Conceptual Frameworks in Design Representation: Hierarchies and Networks

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Abstract

Conceptual Frameworks in Design Representation: Hierarchies and Networks

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This thesis shows how architectural concepts of hierarchy and network structure complex systems of representation. These two modes of conceptualization may seem oppositional, but they are in constant conversation with each other. Hierarchical frameworks describe very controlled sets of relationships, whether they be static loads or spatial boundaries. Networks are more malleable and resilient and are useful for modeling human activity, movement and other dynamic relationships. Architecture is for people and people need both structure and flexibility, rules and play. It is from the dialogue between these two modes in architectural design that a spatial concept— a thesis that drives and organizes a design— emerges. With a clear conceptual structure designers have a better understanding of the relationships and relative importance of various aspects of a spatial composition. Without that understanding designers can easily lose sight of the idea that organizes and holds a project together. This masters thesis explains the roles that hierarchical and network thinking play within architectural representation and how they can help designers develop the relationships and relative importance of design elements through representation. Since architectural design is fundamentally the composition, integration and division of complex systems that organize the built environment, how we think about these spatial relationships is essential. A more intentional use of these conceptual frameworks will improve architectural education and architectural practice by giving designers better tools to think about the underlying conceptual systems shaping their designs.

Conceptual Frameworks in Design Representation: Hierarchies and Networks

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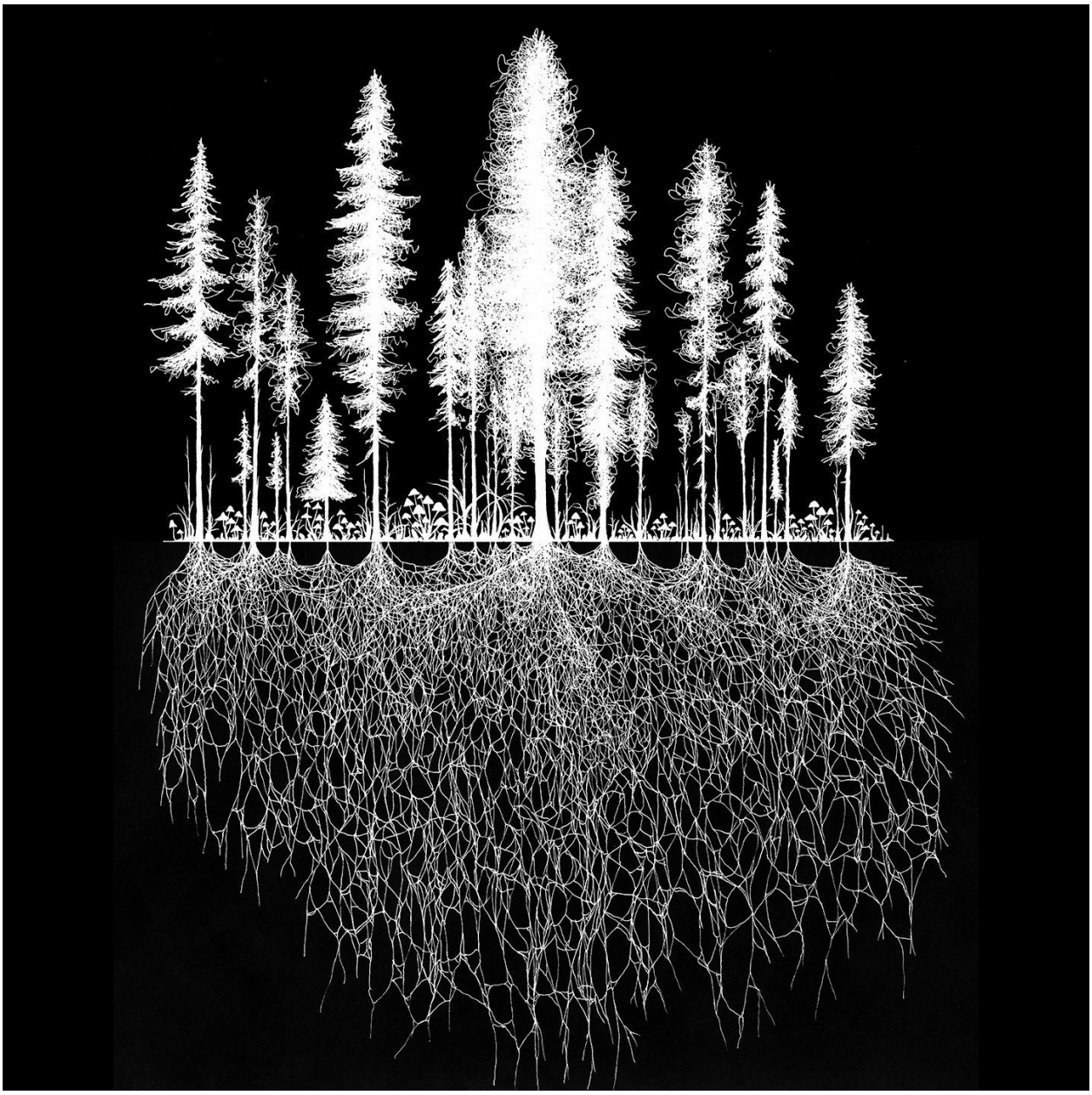


(Figure 1) FOREST by Katie Holten,2019. Shows a forest as individual trees and branches and a network of interrelated systems.

Introduction: (Networks and hierarchies) integration and division of spatial systems

My investigation into the conceptual frameworks of hierarchy and network was inspired by my experience teaching an introduction to architectural representation course. In conversations with students, I found myself constantly telling them to develop their line hierarchy, clarify their conceptual hierarchy, understand their structural hierarchy, etc… These conversations inspired

me to reflect on my own architectural education and the role that hierarchy plays in design representation.

I began by expanding beyond architecture and comparing the use of hierarchy in the representation of architectural space, ecological systems and the organization of knowledge. I found that not only did these three fields rely heavily on the conceptual framework of hierarchy, but also on networks.

This thesis compares conceptual organizations of architectural representation and ecological systems. By investigating the framework these disciplines use to conceptualize integration, division, and the relative importance of components in complex systems, designers will develop better tools for organizing their thinking. This will improve their ability to use current representational tools and improve their ability to make decisions with new methods of representation.

A concept is a thesis that drives and organizes a design. Within any design process, it is essential to understand the central concept and to understand the relative importance of that concept within the context of the project. With a clear conceptual structure designers have a better understanding of the relative importance of various aspects of a concept. Without that understanding designers can easily lose sight of the idea that organizes and holds their project together. A concept is an abstract idea or general notion. It is a mental construct that represents a class of objects or events. Concepts are formed by grouping together objects, actions or events that share common features. For example, the concept of "chair" represents all the different types of chairs that exist in the world. It includes things like wooden chairs, metal chairs, plastic chairs, and so on. The concept of "chair" allows us to understand what all these different objects have in common, even though they may look different. Concepts are important because they allow us to think about and talk about things that are not present. For example, if you are talking to someone about a chair, you can use the word "chair" to refer to any type of chair, even if the chair is not actually present. This thesis explores how designers understand the structure of a concept and how the relative importance of the components of that concept are.

By illustrating the use of these conceptual frameworks, the thesis shows how interrelated components of systems are dependent on one another and built upon or within each other. By developing this system of conceptual frameworks, the thesis describes the role that hierarchical and network thinking play within architectural representation and how designers conceptualize design systems through representation using these frameworks

Ecology is the study of the relationships between living organisms and their environment. It focuses on the interactions between organisms and their surroundings, including the physical environment and other organisms. Ecology is a broad field that encompasses a wide range of topics, including the study of populations, communities, ecosystems, and the biosphere. At each level it is essential to organize complex systems in ways that allow ecologists to understand their relative relationships and importance. Ecological systems are organized into categories

and often systems nested within larger systems. These taxonomies are fundamentally about creating divisions and subdivisions. The other approach conceptualizing ecological systems is through networks. Networks identify elements of a system as nodes and focus on all the connections between nodes. These conceptual frameworks are intrinsic to the field of ecology.

Architecture is the art and science of designing buildings and other structures. Since architects usually cannot directly engage in making architecture due to limitations of time and resources, they design buildings using various methods of representation. An architect uses drawings models and other forms of representation to explore ideas of spatial relationship, program, structural organization circulation and so on. It incorporates understanding of hierarchy and network in the spatial development of these ideas.

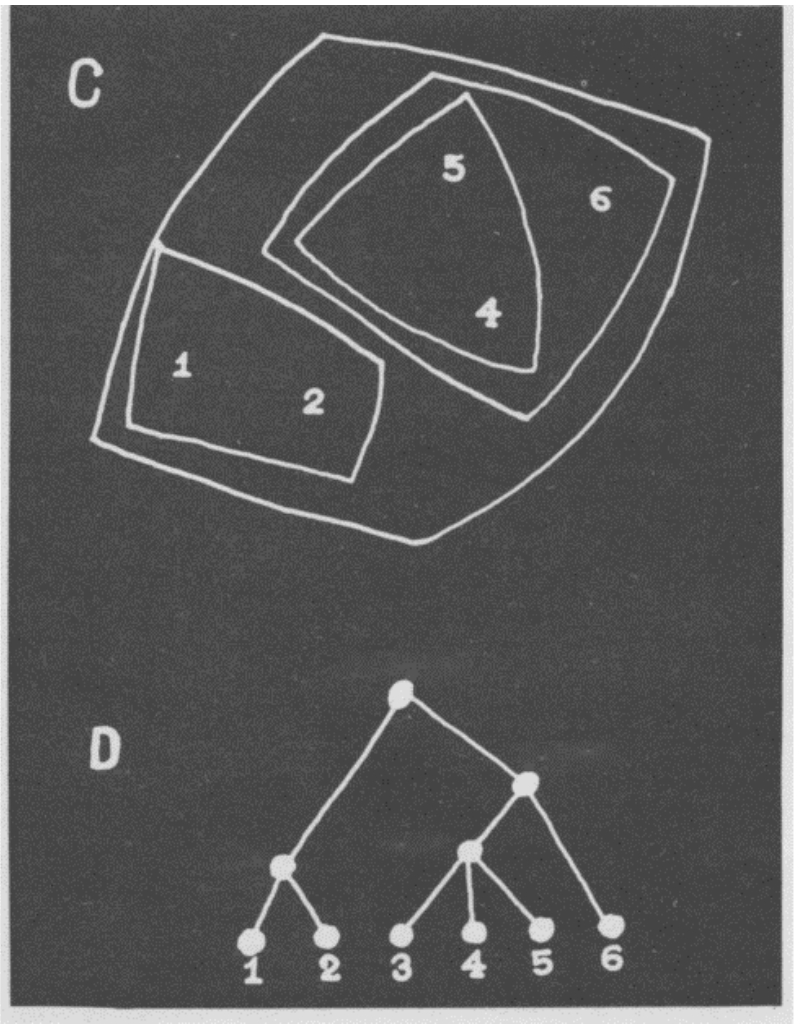
Both disciplines must deal simultaneously with notions of integration and connection as well as concepts of division and separation. It is from these goals that concepts of hierarchy and network emerge. These structural systems of organization are two types of conceptual frameworks used to organize the conceptual relationships that hold these complex systems together.

Hierarchy

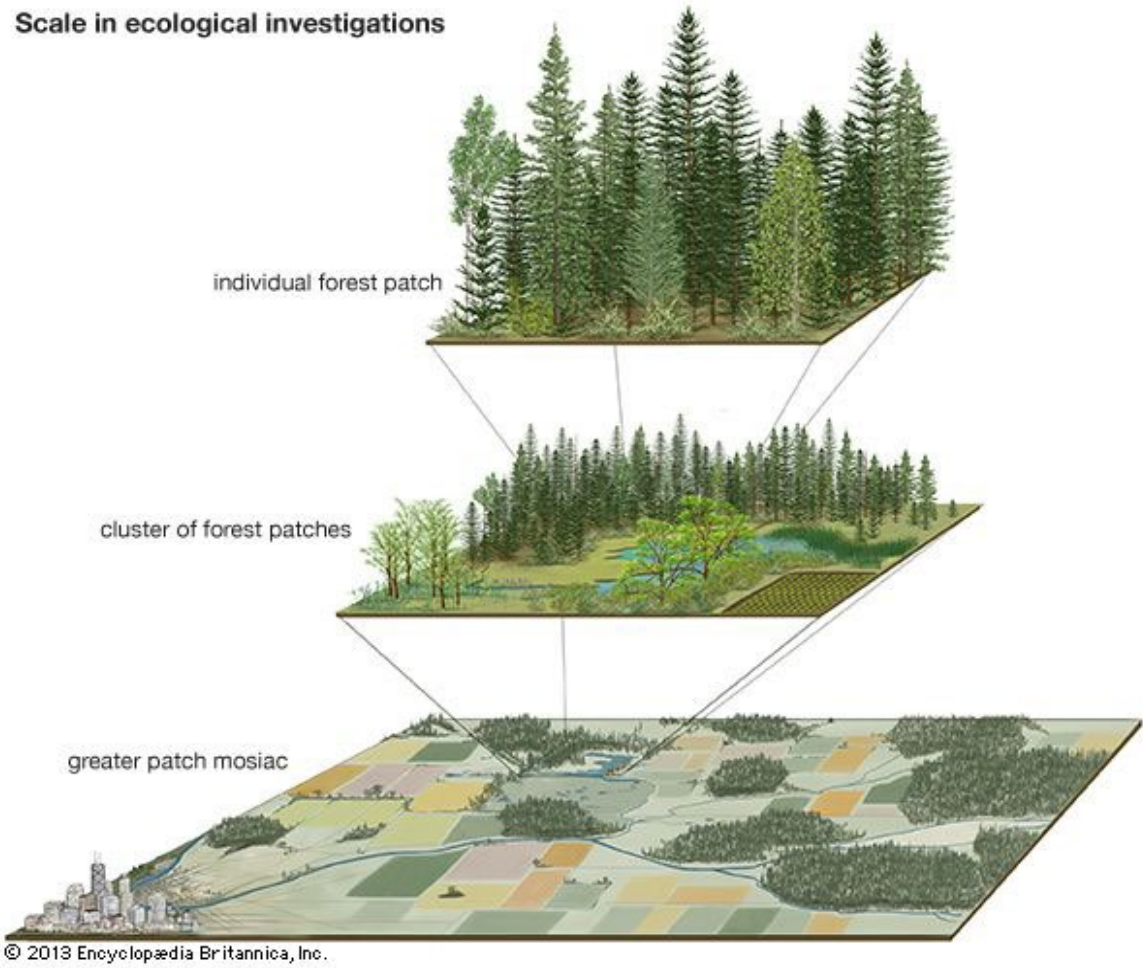
A hierarchy is an arrangement of items that are represented as being "above", "below", or "at the same level as" one another. Hierarchy is an important concept in a wide variety of fields, such as architecture, philosophy, design, ecology, mathematics, computer science, organizational theory, systems theory, systematic biology, and the social sciences. It can be thought of as a set in which: no element is superior to itself, and one element, the (apex or hierarch), is superior to all the other elements in the set. It is an effective way to organize large sets of relationships providing clarity about the relative levels of importance between each relationship.

A **Tree** is a type of conceptual framework in which there is a single root node, and all other nodes are connected to the root node by a single path. Trees are often used to represent hierarchical data, such as the organization of a file system on a computer.

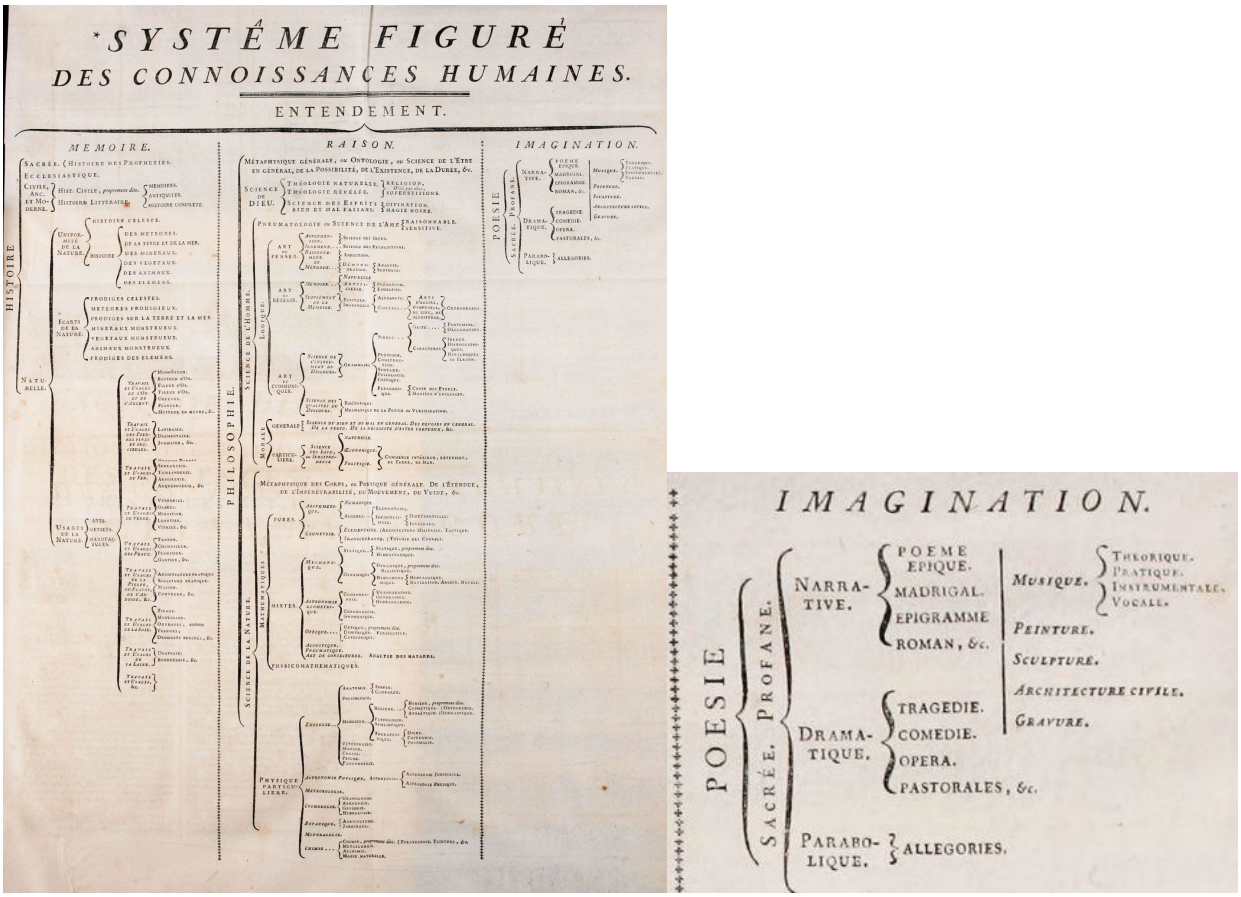
Nesting is a type of conceptual framework in which objects are contained within other objects. For example, a folder in a file system can contain other folders, which can contain other folders, and so on. Nesting is often used to represent complex data structures, such as the DOM tree in HTML. (Gibson, 1979)



(Figure 2) Diagram from Christopher Alexander showing how tree diagrams and nested systems share the same relational framework.



(Figure 3) A forest patch nested within a landscape mosaic showing how ecological systems nest inside each other at different scales.

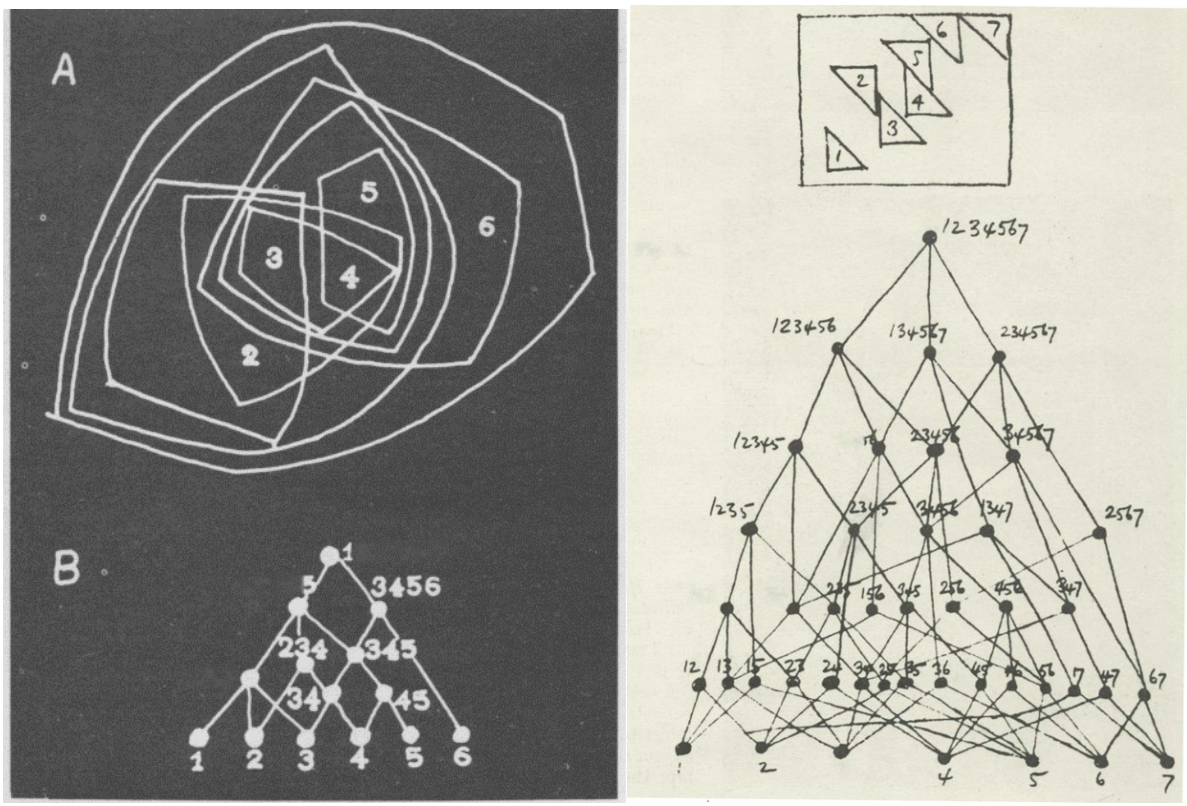


(Figure 4) “Figurative System of Human Knowledge,” from Encyclopédie, by Denis Diderot and Jean le Rond d’Alembert. It calls out architecture which is a subcategory at the bottom of the imagination tree of human knowledge.

