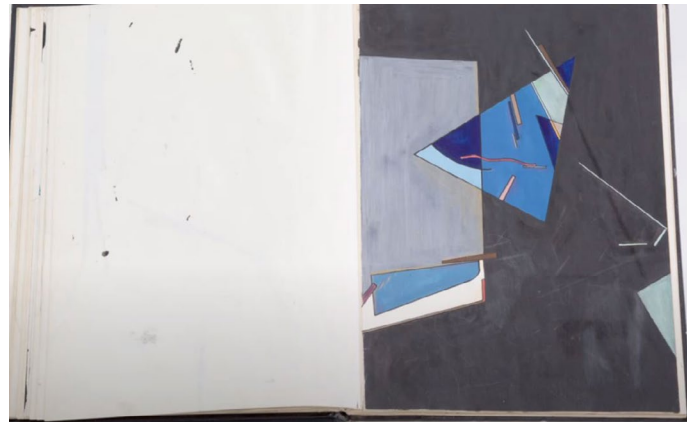


Image 27

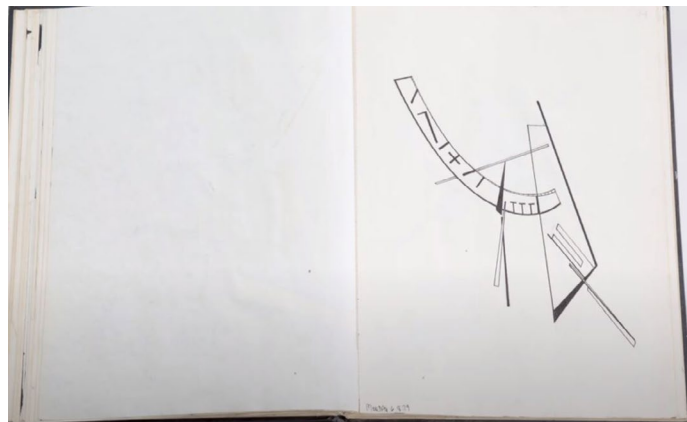


Image 28



Image 29

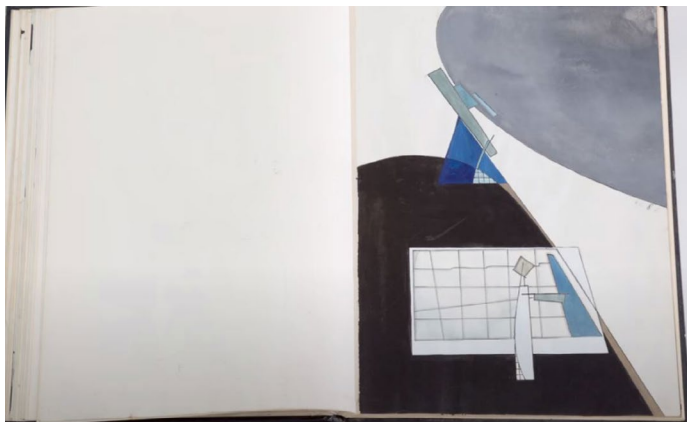


Image 30

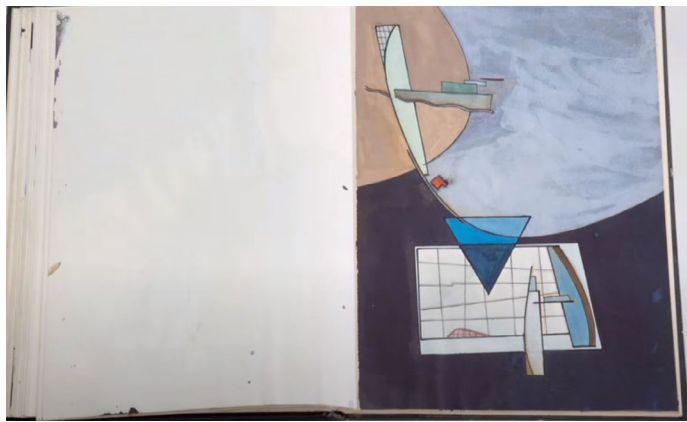


Image 31

Images 24-31: Series of sketches Irish Prime Minister's Residence. Source: Tate Talks. (2014). Zaha Hadid and Suprematism.

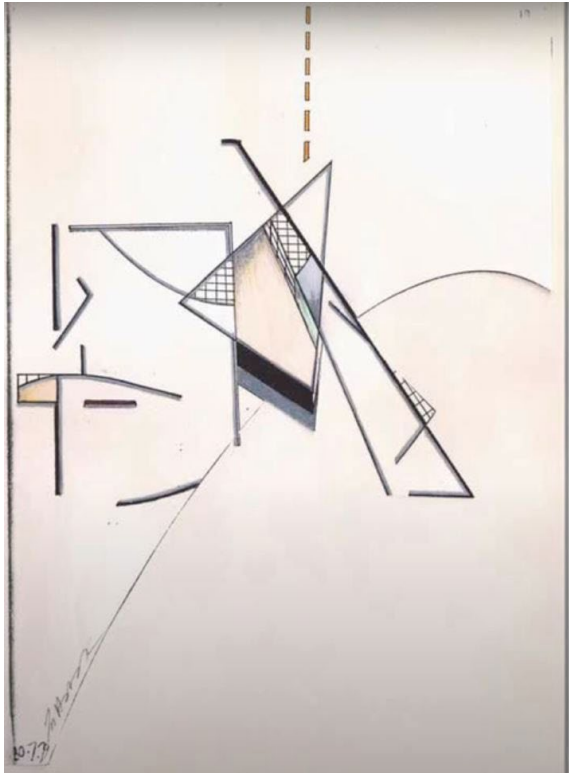


Image 32



Image 33

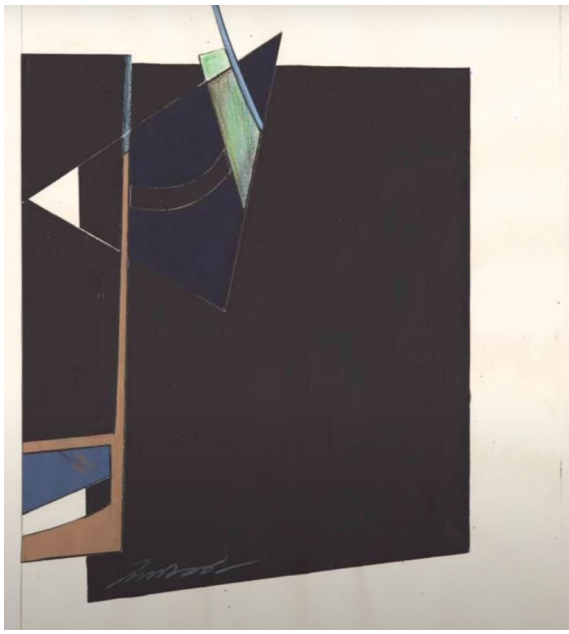


Image 34

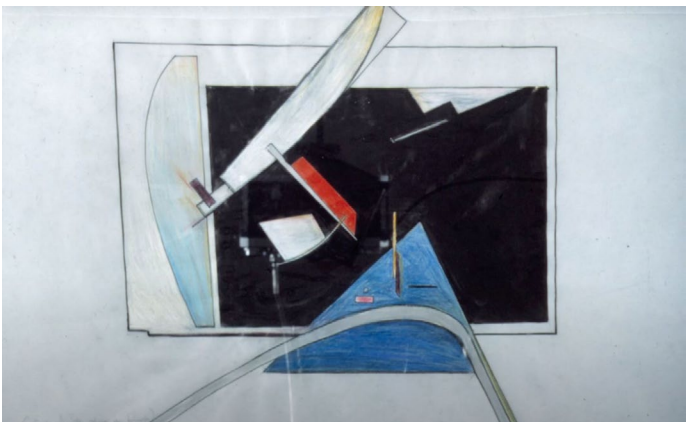


Image 35

Images 32-35: Series of sketches Irish Prime Minister's Residence. Source: Tate Talks. (2014). Zaha Hadid and Suprematism.

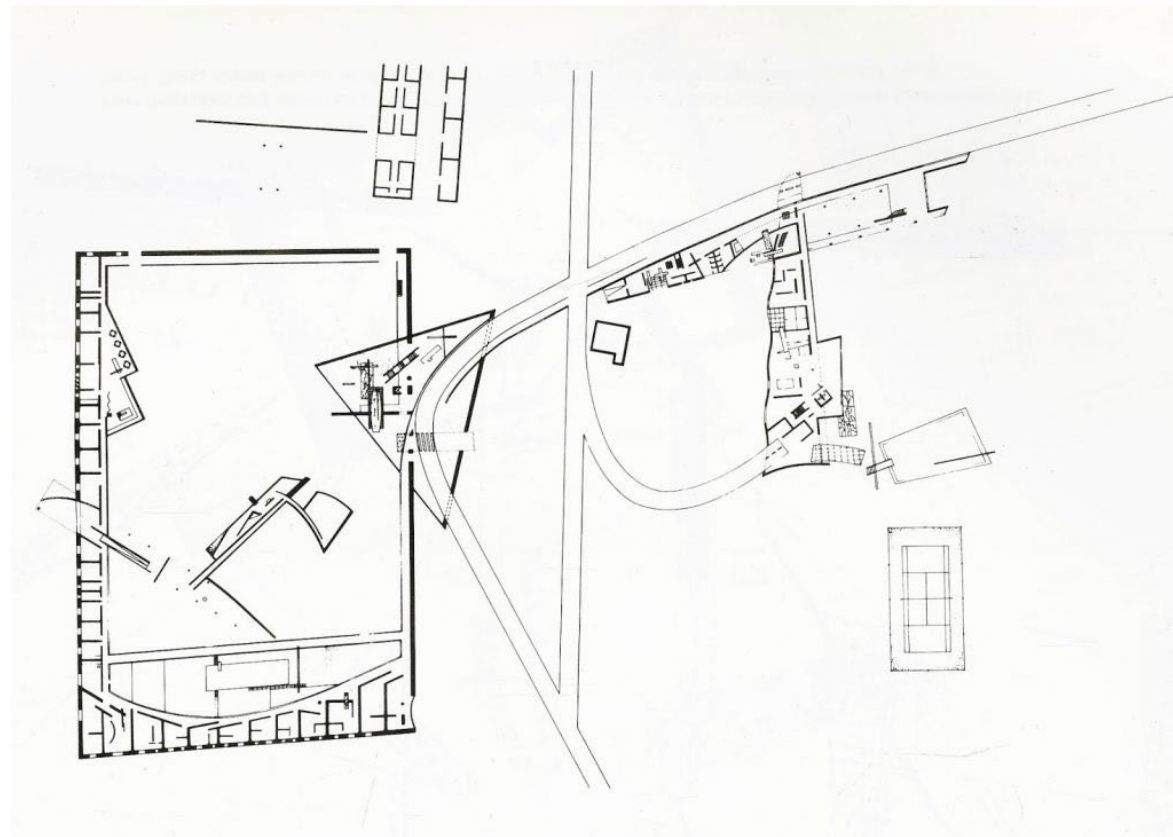


Image 36: Ground floor plan Source: Hidden Architecture. (2016). Residence for the Irish Prime Minister.

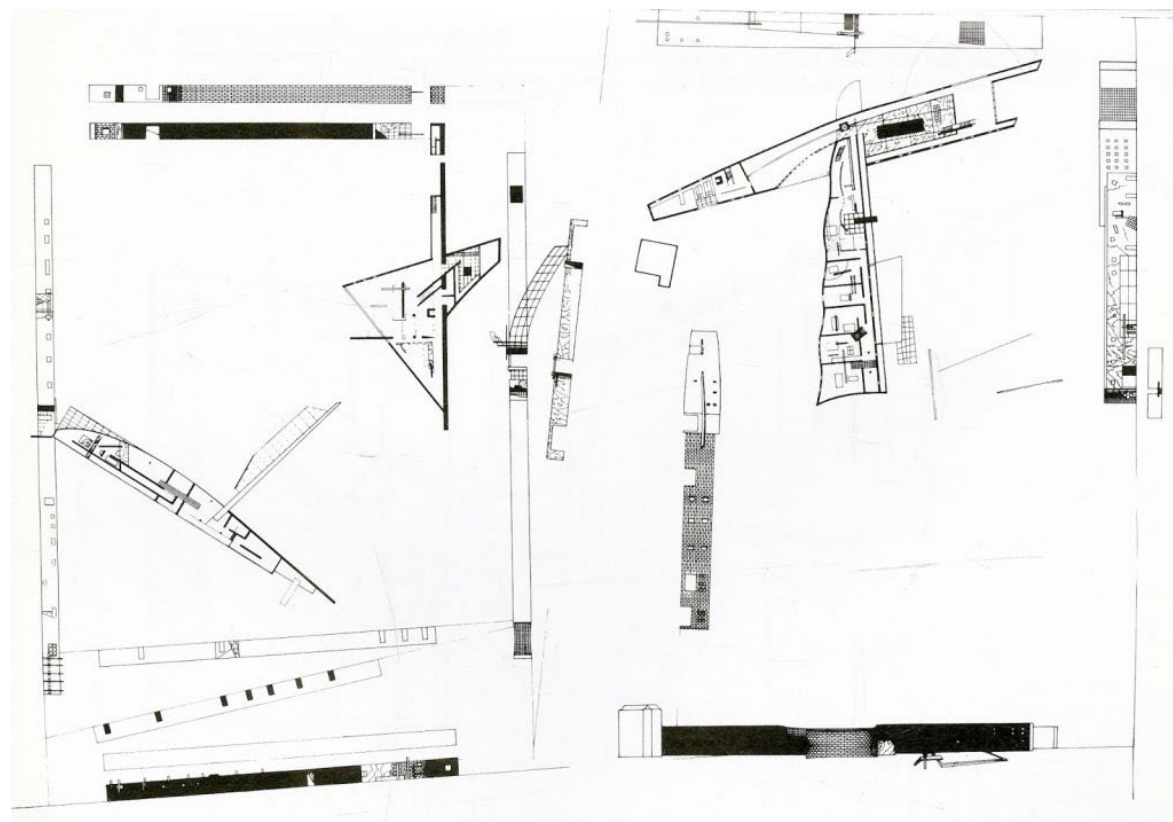


Image 37: First floor plan and elevations Source: Hidden Architecture. (2016). Residence for the Irish Prime Minister.

Conclusion

Zaha Hadid used painting and drawing as a design tool to explore and imagine her architectural projects, to create space and analyze spatial relationships. In contrast to many other architects, Hadid's painting has an immediate effect on the forms of her architecture and not the other way around. Zaha Hadid's paintings are not simply an artwork or a creative expression, rather her paintings can be categorized as representational, as they are very well thought out compositions that depict a building and convey the main ideas of the project. Moreover, Hadid paintings are explorational, as she used painting as a design tool to explore the ideas of dynamism, fragmentation, abstraction and fluidity, while de-constructing ideas of repetitiveness, orthogonality, and mass production. Using fragmentation, abstraction, and radical formal reduction Hadid manifests the complexity of the floor plans, the forms and the spaces in her projects through her paintings.

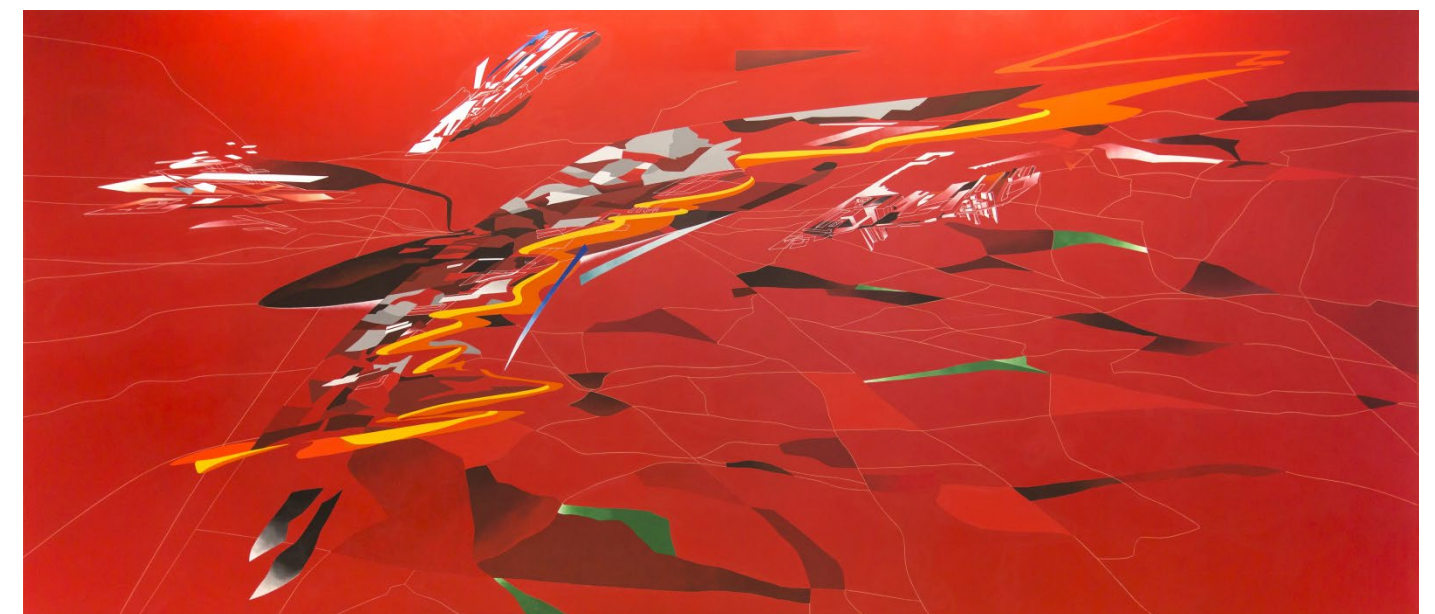


Image 38: Metropolis. Source: Zaha Hadid Architects, n.d.

4.2. Alvar Aalto

Introduction

Alvar Aalto has often discussed the link between the fine arts and architecture and to be more precise between painting and architecture. Aalto claims that “abstract artistic forms have provided a great stimulus to modern architecture” (Aalto, 1970) and this is also resembled in his professional work. Whenever he starts working on a project, he is held up by the thought of its realization because there are so many aspects that have to be considered such as social, historical, psychological, functional, structural, etc. that they form a maze that can not be worked out by rational methods. This complexity prevents the basic architectural idea from taking shape. That's when Aalto starts painting aiming to reach a point when a basic idea is born that brings the numerous elements into harmony with each other. Using imagination and intuition in this process is essential to form a whole out of the many and often conflicting elements (material, social, economic, etc.) which are contributory determinants in architecture.

The role of painting in Aalto's work

Aalto's design philosophy and ideas for the architectural creative process are embodied in the paintings that he makes at the beginning of every project. He believes that “in their beginnings architecture and other art genres have the same starting-point – a starting point which is, admittedly, abstract but at the same time is influenced by all the knowledge and feelings that we have accumulated inside us” (Aalto, 1970). This can be observed in the paintings made for the Aalto Museum and the Helsinki Polytechnic University. The painting for the Aalto Museum (Image 39) represents a white geometric shape on a white canvas. The different tones of white used in the painting create the differentiation between the background and the foreground. Only by looking at the painting, one can read it as pure abstract art. When the painting and the project are put next to each other, however, even though the painting is not literally translated to a building, the similarities between them become evident. The outside walls of the Museum are clad in light-colored ceramic tiles and the concrete plinth is painted white. This white character of the building is also depicted in the painting. Moreover, the geometrical forms in the painting are curved which also comes back in the project. With its curved shapes, the facade of the Aalto Museum becomes free in its form. Similarly, the main ideas for the project are embodied in the painting that Aalto made for the Helsinki Polytechnic University (Image 41). The painting looks like an abstract landscape with the more earthy and green colors in the lower part and the grey colors in the upper part, representing the sky. The building's rigid shape is in contrast with the fluid, organic forms of the natural landscape. Despite this the building still connects with the environment through the materiality, which is also represented in the painting where it seems that the black form 'emerges' from the ground below. The connection between the 'ground' and the 'building' is represented in the similarity of the dark colors - brown and black - which are in contrast with all other colors in the painting.



Image 39: Painting for Aalto Museum in Jyväskylä. Source: Aalto, 1970

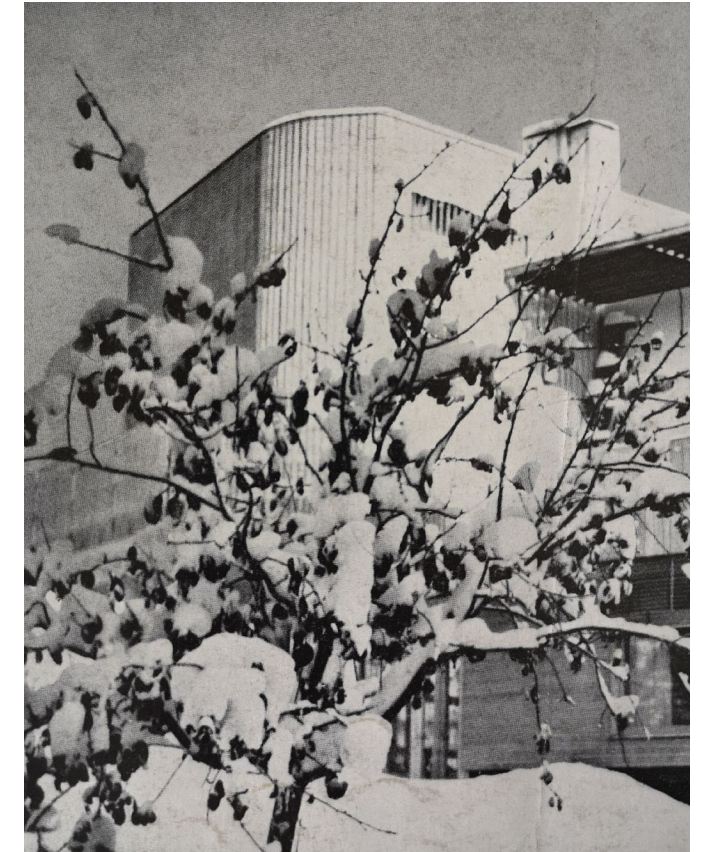


Image 40: Aalto Museum in Jyväskylä. Source: Aalto, 1970



Image 41: Painting for Helsinki Polytechnical University. Source: Aalto, 1970



Image 42: Helsinki Polytechnical University. Source: Wikipedia

The purpose of painting in Aalto's work

Alvar Aalto starts using painting as a design tool in the very beginning of the project. Aalto did not strive to solve the contradictions and complexities contained in design brief in rational ways. Having a more artistic approach to the work than technical, he applied contemplative method where, after having first carefully familiarized himself with the brief for the project, he could put it aside and begin to paint abstract paintings (Venturi, 1966). During this process he did not think about all the challenges that have to be solved, rather the paintings emerged by giving free rein to his subconscious and imagination (Images 43 and 44). This process allowed Aalto to find design solutions and ideas which he then translated to architectural forms that allowed the coexistence between the otherwise contradictory elements and themes that have to be incorporated in the design.



Image 43: Abstract painting - white on blue. Source: Aalto, 1970



Image 44: Abstract painting - red. Source: Aalto, 1970

Painting as part of the creative design process

By working on architectural paintings, Aalto found inspiration for his projects which allowed him to come to a starting point. This becomes evident by observing the painting that he made for the Paimio Sanatorium (Image 45). Firstly, there are evident similarities between the geometrical shapes in the painting and the floor plan of the building (Image 47). Moreover, the functionality of the spaces is also represented in the painting. For the spaces that have different functions, Aalto used different colors - the private areas of the sanatorium are in yellow and the public zones are in brown and green. Oil paint is a material which, because of its texture, allows a three-dimensional relief effect, which Aalto also uses to create space with. In the long part of the sanatorium there is a corridor with rooms which are stacked one after the other. This linearity of the floor plan he depicts with the thicker lines of paint that he used on the canvas. Another way in which he uses texture is by removing some paint with a palette knife. In the brown zone in the middle can be observed seemingly randomly created 'cuts' into the paint. This can be read as the movement of the people in this area. The floor plan shows that this is the entrance to the sanatorium, where the area is open, the visitors' movement is not directed and therefore this will result in a more random movement in contrast to the linear movement in the long corridor. We can't be sure whether or not this is what is actually represented in the painting, but having in mind that the painting was made in the very beginning of the project, it becomes evident how the painting could inform his design.

Even though paintings were his primary source of inspiration for a project, Aalto also used drawings within his creative process. One of the drawings he made for the Paimio Sanatorium, was a sketchy drawing of the site (Image 46). The drawing is made in quite an abstract way as well and can't be read what exactly he analyzed with this drawing. It can be observed, however, that there are some numbers which probably represent the height differences of the terrain. Similar drawings Aalto made for the Municipal Library in Viipuri (Image 48). For the design of the Municipal Library in Viipuri, Aalto spent "a great deal of time making child drawings, representing an imaginary mountain with different shapes on the slopes and a sort of celestial superstructure consisting of several suns which shed an equal light on the sides of the mountain. In themselves these drawings had nothing to do with architecture but from these seemingly childish drawings sprang a combination of plans and sections which although it would be difficult to describe how, where all interwoven. And this became the basic idea of the library" (Aalto, 1970). The basic idea for the project was to group the reading rooms and the lending rooms on different levels, as if on the slope of a mountain around a central control desk which was positioned in the uppermost part of the building - representing the peak of the mountain. On top of that was erected a sort of solar system - the round conical skylights. He made sketches to analyze the lighting conditions in the library and the role of the skylights, i.e. for the more technical part of the project (Image 49). During his creative process, Aalto used to sketch on tracing paper, constantly shifting from the whole to the parts, from plan and sections to details, from conceptual ideas to precise calculations of component sizes and areas (Pallasmaa, 2010).

By comparing Aalto's artistic works and the projects for which they were made, it seems that the painting informs the shape of the building, i.e. that Aalto translates the painting to a building. However, after analyzing his architectural philosophy and ideology, it appears that while making the painting, Aalto subconsciously considers the human and social aspects of the project parallel to the functional and formal aspects. According to him, a painted shape can inspire architecture without being taken over directly. For Aalto, the corner stone of architectural program is human life, as we live, move and work in buildings daily. Therefore, architecture should be built around this process to form a shell and not the other way around where firstly the form is created and then filled with function.