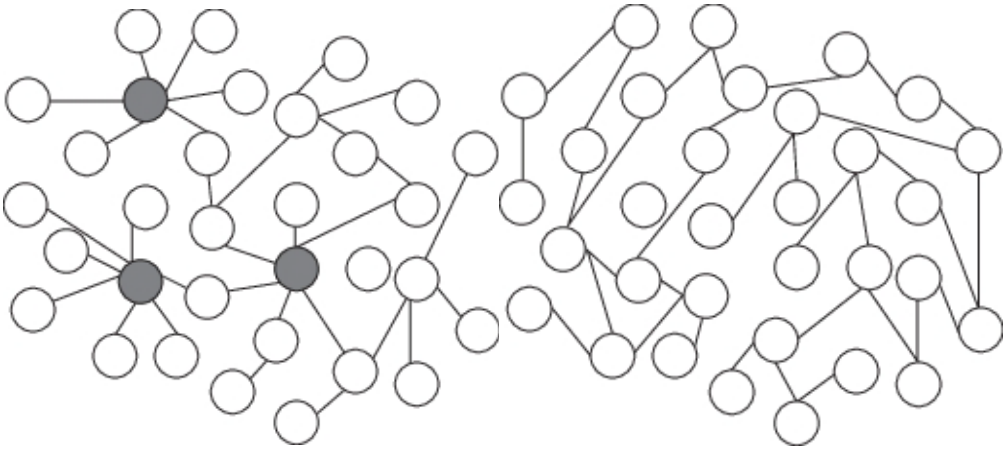
"Branches of the tree whose trunk is architecture."
- Alvar Aalto

Non-Hierarchical

A **Network** is a type of conceptual framework in which objects are connected to each other in a non-hierarchical way. Networks are often used to represent relationships between objects, such as the connections between people on social media or the connections between computers on a network.



(Figure 5) Diagram showing Christopher Alexander's notion of a semi lattice as a type of network structure.



(Figure 6) Network “scale-free” and “random” David Fleming

It is clear how these conceptual frameworks are deeply integrated into the way that we conceive of spatial relationships. Hierarchical frameworks lend themselves to very controlled sets of relationships whether they be static loads or spatial boundaries. We address ideas of hierarchy through words like division, divided, separate, category, nesting, taxonomy, tree, class, sequence, finite, contained, bounded, border, edge, etc… Networks are more malleable and resilient and model human activity, movement and dynamic relationships. The words by which we understand network are words like Integration, connection, stitching, weaving, web, mesh, lattice, boundless, etc…

The following chapters analyze and illustrate the ways that conceptual frameworks are used and understood in different categories of architectural representation. The chapters also show how intertwined the conceptual frameworks of hierarchy and network are throughout architectural representation.

Chapter 1 explores the program as a type of architectural representation used to understand the conceptual frameworks of activity, use, and need in terms of hierarchy and network. Chapter 2 focuses on how the line is used to draw relationships throughout architectural representation. The line as a force of integration and separation is central to the conceptual frameworks that we represent. Chapter 3 illustrates the role these conceptual frameworks play in the representational process of architectural design. In Chapter 4 we map out how the frameworks of hierarchy and network are integrated into the representational mode of the plan.

These chapters investigate conceptual frameworks by looking at two primary types of drawings: design drawings and presentation drawings. The design drawings show how the designer developed their conceptualization of network and hierarchy within the drawing while the presentation drawings show how the designer is communicating ideas of integration and separation to an audience.

Since architectural design is fundamentally the composition, integration and division of complex systems that organize the built environment, how we think about these spatial relationships is essential. By analyzing different examples of architectural representation and examining how hierarchy and network are used within them we can develop a more intentional use of these frameworks. This will improve architectural education and architectural practice by giving designers better tools to think about the underlying conceptual systems shaping their designs.

References

Alexander, C. (1967). A CITY IS NOT A TREE. Ekistics, 23(139), 344–348.

Mattern, S. (2021). Tree Thinking. Places (Cambridge, Mass.), 2021. https://placesjournal.org/article/tree-thinking/

Fleming, David. (2016) *Lean Logic: A Dictionary for the Future and How to Survive It*. Chelsea Green Publishing.

Ian McHarg, “An Ecological Method,” in Simon Swaffield, ed., Theory in Landscape Architecture: A Reader (Philadelphia: University of Pennsylvania Press, 2002), 38-43.

Gibson, James J. The Ecological Approach to Visual Perception. Boston: Houghton Mifflin, 1979.

Mark Hewitt, “Representational Forms and Modes of Conception” Journal of Architectural Education, v. 39, no. 2 (Winter 1985) 2 - 8.

Ian McHarg. (2002) “An Ecological Method,” in Simon Swaffield, ed., Theory in Landscape Architecture: A Reader (Philadelphia: University of Pennsylvania Press, 38-43.

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Figure	Source
Figure 1	Holten, Katie. Katie Holten. Accessed June 20, 2024. https://katieholten.com/emergenceforest.
Figure 2	Alexander, C. (1967). A CITY IS NOT A TREE. Ekistics, 23(139), 344–348.
Figure 3	Wu, J.. "patch dynamics." Encyclopedia Britannica, December 17, 2019. https://www.britannica.com/science/patch-dynamics.
Figure 4	Mattern, S. (2021). Tree Thinking. Places (Cambridge, Mass.), 2021. https://placesjournal.org/article/tree-thinking/
Figure 5	Alexander, C. (1967). A CITY IS NOT A TREE. Ekistics, 23(139), 344–348.
Figure 6	Fleming, David. (2016) Lean Logic: A Dictionary for the Future and How to Survive It. Chelsea Green Publishing.

Chapter 1: (The Program) Activity, Use and Need

Chapter Abstract

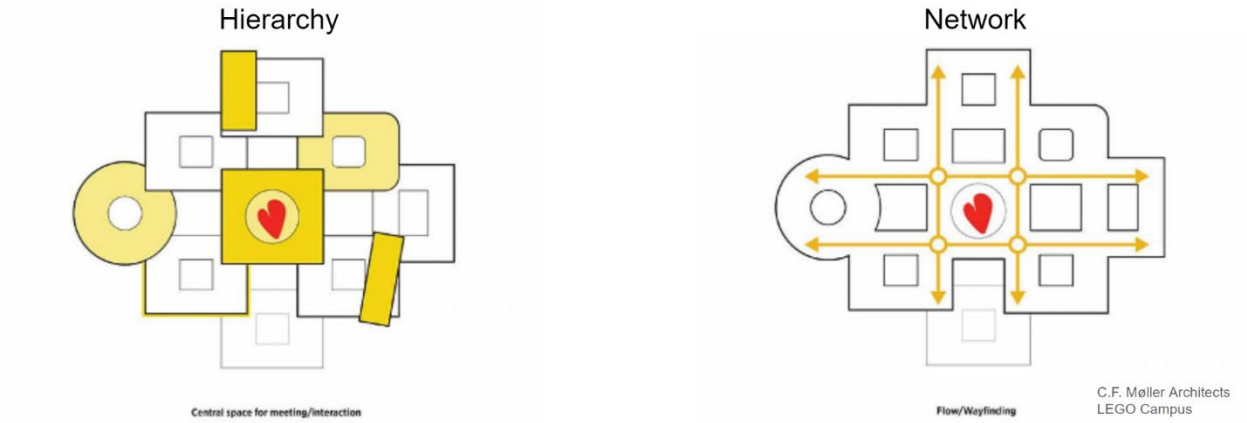
The driving force behind an architectural project is its program. Programming a space is the composition of space for human activities, uses, and needs. The diagram Architects use to conceptualize the program of a building is the “parti.” This chapter examines the parti diagrams and other supporting drawings used by OMA in the representation of the Seattle Public Library (1999). This case study reveals that the conceptual frameworks underlying architecture and ecology overlap. Both use the conceptual frameworks of hierarchy and network to organize their conceptualization of space. OMA’s representation of the library, even at an early stage, communicates hierarchical and networked organization of the projected building using standardized graphic techniques, such as line weight, scale, positive and negative space contour and specificity. Their representations show, for example, how interrelated components of building systems are dependent on one another and built upon or within each other. The images from the Seattle Public Library proposal embody the dialogue between hierarchy and network and how a spatial concept emerges from that conversation. The organization of the library is a conversation between the division of space and the integration of program. The library is divided into static and dynamic volumes with the static volumes subdivided in a hierarchical system with each static programmatic element contained to a particular space. The dynamic volumes are networks of integrated program that bring an ecology of activity into the more active spaces. These ideas of static and dynamic space are integral to architectural representation, and the concept of the library's spatial composition emerges from their interaction.

The Parti diagram

The driving force behind an architectural project is its program and the development of that program to create an environment for people. Programming a space is the composition of space for human activities, uses, and needs. The diagram Architects use to conceptualize the program of a building is the “parti.” In architecture, a parti diagram is a conceptual sketch or diagram that captures the essence of a design idea. It's a simple, abstract representation of the main organizational principles of a building project. Think of it as the "big idea" behind the design, distilled into a visual form. The parti diagram shows spatial relationships—the relative positions and adjacencies of different spaces within the building.

Parti diagrams can communicate programmatic elements through hierarchical or network frameworks. The hierarchies within a parti might be indicated by color, or the size and placement of spaces. Forms within the diagram can indicate the separation and relative importance of different spaces. Larger shapes might represent major program elements like the main hall or auditorium, while smaller shapes could indicate secondary spaces like restrooms or

storage rooms. Networks might exist in a parti showing connectedness. For example, circulation might be shown with lines or arrows in the diagram, thereby representing circulation patterns, indicating how people will move through the building and how different elements of the program connect to each other. Parti diagrams are not meant to be literal representations of the final design. They are conceptual tools that help architects explore and refine their ideas early in the design process.



(Figure 1) C.F. Møller Architects, LEGO Campus

Programming a space is the composition of space for human activities, uses and needs.

Library

Seattle public library

By showing the conceptual organizations used in the representation of the Seattle Public Library through the frameworks of hierarchy and of networks we see that the frameworks of architecture and of ecology overlap. Both disciplines use the conceptual frameworks of hierarchy and network to organize their understanding of space. Within the representation of the library, we see relative importance communicated through hierarchy and network using line weight, scale, positive and negative space contour and specificity.

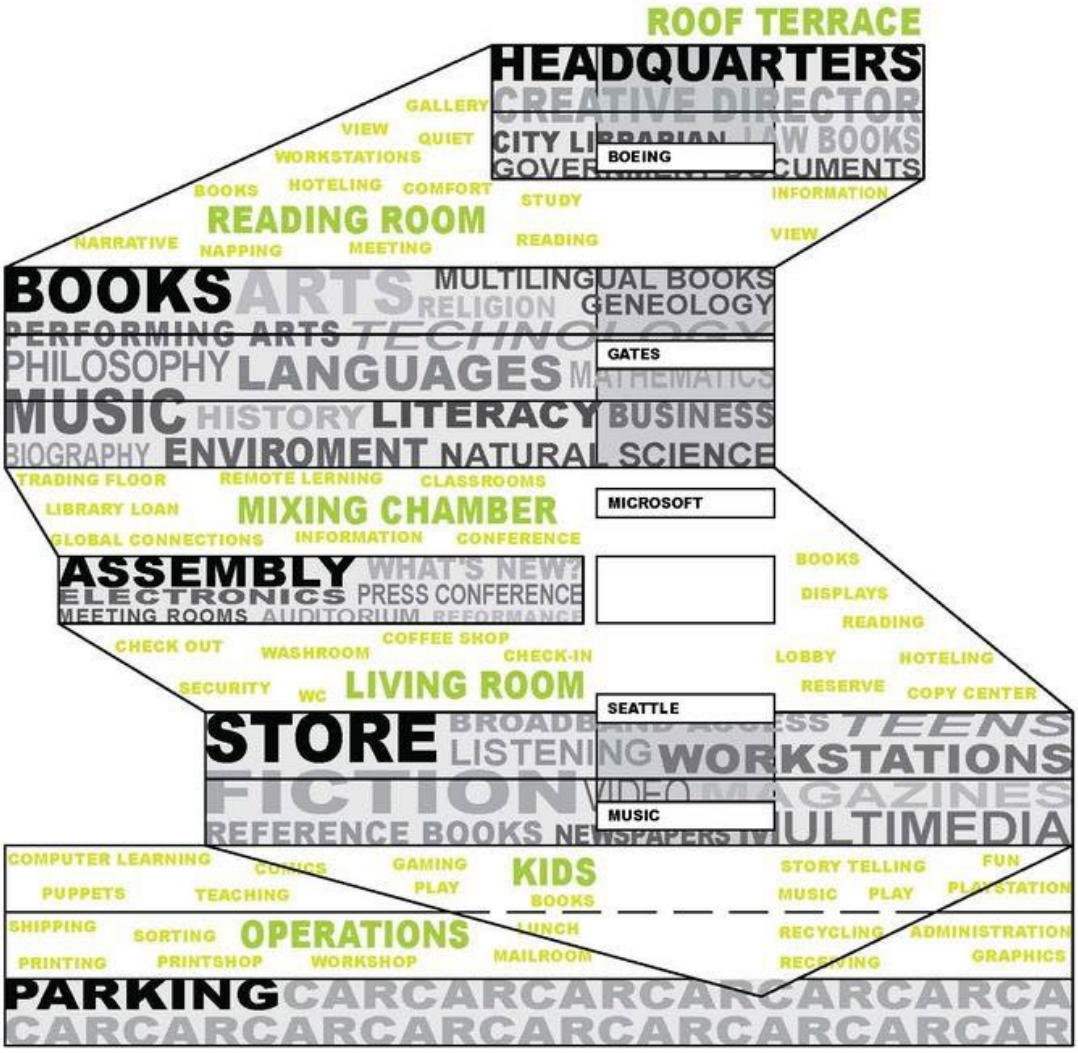
The Seattle Central public library provides an excellent case study to understand these notions of relative importance in architecture. Within the project and its early conceptual representations, we can see ideas of hierarchical organization and network organization. Designed by the Office for Metropolitan Architecture (OMA), the library was completed in 2004. OMA described the concept driving the design as follows.

> Our ambition is to redefine / reinvent the Library as an institution no longer exclusively dedicated to the book, but as an information store, where all media - new and old - are presented under a regime of new equalities. In an age where information can be accessed anywhere, it is the simultaneity of all media and the professionalism of their presentation and interaction that will make the Library new. (OMA/LMN,1999)

The driving spatial concept within the project was one of nine units. Five of them are stable and four of them dynamic. The five stable units would house the fixed elements of the library's program, the library headquarters, books, assembly, the store and parking. The dynamic spaces would be the reading room, the mixing chamber, the living room, and the kids space.

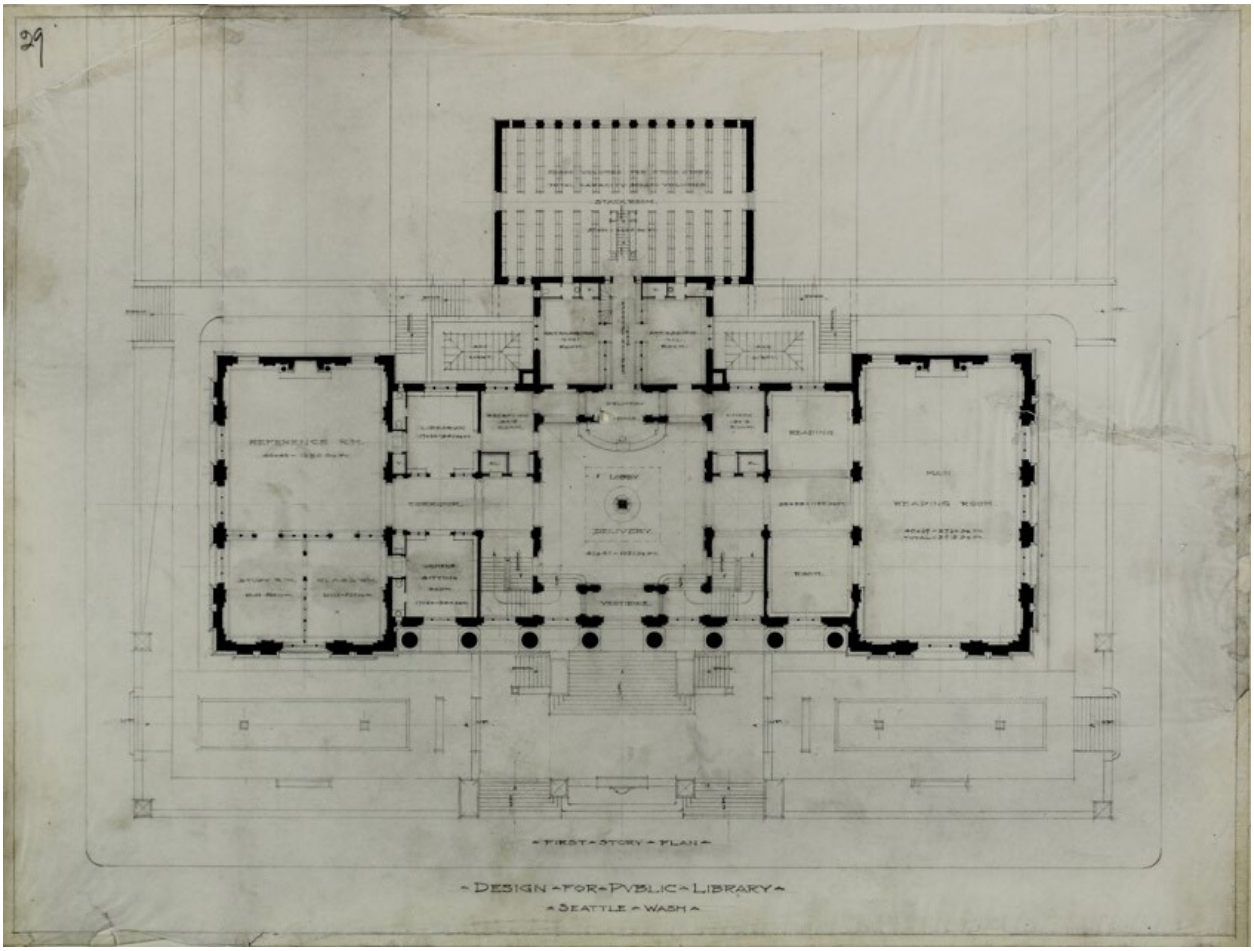
In this conceptualization of spaces we already see a hierarchical structuring through this binary division of types of spaces. It is a tree in which the starting node is the library which splits into two new nodes, dynamic and stable spaces. Each of those splits again into a new set of nodes based on the spaces described above.

In (figure 2) we see this division between stable and dynamic spaces. The stable spaces are made to seem more dense with a gray undertone and we see a hierarchy of uses within each space which is conveyed by the sides of the text describing each use. The relative importance of each use is communicated as being intentionally part of the design. In contrast, the dynamic spaces have a white underlay giving them a sense of lightness. The text is all in the same size with the only larger text being the name of each space. This communicates that the relationship between uses in the dynamic spaces is non-hierarchical. It is intended to be more of a freely adjusting network of uses that adapts to the needs of the librarians and the public.



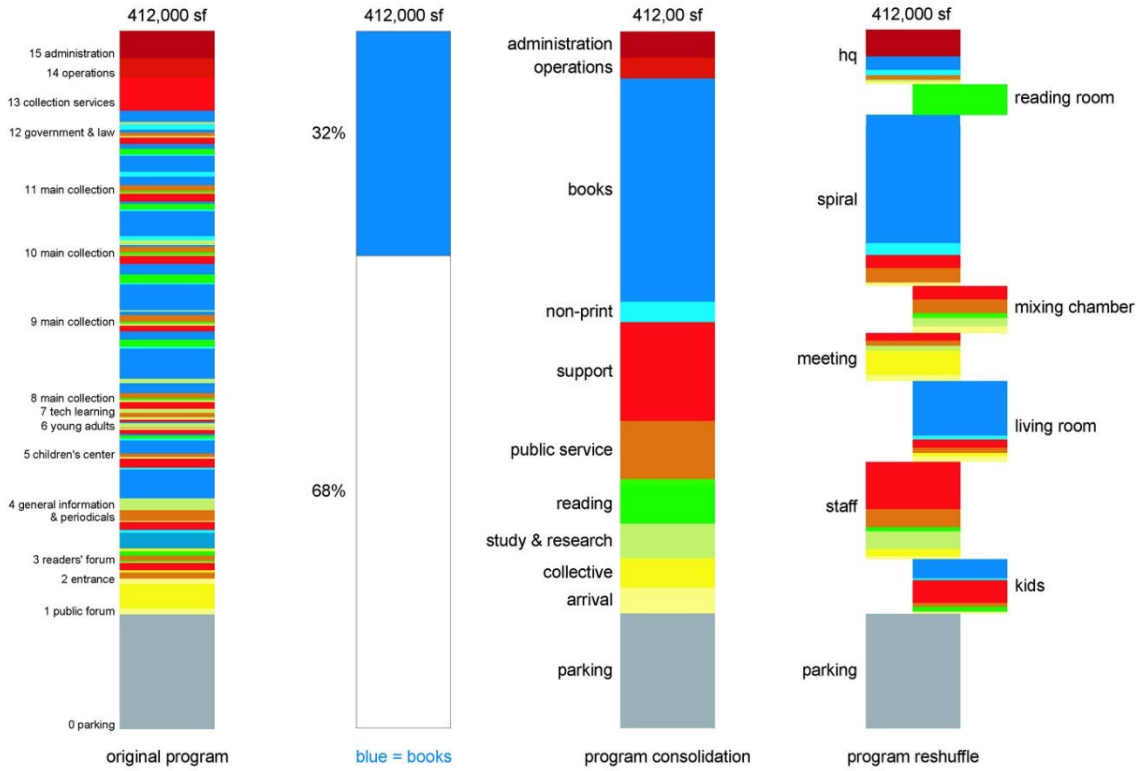
(Figure 2) Parti diagram showing the library's program in section. Dynamic spaces in green and static spaces in grayscale.

We see here that ideas of hierarchy and non-hierarchy can coexist in the same conceptual space.



(Figure 3) Seattle Public Library, Seattle, Washington, First Story Plan

This floor plan of the original Seattle Public Library drawn in 1904 Shows the clear hierarchy of a traditional Library building. It is a classic panopticon with Axial symmetry and the librarian's desk is located at a point to control all the spaces. All possible routes of circulation terminate at the library and desk. We see the concept proposed by OMA as rejecting this classical panopticon format, but it is not without its own hierarchical organization. It is also a classic example of how architectural drawings use hierarchies of line weight to communicate relative importance of the different components in the composition of a space.

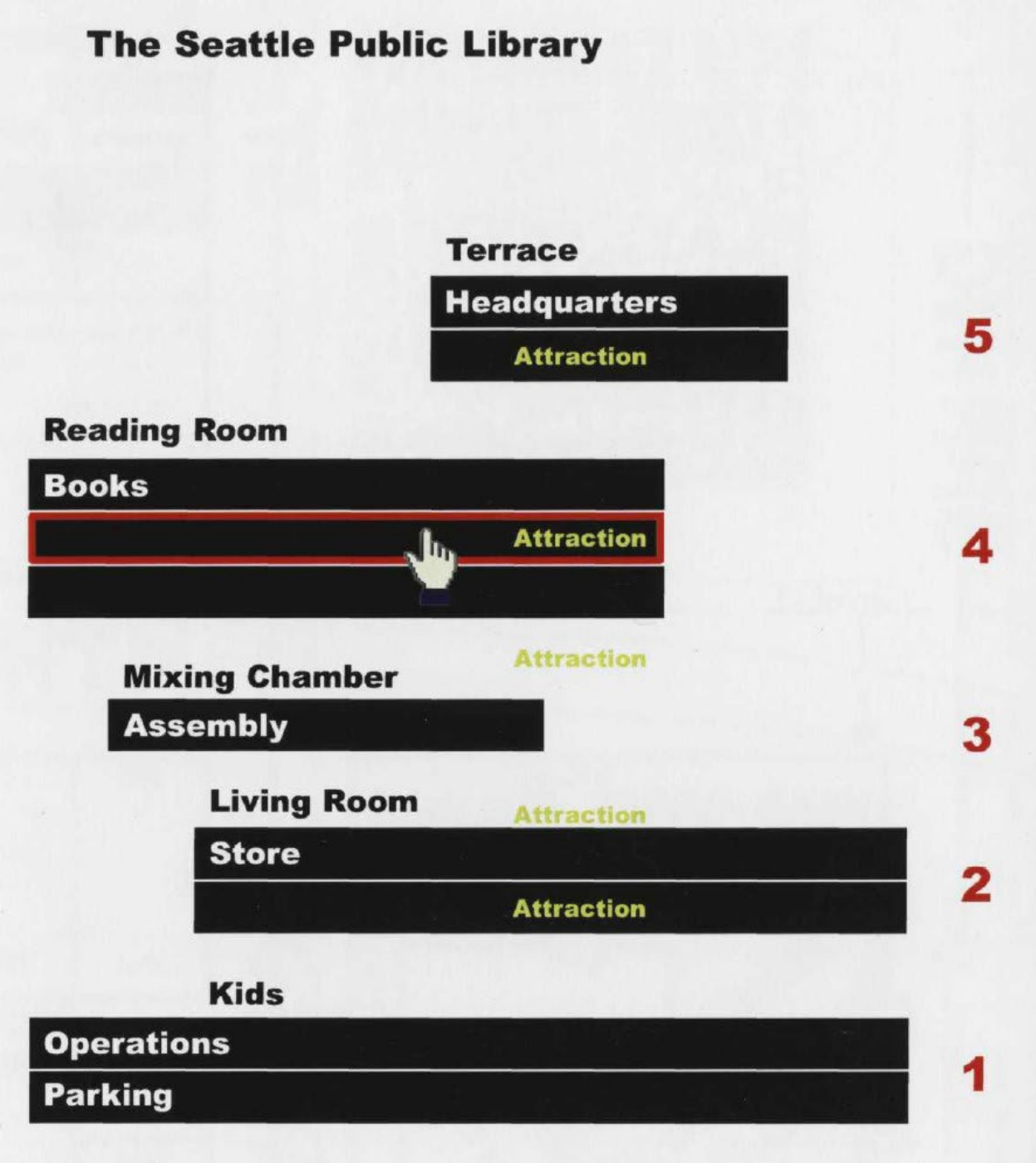


(Figure 4) Diagram showing how OMA refined and simplified the program they were given by Seattle library.

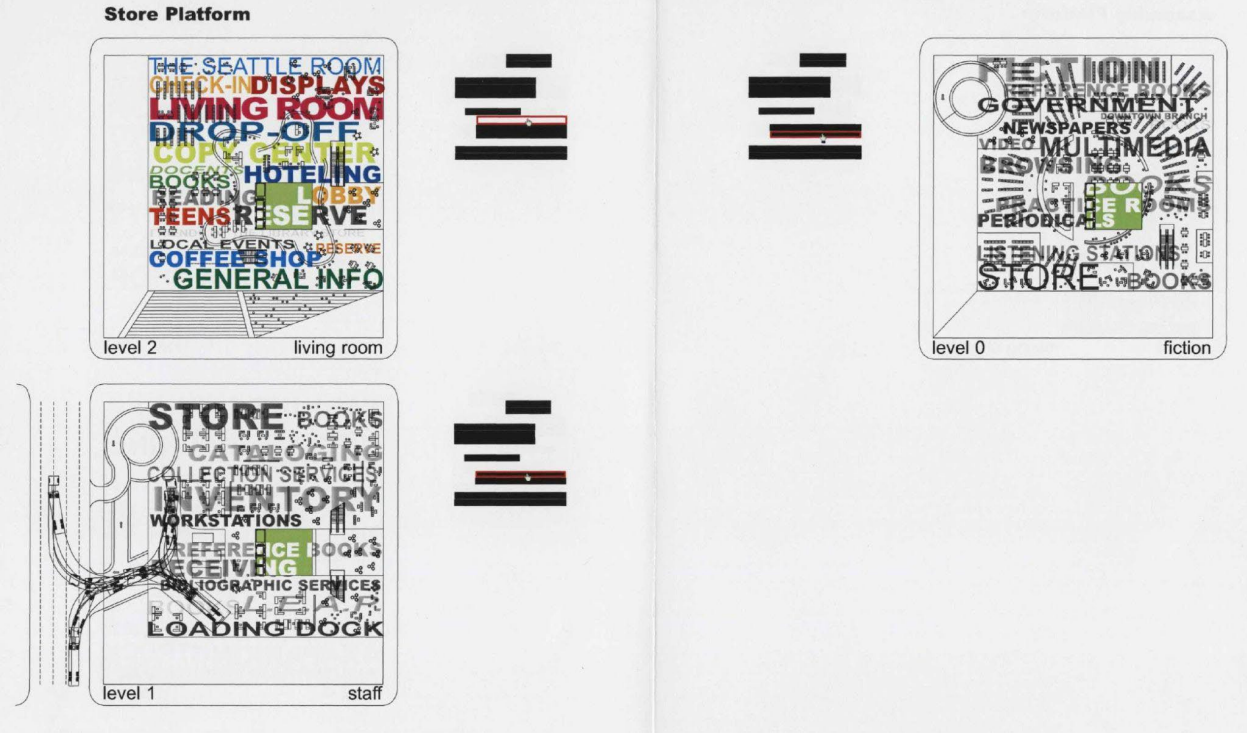
At the beginning of the process OMA was given a program brief detailing every programmatic element that needed to be included within the new Seattle Central library. OMA separated the programmatic elements into several main categories integrating related programs and separating those that were dissimilar and that needed significantly different types of space. The diagram of that integration of spaces (Figure 4) became the basis of the parti that would shape the entire library project. It clarified the space planning and helped to reduce the necessary square footage by 20,000 square feet. (Shannon Mattern, 2003) This new party served both to separate the main spaces of the building and to integrate programmatic elements that had originally been envisioned as separate.

Within the project proposal OMA also designed a concept for a website for members of the community to interact with the library. These diagrams (figure 5 and 6) directly show how the spaces were conceived as a nested hierarchy within the stable volumes of the library. Web domains are themselves hierarchical with each subpage nested inside of the page above.

> introducing the platform model, the hierarchy, features and formats of the new library, facilitating navigation (and reducing demand on staff) for visitor orientation in the real building. The site will also be used to create virtual communities that will regularly ‘embody’ themselves in the real building. (OMA/LMN,1999)



(Figure 5) Diagram of the proposed website for the library. It shows the categories of activities and services provided by the library.



(Figure 6) Diagram showing what's happening on each subpage of the website

In the subpages (figure 6) we see how again, how differently the stable and dynamic volumes are represented. We see the store showing its different programmatic elements in color communicated with a sense of energy and interdependence. In contrast, the stable floors are shown in black and white with permanent elements of the spaces, imposing an order on their use and interpretation.

Many of the concepts driving the design of the library are hierarchical in nature, but there are also notions that are dominated by ideas of network. In figure 7 we see several layers of Networks. The most obvious network is the network of the city grid built up of roads, sidewalks, intersections, city blocks and buildings. This network establishes the pre-existing condition and shows how the library ties into the existing Network of the library's surroundings.It also highlights and reinforces the significance of networking the library into the greater context of its surroundings through views. It suggests how visitors to the library will have views of Elliott Bay and Mount Rainier tying them into the broader geographical network of Seattle. It also shows the significance of the view from I-5 which visually ties it into the experience of people driving on the freeway, but also conceptually ties it into the transportation network of people who drive to the library from the greater Seattle region.

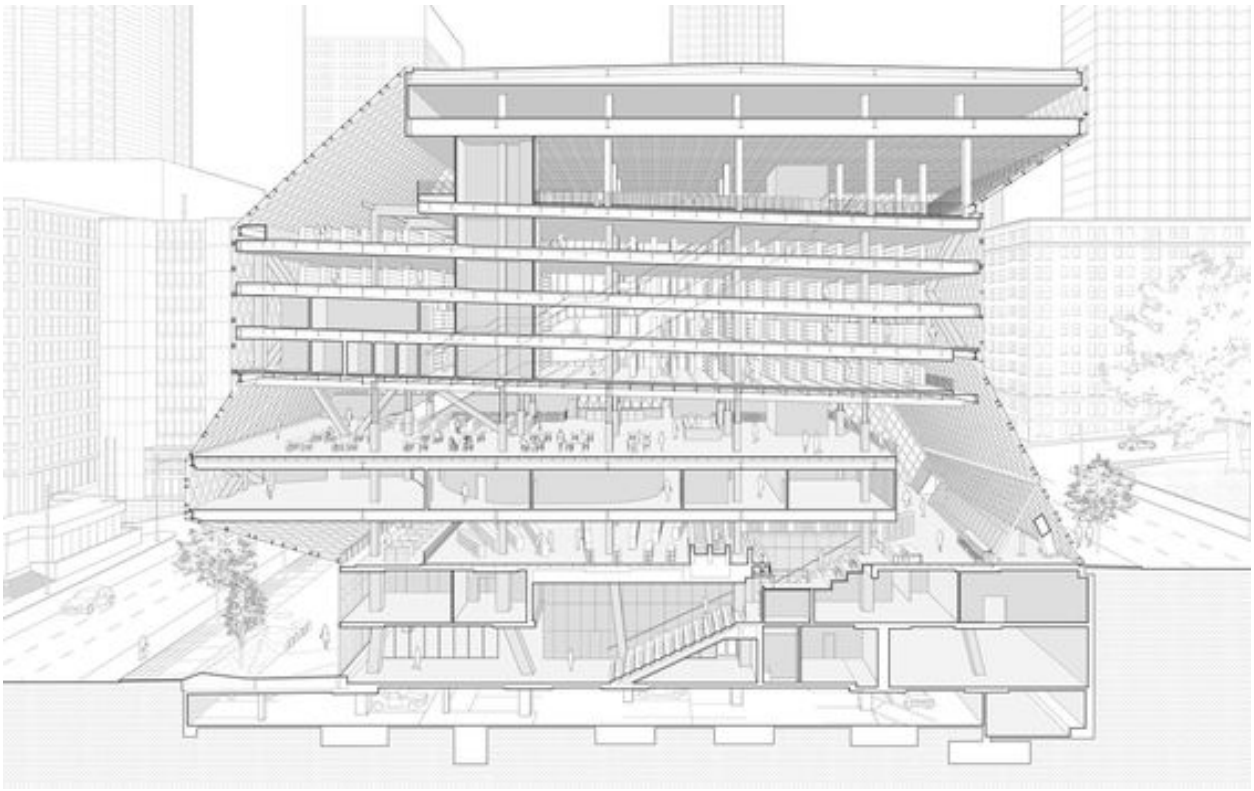
(Figure 7) Diagram of views from the library

As with many of the other drawings that we have looked at here the concepts present in this drawing are not bound solely within one framework. While this map primarily deals with ideas of network, it also touches on hierarchy through ideas of nesting. We see buildings nested within blocks, plazas and Courtyards nested within buildings and in the library itself we see the programs of the library nested Within the building

Downsview Park Tree City

(Figure 8) Diagram showing relationship of trees and landscape nodes for Downsview Park and the circulation that connects each node.

This is not the first project that OMA has conceptualized using the framework of Networks. In their 2000 master plan for Downsview Park, OMA conceived of a tree city that was built of a cluster of trees and landscape perennial clusters connected by a network of walking and bicycle paths. in this network the trees became the nodes and the paths the network.



(Figure 9) Section perspective diagram by LTL showing the completed Seattle public library.

In this section perspective by LTL Architects, We see the classical use of line weights to describe the hierarchy of importance within the drawing of the library. This drawing was done after completion of the building and describes the building as it was built rather than describing it as it was conceived.

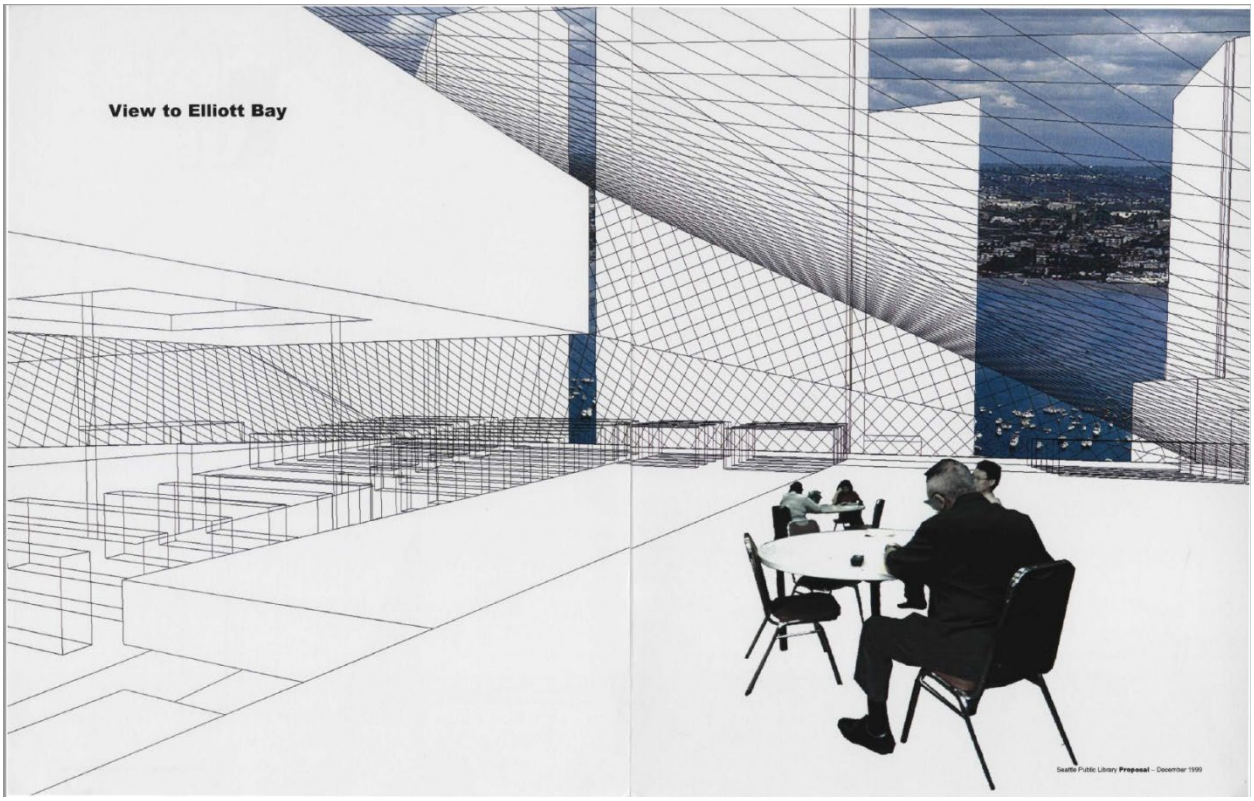
Perspective imagery, as its name implies, is rooted in a singular point of view. From that point of view, perspectival systems have evolved and branched creating many perspectival methods including 1 point 2 point and 3-point perspective. These three methods of perspective emerge from the branch of vanishing point perspective. (Panofsky,1991)

In the hierarchical structure of a perspective the point of view or perspective is the top of any perspectival hierarchy. It establishes the location of the horizon line, which in turn determines where the vanishing point or points are located. The hierarchy of the system goes from point of view to horizon line to vanishing point/s to receding lines to vertical lines to horizontal lines. This is the literal hierarchy of constructing a perspective drawing. They are also compositional components of hierarchy in perspective such as foreground, middle ground, background, which can be indicated by line weight.

Line weight is an important tool for communicating the conceptual hierarchy of a design. By varying the thickness of lines, architects can create a visual hierarchy that helps viewers and the architects themselves to understand the relative importance of different elements in the design.

In figure 10 we understand the hierarchy of the reading room of the SPL to be a much more

direct chain of relative importance. Through the use of detail in the figures and color in the view of Elliott Bay we understand that the most important thing about this space is the relationship between its occupants and The View. With that relationship established as the most important we then understand the connection that the reading room has at the top of the book spiral. Since the wire frame of the bookshelf is the next most detailed element in the image. the enclosure of the building skin can be seen as a transparent lattice of diamonds and finally the least important elements of the image are the floor which is the ceiling of the book spiral and the wall that contains the headquarters above the reading room.



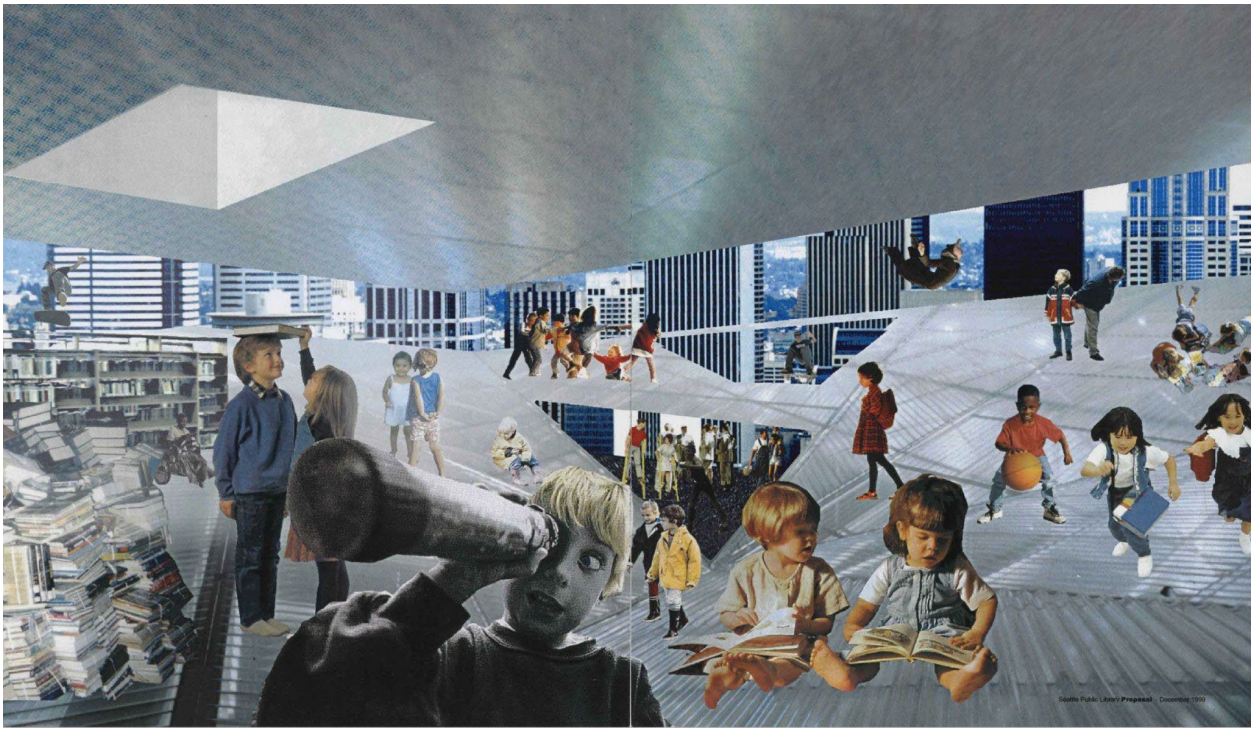
(Figure 10) Perspective showing the reading room and its view.