Image 45: Painting for Paimio Sanatorium. Source: Aalto, 1970



Image 46: Site drawing Paimio Sanatorium. Source: Aalto, 1970

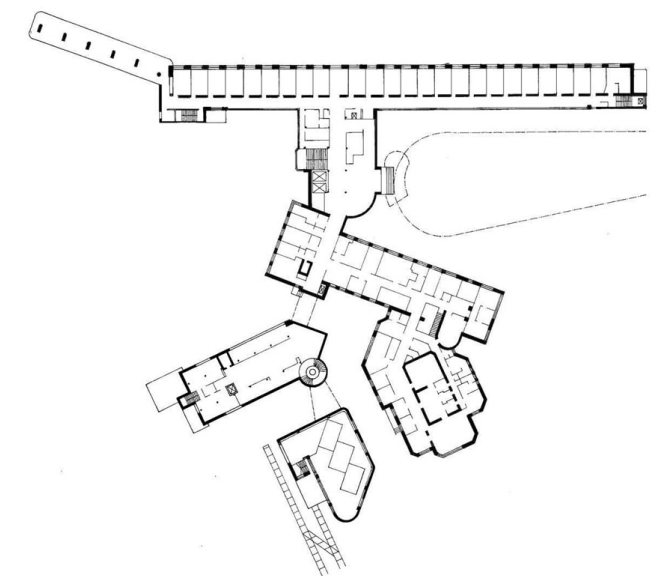


Image 47: Floor plan Paimio Sanatorium. Source: Inexhibit, 2020

Conclusion

Alvar Aalto used painting and drawing as a design tool to find a starting point and inspire his projects. Similar to Zaha Hadid, Aalto’s painting inform the architecture. Even though the translation and the relationship between painting and architecture is, as he describes it, hard to grasp, his creative process shows that while painting Aalto considers many more aspects than only the form of the building. Painting allowed Aalto to ‘analyze’ the architectural challenges in irrational ways and create human-centered designs. Aalto’s paintings can be considered as inspirational because this is the tool that he uses in the beginning of his creative process to create harmony out of the chaos between the different elements that have to be integrated in the design. But at the same time, even though in a very abstract way, similarly to Zaha, his paintings become representational because they embody all main ideas of the project. Making sketches and drawings also played a significant role in his creative process because with these media, he analyzed more technical aspects of the project. Therefore, the paintings that Aalto made in the beginning of the project can be categorized as inspirational, as their aim is to find a starting point for the project, and the drawings and sketches which are produced in the later design phases are rather explorational and analytical, as he explores and analyses different possibilities for specific solutions for the project.



Image 48: Preliminary sketch for the Municipal Library in Viipuri. Source: Aalto, 1970

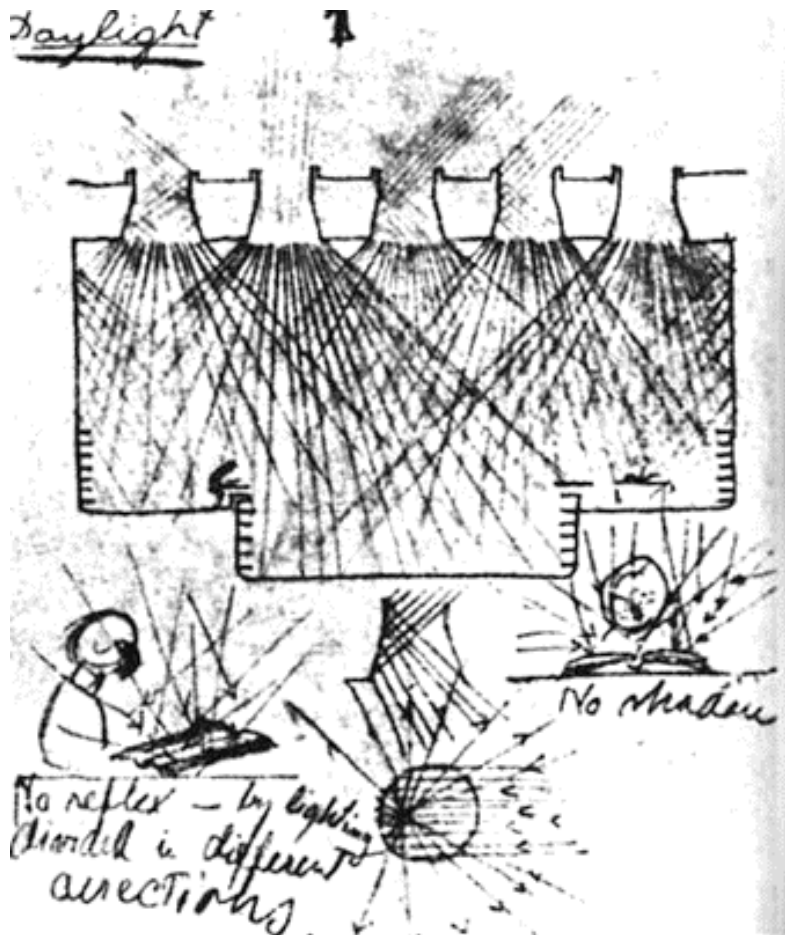


Image 49: Daylight analysis for the Municipal Library in Viipuri. Source: Aalto, 1970



Image 50: Viipuri Library. Source: ArchDaily, 2015, Viipuri Library



Image 51: Viipuri Library.
Source: Jones, P.B. and Kang, J. 2003, Acoustic form in the Modern Movement

4.3. Pezo von Ellrichshausen

Introduction

The Chilean-based couple Mauricio Pezo and Sofia von Ellrichshausen describe their style as ‘architectonic art’ as it blurs the line between art and architecture. Since the beginning of their career, they’ve been fascinated by the loose definition of disciplinary limits and the lack of precise tools to develop ideas which led them to explore the domains of art and architecture. They use painting as a tool for exploration and inspiration and therefore it plays a central role in their design process. However, they don’t use painting in the conventional ways for representation - according to the couple a building cannot be depicted from a fixed viewpoint or classic perspective as this neglects the temporal dimension of its architectural space and the experiences of the dynamics of the changing light, temperature, smell of the space are lost. Their works on canvas and paper, therefore, explore the tension between documentation and experiencing the true narrative of a building or space.

The role of painting in Pezo von Ellrichshausen’s work

Pezo von Ellrichshausen’s philosophy is deeply rooted in their creative process and in the images that they produce. For them it is important to think about architectonic space and to observe architecture without dogmatic models or aesthetic indoctrination and “architecture should be a tool to intensify our experience of the world” (Gallanti, 2020). Opposed to many contemporary architects who are producing architecture for the sake of an image and an impressive visual narrative, Pezo von Ellrichshausen focus on the real experience of a building. The experience of a place is hard to be translated through any media and therefore the frames and planes represented in a painting or image are only partial moments within a much more complex reality. Therefore, architecture should not be bound to flatness, as it is exactly the opposite and it is impossible to convey the fundamental values of architecture by ‘flattening the experience’.

Pezo von Ellrichshausen’s paintings are not made as a replacement of the architectural object or a substitute of reality. Even though some of their paintings refer to actual projects, the couple considers them simply as a translation tool which is supplementary to the project, aiming to extend the qualities one might find in a direct experience of the building. Their paintings, made for specific projects, operate as reductions in the sense that they are condensing attributes, by presenting elements and qualities which are impossible to be perceived in the whole building, e.g. presenting the whole structure of the building, a section or a plan, as in the example of Casa Meri (Image 52). In this way, the paintings simplify the complexity of architecture, in the fashion of a ‘taxonomical operation’. Some of their paintings, such as the sliced axonometries, can be even observed as separate entities from the actual building, as they are more conceptual and ideological in their representation. In some cases, e.g. the oil painting made for the Nida House (Image 54), the medium of painting allows them to depict a particular aspect of a project that will be otherwise impossible to see or perceive in the real construction and in these cases their paintings become a magnifying lens or an x-ray of their intentions. And even when Pezo von Ellrichshausen produce ‘flat images’ that can be conceived as ‘final products’, these images are not the mere visual information, rather also a physical construction: an oil on canvas, an acrylic on canvas or a pencil on paper. This helps them to maintain a high level of awareness about the distinction between presence and representation and in this way their work is both material and intellectual, but never only visual.

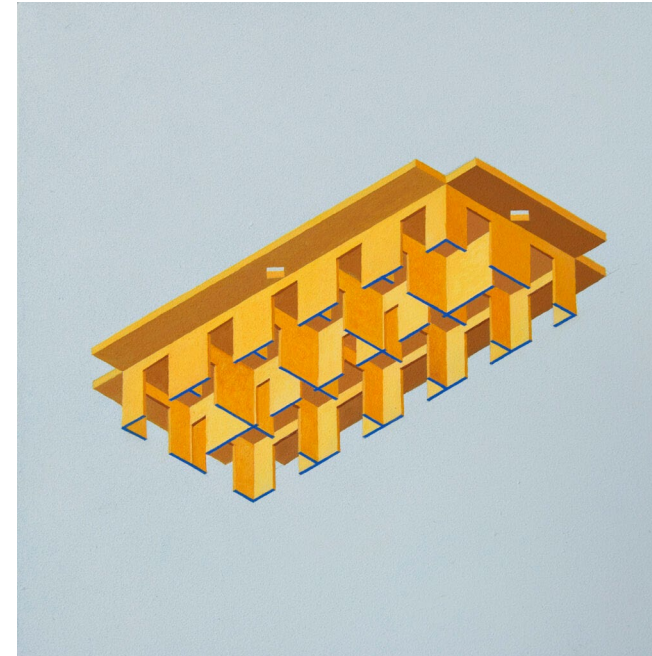


Image 52: Pezo von Ellrichshausen, Casa Meri, Florida, Chile, 2014. Oil on canvas, 300 × 300 mm. Source: PVE archive.



Image 53: Pezo von Ellrichshausen, Casa Meri, Florida, Chile, 2014. Source: PVE archive.

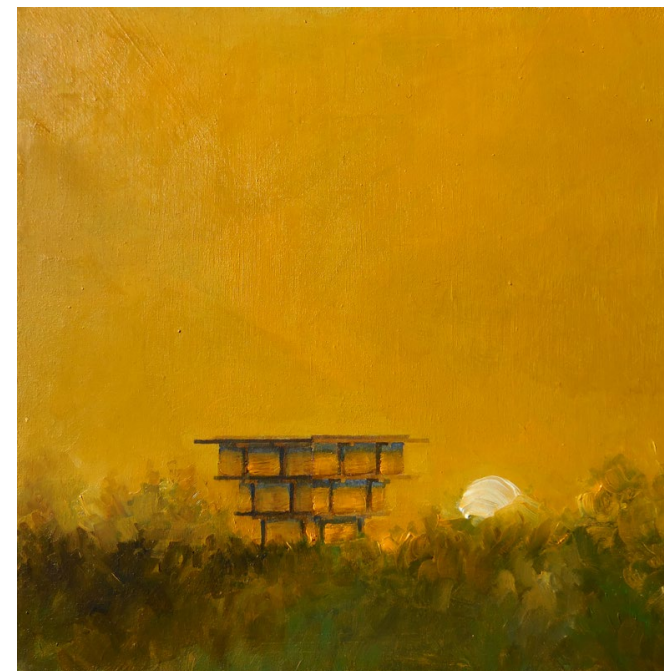


Image 54: Pezo von Ellrichshausen, Nida House, Chile, 2015. Oil on canvas, 300 × 300 mm. Source: PVE archive.



Image 55: Pezo von Ellrichshausen, Nida House, Chile, 2015-2016. Source: Archdaily, 2016, Nida House

The purpose of painting in Calatrava's work

Pezo von Ellrichshausen often use time-consuming techniques in their design process, such as painting. The aim of working in this medium is to increase the level of consciousness in the elements of a building and its representation. In this way the production does not go ahead of the mental processing which is often the case with new technologies, where the production is accelerated and the ideas are translated even before one has a proper idea to be translated. In contrast, paintings take much longer time, this bounds them to a broader time frame, to a degree of slowness, and therefore, on one hand, the whole composition, the choice of color etc. are carefully chosen and on the other hand, the painting often times evolves during the process and changes happen within the creation process. Therefore, Pezo von Ellrichshausen use paintings for two purposes - to make general architectural studies and to explore possibilities for a specific project. Their artistic design process allows them to explore spatial structures, formal tendencies, proportion, scale, while experiencing and understanding, the world in a more intense manner.

When Pezo von Ellrichshausen use painting for studies, they create a few hundred or even thousand paintings from the same series (Images 56-60). In this way they build a large number of potential ideas before knowing what the architectural project will be about. In that sense, they are autonomous realities, series of rooms with character, or variations in format and structure that explore architecture without context, program or function, even without a material definition. They observe them as neither analytical nor instrumental, rather as “intellectual tools for them to think about architectonic space” (Pezo and Ellrichshausen, 2017) which are fundamentally speculative in nature. The function of these works is to promote a subjective projection, a personal interpretation of what one might consider intriguing, interesting or even beautiful. The goal is not to come up with prescribed solutions or references rather to accept the arbitrariness no matter of the motivation or the result. This method they call ‘naive intentionality’ and describe it as intuitive. It is naive as what it produced is more intuitive than rational, which also makes the work authentic. Reflecting their ideology, according to them, this intuitive approach will produce architecture that is based not on the authority of the architect’s persona but on a somewhat anonymous arbitrariness.

In the cases when paintings are made for a specific project (Images 52, 54, 67), their goal is not to depict or to build architectonic spaces. These paintings are made to either simplify the complexity of the architectonic object by presenting specific elements and qualities which are impossible to be perceived in the whole building or to evoke a certain mood, a certain character and atmosphere, which is closer to the memory of a place, to their own imagination of a memorable place. Instead of designing a space, they create an atmosphere and in which way the viewer does not only see something visual but they also “trigger something that goes beyond” even allowing the viewer to understand the temperature of the room and the smell of the stucco on the wall (Pezo von Ellrichshausen, 2018).



Image 56: Architecture studies, Exterior exhibition, 2017 at Solo Galerie. Source: Solo Galerie

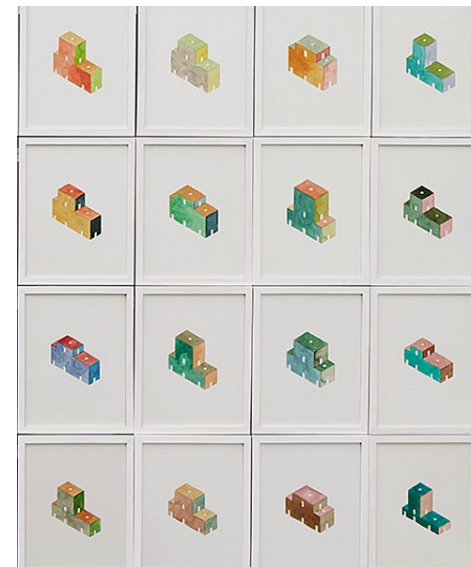


Image 57: Series of studies, Exterior exhibition, 2017 at Solo Galerie. Source: Solo Galerie



Image 58: Architecture studies, Exterior exhibition, 2017 at Solo Galerie. Source: Solo Galerie

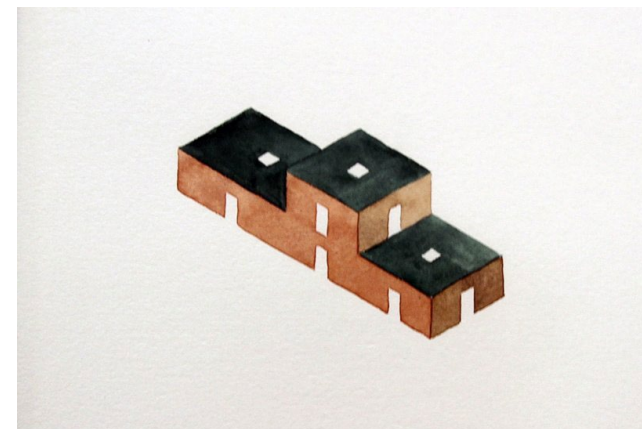


Image 59: Architecture studies, Exterior exhibition, 2017 at Solo Galerie. Source: Solo Galerie

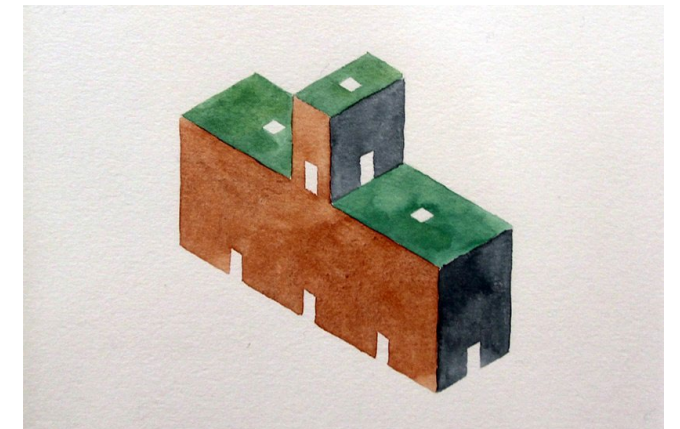


Image 60: Architecture studies, Exterior exhibition, 2017 at Solo Galerie. Source: Solo Galerie

Painting as part of the creative design process

Depending on the stage of the project, Pezo von Ellrichshausen use different painting techniques. They use pencil, watercolor or acrylic on paper for studies and oil on canvas for final stages, for paintings that are meant to fix a proposition in time. The reason for using various techniques is rather functional. The small paintings are studies for the larger ones and the small format gives them flexibility allowing them to observe and assess different situations quickly. Drawing, as an even faster medium, “allows them to structure a particular composition, to study sizes, distances and proportions” (Pezo and Ellrichshausen, 2017). Their creative process starts by making drawings in a sketchbook to explore spatial configurations. Using a pencil and a ruler, these drawings are then transformed to a series of paintings on paper and only when they find something through the colors, they start working on a large canvas. Their final woks are made on large formats as they have an immersive condition, so that they really have a relation with your body when you are standing in front of them (Images 64-66).

Believing that this goes back to ancient times and that there is an archaic rationality, Pezo von Ellrichshausen use basic ratios - 1:1, 1:2, 2:3, 3:4. According to Pezo, it is also often the case that vernacular architecture from different parts of the world shares the same ratios and this refers to the embodiment of that instinctive condition in these anonymous constructions (Pezo and Ellrichshausen, 2017). In this way they depict a serene and genuine reality and their work refers to an architecture without author, without style, prior to conventions, designs or incidental decorations.

Mauricio and Sofia always work together on the same painting, reacting to each other. As color is not prescribed, both of them apply layers one after the other which they call a frictional process. One of them paints first, then the other one applies another color on top which creates a sort of circular process that stops when both of them feel it is the right moment to do so. That’s how their paintings evolve over time in a very intuitive manner and it cannot be expected what the final result will be. Pezo describes finalizing a painting as follows: “When do we stop? I couldn’t know. Perhaps only when the two of us feel comfortable in that virtual place. Only when there is a peaceful aura into which we can project ourselves” (Pezo and Ellrichshausen, 2017).

Their colorful paintings, however, are in contrast with the colors of their buildings. Architecture is much more complex and every building is affected by many external, unpredictable but substantial factors such as the temperature of the day, the type of clouds, the dust in the wind, reflections of the ground, etc. So the colors are already there, exceeding the intentions for the building. Moreover, other objects, such as paintings, carpets, furniture etc. will be placed in these spaces, creating the tones of the rooms, while resembling the complexity of life. Therefore, Pezo von Ellrichshausen use the colors of the natural materials to reduce the prominence of architecture, to allow for life to unfold naturally.

Pezo von Ellrichshausen’s paintings can be categorized as rather abstract art pieces, in contrast to hyper-realistic paintings, such as 71707161201 (Image 64). Therefore, the painting engages and forces the viewer to inquire about the limits of the room, about what is inside or outside, about the extension of that corner after the opening, where the source of light comes from, etc. Moreover this effect is made stronger because of the ambiguity of light and color. Some shapes seem to be in the foreground but the combination of the light and color in the painting makes them dissolve into the background, as in the case of 71707161201 where the left door is closer but the darker colors make it appear further away and the door on the right is more to the back of the composition but the light colors make it appear closer. Because of the simplicity of the paintings, having only a few elements in the composition, combined with the lack of scale and context, makes it difficult to determine whether the figure depicted in the painting is a leg of a table, a column or even a building.

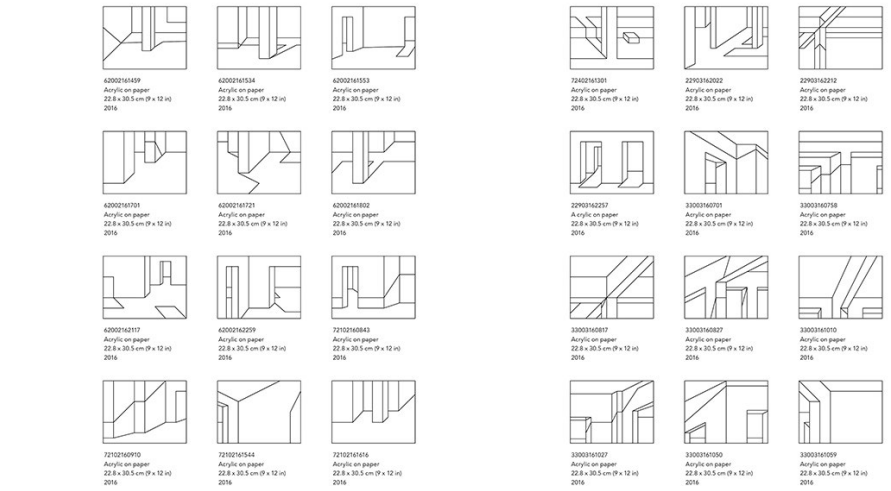


Image 61: Step 1 - Sketches. Source: Pezo, M. Ellrichshausen, S.v. (2017). Pezo von Ellrichshausen Exterior. Arkitektur B.

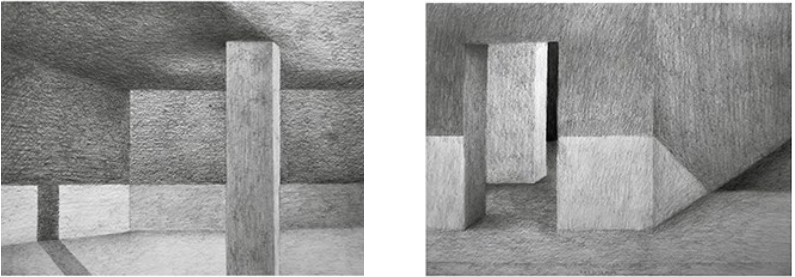


Image 62: Step 2 - Drawings. Source: Pezo, M. Ellrichshausen, S.v. (2017). Pezo von Ellrichshausen Exterior. Arkitektur B.

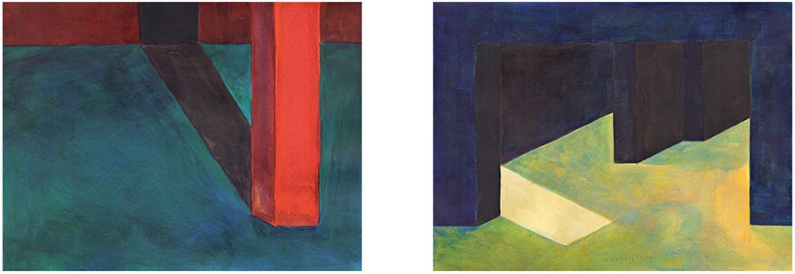


Image 63: Step 3 - Paintings on paper. Source: Pezo, M. Ellrichshausen, S.v. (2017). Pezo von Ellrichshausen Exterior. Arkitektur B.



Image 64: Step 4 - large format paintings. 71707161201 (Exterior no 03), oil on canvas, 180 x 240 cm. Source: Pezo, M. Ellrichshausen, S.v. (2017). Pezo von Ellrichshausen Exterior. Arkitektur B.



Image 65: Paintings on paper (on the wall) and large canvas painting (bottom right corner), Exterior exhibition, 2017 at Solo Galerie. Source: Solo Galerie



Image 66: Large canvas paintings, Exterior exhibition, 2017 at Solo Galerie. Source: Solo Galerie

Conclusion

Mauricio Pezo and Sofia von Ellrichshausen believe that a building cannot be depicted with a fixed viewpoint or classic perspective because in this way are lost the experiences of the temporal dimension of the space such as the changing light, temperature, perspective etc. Therefore their geometric representations explore the tension between documentation and experiencing the true narrative of a building or space. The duo makes paintings for two different purposes - for studies and actual projects. When Pezo von Ellrichshausen make paintings for studies, they create explorational paintings, analyzing spatial relationships and documenting as many possible variations of the explored topic. Some of these can then be used as inspiration or guiding themes for actual projects. When they make a painting for a specific project, their goal is not to depict the project with the painting, rather to represent only specific qualities of the project which are impossible to be perceived on site and in this way the painting becomes complimentary to the actual experience of the real building and to the understanding of the building as a whole. In all of their paintings abstraction plays a central role - on one side in this way the painting engages and forces the viewer to inquire about the qualities of the architectonic space, and on the other side through abstraction the paintings can be interpreted in different ways, which drives further their creativity and allows them to make their extensive studies.

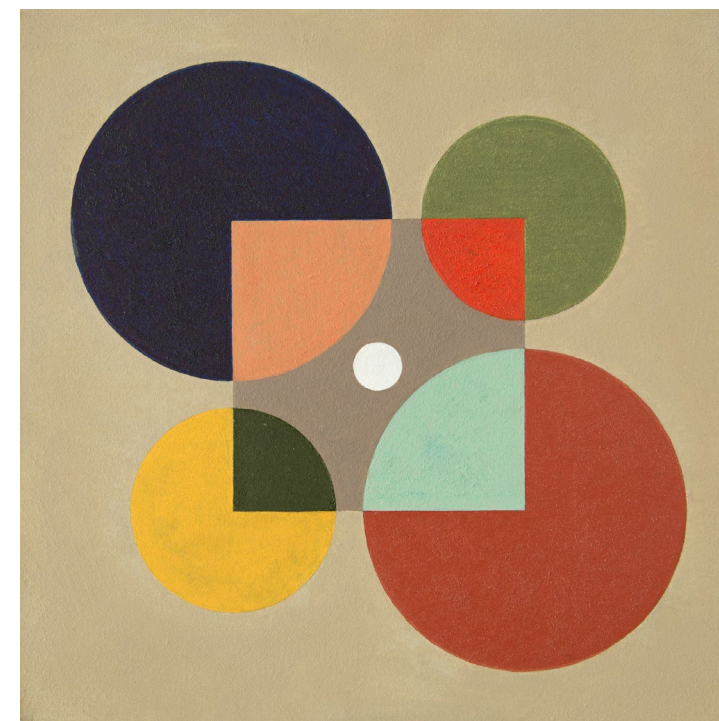


Image 67: Abstract painting for the INES Innovation Center, Chile, 2021. Oil on canvas, 300 × 300 mm. Source: PVE archive.

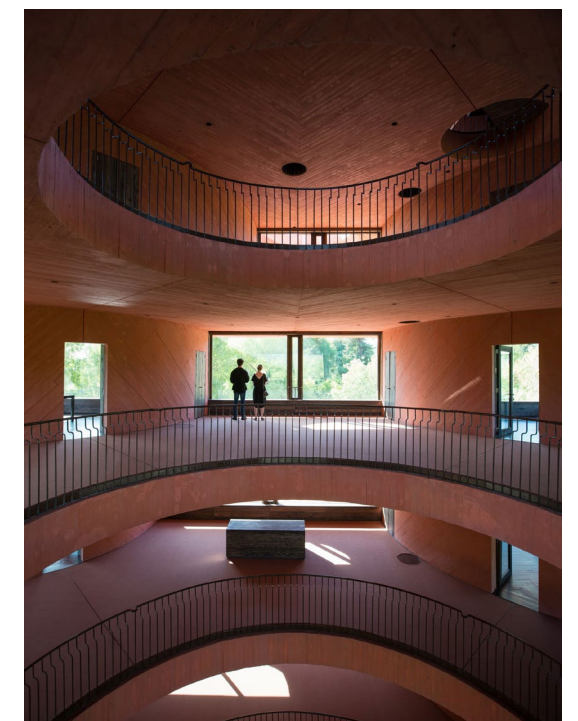


Image 68: Interior photograph of the INES Innovation Center, Chile, 2021. Source: PVE archive.