It is worth noting that there is an almost binary element to this image. The relationship between the two things that are highest in the hierarchy (The people and the view of the water) is conveyed with so much importance that the other elements of the image Fade Into the background.

Another very different example of how networks are shown in the proposal is in the image describing the children's space. We see children engaged in countless activities of play, study, curiosity and conversation. No single activity is given more prominence than any other. Instead, the image shows the children's space as creating a dynamic field in which children can explore, grow and learn. The direction and movement of the children suggest that they can move freely through this network of knowing and doing.

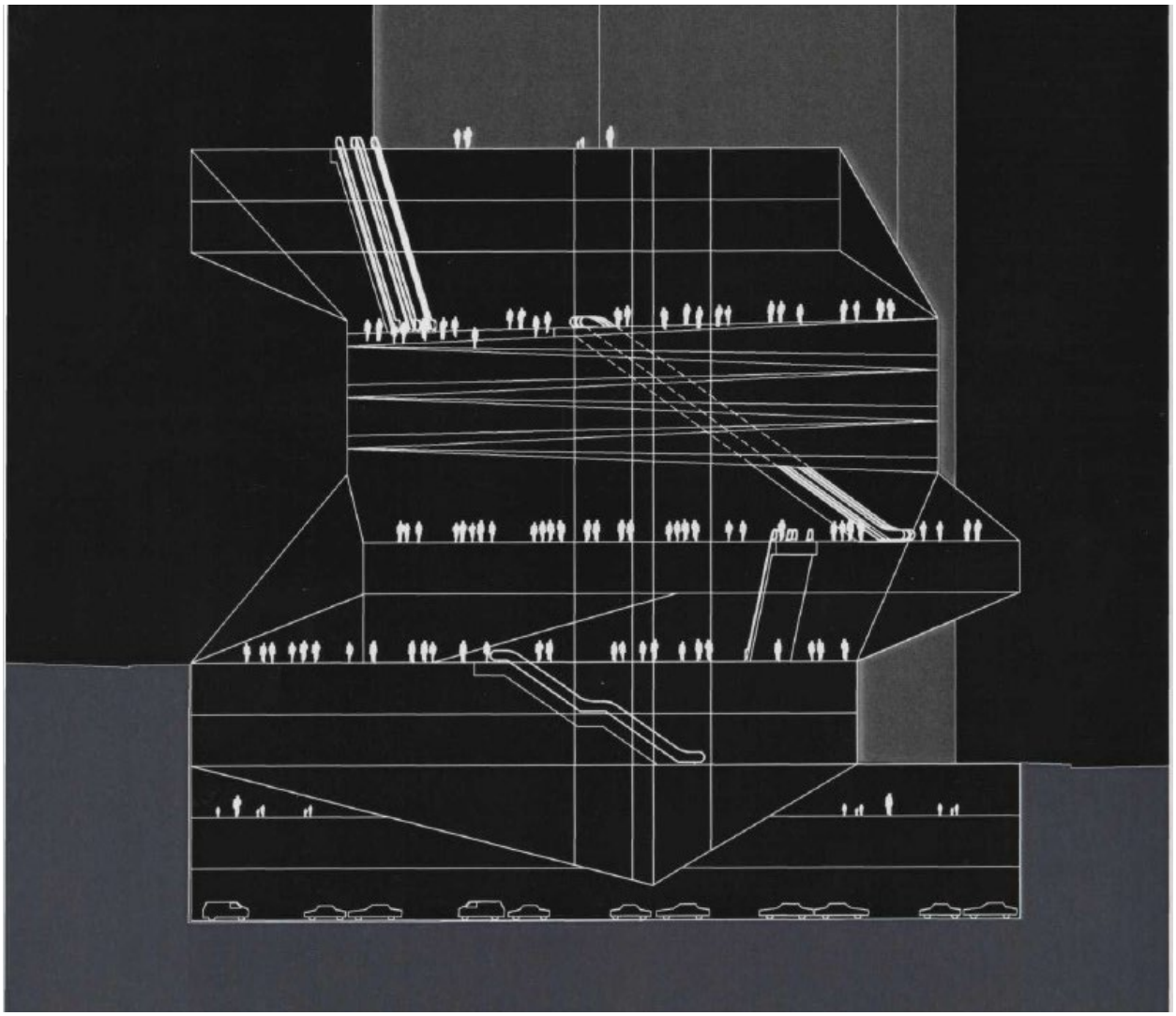
In contrast to the perspective of the reading room this image uses the view out into the city as a continuous backdrop suggesting that it is connecting the space to all the surrounding children.

Conceptually, the children's room is being shown to be a part of the city integrated into its fabric.



(Figure 11) Perspective of the children children's space in the library.

Both images use the perspective as their representational mode, but they communicate very different things about the quality of the spaces that they represent.



(Figure 12) Section showing the most public spaces in the library and the circulation between them.

In Figure 12, a section drawing of the library, we see that the primary importance is being placed on the people in the dynamic spaces and the escalators that move up between the dynamic levels. It tells us that these are the spaces that belong to the city and are an extension of the public realm. By excluding everything else in the drawing it shows that this idea of people moving through a series of public spaces in the library is the most important idea in this drawing. This drawing uses the escalators to pull the angles of the building into this narrative of upward movement making it a force that is shifting the masses of the building to create these public dynamic spaces.

Conclusion

The images from the Seattle Public Library proposal embody how hierarchy- and network-based conceptual frameworks are integral to architectural representation. They are used to organize relative importance, division and integration within a concept. We see that both hierarchies and networks can demonstrate what is most important in the concept that an image is communicating. Through that we can understand the relationship and significance of

components within the larger project being conceptualized.

A concept is a driving idea that structures a design. A conceptual framework is a way of organizing concepts in a structure that allows the designer to make decisions about relative importance and relationship within a design process. We use these concepts of structural organization to model ideas that have not yet been made physical. Different concepts require different levels of complexity at various stages of conceptual development. Designers edit the structural framework they are using within these two modes to help clarify the relationship of a concept's components.

This chapter shows that we can understand interrelated concepts through the frameworks of hierarchy and network. They can show us the relationships and interdependencies within an architectural concept. They also can reveal the relative importance of aspects of that concept. By developing this system of conceptual frameworks in representation, we understand the role that hierarchical and network thinking play within architectural representation. We have seen through the case study of the library how designers conceptualize design hierarchies through representation.

References

Koolhaas, Rem. 1999. Seattle Public Library. OMA/LMN.

Kubo, Michael, and Ramon Prat, eds. 2005. *Seattle Public Library, OMA/LMN*. Barcelona: Actar.

Mattern, Shannon. 2003. “Just How Public Is the Seattle Public Library?: Publicity, Posturing, and Politics in Public Design.” Journal of Architectural Education (1984) 57 (1). Oxford, UK: Taylor & Francis Group: 5–18. doi:10.1162/104648803322336548.

Erwin Panofsky, Perspective as Symbolic Form (New York : Zone Books: Distributed by the MIT Press, 1991) 66-72.

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Figure 2	Koolhaas, Rem. 1999. Seattle Public Library. OMA/LMN.
Figure 3	The Art Institute of Chicago. "Seattle Public Library, Seattle, Washington, First Story Plan." The Art Institute of Chicago, https://www.artic.edu/artworks/247524/seattle-public-library-seattle-washington-first-story-plan.
Figure 4	Koolhaas, Rem. 1999. Seattle Public Library. OMA/LMN.
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Figure 8	OMA. "Downsview Park." OMA, Accessed June 20, 2024. https://www.oma.com/projects/downsview-park
Figure 9	Lewis, Paul, Marc Tsurumaki, and David J Lewis. 2016. Manual of Section. New York: Princeton Architectural Press.
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Chapter 2: (The Line) Drawing Relationships, Shaping the Idea

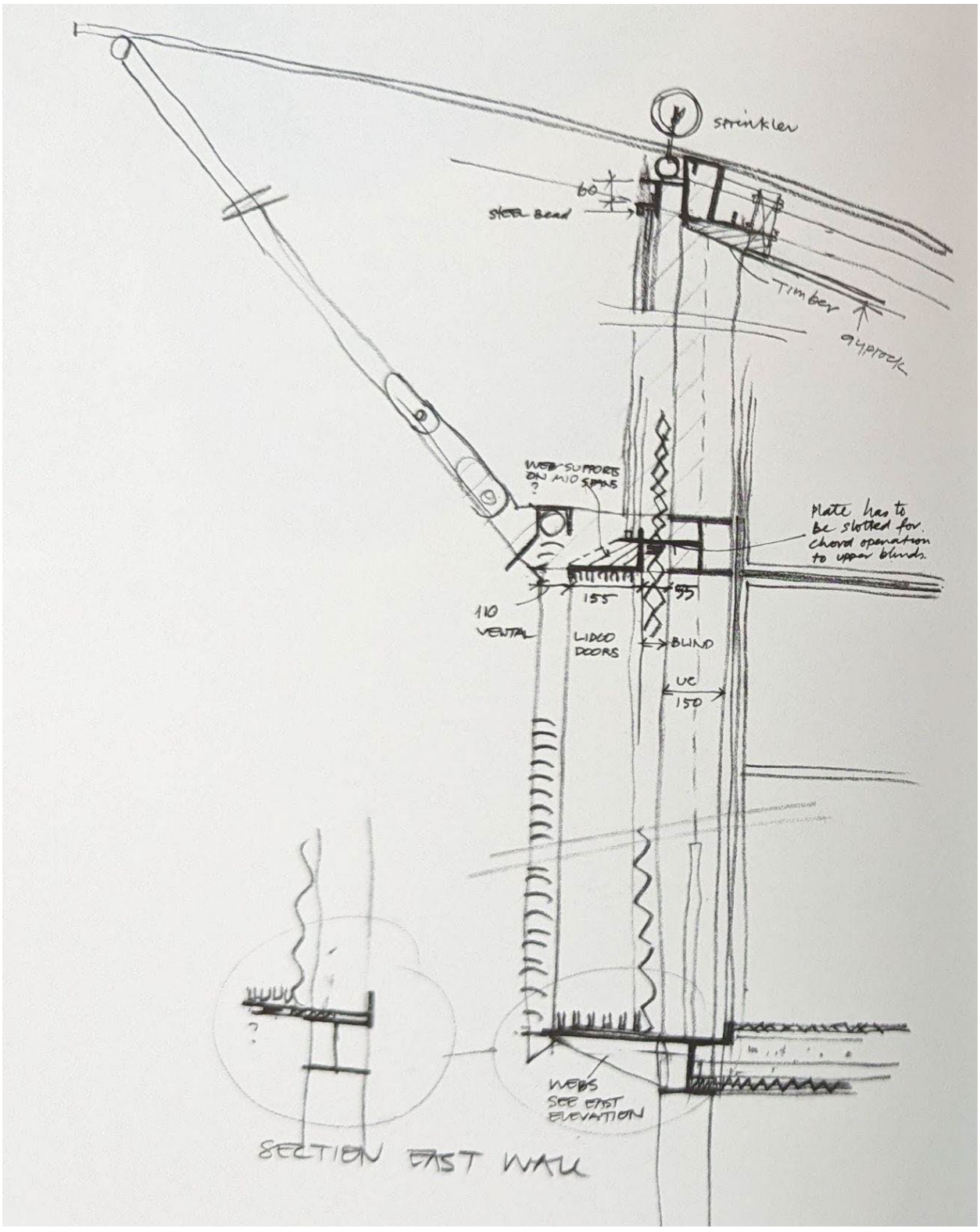
Chapter Abstract

This chapter focuses on the line as an underlying component of architectural representation and the primary method of presenting relationships in architectural drawings. It examines the work of Alvar Aalto to understand how he uses the line as a tool of conceptual organization. The line can be used to build both frameworks of hierarchy and networks; it can express both division and integration. Architects use lines to compose their conceptualization of space, how space is shaped, divided and connected. Conventions related to how lines are used help them carry meanings, but the line as a conceptual tool exists beyond these conventions. This chapter begins by grounding typical architectural line conventions in the context of hierarchy and networks. From there it explores how the line can break free of those conventions while still developing spatial compositions that are grounded in the interaction of hierarchical and network modes of conceptualization. Borders, boundaries and edges which all separate spaces are conceived as lines in representation and beyond. However, lines also describe connections such as paths, bridges, and sight lines.

Line Weight

In architecture, line weight is an important tool for communicating the conceptual hierarchy of a design. By varying the thickness of lines, architects can create a visual hierarchy that helps viewers understand the relative importance of different elements in the design. Line weight is one of the most basic elements of visual communication. It is used to create contrast, emphasis, and direction. In architecture, line weight can be used to create a sense of depth, to direct the viewer's eye, and to highlight important elements of the design.

The conceptual hierarchy of a design is the way in which the different elements of the design are related to each other. The most important elements of the design are typically given more visual weight, while less important elements are given less visual weight. There are a few basic principles that allow line weight to communicate the conceptual hierarchy of a design. Use thicker lines for the most important elements of the design. This will help to draw the viewer's eye to these elements and make them stand out from the rest of the design. Use thinner lines for less important elements of the design. This will help to de-emphasize these elements and make them recede into the background. Use a consistent line weight for similar elements of the design. This will help to create a sense of order and harmony in the design. (Frank D. K. Ching, 2018) describes six types of line and ranks them hierarchically from the most important to the least important. The types of line are section cuts, spatial edges, planar corners, surface lines, hidden lines and construction lines. That hierarchy is typically shown from the heaviest line weight down to the lightest line weight. The darker the line, the more important it is in the spatial composition.



(Figure 1) Working drawing of a wall section for the Simpson-Lee house by Glenn Murcutt

Section cut:

The darkest line in an architectural drawing is the section cut. It indicates a definitive spatial boundary where the architect is cutting through an element that divides spaces such as a wall, ceiling, roof, ground plane, etc… This is a line that represents something abstract, even though it is the most important line in many types of architectural drawing. It is a line that is never experienced in an actual building.

Spatial edge:

The spatial edge is the most important of the lines that depict objects perceived in space. It describes an edge that separates solid matter from void. It is the line that creates a profile and separates elements from each other. It can also be thought of as the boundary that would create a silhouette.

Planar corner:

This is a contour line that exists within the silhouette of a represented volume. It separates adjacent surfaces when both surfaces are visible. It denotes how a space is shaped without indicating a spatial boundary.

Surface lines:

This line describes visible characteristics of a surface. Surface lines are contained to a single plane and describe something about the organization of that plane. Examples could be tile work or siding, things that help us understand the organization and module of a surface that does not itselfs shape a spatial volume.

Hidden lines:

Hidden lines show edges that are significant enough to note, but would otherwise be hidden by other spatial elements of a drawing. It might be something that is behind a wall or something that is overhead. It is typically shown with a dashed line.

Construction lines:

Construction lines when shown are the lightest lines of all. They are another abstract line in that they are not describing something that exists in the space being drawn. Instead, they describe the organizational system used to construct the drawing of the space.

Not all drawings will use all line weights, but the consistent rule is that lines that are more important in communicating the idea of the drawing will be darker. One way to think of it is the farther you get from the drawing the less important things disappear first and the most important things are what remain.

This chapter explores the work of Alvar Aalto and examines his use of lines as a conceptual tool. Aalto's approach was influenced by his early training in surveying and academic architectural design, leading him to incorporate contour lines into his sketches to define both land masses and topographical features. He believed that sketching, especially with lines, was crucial for generating architectural form, using a soft pencil to create free-flowing lines that allowed him to explore complex forms and spatial relationships. His sketches, archived at the Alvar Aalto Museum, offer valuable insights into his design evolution and reveal a dialogic process where he continuously refined and adjusted plans and sections based on their interrelationship. Aalto's mastery of line extended beyond representation; it served as a tool to explore the separation and

integration of spaces through the exploration of multiview drawings, line weight, and the influence of cartography. His upbringing instilled in him a deep understanding of contour lines, evident in his site plans where lines not only define topographical features but also weave buildings seamlessly into the surrounding landscape. Aalto's use of the esquisse, a rough draft of the complete building presented in plan, section, and elevation, further demonstrates the integration of traditional methods with the freely expressive architectural sketch that emerged in the early 20th century. His sketches often feature a central plan surrounded by projections into section, elevation, or perspective, showcasing his ability to explore and refine the design from multiple angles. Aalto's work demonstrates a profound understanding of the line's capacity to shape both form and concep.Aalto's lines were not merely descriptive; they acted as a means of integrating and dividing spaces, both in his sketches and in his built projects.

Aalto's drawings offer a unique perspective on his design process, particularly his approach to conceptual development in architectural representation. A significant collection of approximately 100,000 sketches and drawings by Alvar Aalto is archived at the Alvar Aalto Museum. (Mihoko Ando, 2016) These drawings are valuable for understanding Aalto's design approach and offer insights into his architectural thinking.

Aalto's design sketches are not merely visual artifacts but serve as active illustrations of the design process. They represent the evolution of ideas and reveal parallel strands within the design process for a particular building or project. These sketches can be studied in relation to each other and to Aalto's dated drawings from the intermediate and final design stages of a project. Here we will focus on the drawings that he developed for the Church of the Three Crosses (Vuoksenniska church). This analysis allows for a more comprehensive understanding of how Aalto developed his designs from the initial concept to the final realization.

Aalto's work exists at the intersection of the Beaux-Arts and the emergence of the modern movement. He integrates traditional methods of projected orthographics with the more freely expressive architectural sketch that emerged as an art of its own in the early 20th century. Aalto's father was a surveyor, and his cartographic work had a profound influence on Aalto's development as an architect. He described his time as a child drawing around the white table where his father and his team drew out maps of Finland, referring to that white table as his tabula rasa. This understanding of the Finnish landscape described through the contour lines of a map became central to the way his drawings developed his ideas of space. His use of contour moved freely between his sketches and his orthographic drawings.

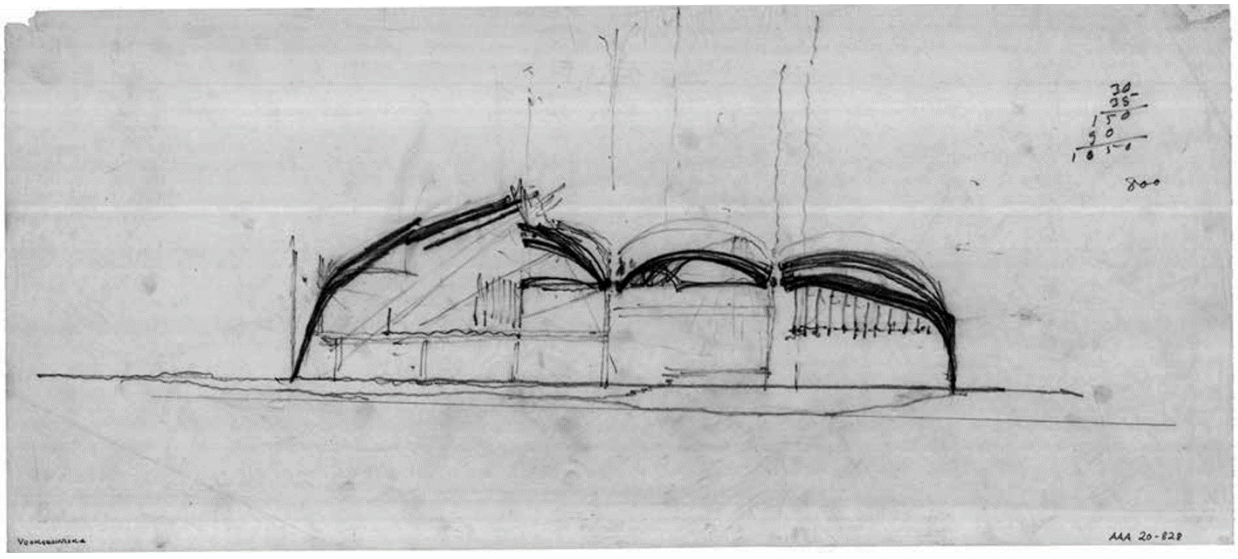
Aalto's sketches provide valuable insights into his unique way of conceptualizing and developing space, form, and structure in architecture, making them a significant resource for understanding his architectural representation. His use of expressive line work throughout his drawings and design process.

Aalto's mastery of the line

Aalto's mastery of line went beyond mere representation; it served as a tool to explore the separation and integration of spaces. Aalto used lines to compose his conceptualization of space, how space is shaped, divided and connected. conventions related to how lines are used help them carry meanings, but the line as a conceptual tool exists beyond these conventions.

> Architects draw lines for a living; lines with different ambitions and impacts — different weights, if you will. From concept drawing to computer model to construction document, the drawing of lines is central to the profession, to its cultural agency and disciplinary identity. Eventually these drawn lines become manifest in the world, in the form of buildings, spaces, objects; and more, in the form of urban systems and social environments. In drawing lines, architects project and produce future worlds. (Barber, 2024)

Aalto skillfully developed the relationships between plans and sections, elevations and perspectives, utilizing contour lines to simultaneously delineate interior volumes and exterior mass. This approach allowed him to manage the separation of internal spaces while shaping the external form of the building.



(Figure 2) Church of the three crosses, Alvar Aalto,1955

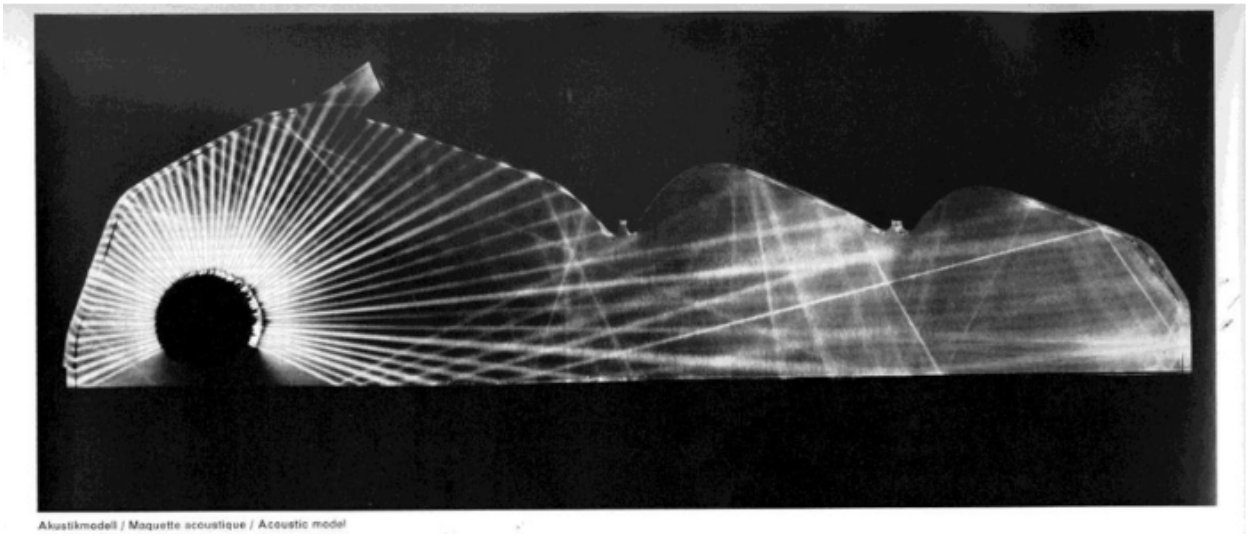
Throughout his plans, sections, elevations and perspectives Aalto makes regular use of a heavy curving line that contrasts with a straighter lighter line. The heaviest line always denotes the most significant figure in his spatial composition and that figure translates across modes of representation. (Hewitt, 1989)

> For the language of his architecture followed very closely the contours of the building programme he was following at the time. And it did this because of one very striking characteristic in the "structure" (abstractly speaking) of his creative attack. This can be epitomized by drawing two forms - an ideograph of two lines - one straight, the other serpentine; we can transform the lines into planes, and whether we view it as a plan or a section it will recall to us the archetypal Aalto space, in which the juxtaposition of a strictly flat plane with a rhythmically wavelike surface seems to charge the air of the space like the beating of a giant wing. But these two forms can also be imagined as the lines of an encephalogram - an imprint of the brain's processes, in the sense that there seems always to be in the "argument" of an Aalto building a complementarity between the rigorous plane of analysis and the turbulent wavelike surge of fantasy.
>
> - Colin St. John Wilson' 162 (Hewitt, 1989)

Aalto's sketches showcased a remarkable sensitivity to line weight, employing soft pencils or charcoal to gradually build up forms and explore intricate spatial patterns. Through this layering of lines, he could articulate the gradual separation of spaces within a building.

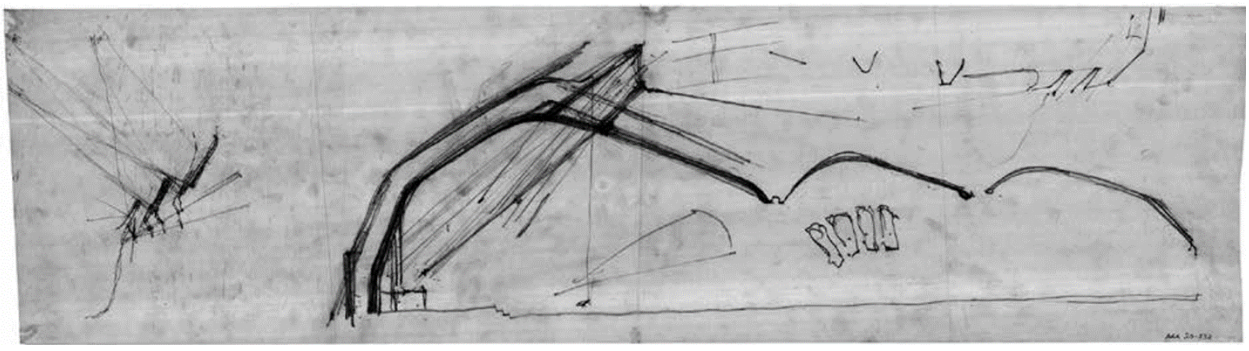
Aalto's upbringing as the son of a surveyor instilled in him a deep understanding of contour lines. This is evident in his site plans, where the lines not only define topographical features but also weave buildings seamlessly into the surrounding landscape. This approach exemplifies Aalto's skill in integrating spaces with their environment, blurring the lines between the built and natural worlds.

Aalto's use of line was fundamental to his ability to conceptualize the separation and integration of spaces. Through a combination of his mastery of contour, sensitivity to line weight, and the influence of cartography, he created spaces that were both thoughtfully delineated and harmoniously connected to their surroundings.



(Figure 3) Church of the three crosses, Alvar Aalto. Photograph of acoustical study model. The model cuts a section through the volume of the church and coats the walls with a reflective treatment. It then uses light at the location of the organ with slits to cast the light as focused beams. This creates a network of lines that depict the reflection and diffusion of sound through the space.

This acoustical model (figure 3) provides an excellent example of how lines can integrate. The lines of light show both direct connections of reflected sound through the chapel as well as showing its diffusion. This acoustical study helped inform changes in the shape of the space to improve the connection that parishioners would have with the sound of the organ. The changes in the shape of the roof appear in a later section sketch (Figure 3) which is drawn in a similar style to (Figure 1).



(Figure 4) Church of the three crosses, Alvar Aalto 1956

We see the same heavy line describing the figure of the space, but we also see that Alto is beginning to articulate the thickness of the roof and showing how light is carving through that thickness to the altar.

Through his masterful use of lines, Aalto demonstrated a unique approach to architectural design that emphasized the integration and division of both physical and conceptual space. His sketches, far from being simple drafts, became powerful tools for exploring and articulating architectural ideas, showcasing a profound understanding of the line's capacity to shape both form and concept.

Perspective

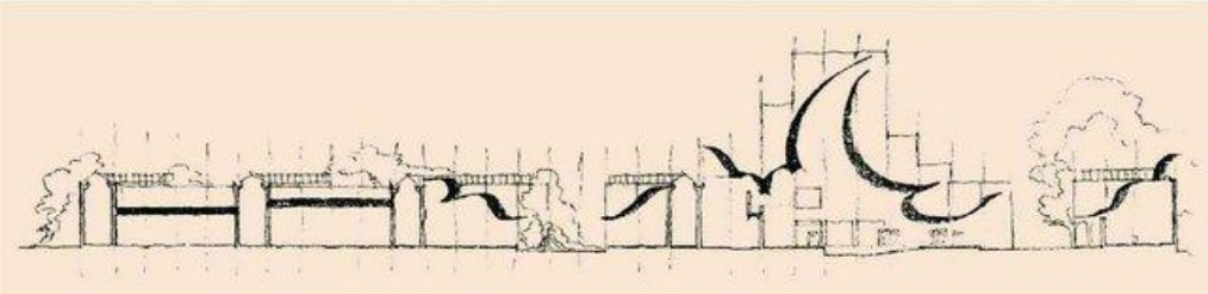
The principles of line hierarchy that we have discussed also exist in perspective drawings, but they can be extended to include other ways of communicating relative importance. Varying line weights can be used to create a sense of depth. Thicker lines can be used to represent closer objects, while thinner lines can be used to represent more distant objects.

Line weight can direct the viewer's eye. Thicker lines can be used to lead the viewer's eye to important elements of the design, while thinner lines can be used to deemphasize less significant components of a space or design.

(Figure 5) Bagsværd Church, Jørn Utzon. Two perspectives showing the concept of the clouds as a ceiling in the landscape and its manifestation in the church.

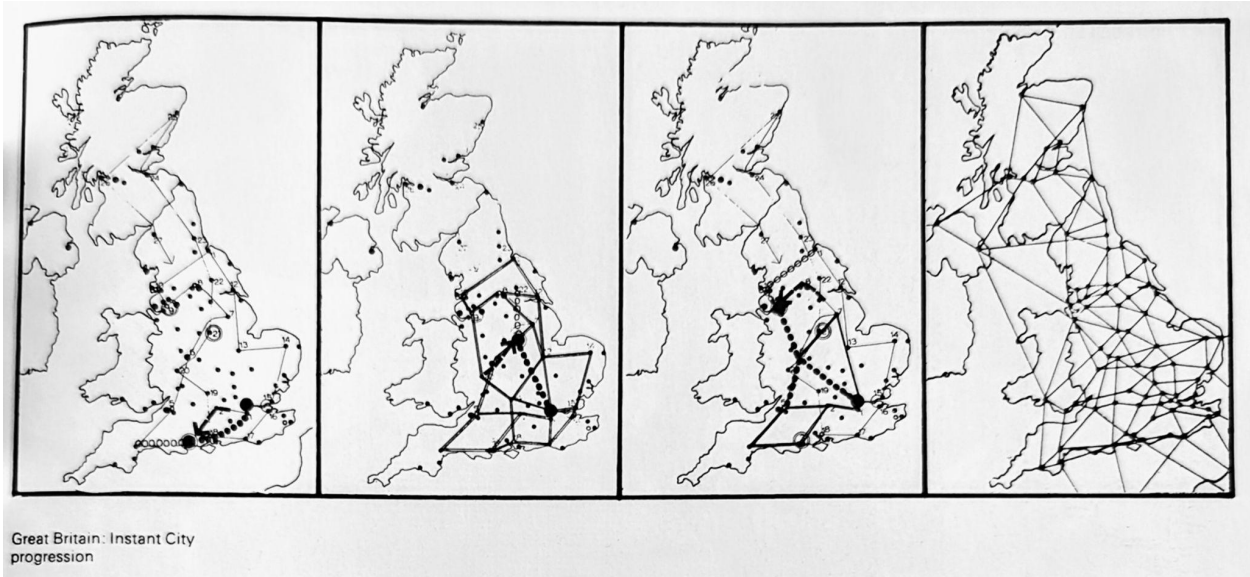
In this early conceptual sketch of Bagsværd Church, Jørn Utzon drew a perspective of a beach scene with clouds and a horizon. In the beach scene there are several types of line that transfer across to the conceptualization of the church's interior. In his landscape sketch he develops the clouds as figures in the sky with strong horizontal lines building the shadowed edge of the cloud and showcasing the glowing light

coming through the clouds. This becomes the driving figure in the space of the chapel, separating the interior from the exterior while simultaneously integrating the sky into the chapel. The construction lines in the landscape that develop the perspective to the horizon structure the space of the chapel with the vanishing point at the crucifix at the front of the space. The heavy line of the horizon in the landscape becomes the hard edge of the walls in the chapel. Finally, the simple lines of the human figures give us a sense of scale and enforce the perspective across both drawings. It is clear how the masterful use of line can so clearly conceptualize how spaces are understood.



(Figure 6) Bagsværd Church, Jørn Utzon. Section showing the organization of the church and its relationship to its ceiling

In this section again the lines that develop the ceiling are drawn in the darkest line weight. Like Aalto's drawings this communicates the visual weight of the ceiling and its significance as the driving force creating space in the building. The amorphous and undulating forms of clouds inform the shape of the section with the openings to the exterior allowing a diffuse light to wash down the surfaces of the ceiling creating an effect like that of clouds and sunlight. In contrast to the clouds, we see lines being used as a regular measure across the project bringing a logic to the construction of the outer walls of the church. It builds a relationship that integrates the strict measure of the outer walls with the fluid ceiling.

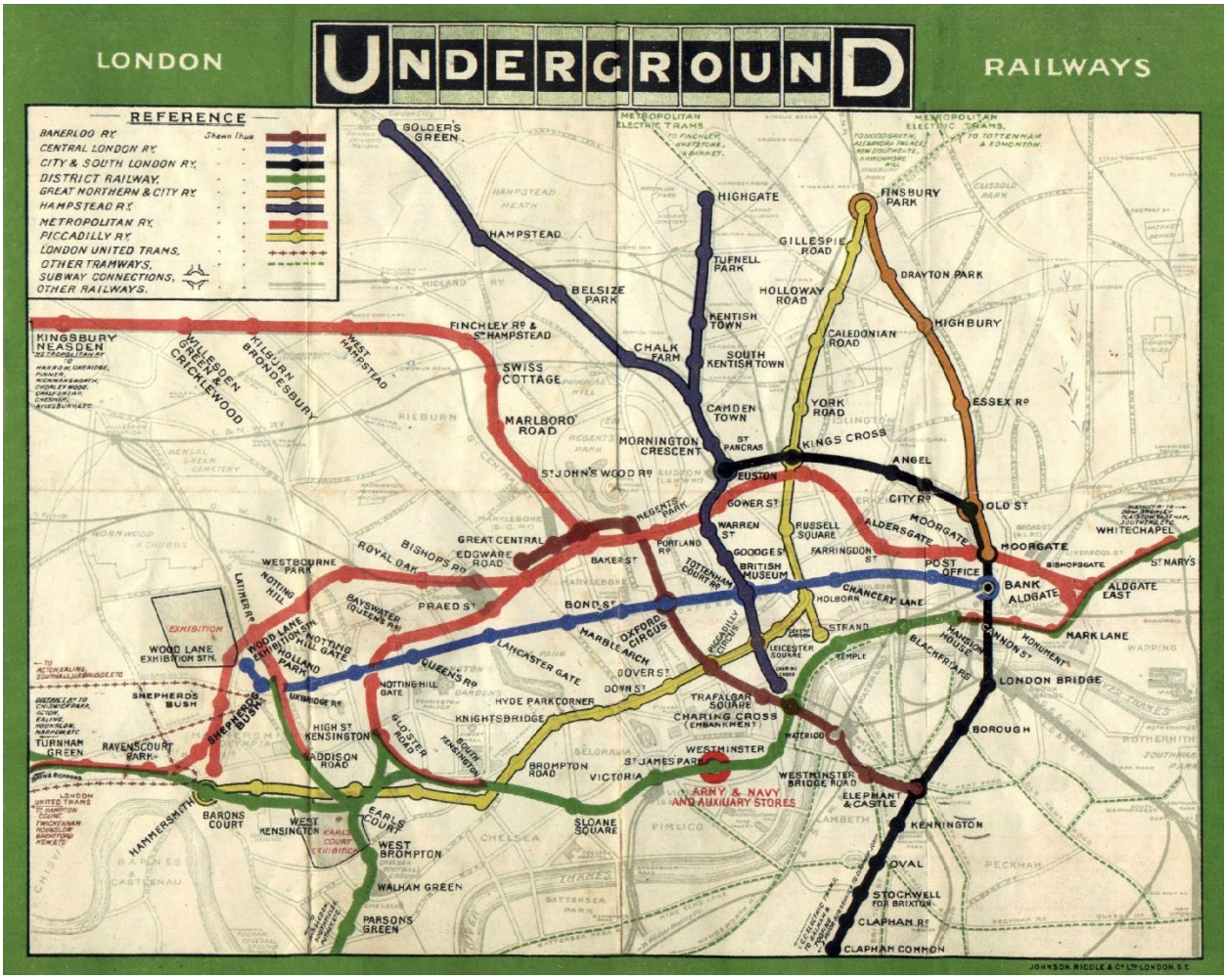


(Figure 7) 1969 Diagram showing the procession of the instant City across the British landscape.

Maps

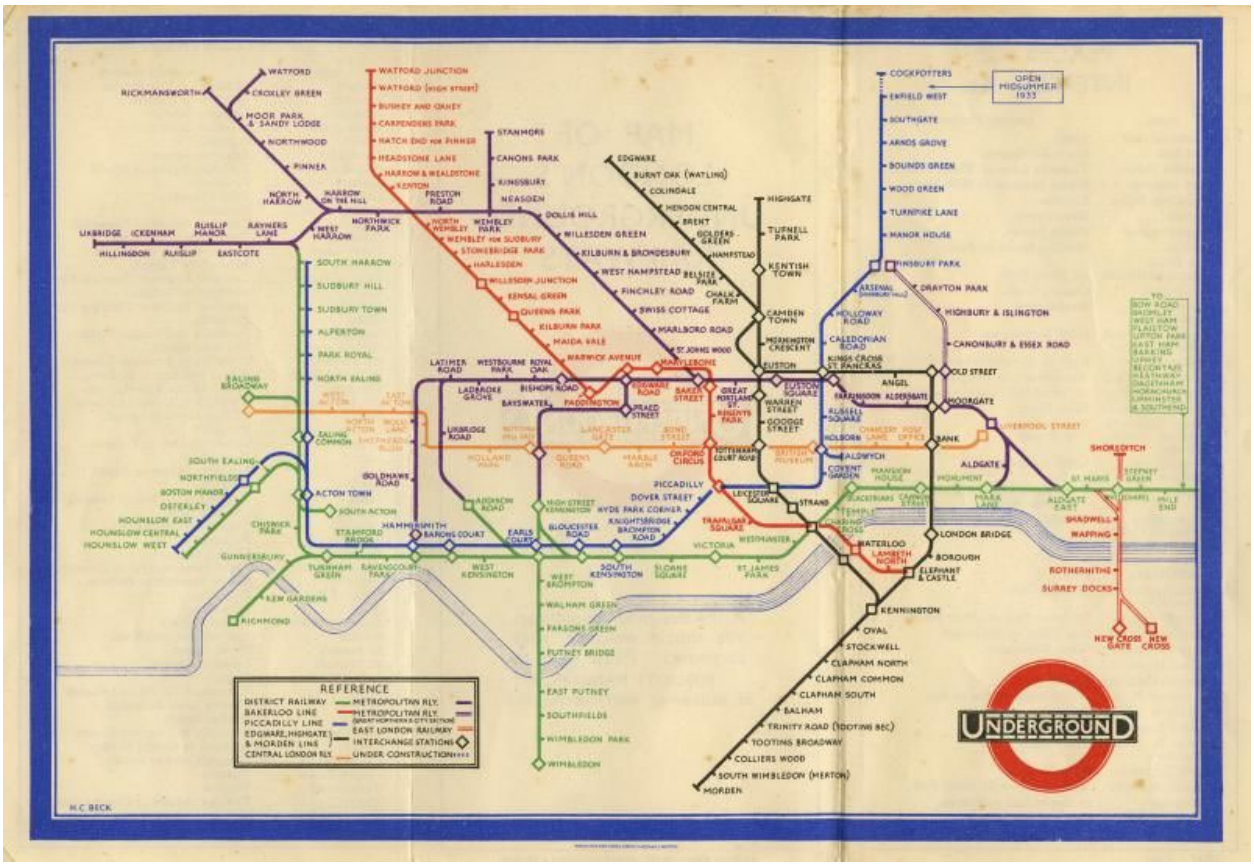
The instant City by Archigram was a concept for a mobile city that would be carried across the English landscape in a blimp and deployed as center for the arts and culture in towns throughout the UK. In the diagram above Archigram uses lines to literally draw out the network of the instant city as it grows over time. The instant City Network is conceptualized as a freely integrated network of locations that the instant city travels between and deploys its pop-up cultural center in. Lines are commonly used to communicate paths of travel.

In the case of the London Underground the The paths of travel are referred to and represented as lines The earliest maps of the London underground separated each tube line by color and showed each station as a labeled dot. The first several iterations of this map surface feature such as roads and parks. The location of each lime on the map was geographically true to reality, but these early maps were reportedly confusing riders of the tube.



(Figure 8) Underground map 1908. This map was printed as both a poster and a pocket guide and was the first map to consolidate all the railways into a single map. It was also the first use of the font that has become iconic as the the Underground Brand.

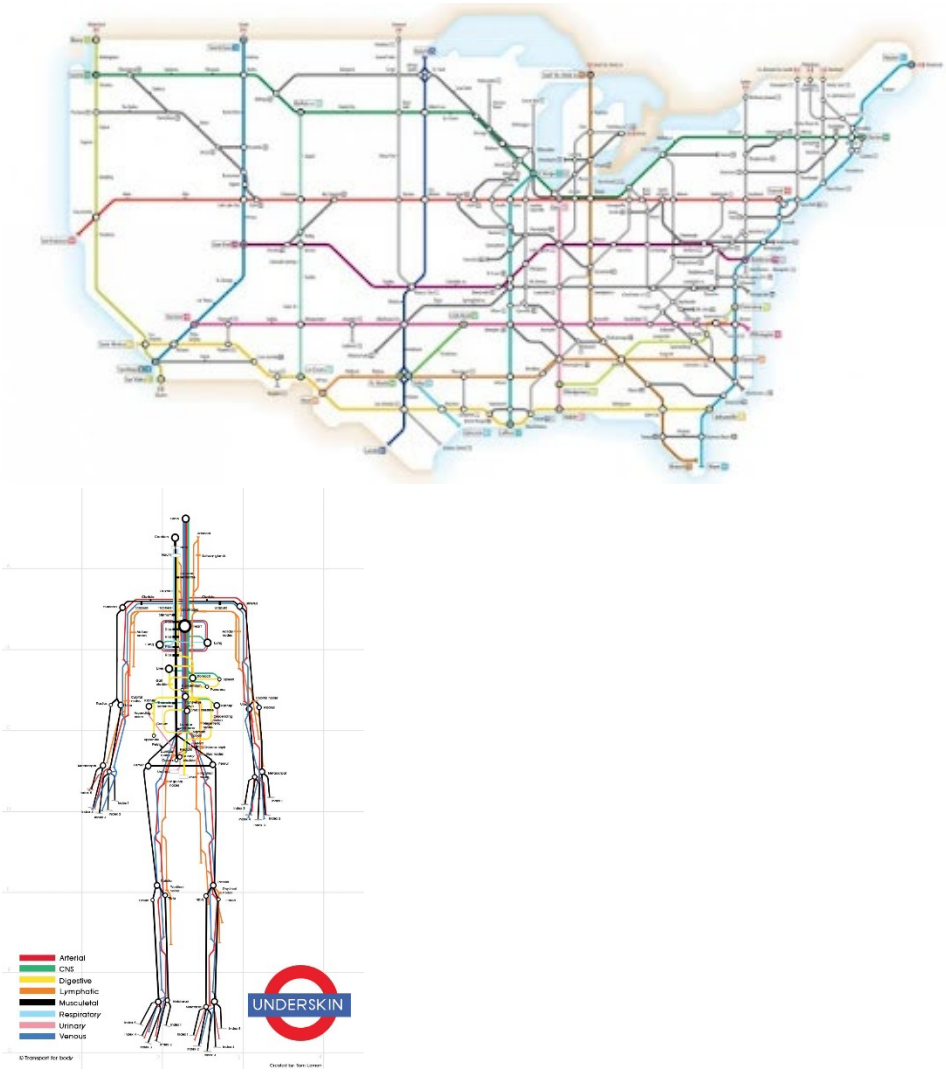
It wasn't until the 1933 Henry Beck map that the underground map gained more clarity. Beck abstracted the lines away from their geographical context and simplified the direction of the track so that all the lines ran either vertical, horizontal, or at a 45° angle. This gave each line a distinct geometry that was easy to distinguish from the others. He also made the distance between each station identical on the diagram so that riders could easily understand the number of stops that they would have to go on a given line. This made it very clear which stops belonged to which line, how many stops a rider would have to make before transferring to a different line and how each line fit into the greater network of the London Underground.