4.4. Calatrava

Introduction

Santiago Calatrava has a reputation of an architect who has the ability to create innovative and sculptural structures by blending advanced engineering solutions with dramatic visual statements. Calatrava doesn't bother himself with categorizing his architecture or defining it as having a certain style. What is more important to him is the personal, formal vocabulary that he developed throughout the years. This vocabulary gives him a large degree of freedom that enables him to express himself through the complicated art of architecture relatively easily. By choosing not to affiliate to any style, he follows in the footsteps of Picasso, who supposedly stated, "I paint what I like, when I like, and where I like".

Calatrava maintains two major convictions - on one hand that architecture is an art form and on the other that if there is a value in his work, it is to be found in his patient research. He explains his approach to architecture as follows: "In one way, at least, my working methods are closer to those of a painter than those of an architect: in order to solve architectural questions, I know I must look within" (Calatrava & de Albornoz, 2018). Thus his approach to architecture is rather artistic and the tools that Calatrava uses in his creative process that enable him to 'look within' are painting and making sculptures. These same tools give him the freedom for expression but they are also the ones that he utilizes for his extensive research for his architectural projects. Even though some of his artistic work can be categorized as paintings and others as drawings, what is more important are the ideas that are embodied and depicted in these works which are then translated to architectural compositions.

The role of painting in Calatrava's work

There are two main guiding themes in Calatrava's work - nature and the human body - and they both come back in the majority of his drawings and paintings. Calatrava has been fascinated by Michelangelo's architectural work, in which he tackled the design very much as he would have done a preparatory drawing - with a great sense of freedom and abstraction. Similar to Michelangelo's approach, he has been using sketches of bodily gestures as preliminary studies for his architecture. This approach has allowed him to transform human anatomy into the Montjuic Communication tower in Barcelona (Image 72), to use an eye (with a movable eyelid structure) as the starting point for the design of the Planetarium within the City of Arts and Sciences in Valencia (Image 71). He also converted a turning torso into a skyscraper in Malmo, Sweden, by basing the design on the proportions and appearance of the human torso when in movement and taking the human spine as a model for its external steel structure (Image 69).

Calatrava extensively studied the apparently simple, abstract principles of nature which he then translated into architectural form. By translating the forms of flowers, waves, patterns or natural textures into architectural compositions, he tries to synthesize and sum up the level of abstraction that can be found in nature. One of the projects that expresses his relationship with nature is Oriente station in Lisbon that resembles a forest composed of steel and glass trees (Image 73). For other projects he got inspired by the forms of the flowers - namely the Allen Lambert Galleria (Image 74) where the sweeping curves of tulip flowers inspired the airy and transparent structures of the building or the Dubai Creek tower that resembles the form of a closed lily. When it comes to nature, however, Calatrava does not only refer to plants but also animals, shapes and organic movement. Soaring birds have also been a source of inspiration for many of his projects such as the Milwaukee Art museum and the WTC station.

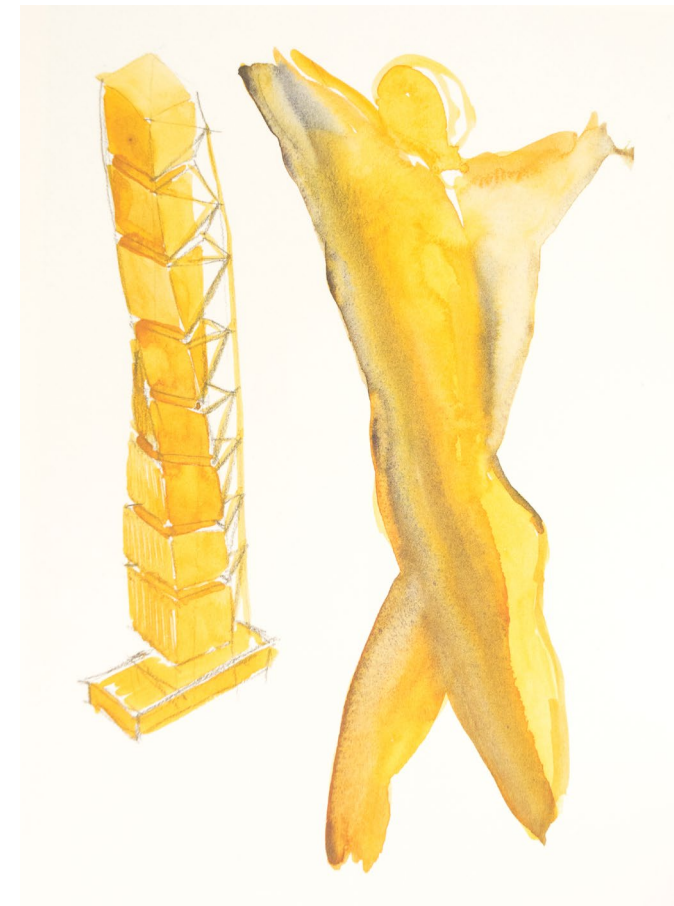


Image 69: A watercolor study for the turning Torso skyscraper in Malmo. Source: Calatrava & de Albornoz, 2018

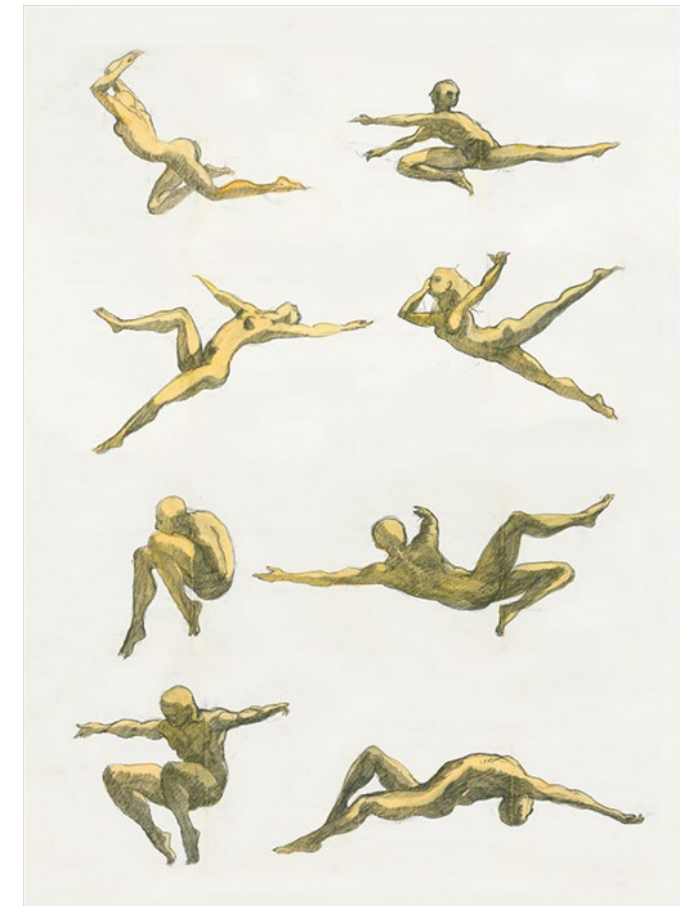


Image 70: A sequence of figures extracted from one of Calatrava's leporellos. Source: Calatrava & de Albornoz, 2018

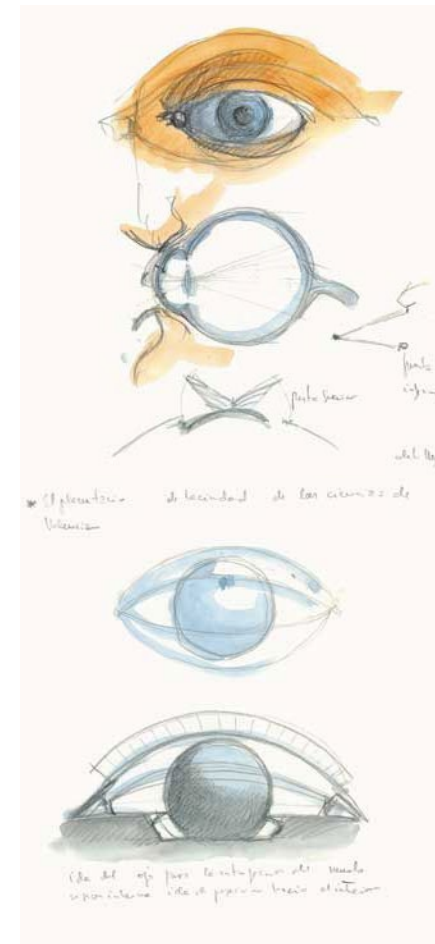


Image 71: Sketches for the City of Arts and Sciences in Valencia. Source: Calatrava & de Albornoz, 2018

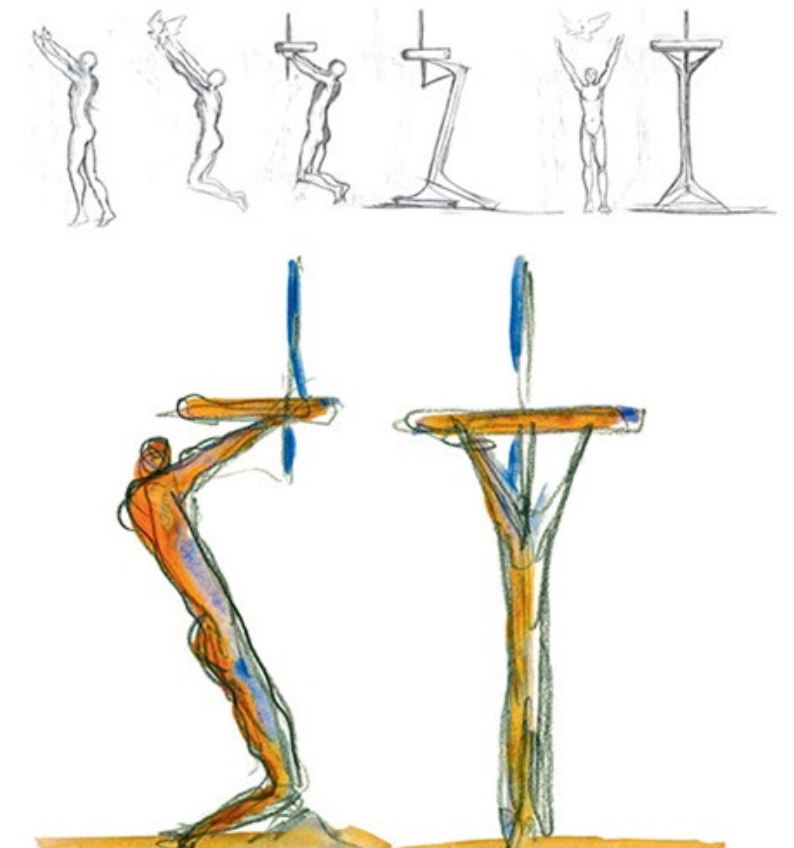


Image 72: Sketches for the Montjuic Communications Tower, showing how the design evolved from numerous studies of the human body. Source: Calatrava & de Albornoz, 2018

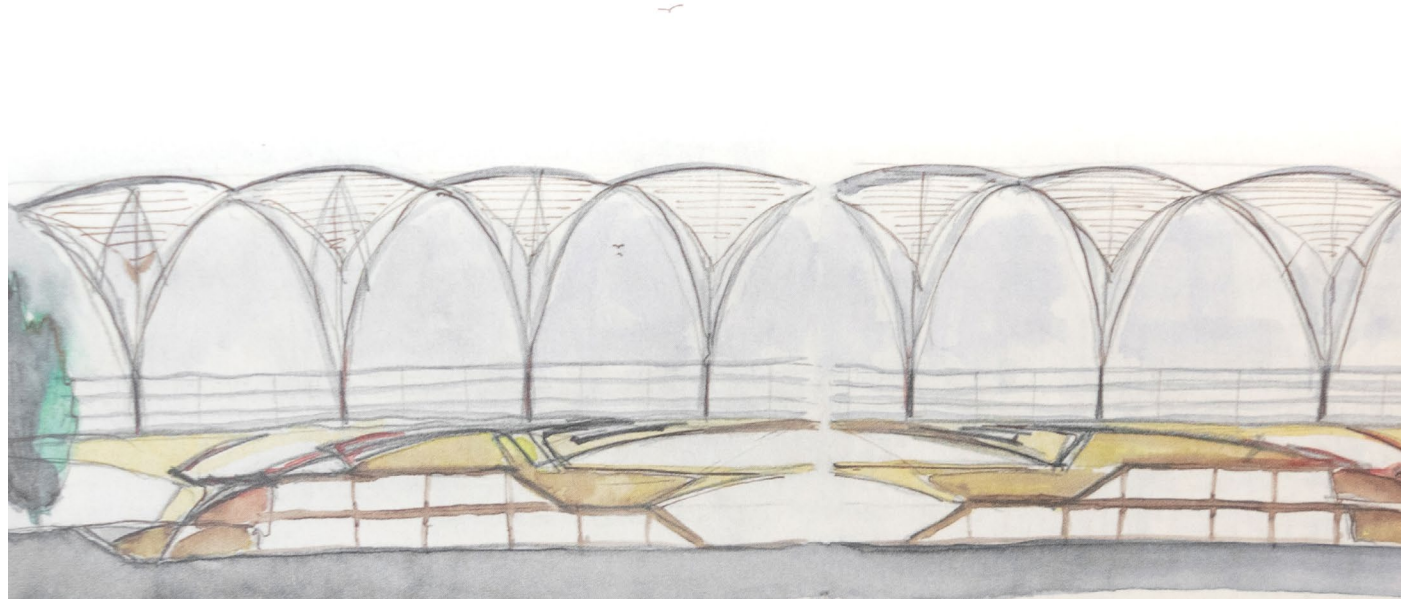


Image 73: Sketches showing the setting and construction of the railway platforms at the Oriente Station.
Source: Calatrava & de Albornoz, 2018

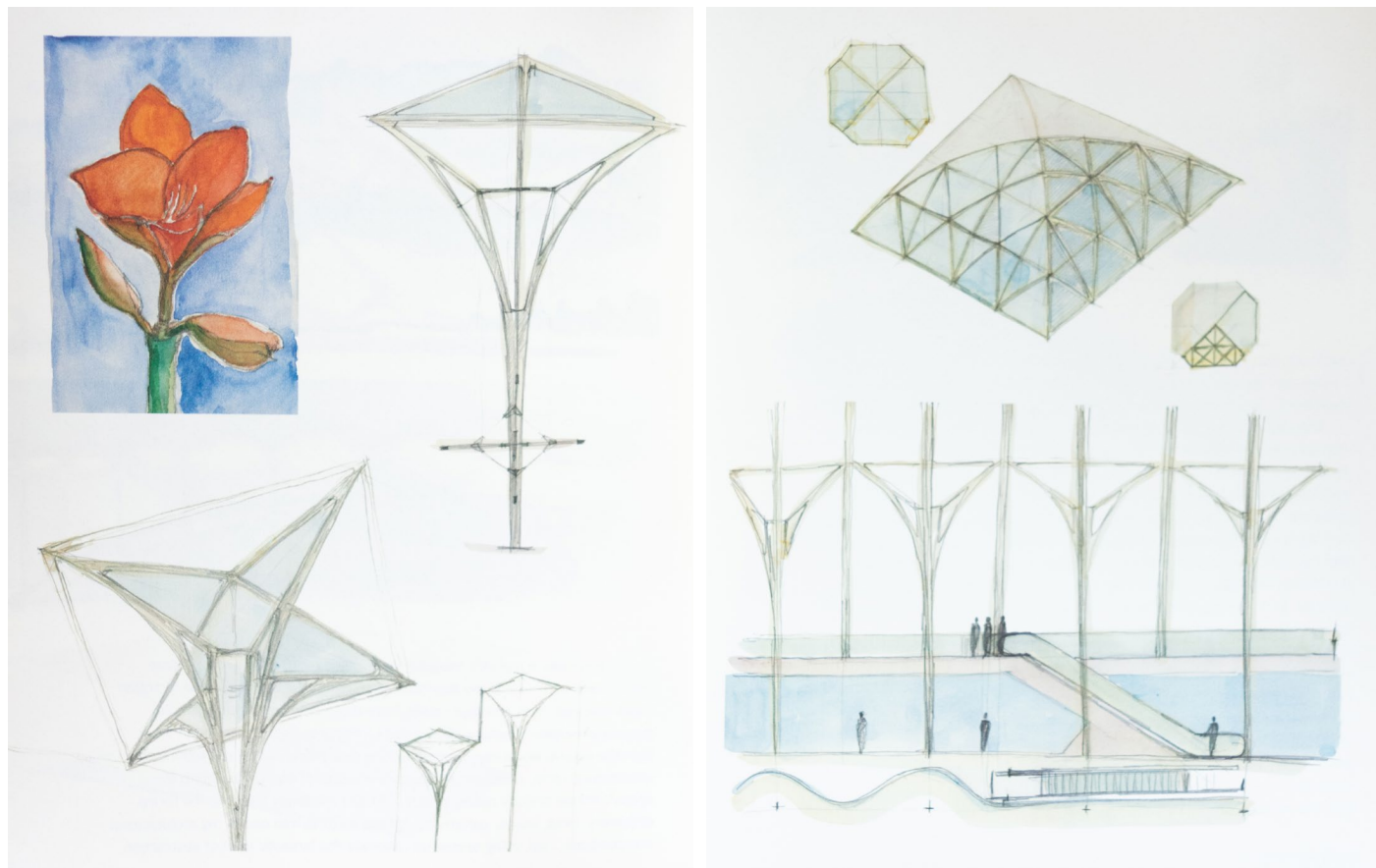


Image 74: Translation of the form of a tulip flower to a roof structure. The sweeping curves of the tulip flowers and the glazed ironwork of British glasshouses inspired the forms of the Allen Lambert Galleria in Toronto. Source: Calatrava & de Albornoz, 2018

The purpose of painting in Calatrava's work

According to Calatrava, architects think not only with their heads but also with their hands. Drawing and painting are introspective methods that allow him to translate his ideas onto paper. For Calatrava "through the gestural process of drawing, you summon your intelligence, your concentration; the order goes from the mind to the hand in a very spontaneous way" (Calatrava & de Albornoz, 2018). Calatrava has been making paintings since a very young age and for him this has become a tool to express himself and understand the world around him. Wherever he goes, he is sketching as an intimate way of reflecting on and trying to understand the spaces and objects around him. That's how he is using drawing and painting to materialize his ideas but also as a 'theoretical background' for his architectural research.

For many of his projects, as already mentioned, he has been inspired by nature or by the human body. However, he does not await inspiration in order to start creating. For him this is a mistake. Inspiration can be only brought into action by an effort, by doing the work and for him this effort is painting. Calatrava sometimes begins drawings without any preconceived problem to solve, rather with a desire to draw and make marks on paper with no conscious purpose. He describes drawing as an act in which are used two instruments - your hand and your intuition. Within this process, even with no conscious aim, he is continually trying to solve a real construction problem and the same process repeats itself - sketch, change, repeat. By making a lot of sketches, drawings, and paintings, at some point Calatrava arrives at a conscious and crystallized idea, and then a control and order begins to appear.

Whenever Calatrava approaches an architectural project, he intuitively starts making paintings, using an irrational way of thinking, concentrating exclusively in terms of form (beauty). Then once the form is defined, it naturally adapts to the rational function or utility of the project (Calatrava & de Albornoz, 2018). For him, according to Vitruvius' foundational principles for good architecture - firmitas (durability), utilitas (utility), and venustas (beauty) - beauty is the most enigmatic, the least easy to grasp and the hardest to recognize. Therefore, he follows Plato's theory that we constantly aspire to the highest form of beauty.

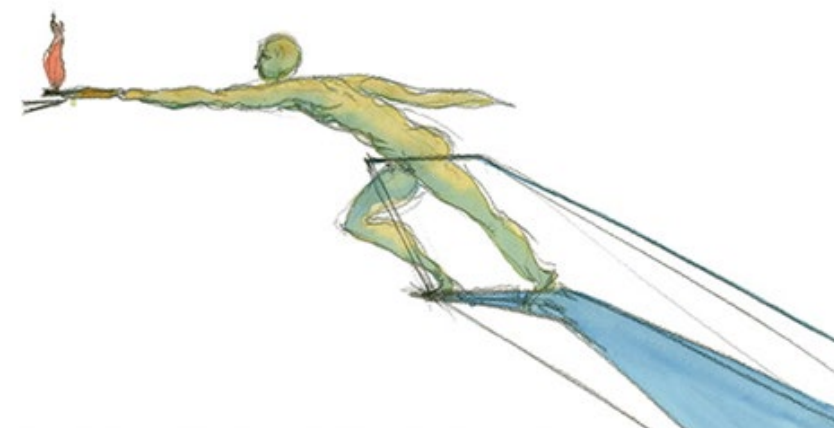


Image 75: Initial sketch for the Athens Olympic Sports Complex in Greece.
Source: Calatrava & de Albornoz, 2018

Painting as part of the creative design process

Calatrava's architectural style is derived from his habit to continuously make studies by painting the human body or nature. He draws the human body in different positions, capturing its gestures and movements, some of which go on to trigger architectural designs. Similar to Rodin, Calatrava is compelled by the human body in motion and tries to incorporate that movement into his architecture. This also resembles his understanding of architecture. Even though movement is the last element which one would expect to find in a static art form as architecture, potential moment is concealed in everything surrounding us. As motion is hidden even in the most stable objects, it should be recognized as an inherent and natural part of architecture and therefore a building should be understood as a dynamic object in itself rather merely as an image made up of volumes and textures.

The first project in which Calatrava began to experiment with relating architecture to the human body was the Stadelhofen Station in Zürich. Triggered by Michelangelo's principle that architecture is derived from human limbs, Calatrava began exploring hand gestures, which became the starting point for the whole project, eventually defining the entire project. This can be clearly observed in a few elements of the structure of the station. The pillars supporting the roofs of the station are derived from an open human hand where the thumb and the index fingers form an arc (Image 76). Also, the pillar supporting the platform with its 'Y' shape resembles the form of a leaning human body (with no head) - a motif that comes back in some of his future projects as well. For this project, he firstly analyzed the human body by making paintings and then synthesized the elements that inspired him and transformed them to an architectural object that serves as a guiding element for the whole project.

Abstraction plays a significant role in the process of translation from inspiration to an architectural composition and this is revealed in his translations of natural forms to architecture. He synthesizes the complexity and extent of nature using abstraction, through architecture and mathematical models, into a kind of geometric purity. The idea of arriving at a synthetic understanding of nature by radically simplifying its aesthetic can also be observed in the works of abstract artists as Ellsworth Kelly, Paul Klee, Piet Mondrian, and Mark Rothko. The idea of abstracting reality refers to the words of Mondrian, 'I want to come as close as possible to the truth and abstract everything from that, until I reach the foundation...' (The Art Story, n.d.). This process of formal reduction and abstraction of natural forms can be observed in his paintings for the Allen Lambert Galleria. Starting with a realistic painting of a tulip, he synthesizes it to its core forms - a steel stem, which then splits into four different triangular glass panels, resembling the leaves (Image 74). His approach for the design of the St Nicholas Greek Orthodox Church in new York is also very similar (Image 77) - the shape of the church emerges from a sequence of drawings of a mosaic in the Hagia Sophia that depicts the Virgin Mary, with Jesus sitting on her lap. He starts by painting the realistic mosaic and then step-by-step he synthesizes its core elements and makes the painting more and more abstract, going through a sort of 'metamorphosis' until a point is reached at which it is transformed more to an object depicting a church rather than an icon.

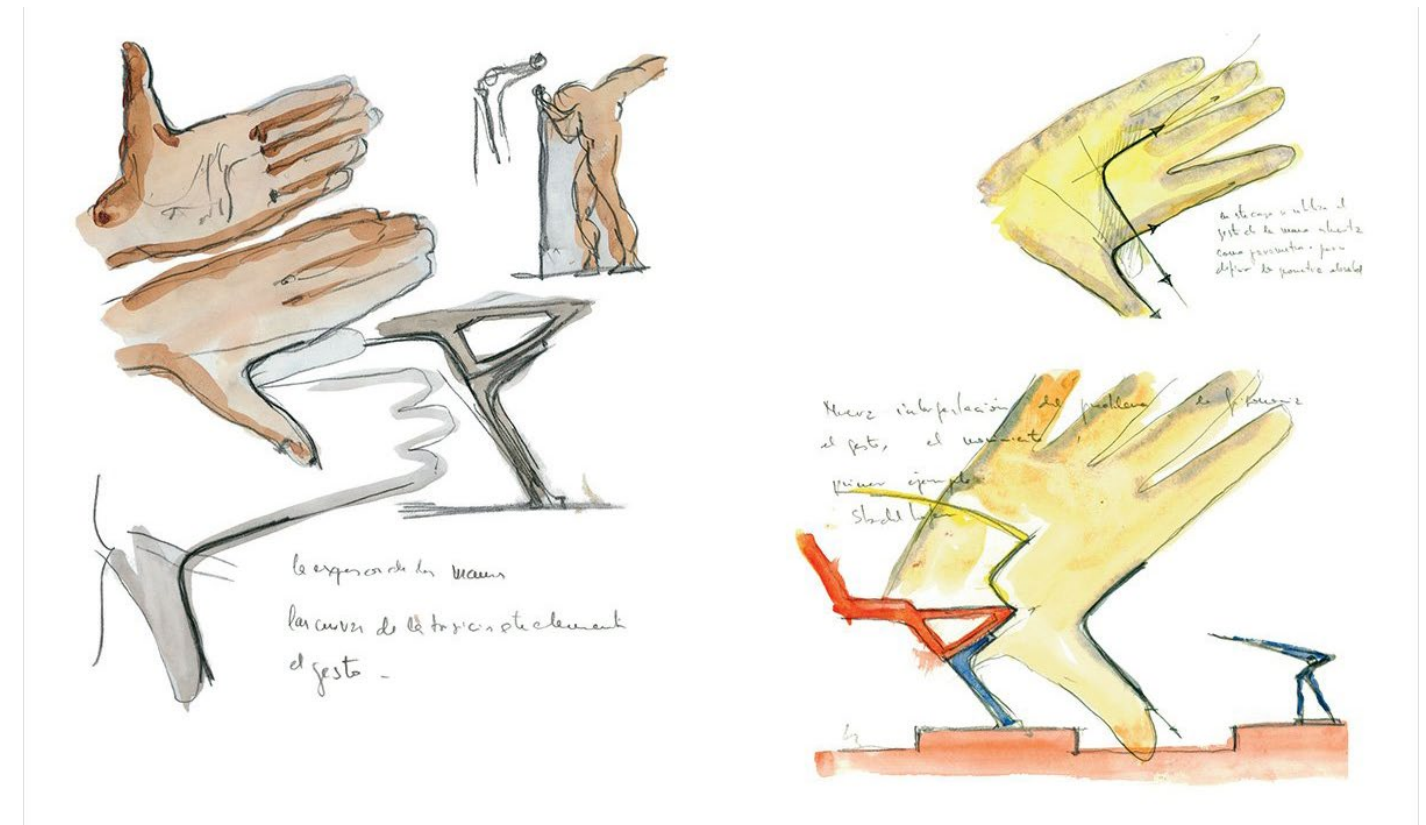


Image 76: Developing the form of the Stadelhofen station's supporting pillars from the curve between the thumb and the index fingers. Source: Calatrava & de Albornoz, 2018



Image 77: The shape of the St Nicholas Church emerges from a sequence of drawings (synthesis) of a mosaic in the Hagia Sophia church that depicts Virgin Mary, with Jesus sitting on her lap. Source: Calatrava & de Albornoz, 2018

Conclusion

Calatrava uses painting as a tool within his creative process for analysis and synthesis. His process starts by making paintings in a highly realistic manner, allowing him to observe and analyze nature and the human body. As soon as he has chosen the ‘element’ that will serve him as a starting point for a project, Calatrava starts synthesizing the core elements of the analyzed object, through abstraction, and then transforms it to an architectural composition. The paintings that Calatrava makes that are not related to any specific project can be categorized as analytical because in this way he analyses the world around him. Throughout this analysis he reaches a specific point at which he develops a certain painting, embodying a specific idea, into an architectural project. When he makes paintings for a project, they are rather explorational, as he is exploring various possibilities on how the object, i.e. the starting point, can be synthesized and into an architectural composition, which will then be naturally adapted to the function of the project.

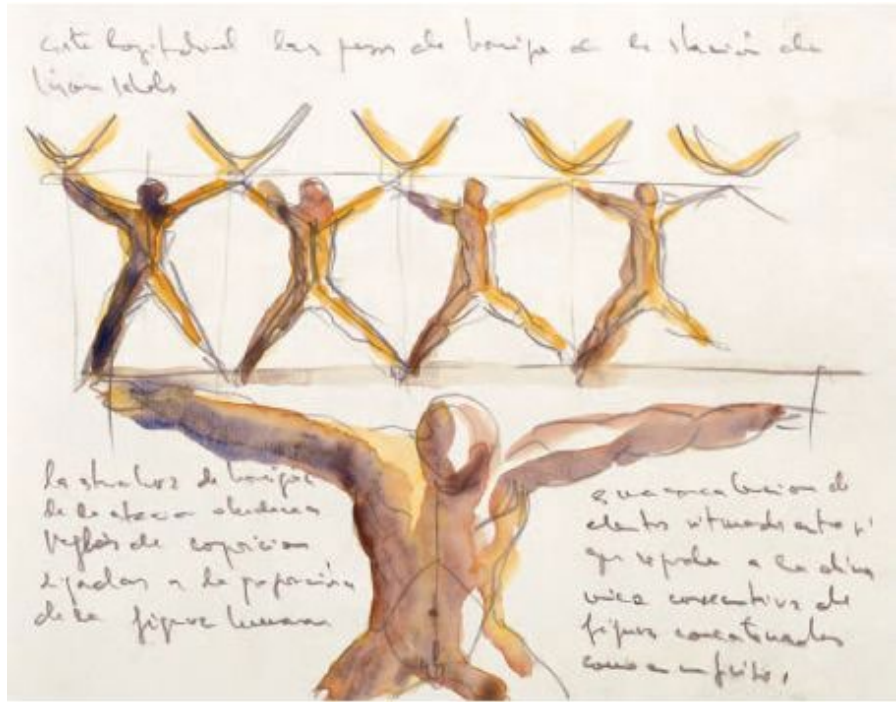


Image 78: Preliminary studies for the Lyon-Saint Exupery Airport Railway Station. Source: Calatrava & de Albornoz, 2018

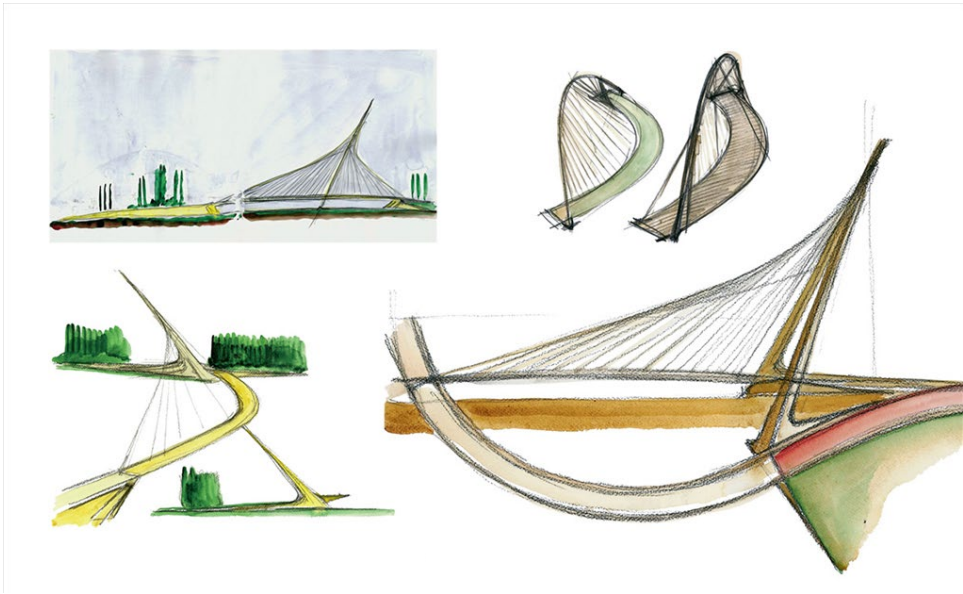


Image 79: Sketches of the cable-stayed Bridge of Strings in Jerusalem. Source: Calatrava & de Albornoz, 2018



Image 80: Preliminary sketches for the Adan Martin Auditorium. Source: Calatrava & de Albornoz, 2018

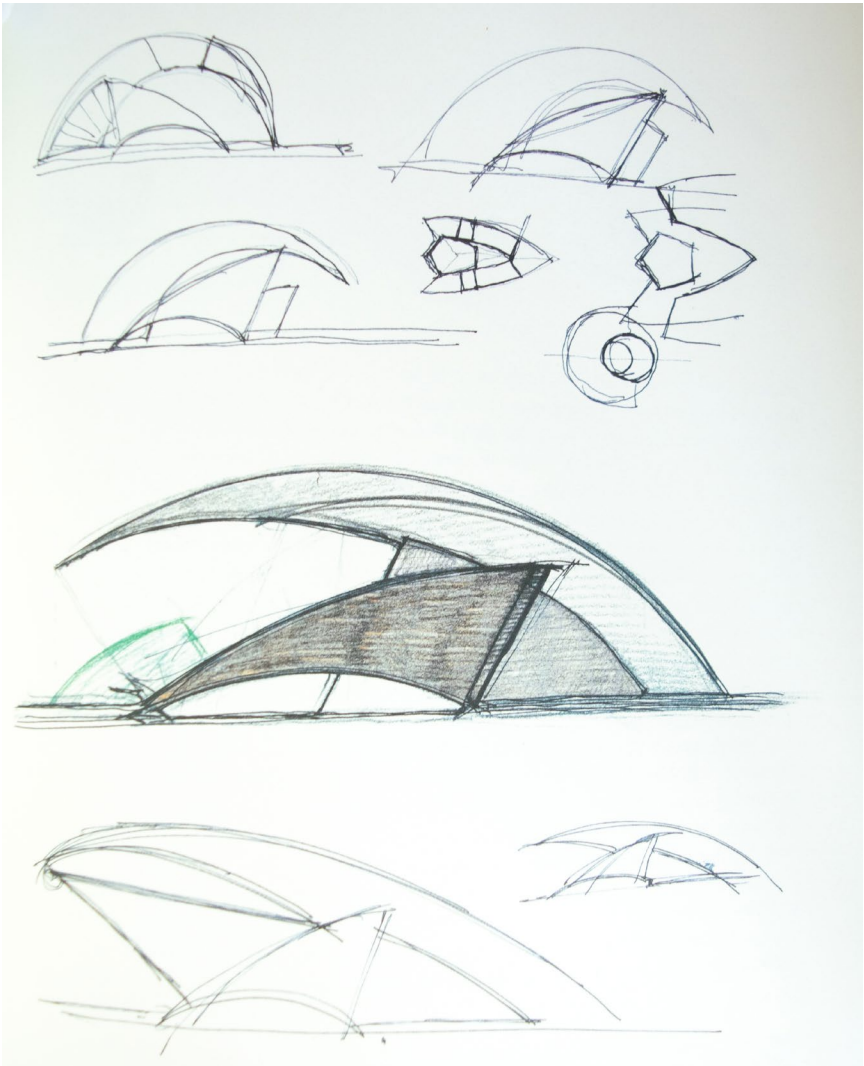


Image 81: Preliminary sketches for the Adan Martin Auditorium. Calatrava sketches incessantly in order to crystalize his architectural ideas. Source: Calatrava & de Albornoz, 2018

4.5. Steven Holl

Introduction

Steven Holl is known not only for his architecture but also for his watercolor drawings that are as renowned as the buildings that they represent. For him drawing is a form of thought and this is the tool he uses to come up with the starting point for his architectural projects. All of Steven Holl's projects begin in the same way - with an intuitive brush stroke, usually first thing in the morning. Holl even likens the process of making drawings to a form of meditation because every morning he wakes up, plays music, drinks green tea and paints.

Making drawings for his buildings helps him tackle the complexity of the architectural projects and to find the balance between the different elements, such as the area, the height, the form etc. His way to tackle these 'problems' is to put them into his brain, go to sleep, wake up and start drawing (TMD Studio, 2018). In other words, through the medium of drawing, Holl transfers his subconscious thoughts on paper and creates order from chaos. This whole process is very intuitive and imagination plays a central role in it. Therefore Holl's creative process can be described as rather artistic.

The role of painting in Holl's work

Throughout the design process Steven Holl creates a wide range of different types of paintings and drawings for his projects - ranging from abstract, diagrammatic, analytical to atmospheric watercolor drawings. Often he starts the projects without a clear idea in mind and therefore he creates watercolor drawings that look more like abstract pieces of art than architectural drawings. Even though these abstract compositions are not made with a specific architectural idea in mind, sometimes when his imagination gets inspired, he translates them to an architectural object and become a starting point for a project. The watercolor for the Chapel of St. Ignatius (Image 82), for example, shows the very early stage of Holl's idea for the composition and lighting of the project. With the help of these abstract drawings, similar to Aalto, he comes to a starting point for the project. After he 'discovers' this corner stone for the specific project, he starts making diagrammatic and analytical drawings. With these drawings he analyses the formal and technical aspects of the project. The watercolor for the Campbell Sports Center (Image 88), for example, explains the exact arrangement of the different functions in the building volume. The watercolor for the Ecocity Ecology and Planning Museums (Image 83), on the other hand, depicts the correlation between the external volume of the building and the internal spaces that seem to form interconnected voids in the building volume. Holl also uses analytical and diagrammatic drawings to analyze the way light enters the building or the routing through the spaces. In the latest phases of the design process, Steven Holl makes interior and exterior atmospheric drawings. The interior perspective drawing for the Kiasma Museum (Image 84) shows how the daylight will enter the foyer of the building. Another example is the exterior watercolor for the Deyang Gallery and House (Image 85) that shows the view from one of the verandas of the house. These perspective drawings are not only used as representational. They are created to show specific aspects of the projects such as Holl's idea for the placement of the windows, the materialization and the lighting of the spaces.

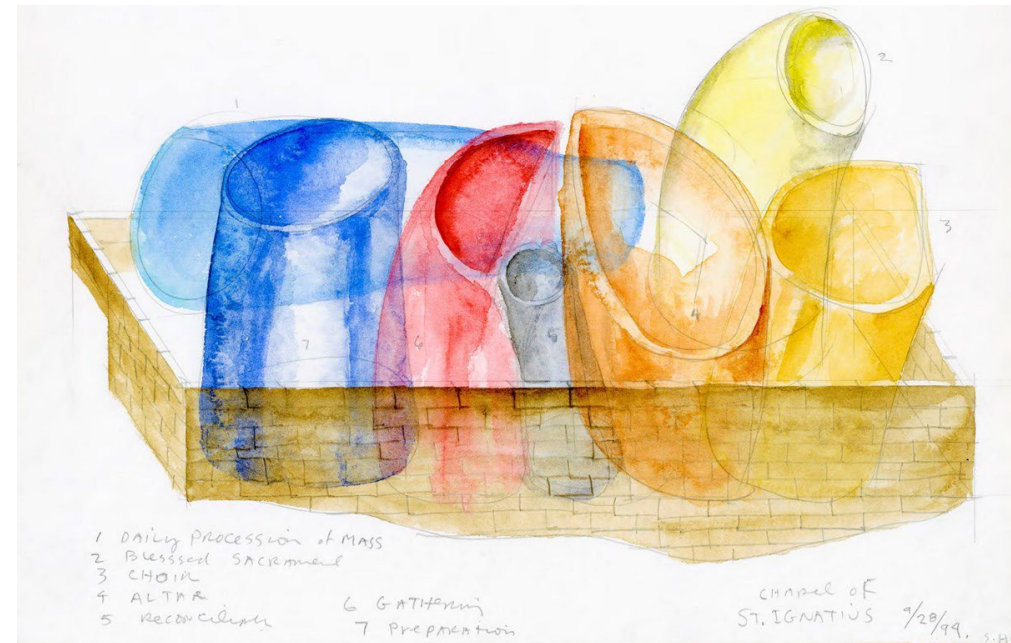


Image 82: Concept sketch - Chapel of St. Ignatius

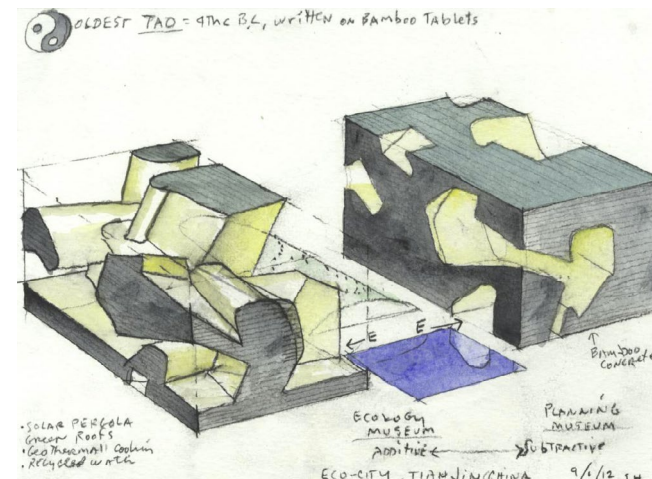


Image 83: Ecocity Ecology and Planning Museums . Tianjin

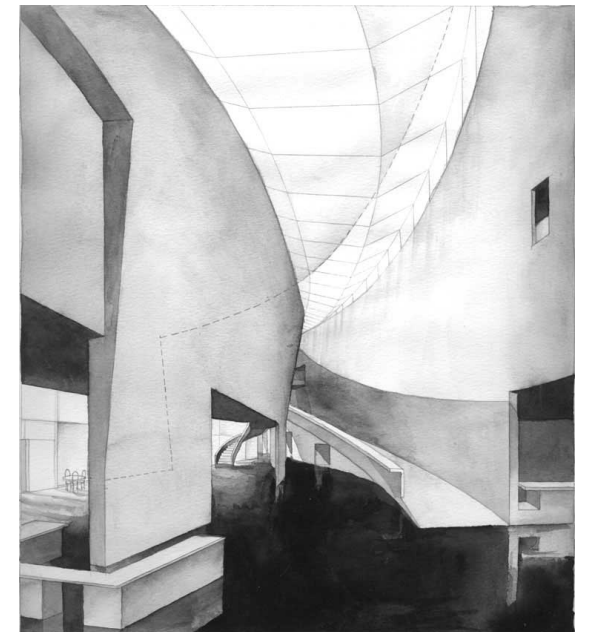


Image 84: Perspective sketch of the daylight foyer of the Kiasma Museum. Image: Steven Holl Architects



Image 85: Perspective views - Deyang Gallery and House

The purpose of painting in Hool's work and his creative process

Through painting, Steven Holl generates his thoughts and connects the subjective and the objective. For him, this is an unpredictable process, during which he doesn't have any constraints except the boundaries of the watercolor pad that he uses. He works on these drawings and sketches every day for one to two hours first thing in the morning, before breakfast and before reading the news in order to be closer to projecting his 'dream-like subjectivity' as he describes it (Shah, 2021). Even though not all his paintings are made for a specific project, during this half-awake, half-asleep process he accidentally stumbles on something that can be defining for a project. According to him, intuition and pragmatic thought, or in other words the subjective and the objective, have to be mixed to get a creative thought and this is exactly what painting allows him to do. This analogue process of creating watercolor drawings, combines the mind and the hand, allowing Holl to come up with an initial inspiration for the project that then becomes the starting point. When he finds a starting point, he's pleased with, he sends a photo of the drawing to his team and the whole team starts working on the project and the process becomes digitally 'supercharged'.

Holl never skips a day without painting and therefore he uses a 13 cm by 18 cm watercolor pad for all his drawings which allows him to carry it everywhere with him and paint even when he is traveling. Working in the same watercolor pad for a single project, gives Steven Holl absolute clarity about what he is doing and to 'create' a chronological archive, allowing him to see where he started and where he is going with a project. He continues this chronological process even during the later design phases and while working on the details of the project.

Holl's watercolors for the Hangzhou Triaxial Field project (Image 86) - a cultural center in China - clearly show how he also uses his drawings as a communication tool to explain his ideas. The paintings encapsulate his desire to create a building with an intimate connection with the surrounding landscape. The interior drawing depicts a porous cave with a hole on the top from where light streams down, while the external watercolor shows how the building extends seamlessly from the ground with its green roof and the small ponds surrounding it, as if it is part of the terrain itself. On the exterior drawing can be seen also his bullet points that refer to the core ideas of the building - "field instead of object", "landscape and arch merge" and "light and structure".

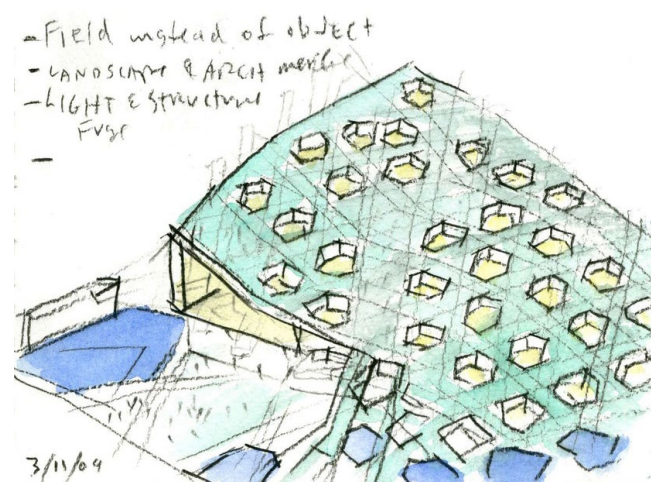
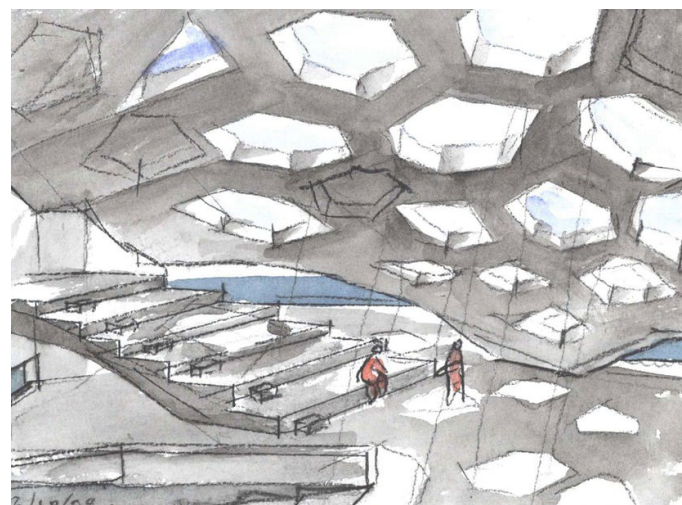


Image 86: 'Translation' - Hangzhou Triaxial Field, Hangzhou, China (Concept)



Another project that clearly shows his creative process is the Ex of In house. The Ex of In house is an experiment on the inner experience of the intersection and compression of four spheres with a Tesseract. This is a project that explores a language of space, aimed at inner spatial energy strongly bound to the ecology of the place. The house's geometry is formed from four spherical spaces intersecting with Tesseract trapezoids intended as a catalyst of volumetric inner space (Carta, 2018). The design process of the Ex of In house clearly shows how Holl's projects get developed step by step, starting by making drawings and then physical models until the final design for the building is developed. For the Ex of In house, each phase of the project started with drawings and then a 3D printed model was created for each phase (Image 91). The Exploration of In project starts with a work on the subjects of space and abstraction, namely with an elaboration of Venn Diagrams (Image 89) and further modifications of them, which form the starting point for the project. Based on these drawings was created a 3D model (Model 1 from left to right - Image 91). The resulting figure was then reversed - a negative was created of the form, i.e. the inversion starts from the inner space, it is a spatial inversion of what is contained (Image 90). The drawing was then again translated to a 3D model (Model 2, Image 91). The next step consisted of the intersection between what had been obtained up to then with a Tesseract, arriving at a "fragment" of Tesseract (Model 3, Image 91) which in turn was inserted into the four intersecting reversed spheres, obtained during the first phase (Model 4, Image 91). With small modifications, everything is brought together in the final step in which the Ex of In house is formed (Image 92; Model 5, Image 91). According to Holl, "when entering the space, you do not need to know all the research that has taken place to understand its geometry because, through the different sphericities, the space engages the visitor in a total experience: on a physical, mental and spiritual level" (Carta, 2018). The house is an embodiment of the connection between form and content because in this place the different spaces work seamlessly and spontaneously together.

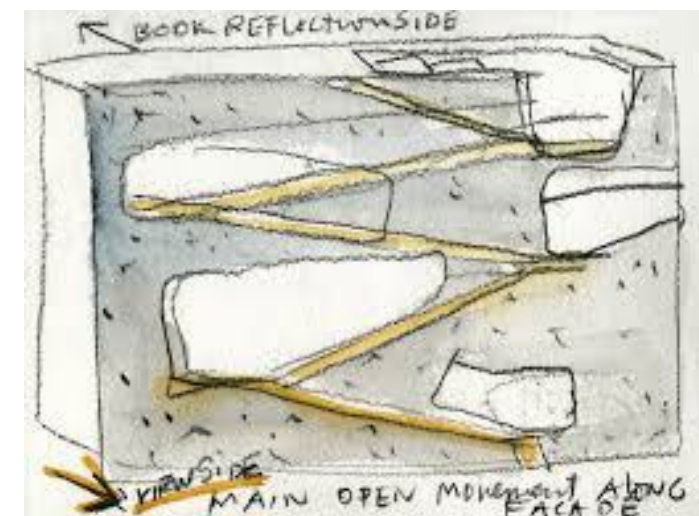


Image 87: Explorational drawing - routing and facade. Hunters Point Library
Source: Steven Holl Architects

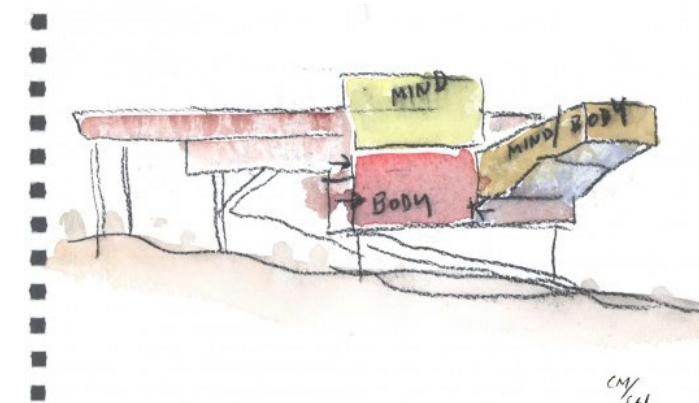


Image 88: Functions - Campbell Sports Center

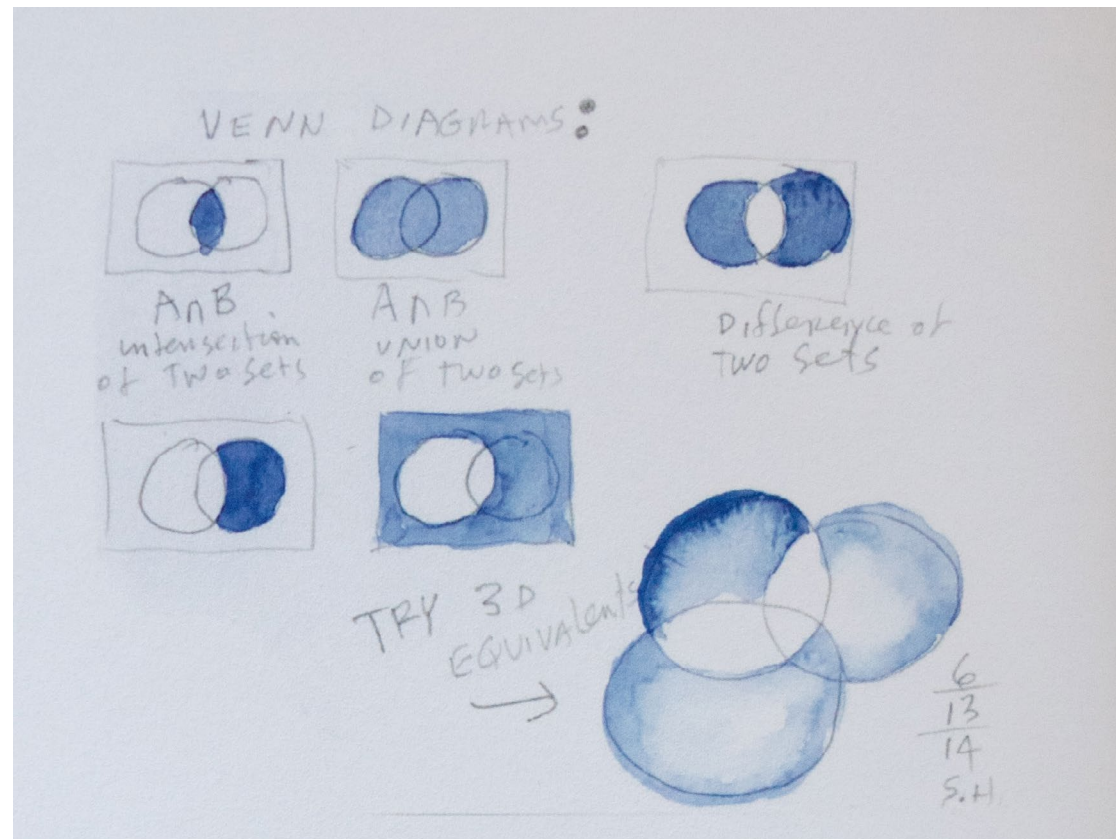


Image 89: Venn diagrams - Study for the Ex of In house. Source: Carta, D. (2018). Lake of The Mind A Conversation with Steven Holl.