(Figure 9) Henry Beck map 1933. The first pocket edition of the diagrammatic style of Underground map designed by Henry C Beck. It highlights the use of 45-degree angles and diamonds to illustrate interchange stations.

We can easily see the hierarchical tree of the underground with each station belonging to a line in the greater train system. But we can also think of it as a network with each station connected to every other station through integrated lines.

The underground style map has become ubiquitous in communicating systems of overlapping and integrated transportation. In the images below, how this logic of connection along discreet paths is integrated into a broader framework of mobility.



(Figure 10) Two images showing how the conventions of the underground map have been adopted to show other modes of transportation such as the highway system and the exchange systems of the body.

From showing how the interstate highway system is connected to showing the integration of systems in the human body, each line is unique, each intersection is discreet but the whole system is integrated into a network of interdependence.

Conclusion

The line is a powerful conceptual force that can either divide or connect; it is a critical tool in understanding conceptual frameworks. This chapter explored the use of the line in architectural drawings as a tool for representing relationships and conveying conceptual hierarchy. It focused

on how line weight, contour lines end the line as a figural element can be used to create both frameworks of hierarchy and networks. The line is a versatile conceptual tool, capable of dividing or connecting, symbolizing edges or paths, and ultimately shaping both form and concept in architectural design. Lines describe abstracting edges and connections. Borders and edges, which separate space, are conceived as lines. Lines also describe connections such as paths, bridges, and sightlines. Lines are the primary force that organizes a drawing by defining boundaries and describing interdependencies.

The line is a literal figure on the page, but it also is a symbolic form that reaches deeply into our conception of the world. We describe our own relationship to the world through lines, lines that connect and lines that divide. As we conceive of spatial relationships with lines we are creating a representation of a concept that gives shape to the world that we design.

References

Ching, Francis D. K, and Steven P Juroszek. 2018. Design Drawing. Third edition. Hoboken, New Jersey: John Wiley & Sons, Inc.

Hewitt, Mark Alan (2019) “Sketches as Cognitive Traces: Alvar Aalto at Imatra.” New Design Ideas, vol. 3, no. 1, pp. 5–20.
Hewitt argues that the sketches of prominent architects can be viewed as "cognitive traces," revealing the historical patterns of thought that inform the design process. The source introduces the concept of "exograms," or external memory triggers, and uses the Church of the Three Crosses at Imatra, designed by Alvar Aalto, as a case study to demonstrate how these loops operate in practice. Ultimately, Hewitt calls for greater collaboration between architects, historians, and cognitive neuroscientists to further illuminate the connection between design thinking and visual perception.

Hewitt, Mark A (1989) "The Imaginary Mountain: The Significance of Contour in Alvar Aalto's Sketches." Perspecta, vol. 25, pp. 162-77.
Hewitt argues that Aalto's seemingly "irrational" sketches are, in fact, evidence of a systematic and rational design methodology rooted in his academic training and influenced by cartography. Aalto's sketches reveal a deep understanding of the reciprocity between plan, section, and massing, allowing him to explore complex spatial configurations through contour lines. This meticulous approach, combined with his intuitive exploration of forms, allowed Aalto to achieve a unique synthesis of space and mass, producing innovative and celebrated architectural designs.

Ando, Mihoko. 2018. “Reprise and Continuity in Alvar Aalto′s Design Process for Three Churches.” Journal of Asian Architecture and Building Engineering 17 (2). Tokyo: Japan Science and Technology Agency: 237–44. doi:10.3130/jaabe.17.237.

Ando, Mihoko. 2016. “Retracing Alvar Aalto’s Design Process through the Sketches and Drawings of Vuoksenniska Church (1955–8).” Arq (London, England) 20 (4). Cambridge, UK: Cambridge University Press: 333–44. doi:10.1017/S1359135516000567.

Enckell, Ulla (1998). Alvar Aalto: Taiteilija – Konstnären – The Artist. Helsinki: Amos Anderson Museum. ISBN 952-9531-25-7.

Barber, Daniel A (January 2024). "Drawing the Line." Places Journal. Accessed 11 Feb 2024. https://placesjournal.org/article/drawing-the-line-architecture-in-the-anthropocene/.

Erwin Panofsky, Perspective as Symbolic Form (New York : Zone Books: Distributed by the MIT Press, 1991) 66-72.
In this book, Panofsky argues that perspective is not simply a mathematical system for representing three-dimensional space on a two-dimensional surface. Rather, he argues that perspective is a symbolic form that reflects the worldview of the Renaissance. Panofsky traces the development of perspective from its origins in ancient Greece to its flowering in the Renaissance. He argues that perspective was not simply a technical innovation, but also a cultural one. Perspective helped to shape the way that Renaissance artists and viewers saw the world. Panofsky's book is focused on the Renaissance. It does not consider the development of perspective in other cultures or periods.

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Figure 3	Hewitt, Mark Alan (2019) “Sketches as Cognitive Traces: Alvar Aalto at Imatra.” New Design Ideas, vol. 3, no. 1, pp. 5–20.
Figure 4	Ando, Mihoko. 2016. “Retracing Alvar Aalto’s Design Process through the Sketches and Drawings of Vuoksenniska Church (1955–8).” Arq (London, England) 20 (4). Cambridge, UK: Cambridge University Press: 333–44. doi:10.1017/S1359135516000567.
Figure 5	Chen-Yu Chiu, Philip Goad, Peter Myers, Nur Yıldız Kılınçer, My Country and My People and Sydney Opera House: The missing link, Frontiers of Architectural Research, Volume 8, Issue 2, 2019, Pages 136-153, ISSN 2095-2635, https://doi.org/10.1016/j.foar.2019.03.002.
Figure 6	Chen-Yu Chiu, Philip Goad, Peter Myers, Nur Yıldız Kılınçer, My Country and My People and Sydney Opera House: The missing link, Frontiers of Architectural Research, Volume 8, Issue 2, 2019, Pages 136-153, ISSN 2095-2635, https://doi.org/10.1016/j.foar.2019.03.002.
Figure 7	P. Cook (1973). Archigram, Praeger Publishers, New York
Figure 8	London Transport Museum. “Mapping London: The Iconic Tube Map.” London Transport Museum, n.d. https://www.ltmuseum.co.uk/collections/stories/design/mapping-london-iconic-tube-map.
Figure 9	London Transport Museum. “Mapping London: The Iconic Tube Map.” London Transport Museum, n.d. https://www.ltmuseum.co.uk/collections/stories/design/mapping-london-iconic-tube-map.
Figure 10	Vizworld. "Sam Loman's Underskin Visualization." Vizworld, March 3, 2010. https://vizworld.com/2010/03/sam-lomans-underskin-visualization/. and Cameron Booth. Interstate Highways as a Subway Diagram. 2020. [website] Retrieved from https://www.transitmapstore.com/products/interstate-highways-as-a-subway-diagram/.

Chapter 3: (Process) Discovering the Dialogic

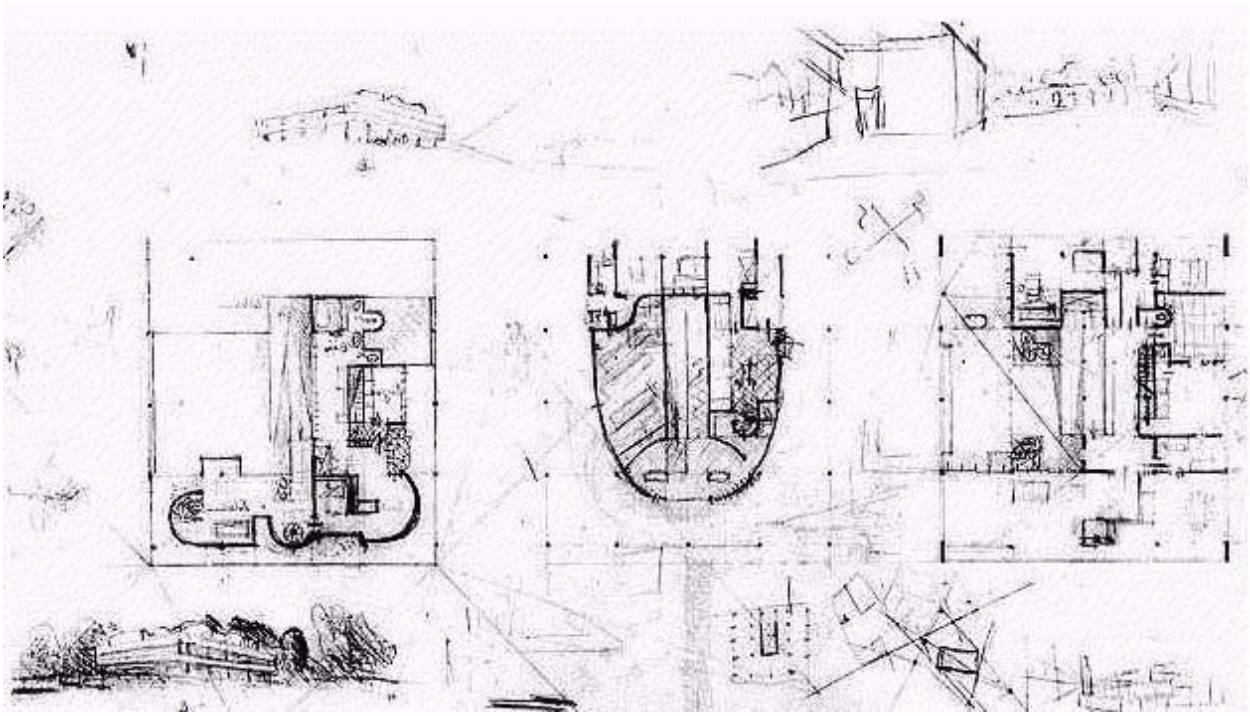
Chapter Abstract

This chapter examines the structures of hierarchy and network in the architectural drawings of Alvar Aalto, Archigram and Carlo Scarpa through the dialogic and the carnivalesque. Mikhail Bakhtin views the dialogic as the fundamental nature of language and reality, where meaning emerges through the interaction and exchange between different voices and perspectives. From the dialogic comes the carnivalesque which he describes as a process in which people dissolve the hierarchies of the everyday and come together with a multiplicity of voices to create a new communal synthesis by the integration of diverse parts. In this context “hierarchy” refers to division, categorization and nesting and “network” encompasses the joining, interrelation and conversation that knits together the understanding of the drawings. The carnivalesque and the dialogue between these forces are clear in the drawings of Aalto (Church of the Three Crosses), Archigram (instant city) and Scarpa (Castelvecchio). Their depictions of human life are dependent on these structures, which create limits and boundaries. However, their drawings break these boundaries and transcend these limits in important ways. The dialogic and the carnivalesque provide frameworks to explain how these designers break free of boundaries and restructure new systems of integration by creating a space for a multiplicity of voices. They show the interaction between hierarchical and network frameworks and how they develop relationships in the process of design representation. In Aalto's work we see the dialogic formed through many discreet drawings that all reference and build on each other. In the work of Archigram we see the carnival unfold describing the process of how the Instant City breaks down the hierarchies of a town and creates a place for a multiplicity of voices. Scarp's drawings are themselves of the carnival with a multiplicity of voices embodied in his process. This multiplicity is important because architecture must contend with the interplay of static and dynamic elements so that they can synthesize those elements into a coherent whole.

Process

The drawings made by Alvar Aalto, Archigram and Carlo Scarpa are excellent examples of how the conceptual frameworks of hierarchy and network relate to representation as a process. All three sets of drawings operate within hierarchical frameworks, but also break free of them to expand their conception of the spatial systems developed in their designs. This chapter describes how these drawings embody the idea of the dialogic as a conversation between hierarchy and integration. It explores the question of how boundaries are created within the drawings and how those boundaries are broken to allow a new integration.

Esquisse



(Figure 1) Esquisse "Villa Savoye" (Le Corbusier, 1929)-. Source : "Le Corbusier, Architecte Artiste"

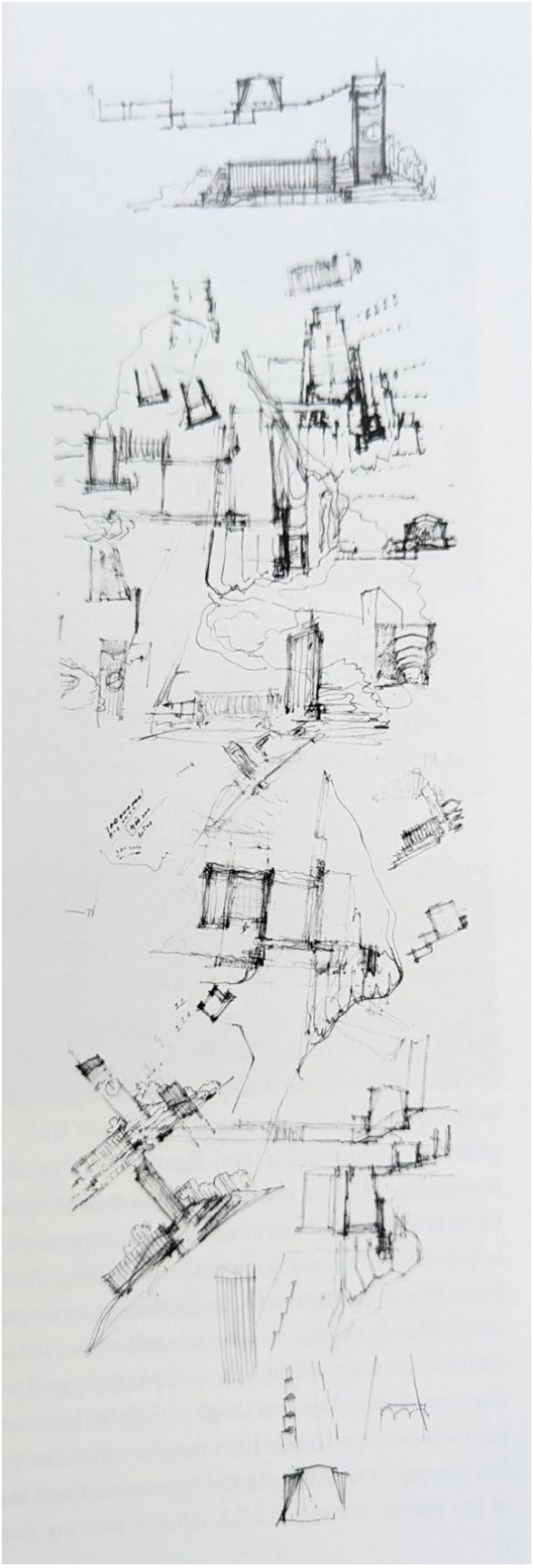
To begin this conversation of process let us start with the esquisse. An esquisse is an academic drawing like a rough draft of an entire building. It is a multi-view drawing composed on a single page. It is always presented in plan, section, and elevation, following a conventional layout. Esquisses were used during the design competition process in the French Beaux-Arts architectural education system. They acted to assess the overall quality of a design concept. The building was understood through the dialogue between the different views. (Hewitt, 2019) The esquisse was the first full conceptualization of a building in a larger design process. The layout of discrete drawings all emanating from a central plan is a hierarchical conception of composition see figure 1. However, the shared scale, construction lines and integration of elements across the page can be thought of as a Network. This idea of the multi-view drawing as a set of discrete drawings and a simultaneous integration of ideas extends beyond the esquisse into the greater architectural design process.

Alvar Aalto's design process was heavily influenced by his early training in architectural design at the Helsinki institute of technology institute of technology which followed the Beaux-Art convention and his exposure to surveying from his father. He frequently used contour lines, a tool from cartography, to define both land masses and topographical features in his drawings. This approach is evident in his sketches for the Church of the Three Crosses at Vuoksenniska, where he integrated building forms with the natural

contours of the site. His design process moved freely between the esquisse and the gestural sketch with shared elements integrating the two modes.

The concept sketch, which encapsulates several design aspects in a single stroke, became an iconic form of architectural expression during the twentieth century. Aalto's early architectural training at the Helsinki Institute of Technology was heavily influenced by Beaux-Arts principles and emphasized drawing. Aalto's design process was thus formed around conventional techniques of academic architectural representation the esquisse method, wash rendering, and pencil line drawings. Even in his early work, he tended to resist using heavy shade and shadow rendering. Instead, he favored line drawings, primarily using pencils. (Hewitt, 2019)

Aalto clearly believed that the act of sketching was fundamental to the creation of architectural form. His free approach to space and mass is precise and sophisticated. Aalto was also rigorously governed by a thought process that was architectural, not painterly. His concept sketches are often extraordinary multiple representations informed by the esquisse technique: a tiny plan or plans are placed at the center, surrounded by projections into section, elevation, or perspective. His formal ideas were expressed in the emerging lines, tracing plan, masses, and contours of land and building form. (Hewitt, 1989)

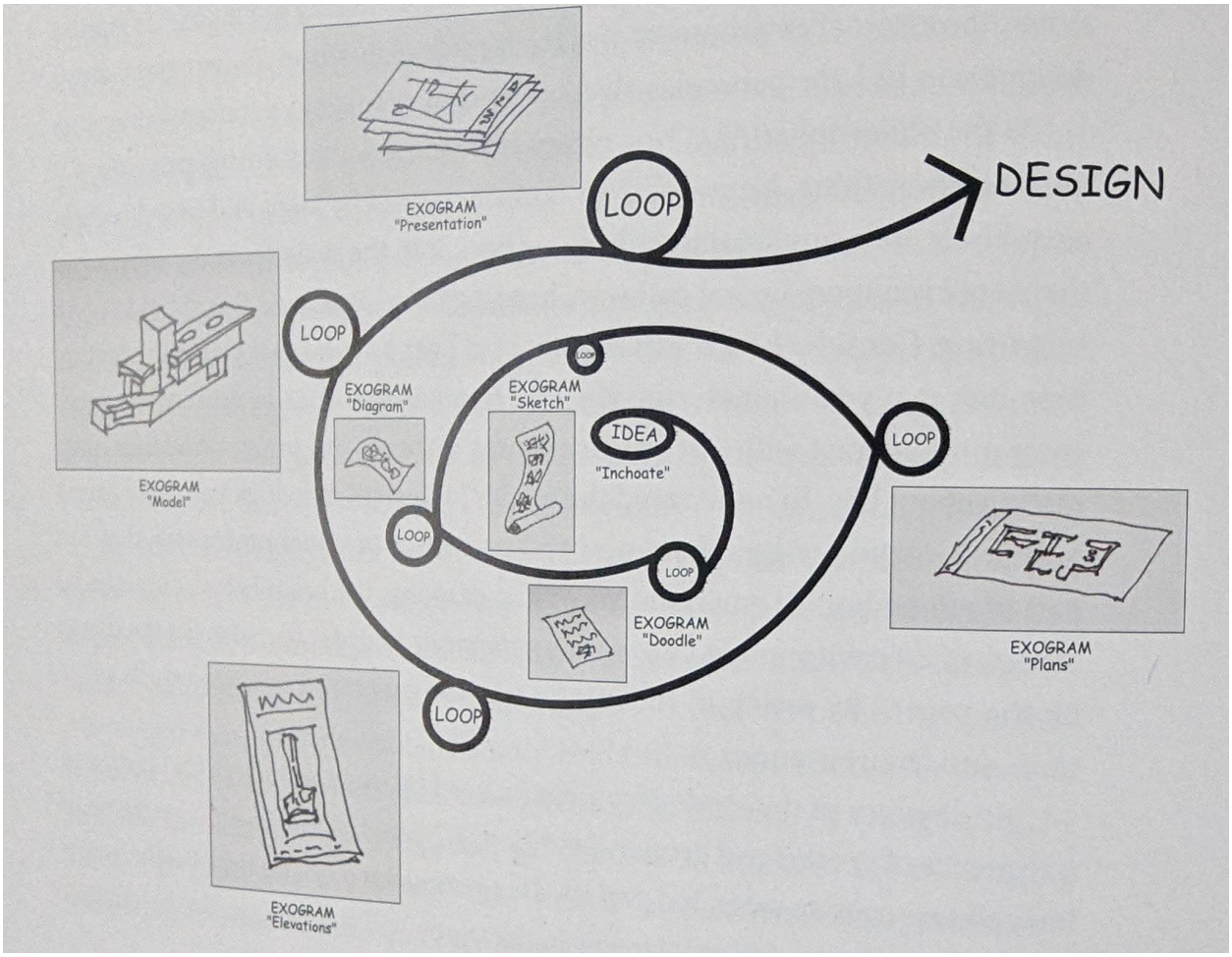


(Figure 2) Competition entry Fora Church, Lahti, Finland,Alvar Aalto, Preliminary sketch. Alvar Aalto Foundation

Aalto's sketches also demonstrate a willingness to find a representational mode suitable to each problem after working out the basic ideas. Aalto's apparently indecipherable concept sketch of the church at Lahti (Figure 2) is in fact an extraordinary multiple representation informed by the esquisse technique: a tiny plan or plans at the center, surrounded by projections into section, elevation, or perspective. (Hewitt, 1989) Even in Aalto's later work, the esquisse method was used in conjunction with a more intuitive design process to produce the complex buildings of his later years.