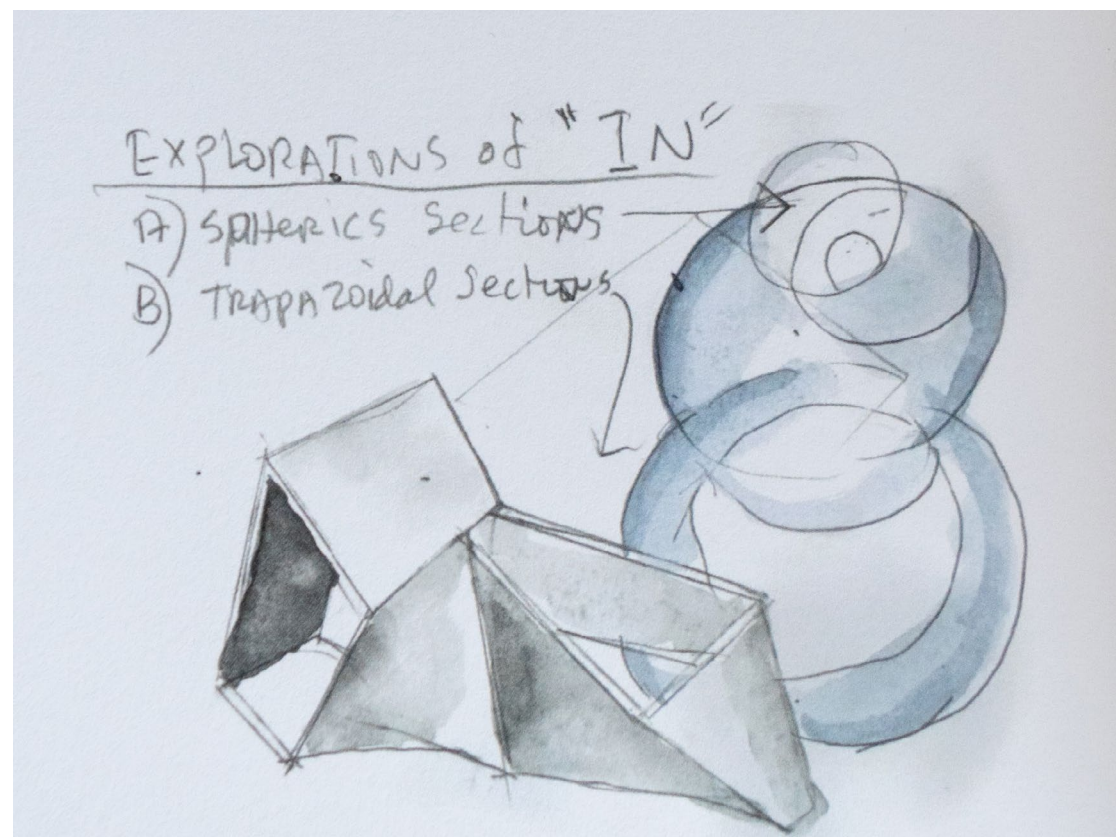


Image 90: Study for the Ex of In house. Source: Carta, D. (2018). Lake of The Mind A Conversation with Steven Holl.

Conclusion

Steven Holl makes watercolor drawings to find a starting point and to find the balance between all the contradictory elements that have to come together in an architectural project. Holl's watercolor drawings are inspirational in the beginning as they are made without clear goal in mind and they eventually spark an idea in his mind, i.e. inspire him, which then becomes the starting point for a project. Later in the process they become explorational and analytical as he starts working with a specific form or volume which gradually develops to the final building. Holl's watercolors are also a communication tool which helps him explain his ideas about the project to his team, so that they can take over the drawing board and start developing the project digitally. Embodying his philosophy that the digital is too literal and therefore renders can be misleading for the client, his paintings are also a communication tool with the clients in the beginning of the projects based on which the design for the building is further developed.

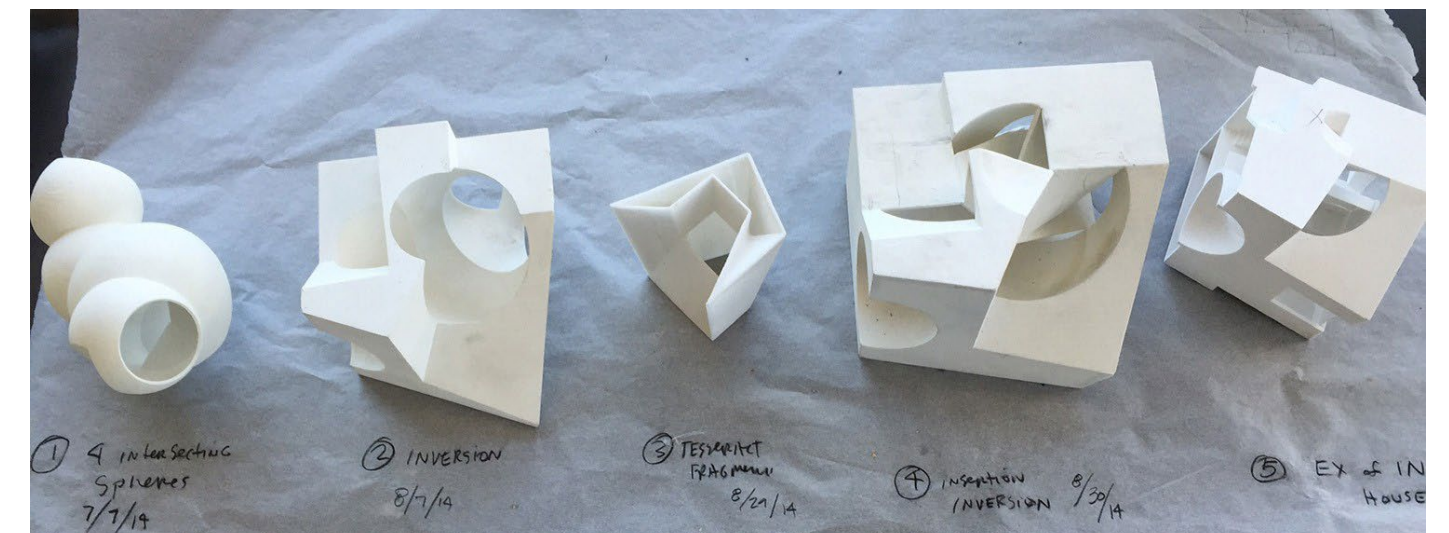


Image 91: Models for the Ex of In project showing how the geometry develops after each phase. Source: Carta, D. (2018). Lake of The Mind A Conversation with Steven Holl.

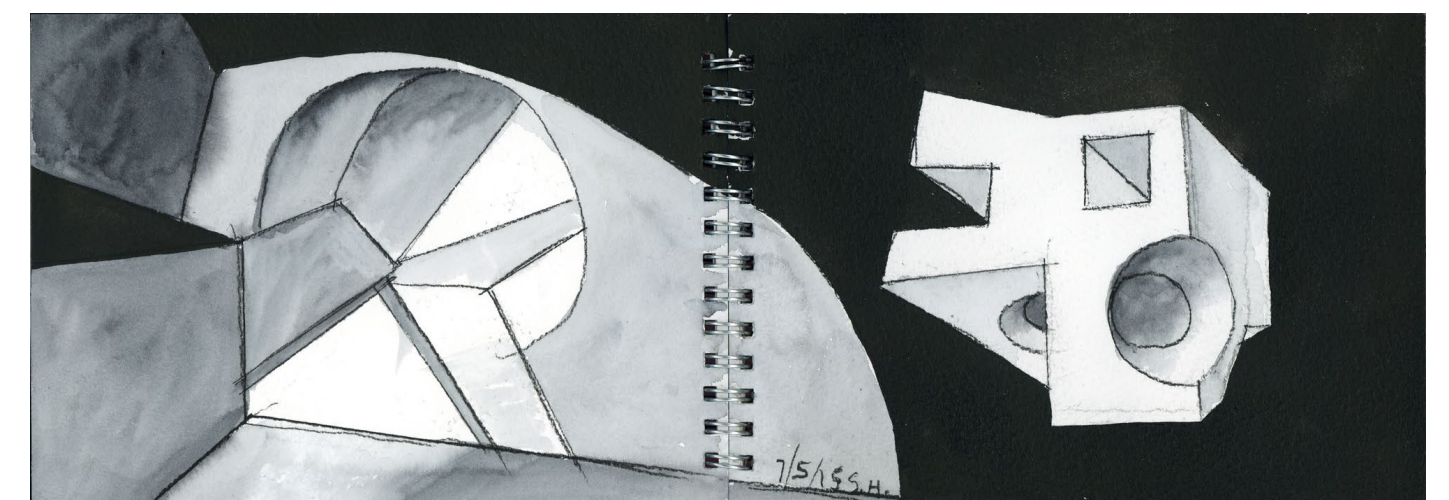


Image 92: Study for the Ex of In house. Source: Carta, D. (2018). Lake of The Mind A Conversation with Steven Holl.

4.6. Sketching

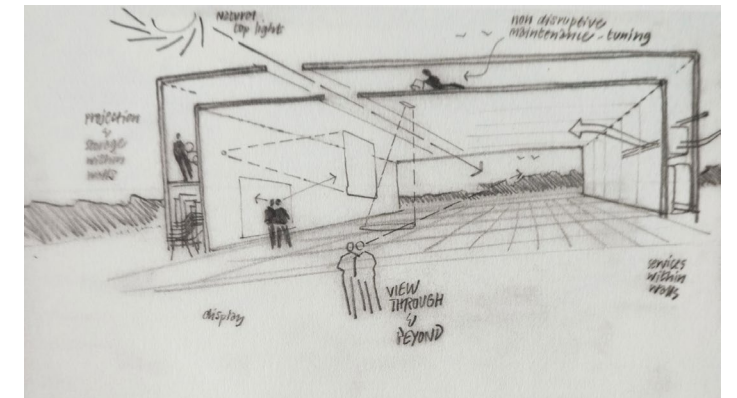
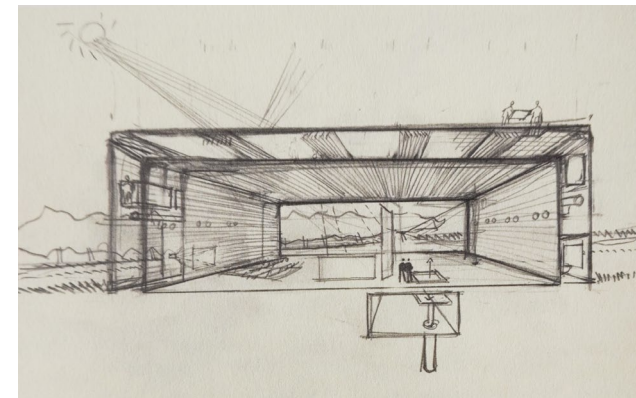
Introduction

Even though painting, sketching and drawing theoretically have different definitions, within the creative process of architects who use painting as a tool, the three methods complement each other. In these cases, sketching and drawings are used as exploration tools prior to making the final painting and therefore it can be even considered that they fulfill the same function within the design process. In some phases of the design process, however, sketching and drawing can be more useful tools than painting. This can also be observed in the analysis of the architects in the previous chapters, as they use the different tools in different phases. Alvar Aalto makes paintings to discover the starting point for the project, but in the later design phases, he uses primarily sketches to discover and analyze solutions to fulfill the technical and practical requirements of the project. Therefore, in this chapter will be analyzed the ways in which three architects use sketches and drawings in their creative process, for whom this is the primary design tool - Norman Foster, Oscar Niemeyer, and João Filgueiras Lima (Lelé).

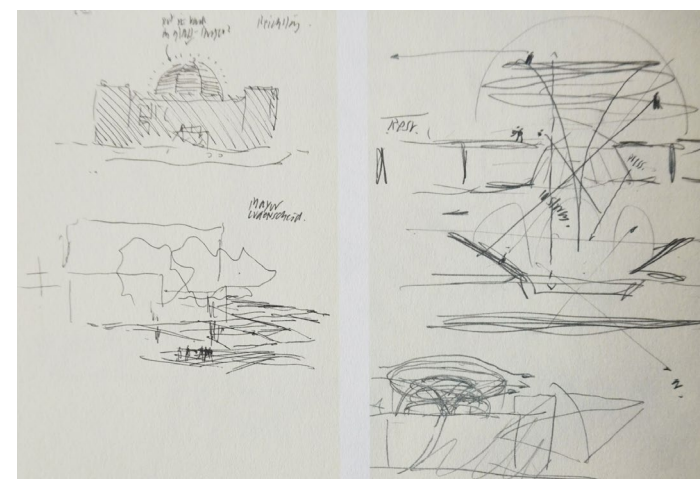
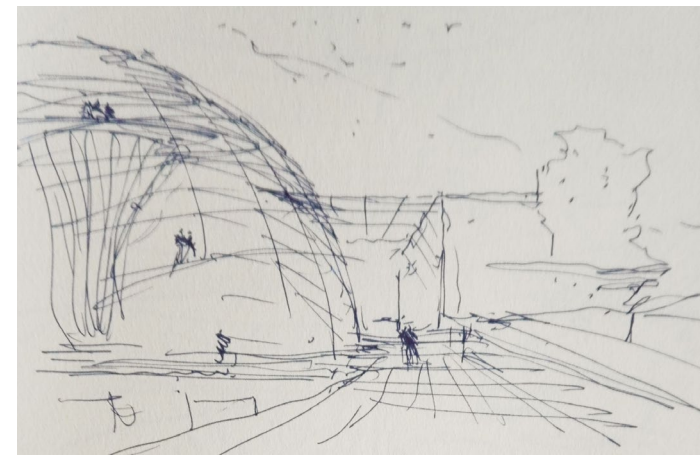
Norman Foster

Norman Foster makes sketches and drawings from the earliest moments a project starts until the last design phase of a project on various scales. This can be observed in the sketches for the Gherkin which range from a very big scale to the very small scale (Images 98-105). On the big scale, he draws the building in the urban context and depicts it in the skyline of the city. Then, he zooms in to the building, in elevations and perspectives, in which he explains specific features of the project. Further, he even zooms in to the facade details and how the facade affects the interior spaces. Having a very rational approach to architecture, using very simple sketches he also manages to explain from where the form of the building is derived - in this case namely the cylindrical shape of the building is created to prevent the formation of wind currents around the corners of the building. Foster had a similar approach for the Commerzbank Headquarters building in Frankfurt (Images 106-109) - he made sketches of floor plans and sections in order to explain the more rational parts of the project such as positions of voids in the building and to explain some of the technical solutions that he envisions for the project. On the other hand, he uses perspective drawings to depict the atmosphere of the space. His rational approach is once more depicted in the sketches for the Millau Viaduct (Image 97), where the sketches show how the shape of the bridge's columns is derived from the shape of a needle.

Something interesting to observe is that his sketches are very neat and rather representative for the project than explorational process drawings, not having any traces of a thought process but directly 'uncovering' the solution. In contrast, the sketches for the cupola of the Reichstag in Germany (Images 95, 96) seem to be more revealing, exposing his design process - making very conceptual and rough drawings of the building and exploring different ideas for the design, again working primarily in sections and perspectives. The explanation for the 'neatness' of his sketches could be in the way Foster and his studio present their projects. Even nowadays - decades after these sketches were made - his firm has a whole department which is focused on producing sketches and drawings, within the design and communications studio, as representative pieces which then can be used by the team to present the project. Most probably, Foster makes a lot of rough sketches and drawings, exploring different ideas and as soon as he comes to a starting point, to something concrete which then becomes the foundational piece for the project, he makes a sketch/drawing that embodies the main starting point and he does this in a much neater way (Image 97). This same sketch is then used as representational for the project.



Images 93, 94: Sketches for the Gherkin. From left to write: Skyline view; . Source: Norman Foster Foundation, 2020, Norman Foster Sketchbooks 1975-2020.



Images 95, 96: Rough sketches for the Reichstag. Source: Norman Foster Foundation, 2020, Norman Foster Sketchbooks 1975-2020.

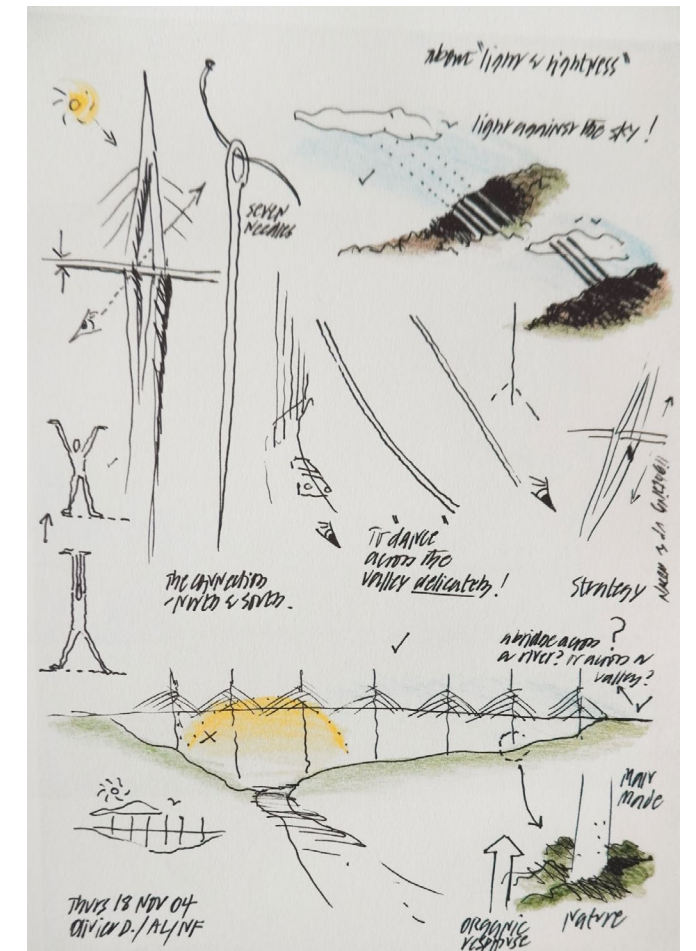


Image 97: Sketch explaining the concept for the Millau Viaduct. Source: Norman Foster Foundation, 2020, Norman Foster Sketchbooks 1975-2020.

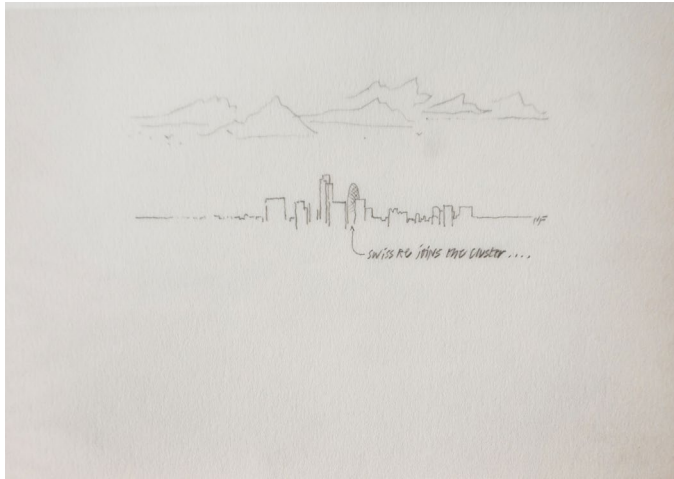


Image 98. Sketches for the Gherkin - Skyline view.

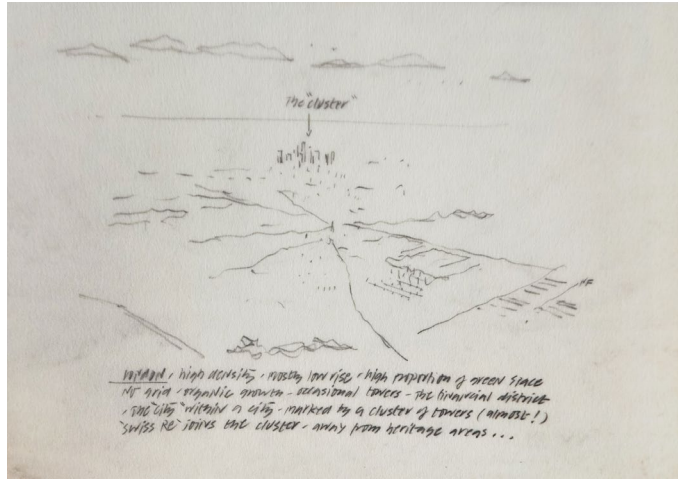


Image 99. Sketches for the Gherkin - Birdseye city view.

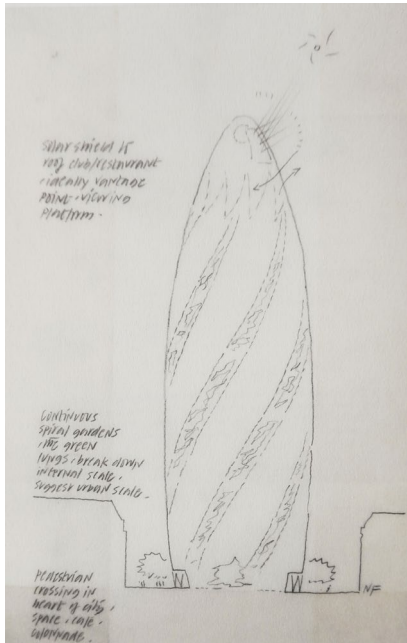


Image 100. Sketches for the Gherkin - Elevation.

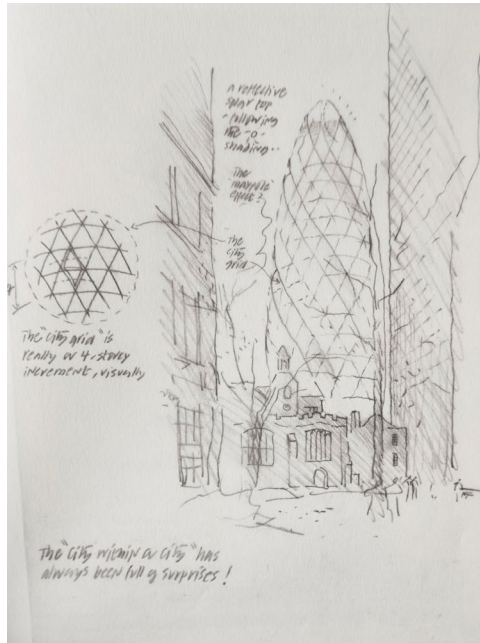


Image 101. Sketches for the Gherkin - Urban perspective.

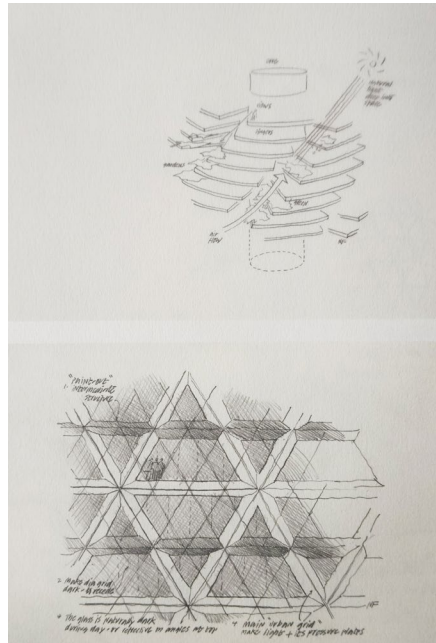


Image 102. Sketches for the Gherkin - Facade detail and internal structure.

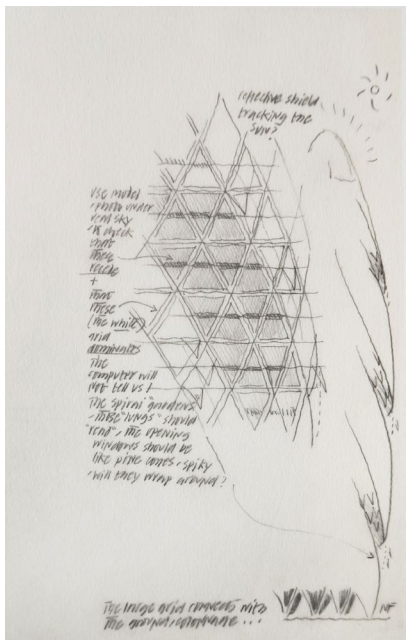


Image 103. Sketches for the Gherkin - Facade detail.

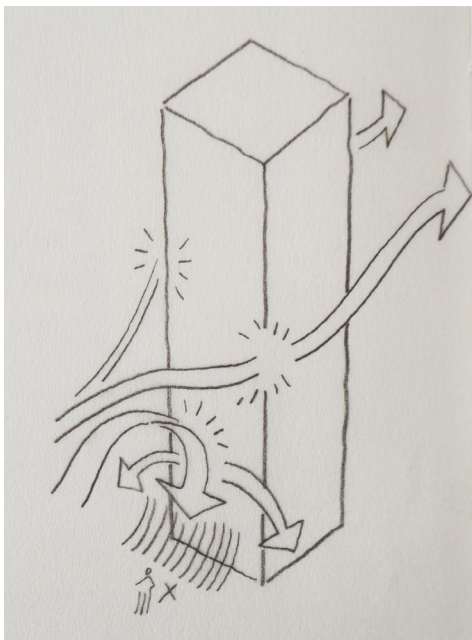


Image 104. Sketches for the Gherkin - Concept explanation.

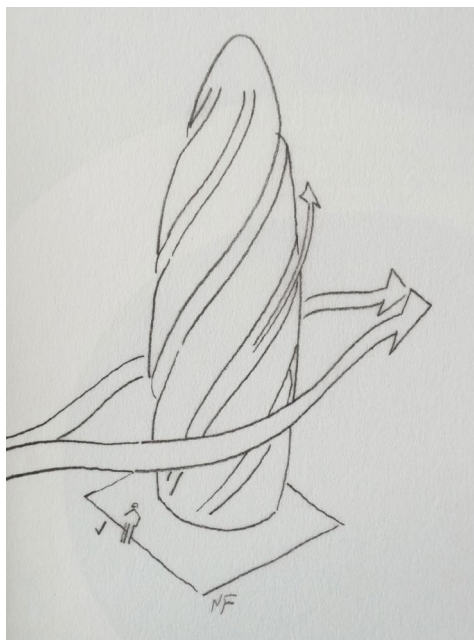
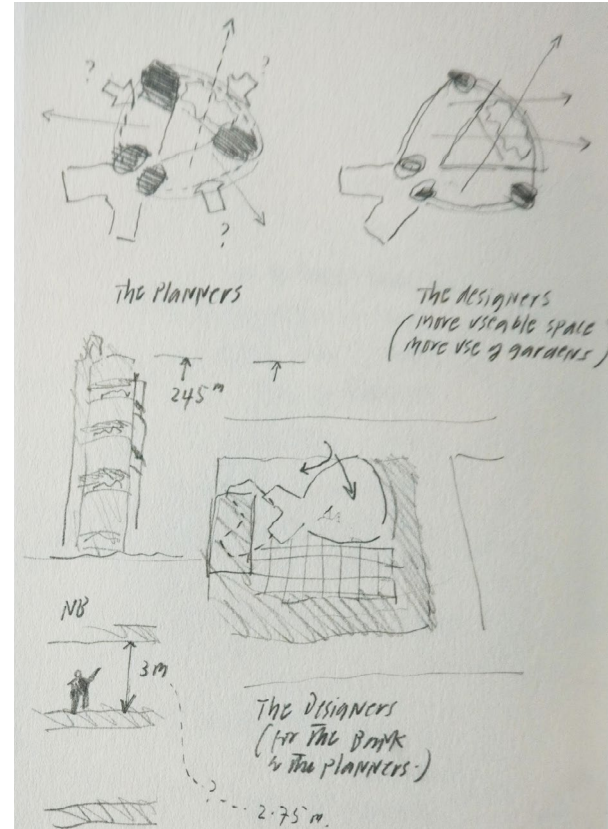
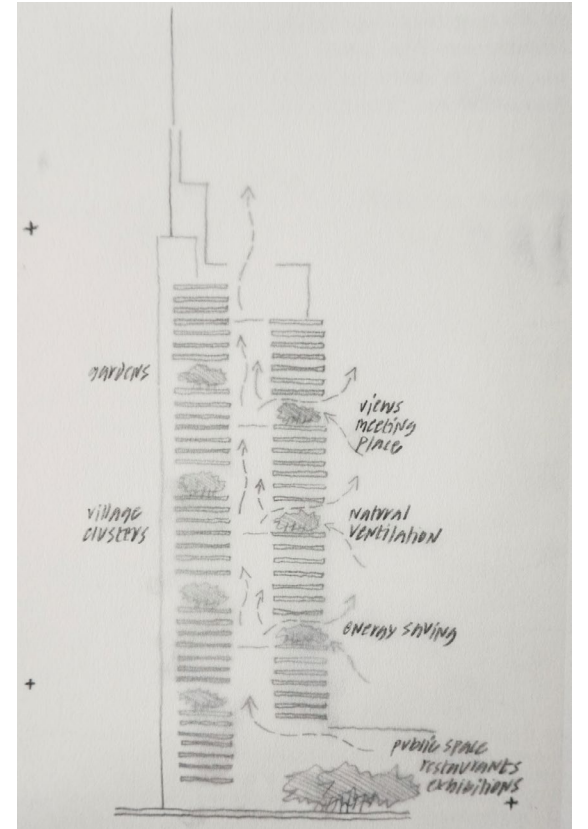


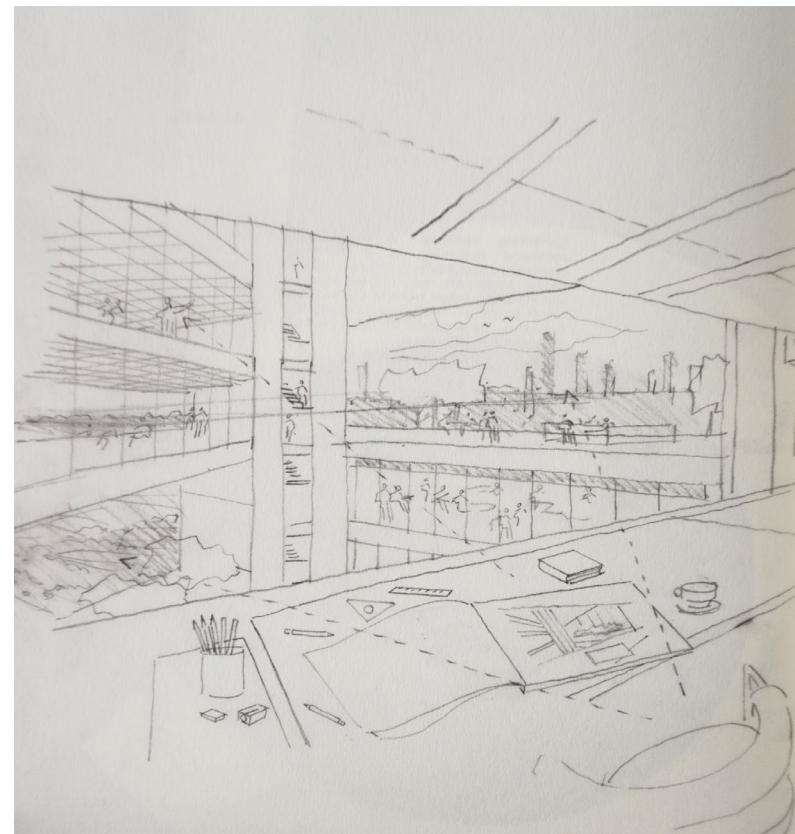
Image 105. Sketches for the Gherkin - Concept explanation.



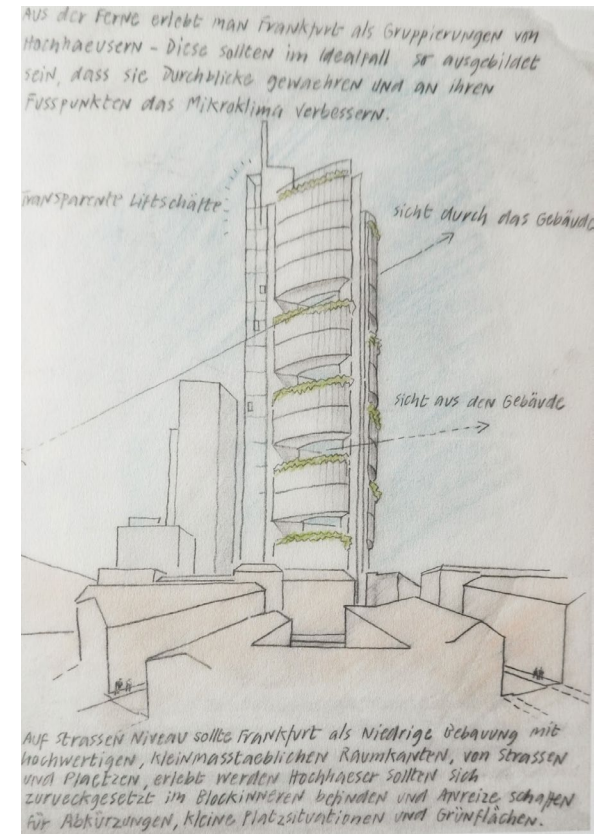
Images 106. Sketches for the Commerzbank Headquarters. Layout sketches



Images 107. Sketches for the Commerzbank Headquarters. Section explaining ventilation principle



Images 108. Sketches for the Commerzbank Headquarters. Interior perspective

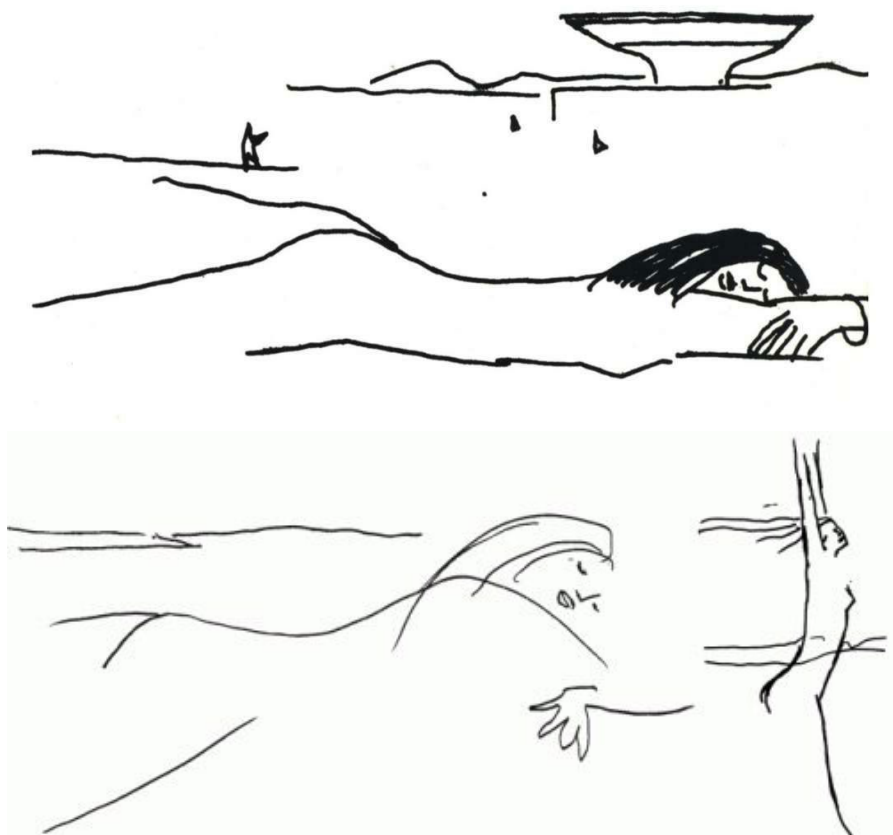


Images 109. Sketches for the Commerzbank Headquarters. Urban perspective

Oscar Niemeyer

Oscar Niemeyer is known for the curved architecture he creates. Niemeyer wrote in his memoir, The Curves of Time, “right angles don’t attract me. Nor straight, hard and inflexible lines created by man”. Niemeyer is attracted by free sensual curves that can be found “in mountains, in the waves of the sea, in the body of the woman we love” (Neimeyer, 2000). This ideology can be clearly observed in his sketches which were the tool he used to explore the potential of the curve. His working sketches for the church of Sao Francisco de Assis (Image 112), clearly show his decision making process - he makes iteration of the architectural composition and based on the visual result he determines which forms he finds more appealing. For the church, he chooses the bell tower which is slimmer at the bottom and wider at the top because in this way it is in contrast to the shape of the church which is slimmer at the top and if these elements are synthesized to two shapes, as he does with the two curves, the contrasting curves compliment each other. In similar fashion he explores the shape of the Museum of Modern Art in Caracas (Image 116) and the Cathedral of Brasilia (Image 113). For both of these projects, the sketches are made in the very early design phase. After Niemeyer chooses the correct form for the building, a very simple sketch consisting of a few lines becomes representative for the whole project. Further into the design process, Niemeyer again uses sketches as a tool for exploration but in these cases the form of the building is much more concrete and the sketch is made to show specific elements and sizes of the building, as shown in the section of the Museum of Modern Art (Image 114, 115), but also some technical elements, as the columns for the Palacio do Planalto (Images 117, 118).

Similarly to Calatrava, Niemeyer was not making sketches only for specific projects but to analyze the world around him. As an architect, Niemeyer was looking for the most beautiful shapes. For him, nothing is prettier than a woman’s perfect body which is why many of his sketches depict women in different movements which then served as inspiration for his projects (Images 110, 111).



Images 110, 111: Sketches of women’s bodies. Source: Neimeyer, 2000, The Curves of Time.

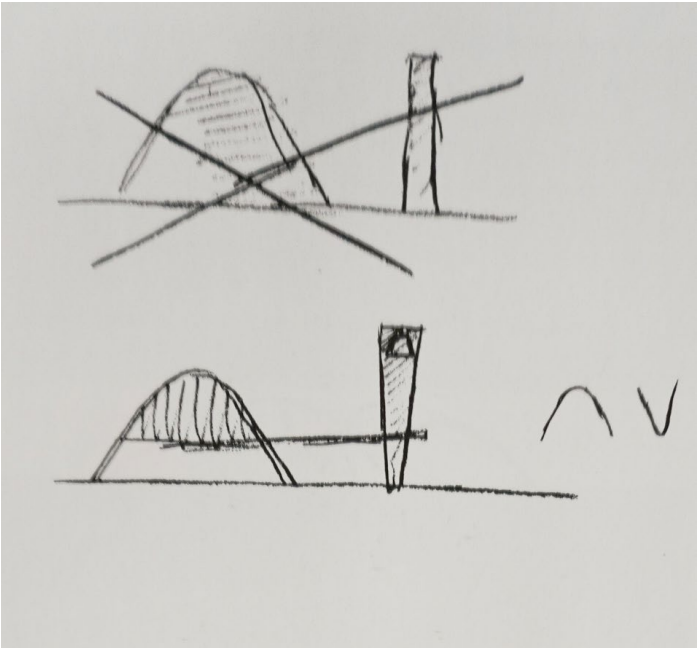


Image 112: Sketches for the form of the Church of Saint Francis of Assisi. Source: Neimeyer, 2000, The Curves of Time.

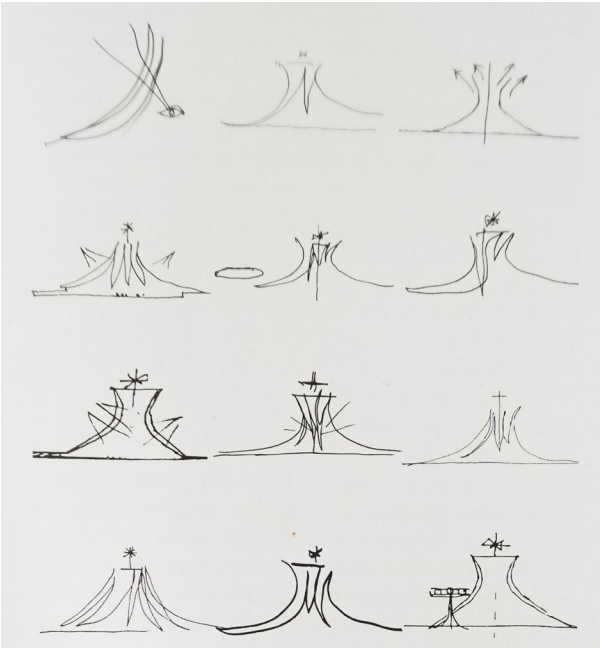
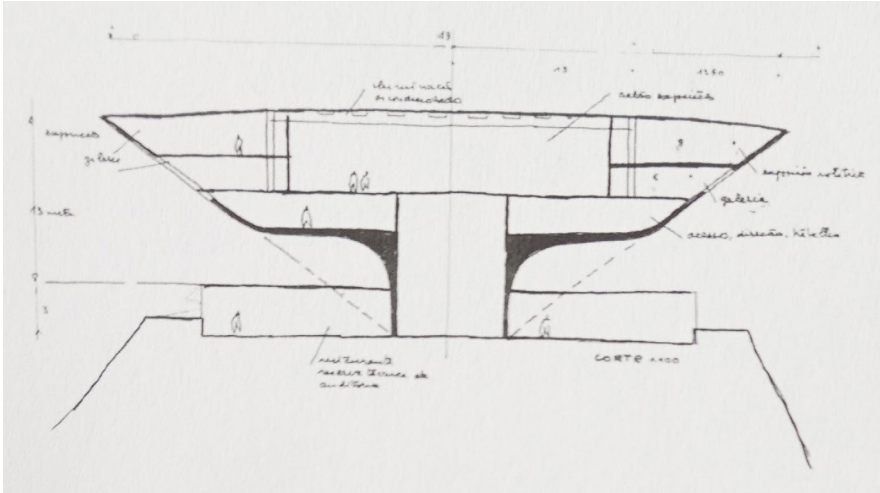
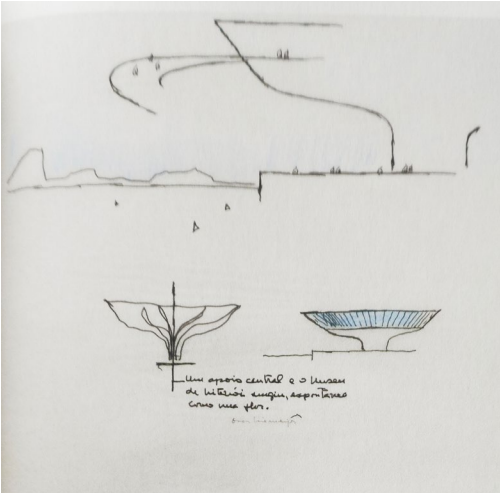


Image 113: Sketches for the form of the Cathedral of Brasilia. Source: Neimeyer, 2000, The Curves of Time.



Images 114, 115: Sketches for the The Niterói Contemporary Art Museum. Source: Neimeyer, 2000, The Curves of Time.

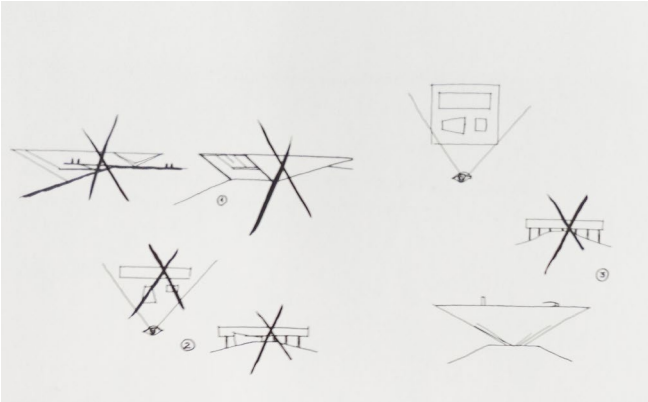
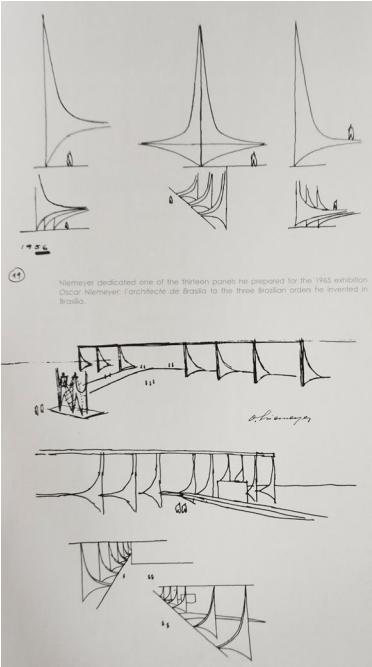


Image 116: Sketches for the form of the Niterói Contemporary Art Museum. Source: Neimeyer, 2000, The Curves of Time.



Images 117, 118: Sketches for the Planalto Palace Brasilia. Source: Neimeyer, 2000, The Curves of Time.

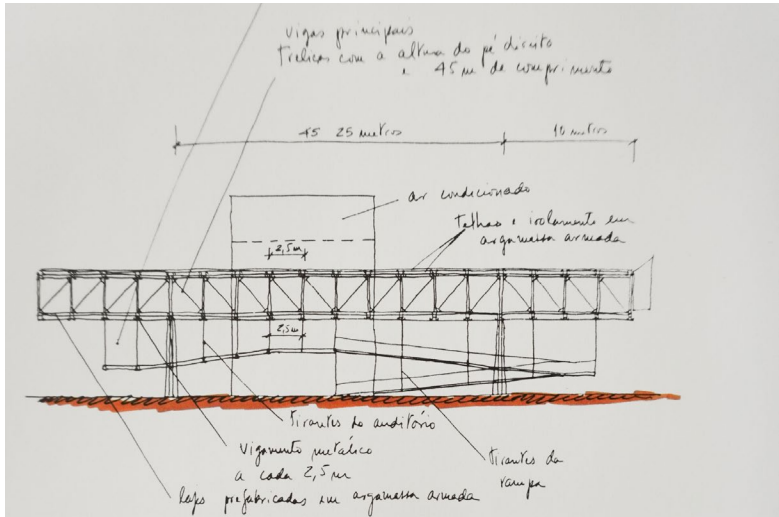


João Filgueiras Lima (Lelé)

Lelé is another architect who utilized the power of sketches in his architectural design process. However, he mostly used sketches to explore technical solutions for his projects and not so much to explore different forms for his designs. He mostly uses sketches to explain the structure, the construction principles and the systems that will be used for the project. In his structural sketches for the TCU Headquarters (Image 119), he explains the most important aspects of the structure. He shows specific dimensions both in section and perspective and with text additionally clarifies his ideas. In sketches for other projects, he shows how the natural light enters the building or how the building gets naturally ventilated (Image 123). In the sketch of the JSN Residence, Lele even sketches the layout of the fire extinguishing system (Image 121). Lele also depicted the construction techniques that will be used for his projects, as represented in the sketch of the House for Brazil's Minister (Image 122) and the foundation drawings for the Darcy Ribeiro Memorial project in Beijódromo (Image 120). All in all, Lele has a very integrated approach to architecture and sketching allowed him to communicate his ideas for the projects, aiming to combine architectural aesthetics with the climatic and the structural design of the building, working on various scales.

Conclusion

Sketching is a complementary tool to painting, as it is the tool used to explore different compositions for the painting itself. When it comes specifically to architecture, however, sketches can also extend the possibilities of paintings. In a painting, there is always color, while the sketch is usually made with a single color. This allows the architect to explore pure formal relationships between objects or parts of a building, as in the case of the church of Sao Francisco de Assis. Just like an architectural painting, a sketch can also be used as representative for a project, as Norman Foster's sketches, but they also allow the architect to explore the technical and structural aspects of the project. Based on the analysis of Lele's sketches, it can be concluded that it is much easier to represent, as a communicational tool, how a specific building system works, i.e. ventilation, what the construction technique is or how the building structure is dimension with a sketch than a painting. The reason for this is that these types of sketches are much more straightforward and diagrammatic, more rational than abstract.



Images 119: Sketches for the TCU Headquarters. Source: Risselada, M. and Latorraca, G. 2010, Lele's Architecture: Factory and Invention

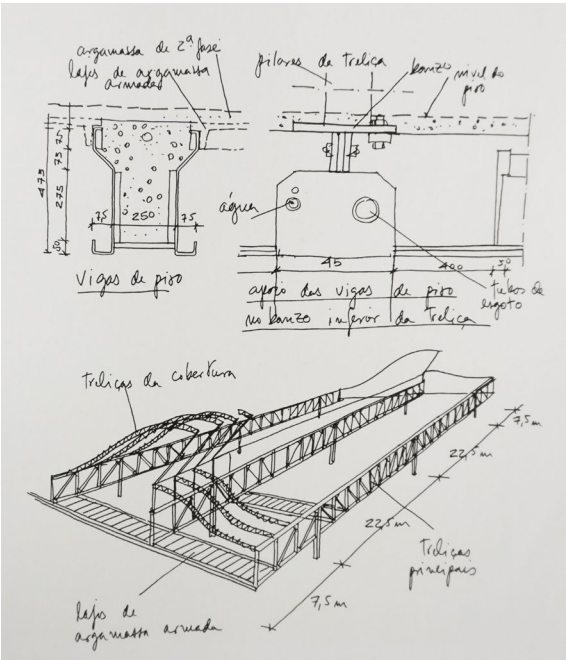


Image 120: Sketches Darcy Ribeiro Memorial project. Source: Risselada, M. and Latorraca, G. 2010, Lele's Architecture: Factory and Invention

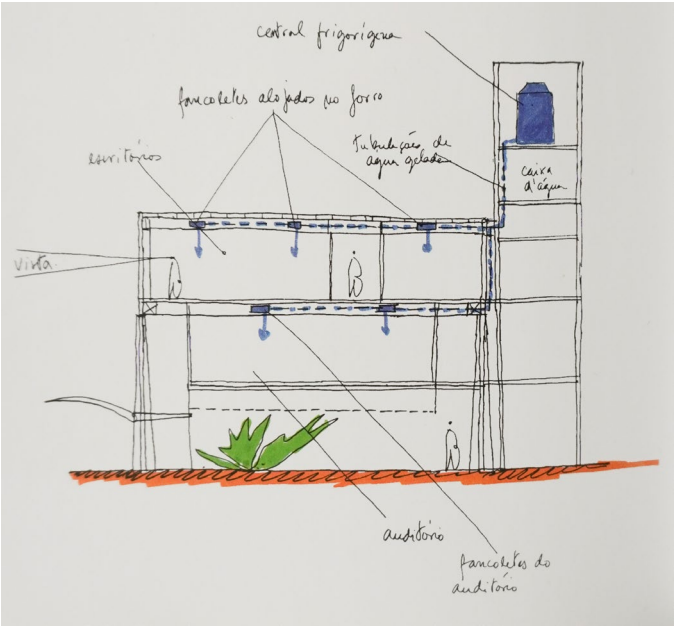


Image 121: Sketch of the fire extinguishing system for the JSN Residence. Source: Risselada, M. and Latorraca, G. 2010, Lele's Architecture: Factory and Invention

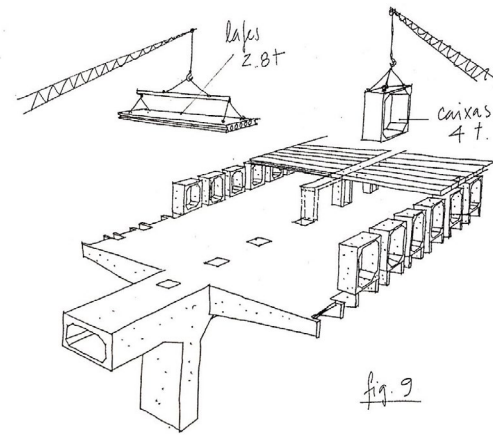


Image 122: Sketches for the House for Brazil's Minister. Source: ArchDaily.