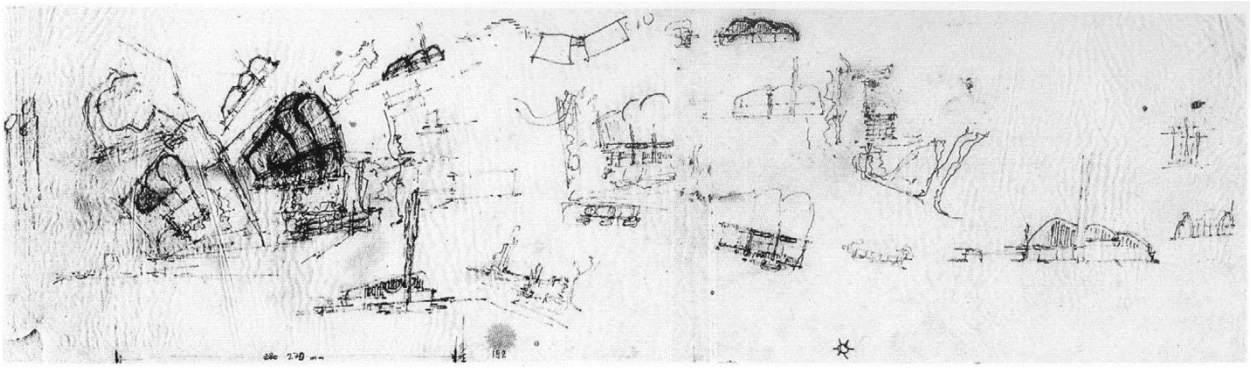
The Action-Perception Cycle and the Role of Sketches

When architects begin a design, they initiate a continuous feedback loop of actions (drawing, sculpting, painting) and perceptions (seeing and judging the artifacts in front of them). Psychologists, neuroscientists, and architects have recognized these cycles of cognition. (Hewitt, 2019) This cycle allows architects to "survey" the problem before them by physically rendering part of its perceptual content in some external form, such as a drawing or model. In this way, they can "see" the problem more clearly, thereby understanding what steps to take in order to advance that understanding to the next level.



(Figure 3) Diagram showing the creation and perception cycle as described by Hewitt.

We clearly see this looping cycle of creation and perception in the approach that Aalto takes to the esquisse as each drawing on the page references all the others. (Hewitt, 2019) This ever-expanding dialogue in the esquisse can be expanded out into his greater process with drawings made years apart clearly referencing each other.



(Figure 4) Church of the three crosses, Alvar AaltoOne of the first esquisse for the Church of the three crosses. The three curves of the chapel move across the Page shown in the darkest lines. The idea of these three volumes is Central to the articulation of the space.

Aalto's design process was characterized by a continuous dialogue between different design elements and a cyclical return to earlier ideas, resembling a conversation unfolding on the page. This dialogic approach is evident in several aspects of his work:

Interplay of plan, section, and mssing: Aalto viewed the design process as a dynamic interplay between plan, section, and massing, where each element informed and responded to the others. He would sketch numerous variations of plans and sections, constantly refining and adjusting them based on their interrelationship. This iterative process created a continuous feedback loop where modifications in one element triggered adjustments in the others.

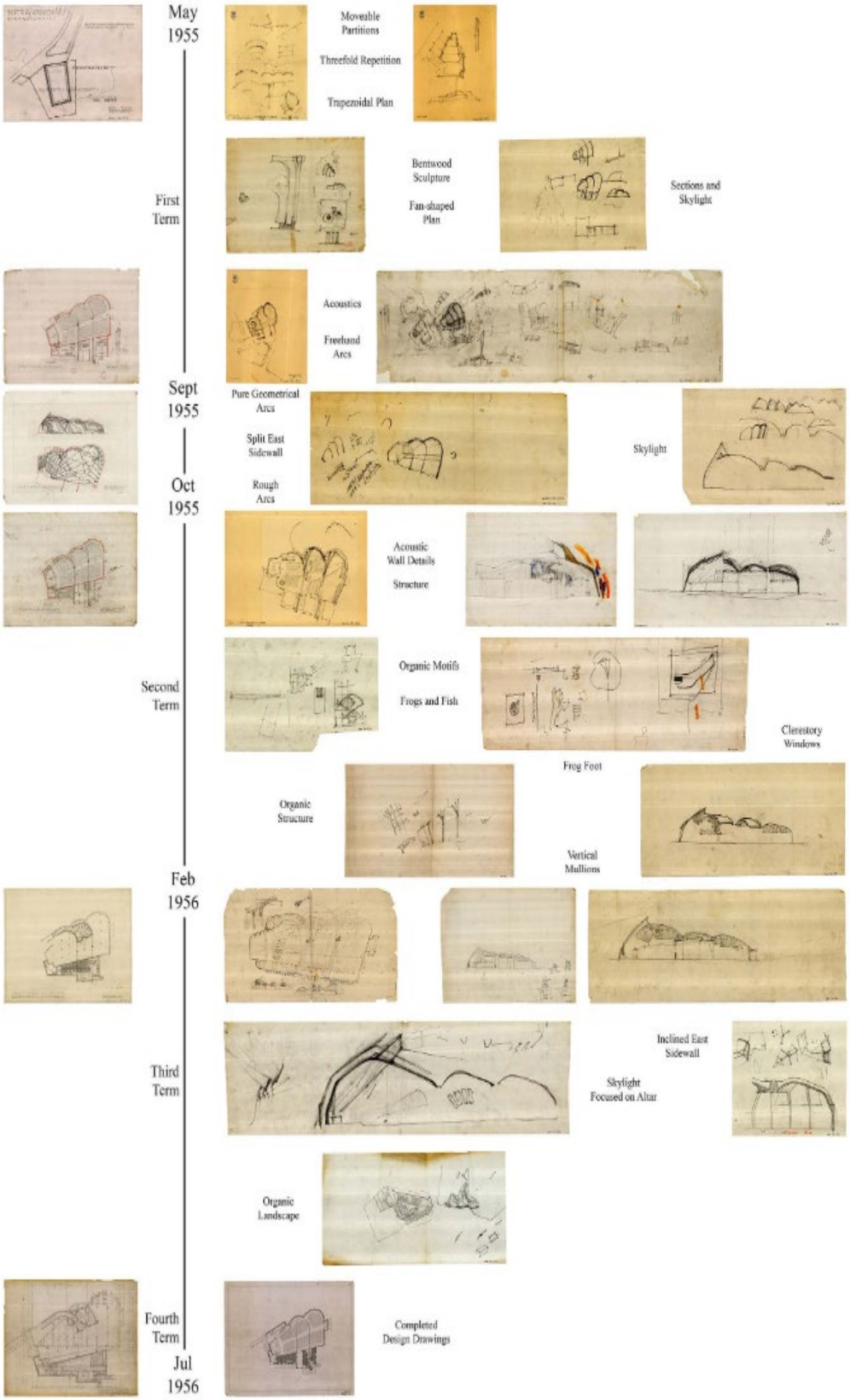


Fig.3. The Approximate Timeline of the Design Process for Vuoksenniska Church Showing Aalto's Key Sketches and Drawings

(Figure 5) This diagram prepared by Mihoko Ando organizes the design drawings of the church chronologically showing that Aalto often moved back and forth between well-developed production drawings and freely expressive sketches.

Aalto frequently revisited and repurposed design elements from previous projects, adapting them to new contexts. He saw these elements not as fixed forms but as malleable starting points that could be modified, repeated, or scaled to address different design challenges. This cyclical return to earlier ideas fostered continuity in his work, allowing him to build upon previous explorations and establish a rich vocabulary of architectural forms. (Ando, 2018)

The dialogic

This notion of an action perception cycle in which each action is perceived and becomes part of a greater cognitive dialogue can be better understood through Bakhtin's notion of the dialogic. According to Bakhtin (Morson and Emerson,1990, p. 51), dialogue lives on the boundaries between individuals: not in the sense of a meeting between isolated entities that exist "within" the boundaries, but actually on the boundaries. According to Bakhtin, dialogue is not a meeting between two isolated individuals who exist independently of each other. Rather, dialogue is a process that takes place on the boundaries between individuals. These boundaries are not fixed or static, but are constantly being negotiated and renegotiated. In this way, dialogue is not simply a matter of exchanging information or ideas, but is also a process of creating and recreating meaning.

Aalto's sketching technique was central to this dialogic process. He employed a loose line style that facilitated a fluid exploration of ideas. Sketches were not mere representations of finished concepts; they were tools for thinking, for uncovering hidden potentialities within a design. By layering lines, Aalto could gradually build up forms and spatial relationships, allowing ideas to emerge and evolve through the act of drawing.

Bakhtin argues that there is no such thing as a "self" that is independent of others. Rather, the self is always in dialogue with others. This is because the self is not a fixed entity, but is constantly being constructed and reconstructed through interaction with others. In this way, dialogue is not simply a way of communicating with others, but is also a way of creating and recreating the self.

Aalto's drawings often featured marginalia, notes and annotations that provided insights into his thought process. These marginal explorations are not unlike those found in the work of Carlo Scarpa. These markings served as a running commentary on the design, revealing his internal dialogue and the evolution of his ideas. Moreover, his drawings

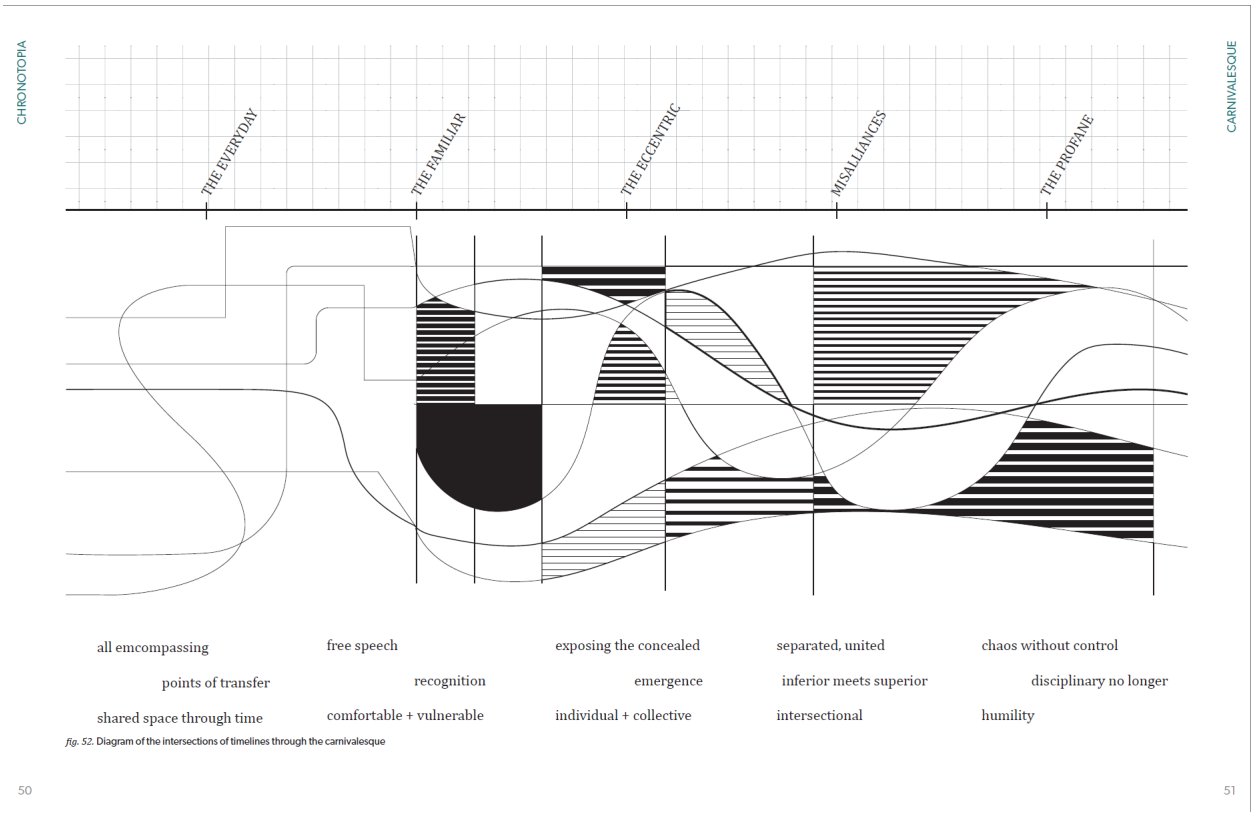
would often engage in a visual conversation across the page, with different sketches responding to and informing each other. This visual dialogue further emphasized the interconnectedness of Aalto's design process and the cyclical nature of his explorations.

The boundaries between individuals are not simply physical boundaries, but also psychological and social boundaries. These boundaries are created by our language, our culture, and our social interactions. They define who we are and who we are not. However, these boundaries are not fixed or static. They are constantly being negotiated and renegotiated through dialogue. "no living word relates to its object in a singular way."(Bakhtin, 1981, p. 276) Between the speaking subject, the word that is spoken, and the object spoken of, there is "an elastic environment of other words about the same object... it is precisely in the process of living interaction with this specific environment that the word may be individualized and given stylistic shape."(Bakhtin, 1981, p. 276)

Aalto's dialogic approach to design fostered a dynamic and iterative process in which ideas emerged and evolved through a continuous conversation between different design elements, a process that was deeply embedded in his sketching technique.

Carnivalesque

The carnivalesque is a literary mode described by Mikhail Bakhtin that disrupts and releases a dominant structural system through disruption and inversion of hierarchies. In doing this the carnivalesque breaks the inertia of the everyday allowing the emergence of new associations and integrations. It is characterized by four stages (Bakhtin, 250), the familiar, the eccentric, the misalliance, and the profane. As a literary mode the carnivalesque is a way of understanding the human experience through the lens of Homo Ludens (man who plays). As a literary mode the carnivalesque is a mode that illustrates how we as humans can find new connection and integration through the chaos of disrupted hierarchies. As a tool to understand human life it can easily be extended to architecture to create designs and design processes that break free of hierarchical structures and create new systems of integration by allowing a multiplicity of voices.



(Figure 6) The stages of the carnivalesque, Emily Terzic,Chronotopia: A Festival for a Pluralist Public Realm

The Familiar

The Familiar is the first of four principles that Bakhtin identifies as essential to the carnivalesque. The Familiar is the basis for free interaction among a community, and it is expressed through the carnival's flattening of hierarchies. The carnival brings together people from all walks of life, regardless of their social status or economic class. This leveling of the plane of interaction creates a sense of familiarity and equality among participants.

> The laws, prohibitions, and restrictions that determine the structure and order of ordinary, that is noncarnival, life are suspended during carnival: what is suspended first of all is hierarchical structure and all the forms of terror, reverence, piety, and etiquette connected with it - that is, everything resulting from socio- hierarchical inequality or any other form of inequality among people (including age). All distance between people is suspended, and a special carnival category goes into effect: free and familiar contact among people. This is a very important aspect of a carnival sense of the world. People who in life are separated by impenetrable hierarchical barriers enter into free familiar contact on the carnival square. The category of familiar contact is also responsible for the special way mass

> actions are organized, and for free carnival gesticulation, and for the outspoken carnivalistic word. (Bakhtin,p250)

The Eccentric

Following the Familiar is the Eccentric. The Eccentric manifests as a counter site, or a place where people can escape from the constraints of everyday life and experience a sense of freedom and liberation. In the Eccentric, individuals are able to emerge from the center of their identity and become a part of a larger community. The Eccentric is a place where people can experience a sense of converging time, as they are able to break free from the constraints of the everyday and experience a new sense of possibility. It is a powerful force for change, as it can provide people with a space to challenge the status quo and create new ways of being. The Eccentric is a place where anything is possible, and it is a place where people can come together to create a new world. The Eccentric is a force for change, and it is a place where people can experience a sense of freedom and liberation.

> "Carnival is the place for working out in a concretely sensuous, half-real and half-play-acted form, a new mode of interrelationship between individuals, counterposed to the all-powerful socio-hierarchical relationships of noncarnival life. The behavior, gesture, and discourse of a person are freed from the authority of all hierarchical positions (social estate, rank, age, property) defining them totally in noncarnival life, and thus from the vantage point of noncarnival life become eccentric and inappropriate. Eccentricity is a special category of the carnival sense of the world, organically connected with the category of familiar contact; it permits in concretely sensuous form the latent sides of human nature to reveal and express themselves." (Bakhtin,p250)

The Carnivalistic Misalliance

Third, the Carnivalistic Misalliance occurs when what is normally separated is integrated. "A free and familiar attitude spreads over everything: over all values, thoughts, phenomena, and things. All things that were once self-enclosed, disunified, distanced from one another by a noncarnivalistic hierarchical worldview are drawn into carnivalistic contacts and combinations. Carnival brings together, unifies, weds, and combines the sacred with the profane, the lofty with the low, the great with the insignificant, the wise with the stupid". (Bakhtin, p250) Everything comes in contact with everything else creating a multiplicity of voices, all intertwined and mixed into one shared place. Contact exists in a free network of crisscrossed and intersectional association. This contrast of noncarnival states creates new meanings that challenge the status quo and can lead to new connections through these misalliances.

The Profane

The fourth category of the carnival is the profane. The profane is a moment of release from the strict rules of piety and social order. The profane is also a celebration of the process of change, rather than change itself. The profane is a time of freedom and liberation. It is a time to let go of the rules and to celebrate the chaos and disorder of life. The profane is a time to create new possibilities and to imagine a different world. Bakhtin describes the profane as big collection of

“carnivalistic blasphemies, a whole system of carnivalistic debasings and bringings down to earth, carnivalistic obscenities linked with the reproductive power of the earth and the body, carnivalistic parodies on sacred texts and sayings, etc.” (Bakhtin, p250). The profane is simultaneously the most integrated stage of the carnivalesque and the most removed from the everyday of the non-carnival.

The carnival breaks free of hierarchical structures to create new connections. The traces of the pre-existing hierarchy remain but the carnival allows for a new understanding of how a multiplicity of parts can be integrated into a whole. It allows for the dialogic of rational division of space and the experiential integration of place. Woven through the stages of the carnivalesque are the dialogic, chronotope and the lived presentation. These ideas are integral to the carnival and culminate in the profane with an integration of multiple voices and ideas into a singular presentation of the carnival.

The stages of the carnivalesque create an environment within which the dialogic flourishes. Bakhtin describes the images of carnival aa “dualistic; they unite within themselves both poles of change and crisis: birth and death (the image of pregnant death), blessing and curse (benedictory carnival curses which call simultaneously for death and rebirth), praise and abuse, youth and old age, top and bottom, face and backside, stupidity and wisdom”. (Bakhtin, p253) he describes these paired images as being characteristic of the carnival and of carnival thinking these pairs create a context for the dialogic which is intrinsic to the carnivalesque.

Presentation not Representation

In one of his earliest works, *towards a Philosophy of the Act*, Bakhtin described the difference between the world as experienced in actions and the world represented. He says that "We cannot understand the world of events from within the theoretical world. One must start with the act itself, not with its theoretical transcription. (Morson and Emerson, 1990, p50) this idea that the world is lived and understood through action (presentation) and not through representation essential to the development of his idea of the dialogic. It is through dialogue that we act and build a synthesis of being.

Within the carnivalesque Bakhtin discusses the carnival act as something in which everyone is an active participant. It “is a pageant without footlights and without a division into performers and spectators.” it is not represented but presented as it unfolds. The “Carnival is not contemplated and, strictly speaking, not even performed; its participants live in it, they live by its laws as long as those laws are in effect; that is, they live a carnivalistic life.” (Bakhtin, p250) The free dialogue between its participants presents the carnival as a synthesis emergent from the carnival act.

Chronotope

The chronotope (literally, 'time space') is an integration of time and space creating place. In the essay Forms of Time and of the Chronotope in the Novel, Bakhtin describes the chronotope as having an “intrinsic connectedness of temporal and spatial relationships that are artistically expressed”. In the artistic chronotope, “spatial and temporal indicators are fused into one carefully thought-out, concrete whole”. The primary category in the chronotope is time made manifest and tangible through its intersection with place.

> “Time, as it were, thickens, takes on flesh, becomes artistically visible; likewise, space becomes charged and responsive to the movements of time, plot and history. This intersection of axes and fusion of indicators characterizes the artistic chronotope.”