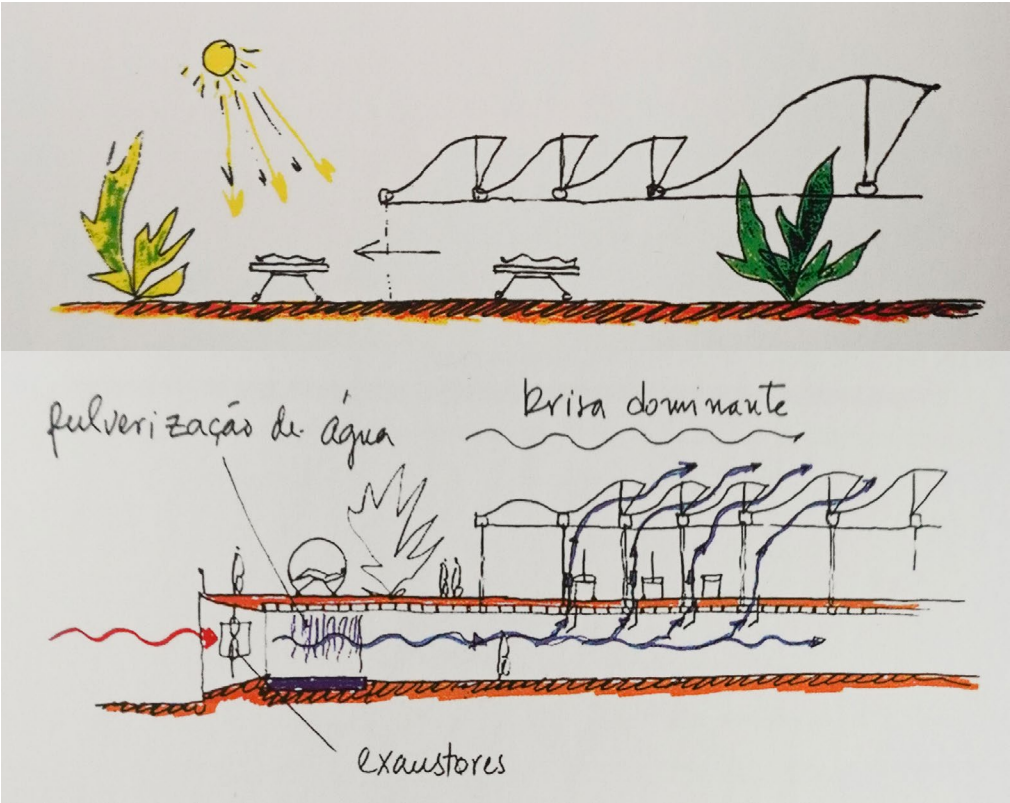


Image 123: Sketches of the natural daylighting and natural ventilation for the hospital Sarah. Source: Risselada, M. and Latorraca, G. 2010, Lele's Architecture: Factory and Invention

4.7. Ellsworth Kelly

Introduction

Ellsworth Kelly's is known for his large format paintings in clear shape and colors. He created monochrome and multi-panel paintings using simple forms and shapes, devoting himself to the use of chance and seriality. Kelly had an utterly unique approach to abstraction, grounded in particulars rather than universals. According to Kelly (Paik, 2015):

‘Making art has first of all to do with honesty. My first lesson was to see objectively, to erase all ‘meaning’ of the thing seen. Then only, could the real meaning of it be understood and felt.’

By understanding Ellsworth Kelly's creative process, where he draws inspiration from, how he makes these works of art and what the role of abstraction is in this process, it will help better understand the creative design process of the architects who use painting as a design tool.

Kelly's artistic inspiration

Early in his career, he realized he was not interested in figurative painting and 20th-century abstract art because they didn't provide him the solutions to his own problems. Kelly wanted to create art works that were not too personal and not as man-oriented as art has been since the Renaissance. He was more attracted in the physical world around him, such as the stonework of old buildings and bridges, and preferred to study and be influenced by it rather than by contemporary art. These real forms seemed to him "more valid and instructive and a more voluptuous experience than either geometric or action painting" (Paik, 2015). Therefore, instead of making pictures as interpretations of a thing seen, or a picture of invented content, he found an object and presented it as itself alone. The first object that inspired him in such a way was a window. While walking in the Musee National D'art Moderne, he was drawn more to the elegant, elongated windows in between the small paintings rather than the art itself. Back in his studio, he created some drawings, analyzing the proportions and the color scheme. Eventually, from these studies he developed his first 'object' - Window, Museum of Modern Art, Paris (Image 124). Since then his works were objects, unsigned, anonymous.

Everything he looked at and everything he saw became an inspiration, something that can be the starting point for a new art piece. However, it had to be exactly as it was - without anything added or removed from it. This gave him freedom because the subject was already there, he didn't have to compose, and as the object was already there, he could take from anything. Whether it was a paper cup, part of a column, a lake, or a shadow casted on a staircase, it did not matter because it was all the same - it could all become a starting point.

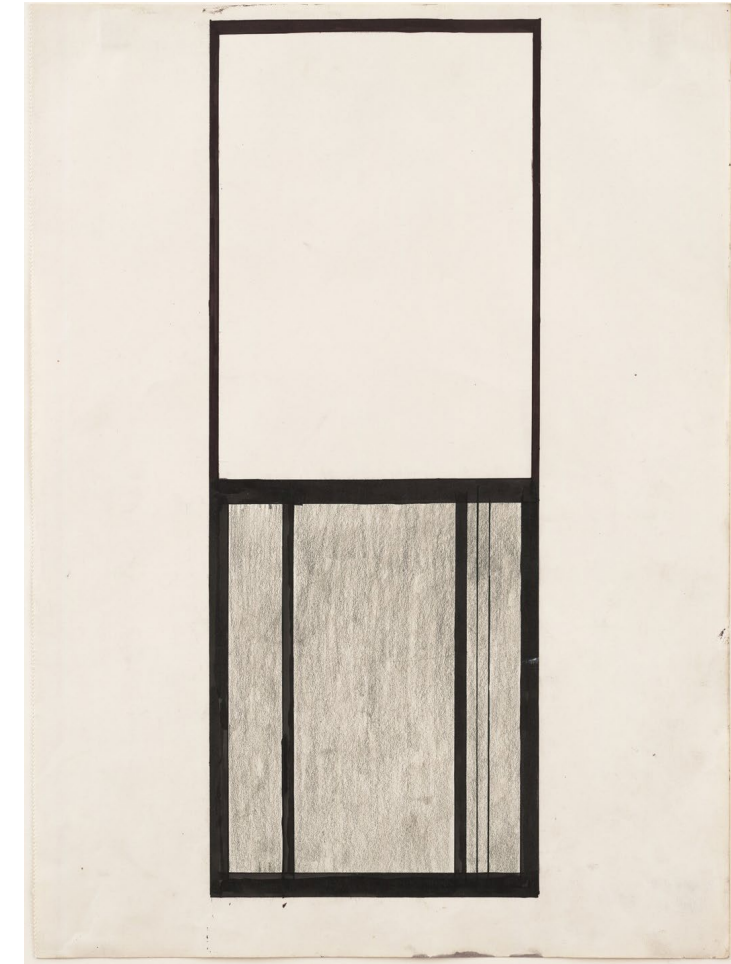


Image 124: Window, Museum of Modern Art, Paris.
Source: Museum of Modern Art (MoMA)



Image 125: White Plaque: Bridge Arch and Reflection.
Source: Museum of Modern Art (MoMA)

Kelly's creative process

Kelly usually started working on his paintings from things that he saw, whether they're man-made or natural or a combination of the two. He was rather interested in the interplay between light and shadow, between the masses of the objects and the open voids than in the textures and the exact looks of the objects and the surrounding environment. Sketching played a central role in this process, as this was the tool he used to anchor his work in observed reality. Kelly used sketches not only to analyze the world surrounding him but also to make preliminary studies for his paintings and the compositions of his multi-panel configurations (Images 127, 128).

Kelly was particularly interested in flatness and therefore, he intentionally chose not to render the volumetric space of and around the objects that inspired him. In other words, as he would explain it, he just takes the space out. This is visible in his work *White Plaque: bridge Arch and Reflection* (Image 125). For this painting he firstly condensed the volume of the negative space under the bridge, then he made a distinction between the waterline and the reflection, isolated the three elements and then brought them back together unifying and flattening them out on the canvas. This approach towards flatness can be also found in his plant drawings. Plants and leaf forms, in contrast to the human body for example, were easier to be flattened. His plant drawings were simply observations of the forms of the leaves or flowers without any shading or surface markings added. Therefore, they are not an approximation of the thing seen nor are they a personal expression or an abstraction, rather an impersonal observation of the form. Already embodying the ideas of flatness and impersonality, Kelly's plant drawings can be considered as finished works, as they are not created from earlier sketches and they are not conceived as studies for works in other media. The waterlily (Image 126) is a good example for such a drawing, being one of Kelly's most successful drawings - the composition is in balance, it very well replicates the subject and at the same time was made within a minute without any prior sketches (Upright, 1987).

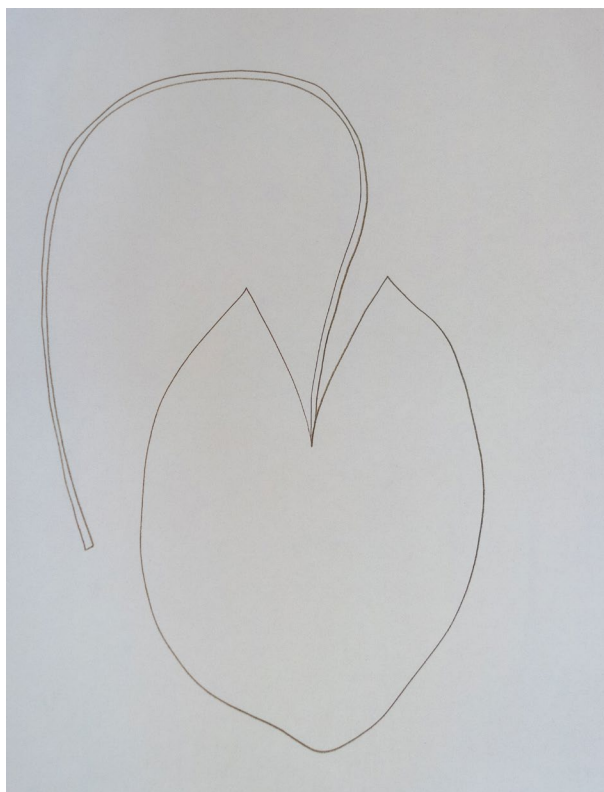


Image 126: The waterlily.
Source: Upright, D. (1987). Ellsworth Kelly: Works on Paper. Harry N Abrams Inc.

Another case that clearly shows the initial phases of his creative process are the study for the *Atlantic* painting (Image 127). The inspiration for this painting came while riding a bus. He read a book which was on his lap and he noticed how the paperback pages became a receptive surface for the changing light streaming through the bus window. That's when he started to sketch the outlines of these shapes, trying to capture the ever-changing patterns of black and white forming on the printed paper. Then when he got to his studio, he transferred these sketches onto a bigger surface and continued his exploration working in a more abstract way 'translating' the observed, rather than representing it. This can also be observed in the studies for "*Lake*" (Image 128) that show both his translation from his inspiration of nature to geometric purity through abstraction and synthesis. Kelly started making the first sketches for these studies while on a hill and observing a lake and he translated the complicated three dimensional shape of the lake to a flat simple geometry. The next step of the 'translation' process is to refine the composition and define the colors for the painting. The Study for "*Red Panel*" (Image 129) discloses his careful choice of composition, by revealing the exact angles for his shapes and the calculations necessary to fabricate a stretcher for one of Kelly's paintings. The shapes, patterns and forms of his paintings are so simple and minimalistic that the painting derives its strength as much from the impact of color as from the tensions of its dynamic but yet balanced geometry. Based on many drawings and iterations, Kelly reaches a point at which he is satisfied with the refined shape. Only then Kelly starts calculating the exact dimensions of the stretcher and the placement of the hanging hooks and bar that keep the shape suspended on the wall precisely at his desired angle.

Another method that Kelly used to create studies for his paintings were collages. He initially starts with a pencil study which is closer to the original object than the final painting. The collage, on the other hand, moves further from nature in favor of a pattern of shapes, introducing color to the composition and starting to represent the actual object in an abstract way. This can be observed in his works for colors on a wall (Images 130 and 131). Whenever he starts to like the composition and the chosen colors, he starts making the painting. And most of the time, there are still adjustments made while making the painting, as through the painting process Kelly finds the exact color, works the exact form and by playing with the painting, it adjusts itself (Upright, 1987). The way in which Kelly perceived the world around him and the objects from which he drew inspiration can also be observed in his photographs. However, in relation to his creative process, these were not used as inspirations for his projects, in other words the paintings were not made from the photographs. These photographs were usually made as documentation of his inspirations.



Image 127: Study for Atlantic.
Source: Paik, T.Y. (2015). Ellsworth Kelly. Phaidon Press.

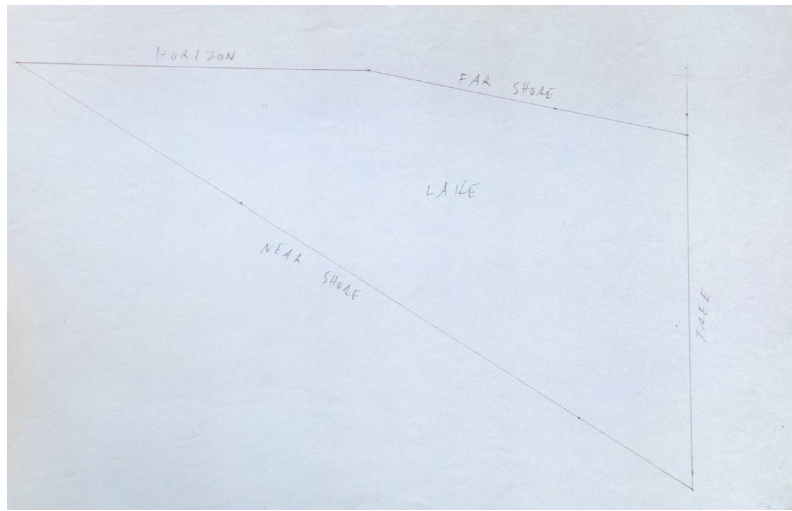


Image 128: Studies for "Lake".
Source: Upright, D. (1987). Ellsworth Kelly: Works on Paper. Harry N Abrams Inc.

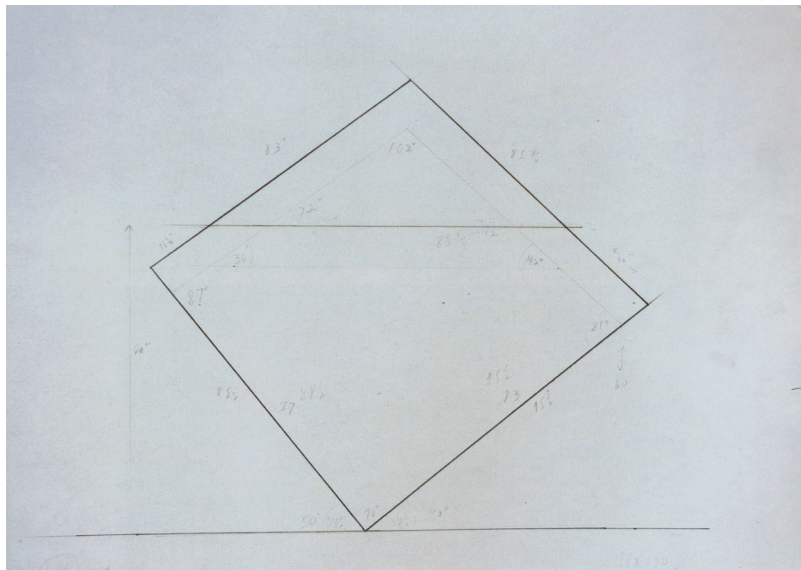


Image 129: Study for "Red Panel".
Source: Upright, D. (1987). Ellsworth Kelly: Works on Paper. Harry N Abrams Inc.

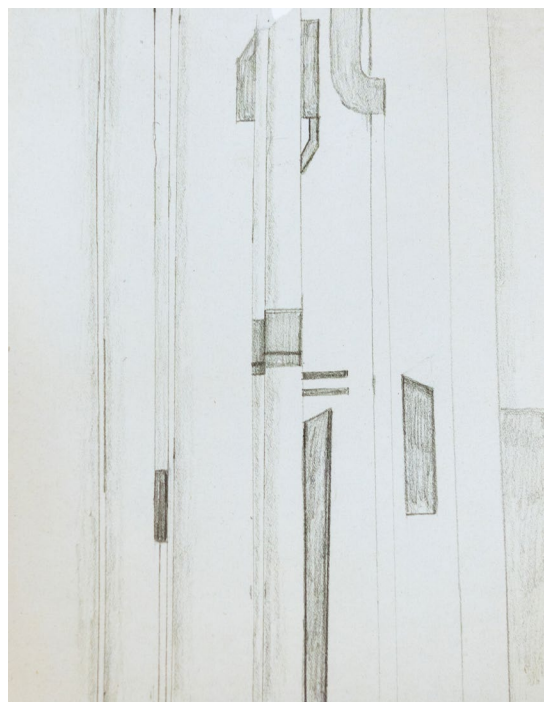


Image 130: Wall with pipes. Source: Upright, D. (1987). Ellsworth Kelly: Works on Paper. Harry N Abrams Inc.

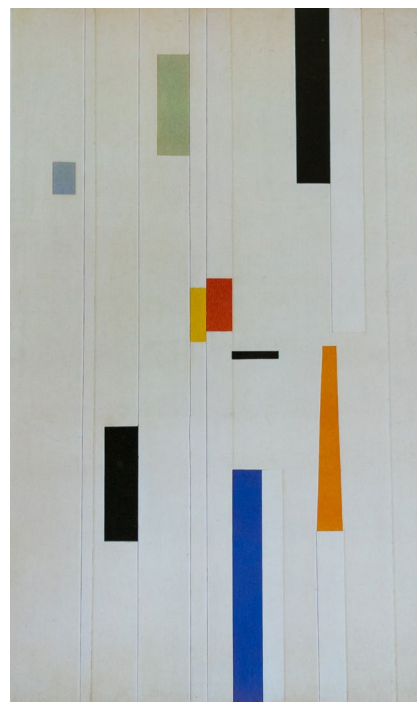


Image 131: Colors on a wall. Source: Upright, D. (1987). Ellsworth Kelly: Works on Paper. Harry N Abrams Inc.

The role of abstraction in Kelly's creative process

As already explained, Kelly takes the shapes out of their original surroundings, he isolates them and then renders, i.e. transforms, them unrecognizable, distanced from their original contexts. As he explained in 1991, "Since birth we get accustomed to seeing and thinking at the same time. But I think that if you can turn off the mind and look at things only with your eyes, ultimately everything becomes abstract" (Paik, 2015). So Kelly still focused on what he saw in the world but he discovered a way to translate these existing sources of inspiration into paintings, i.e. painted objects, that still drew from reality but in the end became abstractions. Constructed works such as *White Plaque(...)*, *Window Museum of Modern Art, Paris (...)*, and *Relief with Blue (...)* are derived from the real that appear abstract. In these works the central elements are distanced from their original contexts by fragmenting and isolating the forms and then reinstated back into the world as an painted, abstract object.

Abstraction suggests an economy of forms or a process of conceptualization. Through abstraction, Kelly manages to translate an object into a simple, minimalistic shape which then doesn't become a representation of the object, rather simply the shape itself. In this way, abstraction allows him to embody his philosophical view in his artworks, namely to live in the present. Although Kelly is not an artist who buttresses his work with theory or ideology or who writes manifestos, his work carries a lot of meaning. By looking at Kelly's paintings, one could start seeking different interpretations or looking for what Kelly tried to depict but what his paintings actually are, are what one can see in the moment, only when looking at the paintings with the mind 'turned off' and without bringing any meaning to the painted object. *Spectrum IX (...)*, for example, is simply a presentation of colors. As Kelly would describe his abstract artworks - they are nothing more, nothing less than one could see.

Therefore, abstraction is not relevant for the interpretation of his final artworks, rather for his creative process where the stylization of the everyday object, the translation from the complexity of reality to the simplicity of a single geometric shape happens. All in all, his paintings are so simple and minimalistic but yet so complex to understand precisely because of their simplicity.

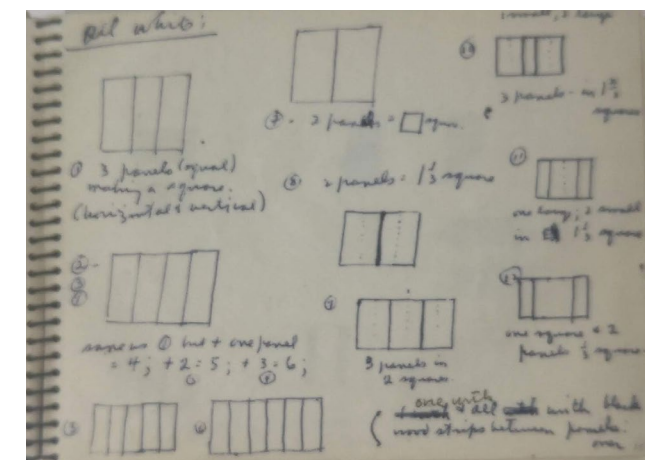


Image 132: Sketches for white panels, ink on paper. Source: Paik, T.Y. (2015). Ellsworth Kelly. Phaidon Press.

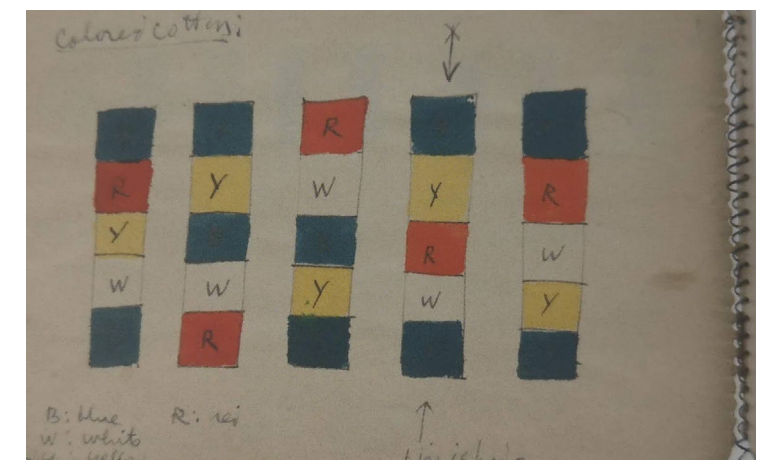


Image 133: Study for Red Yellow Blue White (from sketchbook 18), 1952. Source: Paik, T.Y. (2015). Ellsworth Kelly. Phaidon Press.

Conclusion

The analysis of Ellsworth Kelly's paintings reveals not only his creative process but also the crucial role of abstraction in this process. Inspired by the world surrounding him, Kelly takes an object and through abstraction translates and distills it to a simple geometric form. To understand his paintings, one has "to see objectively, to erase all 'meaning' of the thing seen. Then only, could the real meaning of the painting be understood and felt" (Paik, 2015). Thus abstraction plays a central role in the creative process itself, in the translation from reality to painting and not in the understanding of the painting itself. Very similar is the role of abstraction in the creative design process of architects where the inspiration is 'translated' to architectural form through abstraction and abstraction drives the process forward and stimulates the creativity of the creator.

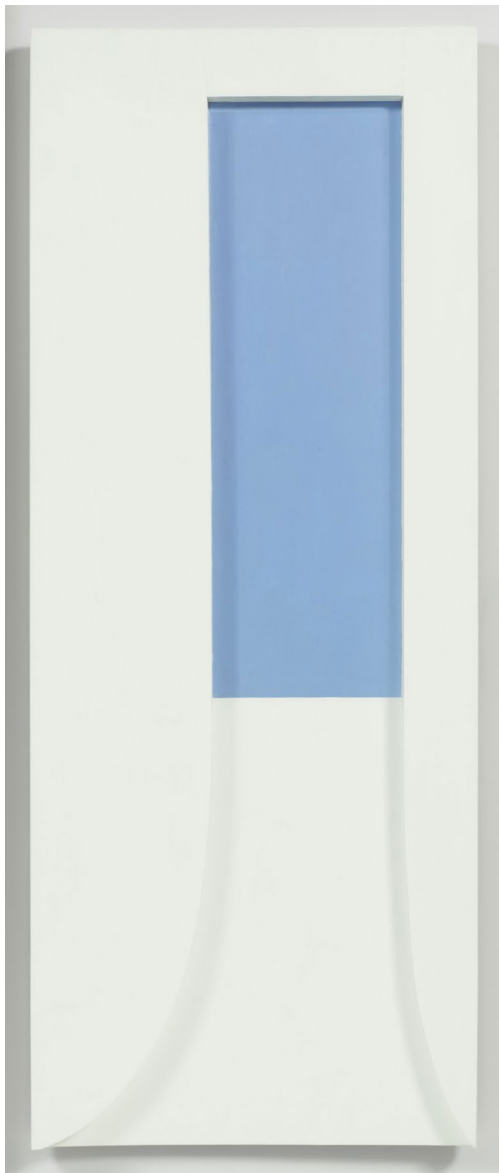


Image 134: Relief with blue. Source: Museum of Modern Art (MoMA)



Image 135: Spectrum IX. Source: Museum of Modern Art (MoMA)

5. Discussion

This research goes very much in depth into the different ways in which painting can be used as a design tool and incorporated into the creative process of architectural practitioners. To fully understand the creative process of each of the analyzed architects, however, should be examined all the tools from their arsenal. Focusing only on paintings as a design tool is one of the limits of the research. Similarly to luthiers who were trying to recreate a Stradivari but weren't able to do so because they were not involved in the workshop of the craftsman (Sennett, 2009), not being involved in and not analyzing the whole design process of these architects makes it limiting for the research to trace back the step-by-step process and to assess whether the paintings were the decisive element based on which the design has been developed or there were also models and other methods used to come to develop the architectural projects. Moreover, to clearly see how the architectural paintings are developed throughout the design process and what their influence is on the design of the building, it would be useful to make a detailed analysis of all the sketches, drawings and paintings made for a single project and through them analyze the creative thought process of the architect who uses painting as a tool.

| Name | Abstraction | Dynamism | Fragmentation | Fluidity | Explosion | Floatation | Formal reduction | Translation | Inspiration | Exploration | Analysis | Synthesis | Atmosphere |
|-------------------------|-------------|----------|---------------|----------|-----------|------------|------------------|-------------|-------------|-------------|----------|-----------|------------|
| Zaha Hadid | X | X | X | X | X | X | X | X | | X | X | | |
| Alvar Aalto | X | | | X | | X | X | X | X | | X | | X |
| Pezo von Ellrichshausen | X | | X | | | X | X | | | X | X | X | X |
| Santiago Calatrava | X | | X | X | | | X | X | | X | X | X | X |
| Steven Holl | X | X | | X | | | X | X | X | X | X | | |
| Ellsworth Kelly | X | | X | X | | X | X | X | | X | X | X | |

6. Conclusion

Architectural paintings are made by architects during the design process with a specific intention in mind. Based on the analysis of the architectural paintings and drawings in this research can be clearly defined 13 categories: abstraction, dynamism, fragmentation, fluidity, explosion, flotation, formal reduction, translation, analysis, inspiration, exploration, synthesis, and atmosphere. A definition for each of these categories is given in the appendix (p. 77). These categories help define, on one hand, the methods used by the architects to depict their ideas and, on the other hand, pinpoint the purpose of making the architectural paintings. Based on the categories for the purpose of making the paintings can be defined the following method: Inspiration - Translation - Exploration - Analysis. There are two ways in which the creative process can start, i.e. from where the inspiration can come from - to study and get inspired by the surrounding environment (Images 142-147) or by making inspirational paintings, in other words paintings created with the aim to stimulate creativity and eventually spark an idea that can be translated to an architectural object (Images 136-141). In the latter, the inspiration comes from within - the architect gets inspired from the inspirational paintings themselves, and this approach is used by Zaha Hadid, Alvar Aalto and Steven Holl. After the idea is found it is then translated to an architectural object. In the other case, when the architect gets inspired from the surrounding environment, then they usually analyze the environment through sketches, drawings and paintings, synthesize the core elements of the studied objects and then translate it to an architectural object. This is an approach used by architects such as Calatrava but also artists like Ellsworth Kelly. No matter which initial approach the architect uses, the following steps of the design process are similar. The initial architectural object is further developed through explorational paintings that explore different forms, ratios etc. In the later design phases are used analytical drawings and paintings to analyze the more technical aspects of the project.

In table 2 (p. 69) are brought together the categories that each of the analyzed architects uses in their design process to make paintings. Based on the table can be concluded that there are two methodological categories used by all architects - abstraction and formal reduction - and two categories for the purpose of the painting used by the majority of them - exploration and analysis. The latter findings overlap with the common workflow that has been defined. Abstraction and formal reduction, on the other hand, are representative for the way in which the architectural paintings are made. The architectural paintings are mostly abstract because they do not attempt to represent an accurate depiction of a visual reality but instead use shapes, colors, forms and gestural marks to achieve their effect and carry the main ideas of the project. By keeping the paintings abstract, i.e. by not making concrete and precise representations, the architects also stimulate their creativity and keep their minds open for further possibilities that can spark a new idea that can drive the project forward. In other words, abstraction gives freedom for creation and exploration and it has the ability to inspire our curiosity and broaden the horizons of our imagination. Formal reduction is also part of this abstract nature of the architectural paintings because by reducing the objects only to their core elements, the architects keep the paintings open for new interpretations. Through abstraction in paintings, architects also 'translate' and interpret reality. This type of abstraction, however, is not the same as the level of abstraction in abstract art where the artist has the freedom to intuitively paint their imagination beyond our comprehension, emotions, and understanding of the physical world, while the viewer can interpret what they see based on the emotions that were evoked by seeing the art. Abstraction in architectural paintings is more related to abstraction in the process of making the painting because as it has been mentioned, architectural paintings are not made purely for the effect they create, rather as representations and explorations. Even though

some architectural paintings are less abstract than others, the painting process of translation and interpretation incorporates abstraction within itself.

Timothy Hawkesworth's (Nimmer, 2019) explanation of abstraction summarizes how abstraction influences the creative process:

“For me ‘abstraction’ [...] is a crucial integral connector to the vitality of painting. What is extraordinary for me is that as I go out past what I know—past where I am controlling what I do—to find coherency and form. Contact with this wordless coherency, the gift of form is a profound homecoming.”

The goal of incorporating painting as a design tool from the early stages of the architectural design process is to stimulate creativity, imagination and innovation. By starting to directly work on architectural plans or volumetric studies, either in a digital or analog way, it is much more difficult to tackle the complexity of the architectural projects, as discussed earlier in the research, because the architect is limited by the tool as the representation is too literal and does not allow for multiple interpretations. Furthermore, when using time-consuming techniques, such as painting, the level of consciousness in the elements of a building and its representation increases and in this way the production does not go ahead of the mental processing which is often the case with digital technologies. All architects, discussed in this research, start their projects by making rather abstract drawings and paintings and after they come up with a 'solid foundation', also starting point for the project or guiding story of the project, they start developing the architectural object. Even then, in the later design phases, for many architects, such as Steven Holl, Aalto and Foster, drawings and paintings play a central role, as they are also used for exploration and to find solutions to technical challenges. To understand the importance of using paintings and drawings as integral part of the design process is especially important nowadays, when the digital tools play a central role in the architectural process. For the architects, discussed in this research, the digital tool is only used to translate the paintings, drawings and models to a precise model of the building (nowadays also called 'digital twin') based on which the building is going to be constructed but not for inspiration and exploration which is usually the case nowadays.

All in all, as shown in this research, there are many ways in which painting can be used as a tool within the architectural design process and there isn't a single methodology that can be defined. Everyone should find their own way of incorporating this tool in their own design process. Moreover, the majority of the analyzed architects paint and draw daily, meaning that they not only constantly improve their painting and drawing skills and stimulate their imagination and creativity but also that each of them found a way to incorporate painting as a tool within their design process throughout the many years of working with this tool. One thing is for sure, however - painting can be used as a tool within the architectural design process to stimulate creativity and imagination and to allow the architect to explore the multidimensionality of architecture.

Hunters Point Library by Steven Holl - starting with an inspirational painting

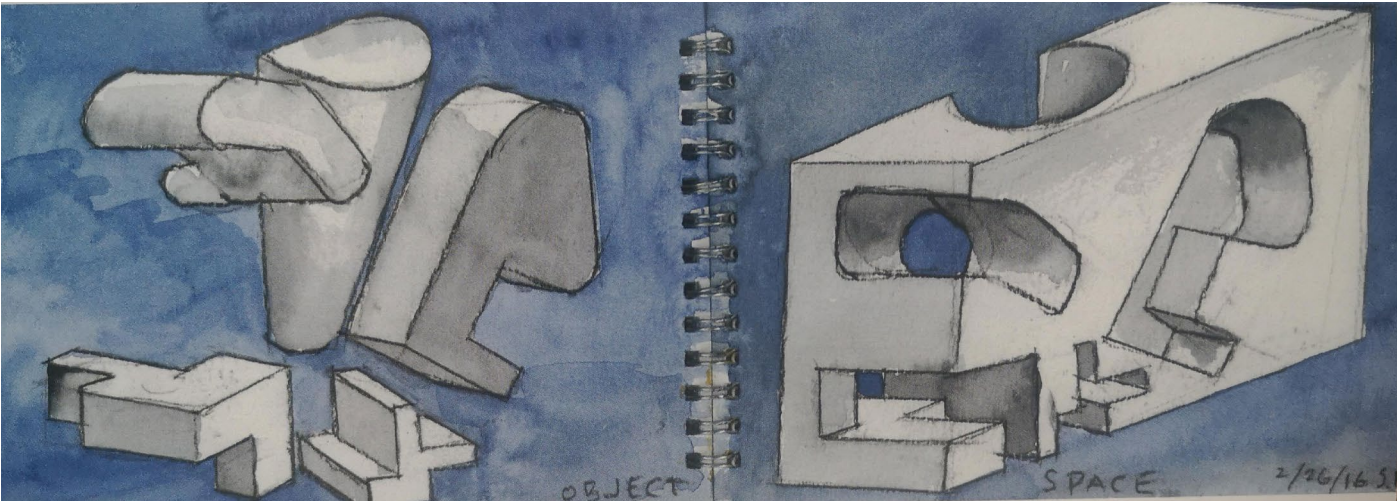


Image 136: Initial inspiration - abstract geometric forms; study of volumes and voids

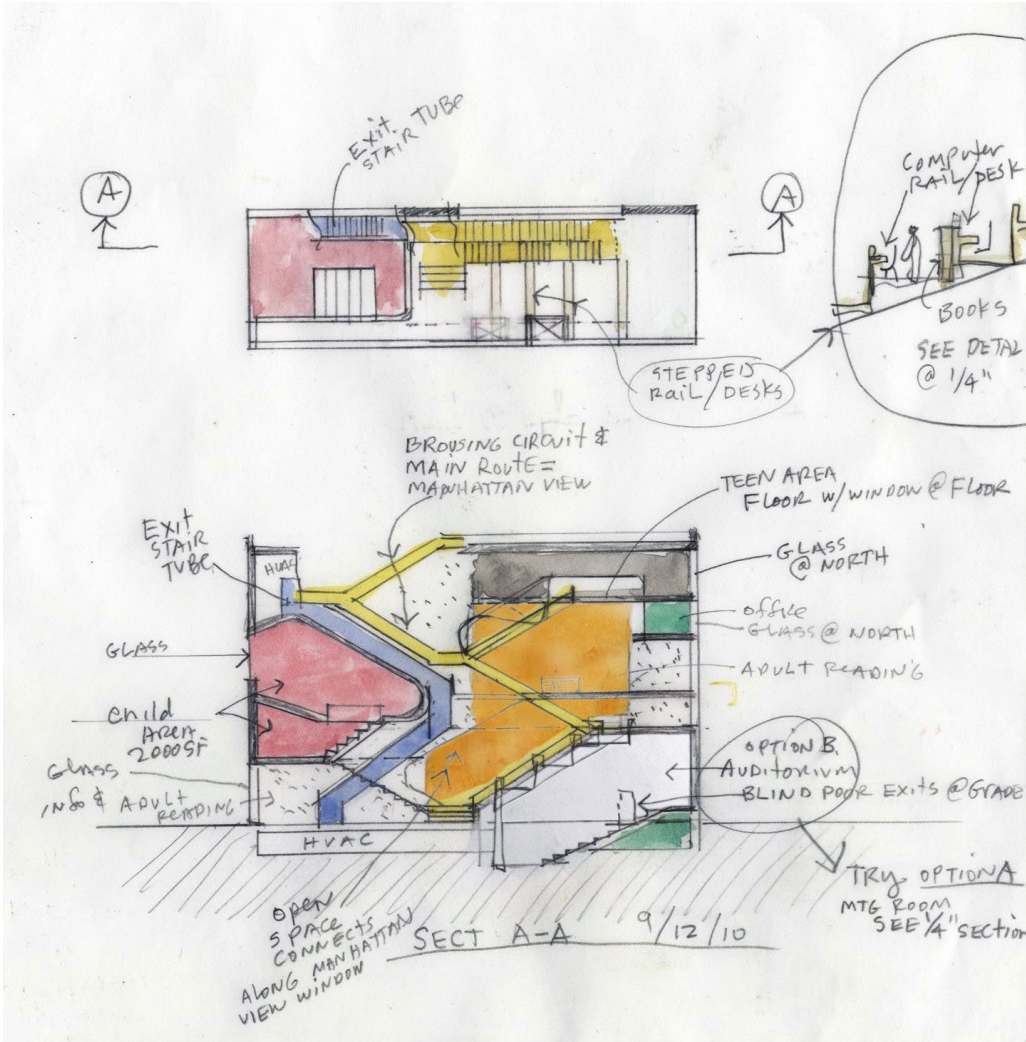


Image 140: Analytical drawings - function and routing

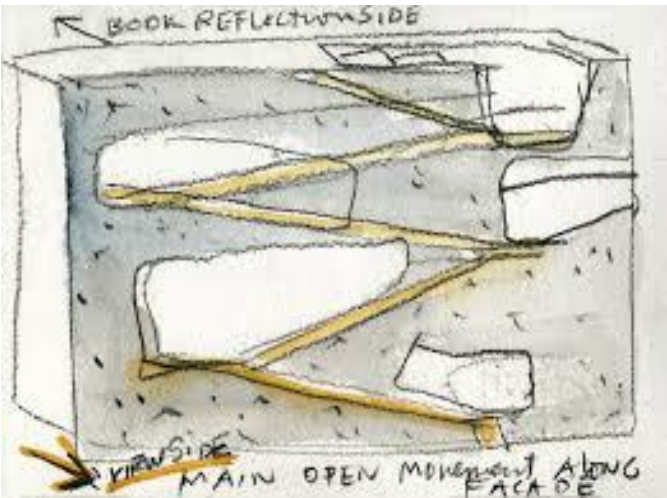


Image 137: Explorational drawing - routing and facade

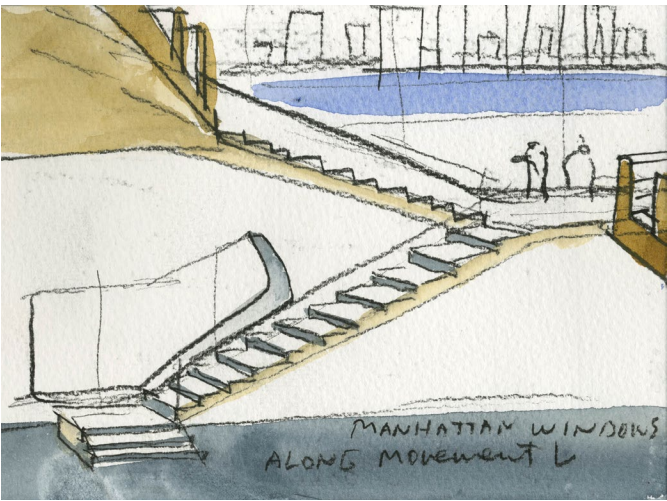


Image 138: Interior sketch - inside - outside connection

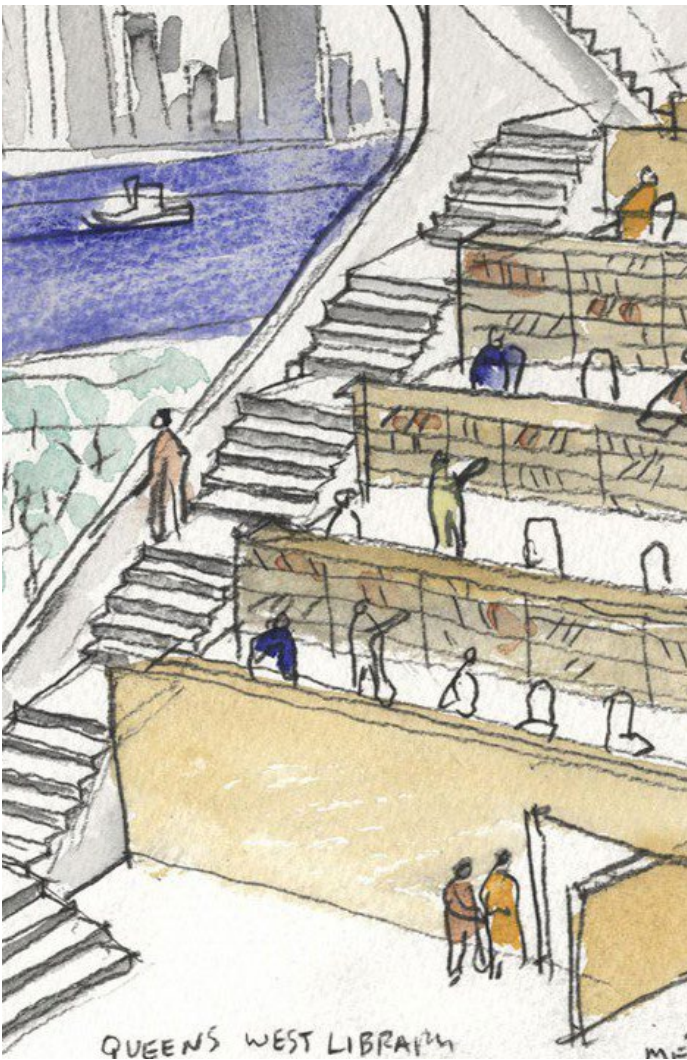


Image 139: Atmospheric drawing - interior

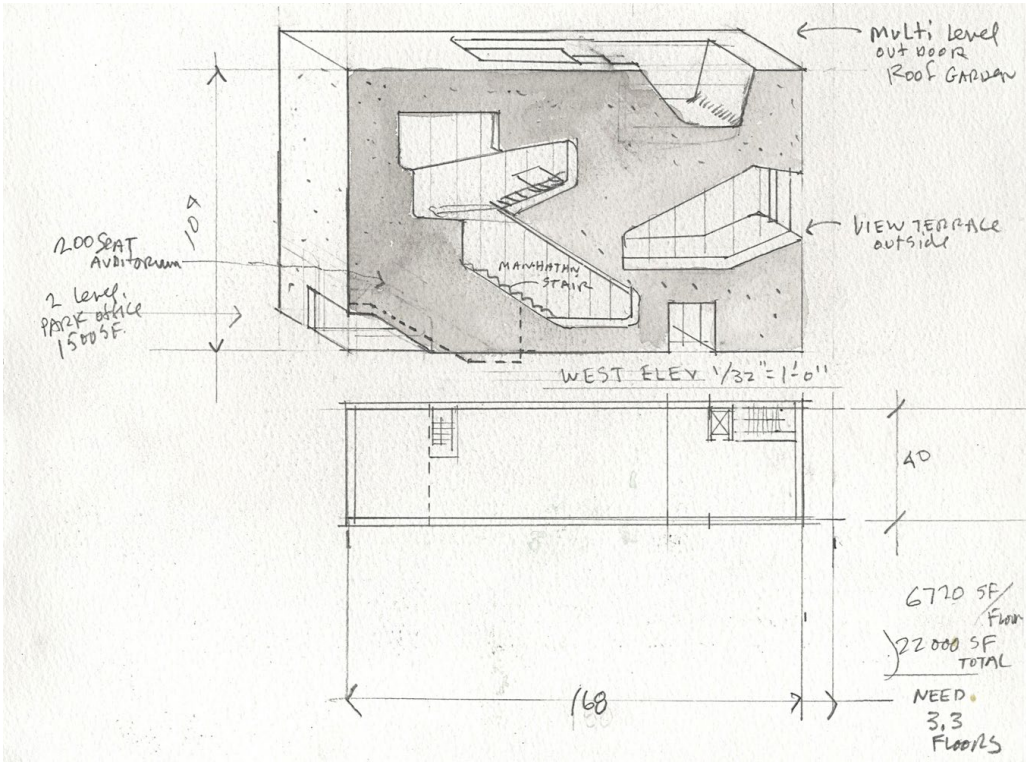


Image 141: Analytical drawings - facade

Dubai Creek Tower by Santiago Calatrava - inspired by the surrounding environment



Image 142: Initial inspiration - closed lily bud

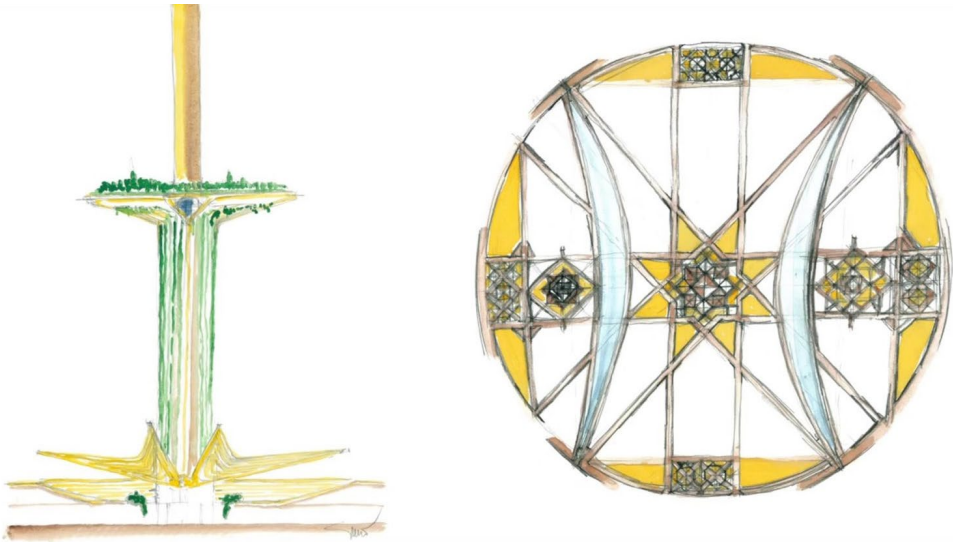


Image 143: Preliminary design idea and inspiration for the floor plan (based on typical cultural patterns)

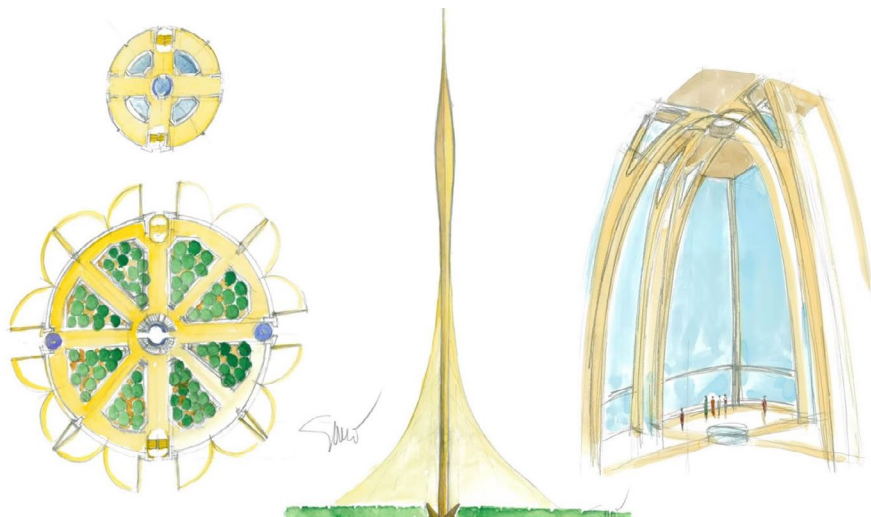


Image 144: 'Translated' floor plan from the initial inspiration; used as an initial floor plan design

Source of all images on this page: Calatrava & de Albornoz, 2018

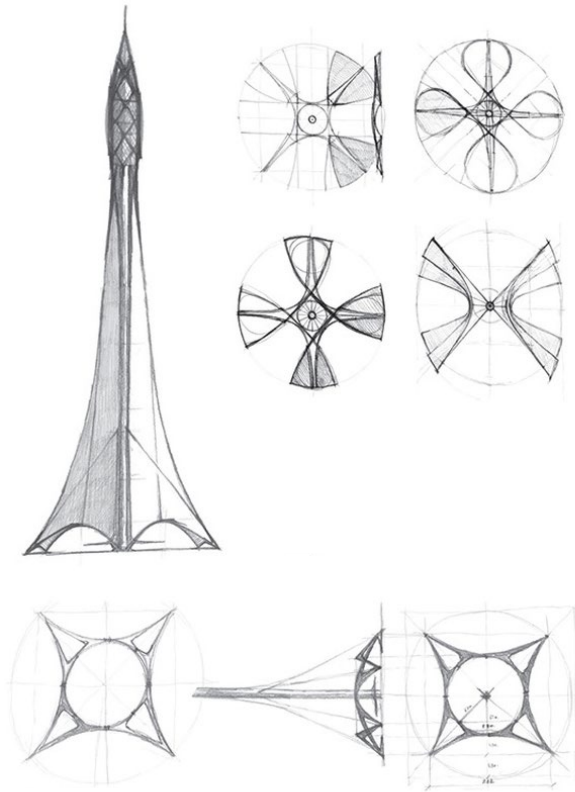


Image 145: Explorational sketches for the floor plan and section

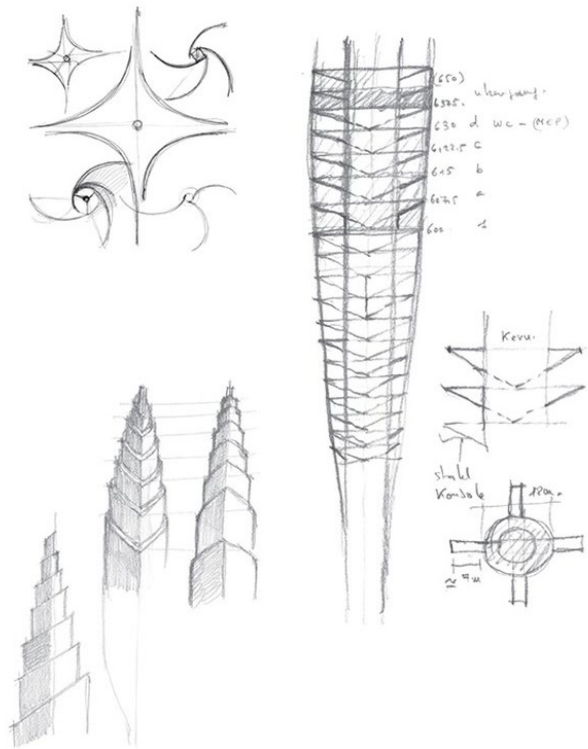


Image 146: Analytical sketches for the floor heights

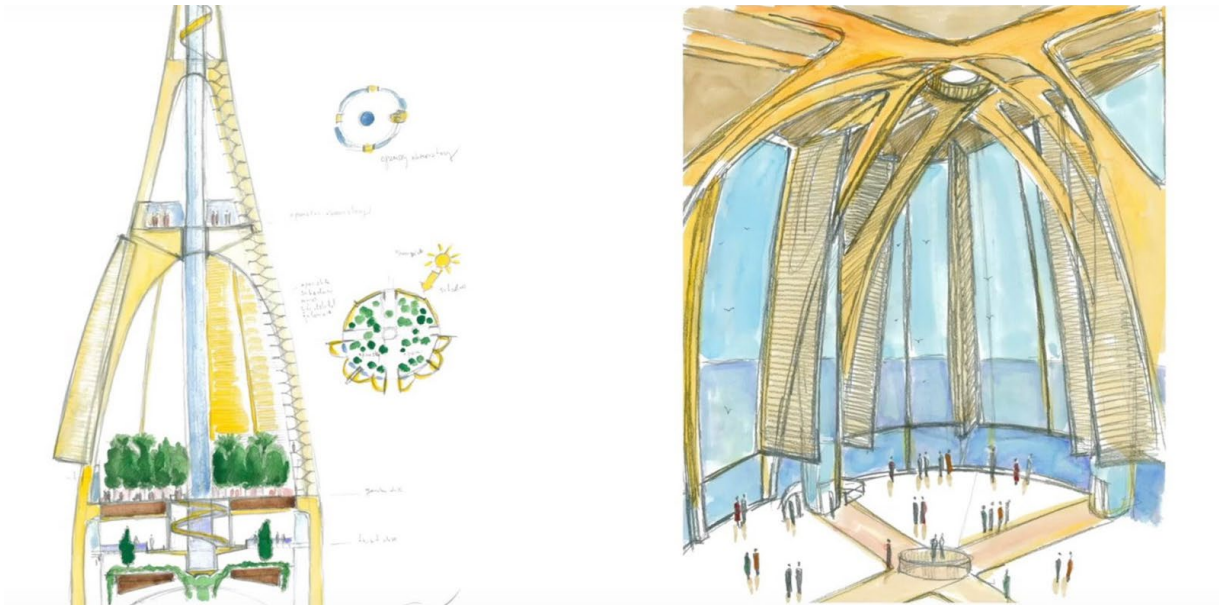


Image 147: Detailed explanatory sketches of the top part of the building; used as basis to be then 'digitally supercharged'

Source of all images on this page: Calatrava & de Albornoz, 2018

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Appendix

Definition of terms:

M - method ; P - purpose

- Abstraction (M) - paintings that do not attempt to represent an accurate depiction of a visual reality but instead use shapes, colours, forms and gestural marks to achieve their effect and carry the main ideas of the artist/architect
- Dynamism (M) - representing constant change and motion of elements and spaces
- Fragmentation (M) - deconstructing elements and representing them as fragments
- Fluidity (M) - seamlessly connecting elements with each other
- Explosion (M) - collision of spaces, resulting in fragmentation of inner elements
- Floatation (M)- Spaces and elements float in and out of each other
- Formal reduction (M) - the process of reducing an object only to its core elements (primarily a visual reduction)
- Translation (P) - the transformation of an element, e.g. from abstraction, to something different carrying a different meaning, e.g. architectural idea
- Inspiration (P) - drawings created without any prior idea in mind, created with the aim to stimulate creativity and eventually spark an idea that can be translated to architecture
- Exploration (P) - drawings created with the aim to explore different variations (rather creative/artistic)
- Analysis (P) - examination of the elements or structure of something (rather technical)
- Synthesis (P) - the process of reducing an object only to its core elements that carry the main ideas
- Atmosphere (P) - paintings depicting the desired atmosphere in the space