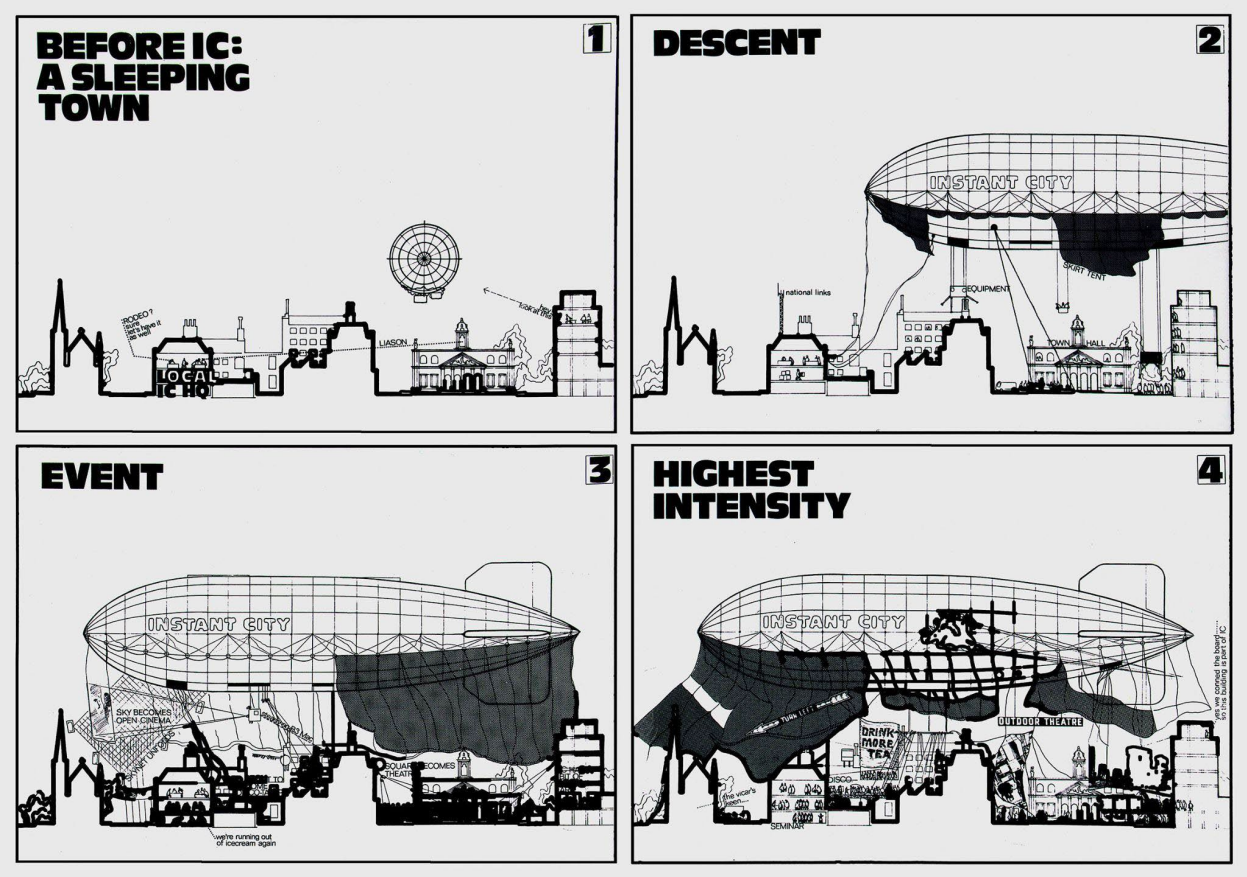
The chronotope as a formal category determines “the image of man in literature as well. The image of man is always intrinsically chronotopic” because a person always exists at the convergence of time in a space creating place. So too we can understand architecture as creating place through the convergence of time and space.

Bakhtin, Mikhail M. (2020) [1981]. "Forms of Time and of the Chronotope in the Novel: Notes toward a Historical Poetics". In Holquist, Michael (ed.). The Dialogic Imagination: Four Essays. Slavic Series, NO. 1. Translated by Emerson, Caryl; Holquist, Michael. Austin, Texas, USA: University of Texas Press. pp. 84–85

Archigram

The instant city and the carnivalesque

The Instant City was a project by Archigram. It was envisioned to be a traveling cultural show that could bring all the arts and entertainment of a major city anywhere. Almost like a traveling circus. It would move into a city, transform it for a week and then move on. In the storyboard below (Figure 5) we see the four stages of the instant cities deployment which parallel the four stages of the carnivalesque.

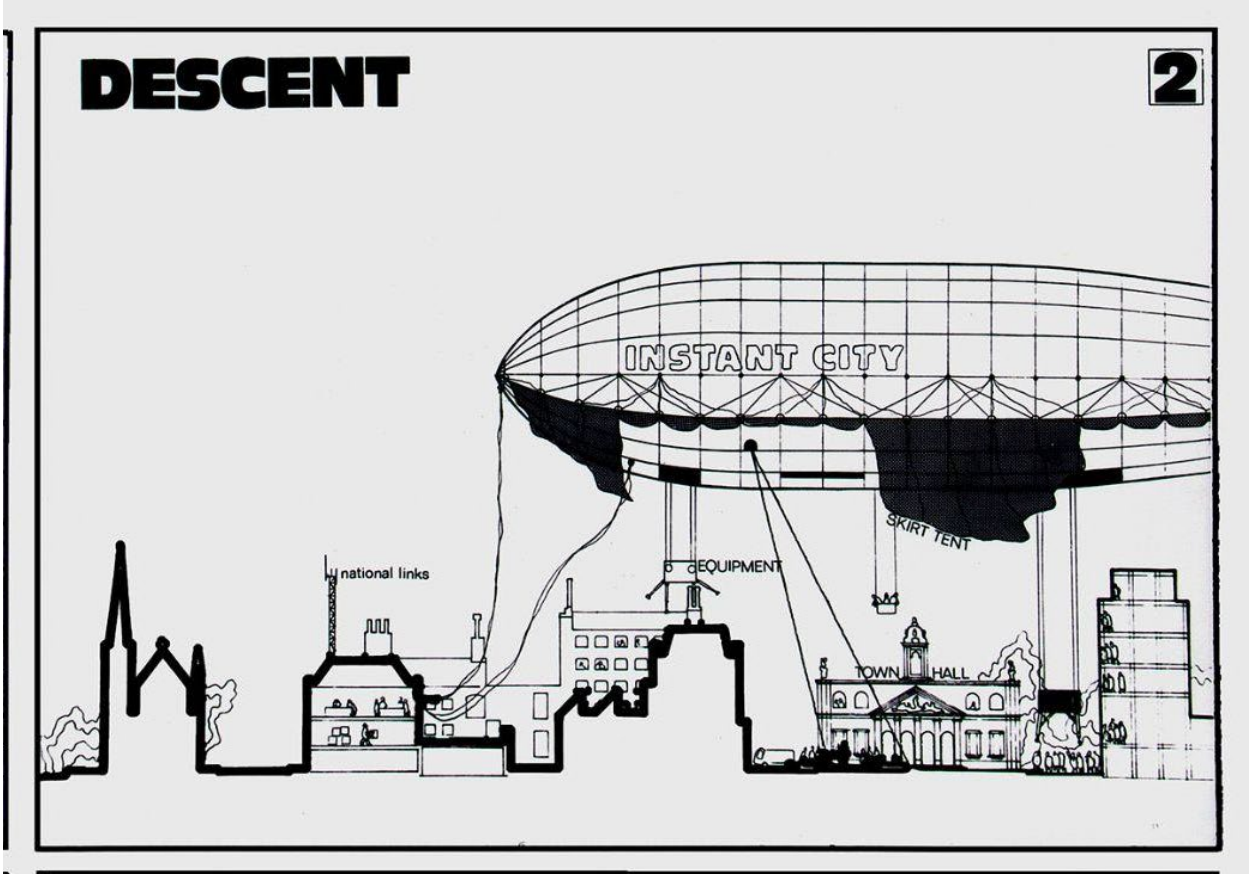


(Figure 7) Storyboard showing the arrival and deployment of the instant city.

In frames 1 through 4 (figure 5) we see the instant city carried in on a blimp. The town being transformed by the carnival that is released by the blimp.

(Figure 8) The approach of the blimp carrying the instant city.

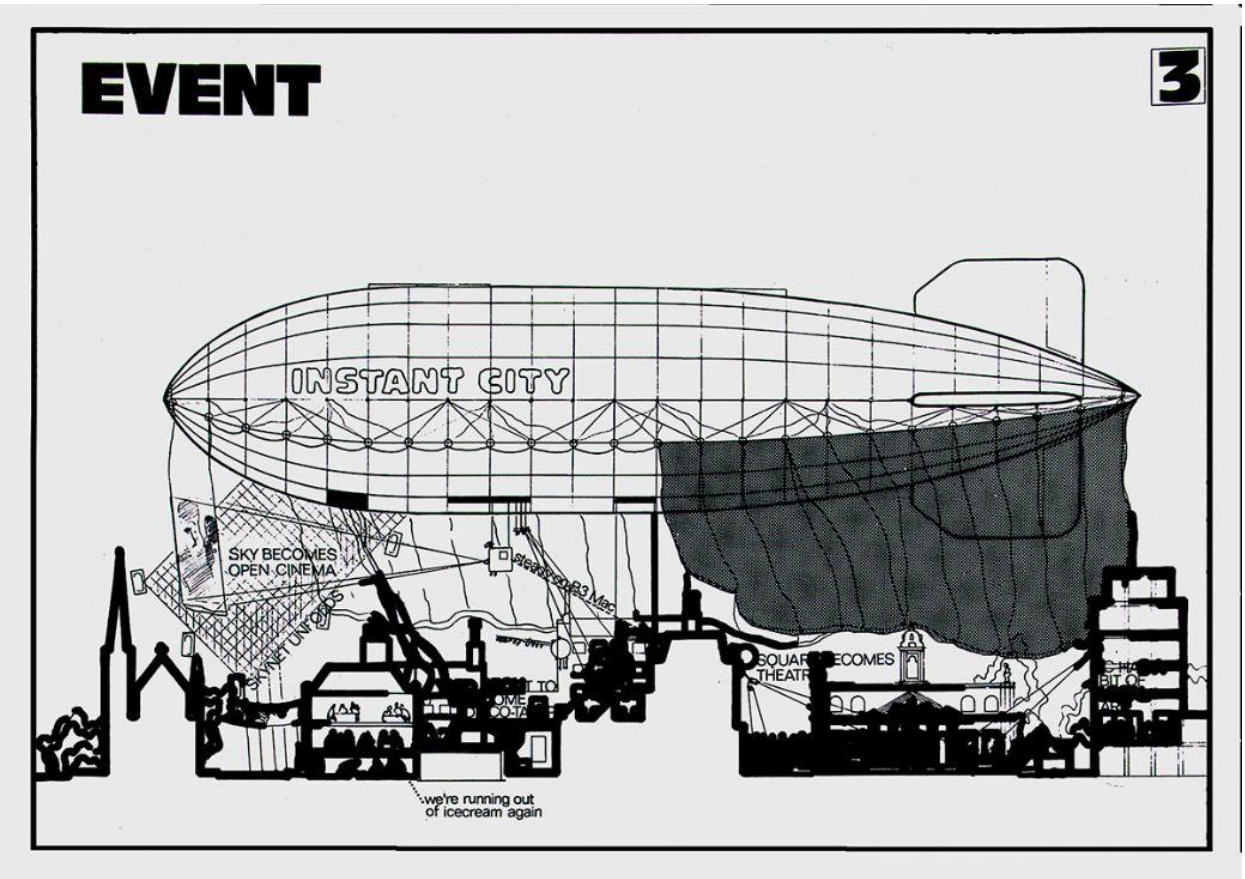
The Familiar
We begin with a sleepy town and a somewhat ambiguous shape approaching in the distance. The cut line of the section establishes the primary hierarchy in this image dividing sky and ground interior and exterior. The only figures in this section are those in the building looking out the windows to the approaching blimp. The attention of the figures in the buildings is directed towards the blimp and we see flattening of the hierarchy as the blimp creates a common focus.



(Figure 9) The arrival of the instant City blimp.

The eccentric

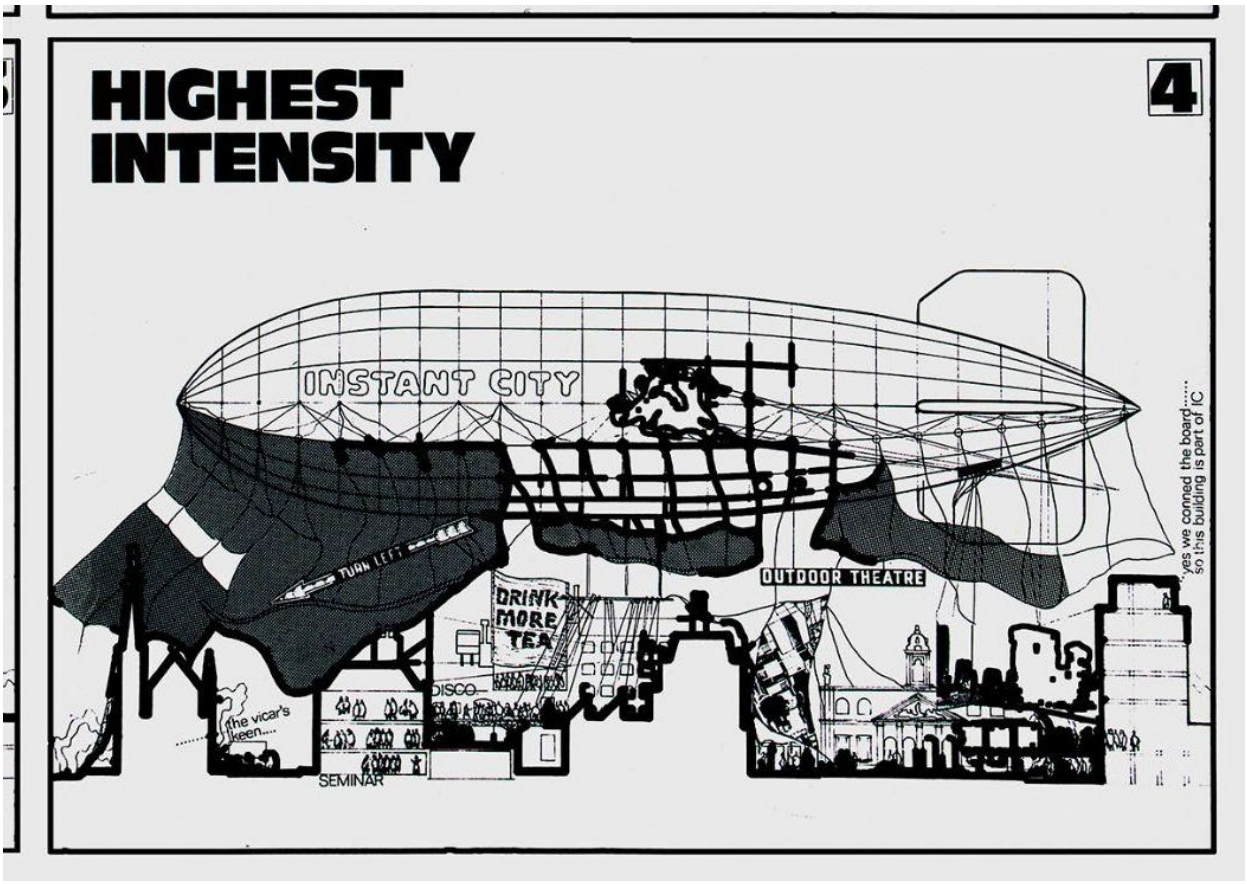
In the second cell (Figure 7) we see the blimp above the town transforming the space of the public realm into a counter site. This transformation of the everyday provides the town with a space to free themselves from the expectations of what is normal. It begins integrating itself into the town, dropping lines, lowering lifts and extending unfurling its tents. These new integrations create new possibilities. The edges of the tent are drawn in the same black as the section cut, containing and unifying the space of the town below. This unified space also shows the city as a counter site, a space to challenge the status quo and enable change.



(Figure 10) The beginning of the instant City deployment

The Misalliance

A new dialogic takes form as new and unfamiliar connections are established. The square becomes a theater, the sky becomes a cinema, and we see the activity of the Instant City as the dark line of the ground plane is in dialogue with the people and breaks free of its static state. It integrates itself into the network of misalliances that is carnival of the instant city.



(Figure 11) The instant city established with all of its activities underway.

The Profane

By this point the section cut has completely re-established itself to be entirely outside the envelope of the town's existing buildings. A network of dark lines has emerged on the belly of the blimp and the instant city reads as one integrated space built out of a multitude of activities and voices. All spaces have become equal and simultaneous. The whole town exists as the carnival, one simultaneous presentation of the carnival act. The dialogic has unified a multiplicity of voices and a multiplicity of time in one chronotope.

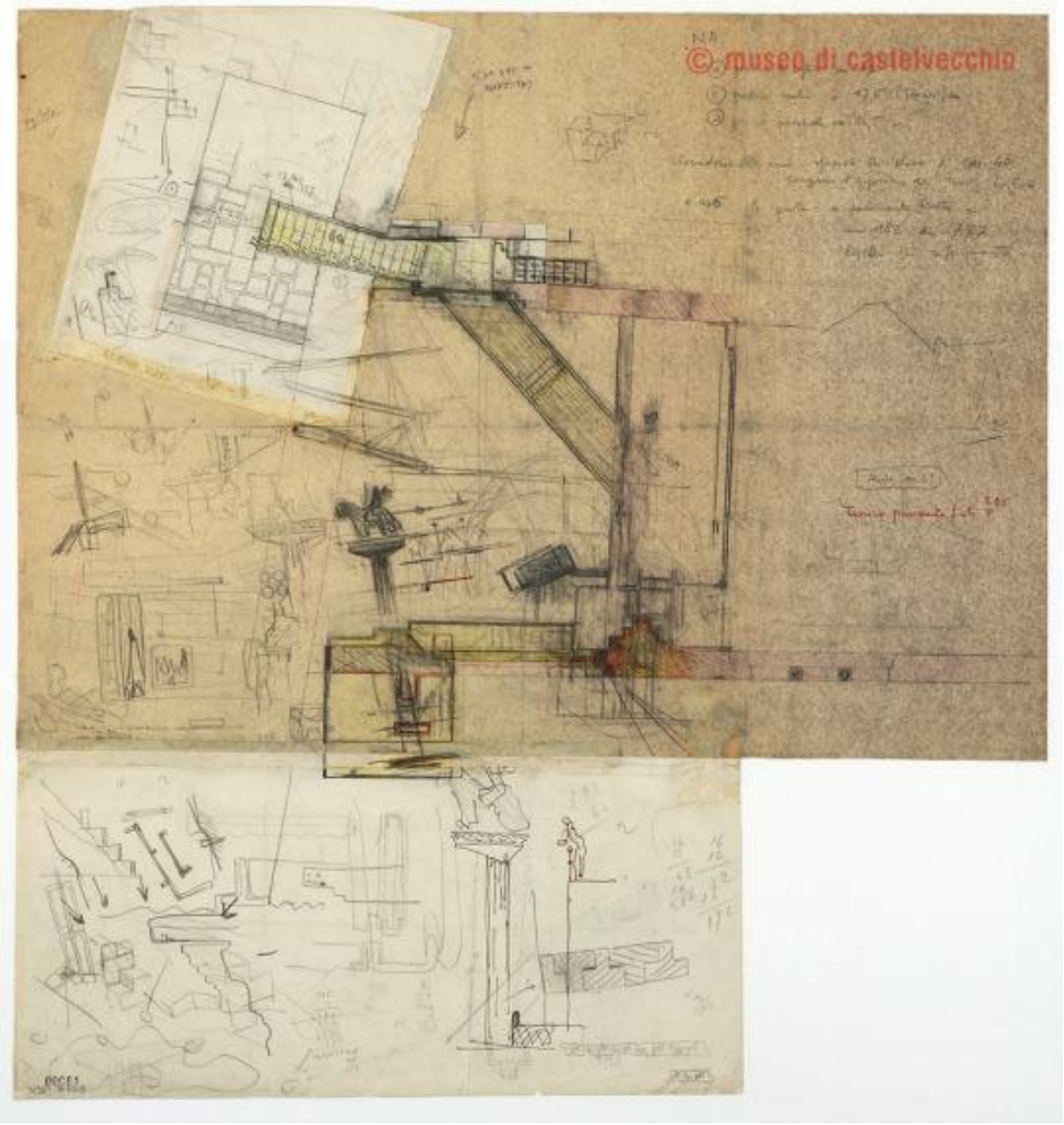
The instant city shows a literal carnival, complete with the four stages of the carnivalesque. The arrival of the instant city breaks the boundaries that divide the sleeping town. By injecting new activities and integrating the carnivalesque into the landscape of the town the Instant City shows us how a unified town can be built out of a plurality of voices, a unity of time and place (chronotope) and the presentation of the carnival act.

Scarpa
Castelvecchio

In the work of Scarpa we see the plurality of voices in his details. Unlike the Instant City, Scarpa's design process is itself a carnival. He rigorously divides space and makes boundaries only to break those boundaries again and again.

The dialogic was central to Scarpa's life and process, he "was a devourer of books of images, for which he would invest a great deal of money. On this subject he was very stimulating to his students; he would explain how to read a book, not only turn the pages, but to meditate, how to really look and how to make notes." (Zambonini, p28) His ability to synthesize ideas through a multitude of influences and ideas was extraordinary. He freely associated ideas, techniques and inspirations.``His interlocutors were in the entire histories of architecture, sculpture and painting."(Zambonini, p28) "There was no great or small painter that Scarpa did not know." (Zambonini, p28)

Scarpa brought the same approach of the dialogic into his design projects, incorporating same thoughtful conversation within his own drawings that he had with his interlocutors. His meditation on his drawings is apparent in his marginalia and in the conversation they have with each other across the page. (Figure 10)



(Figure 12) plan of the Grand courtyard (Museum of Castelvecchio)

Figure 12 depicts the space at the end of the main gallery as a complex resolution of spaces. It forms a junction of multiple divided spaces and unifies them around the castle’s primary vertical circulation. This drawing exemplifies what Marco Frascari describes as the significance of the joint in Scarpa's work. He discusses how Alberti saw beauty as “the 'concinnity' of all the details in the unity to which they belong" (Frascari, 81, p4) this means that beauty comes from the “skillful joining of parts” where those parts are joined and composed in such a way that “nothing can be added, subtracted, or altered for the worse.” (Frascari, 81, p4) This was not applied to the physical construct but rather the mental (conceptual) one. For Scarpa the joint was a dialogue, a conversation that integrated multiple elements into a whole. “The joint, that is, the detail, is the place of the meeting of the mental construing and of the actual construction.”

(Frascari,81, p4) This is a meeting of two things and a meeting between the conceptual and the constructed.

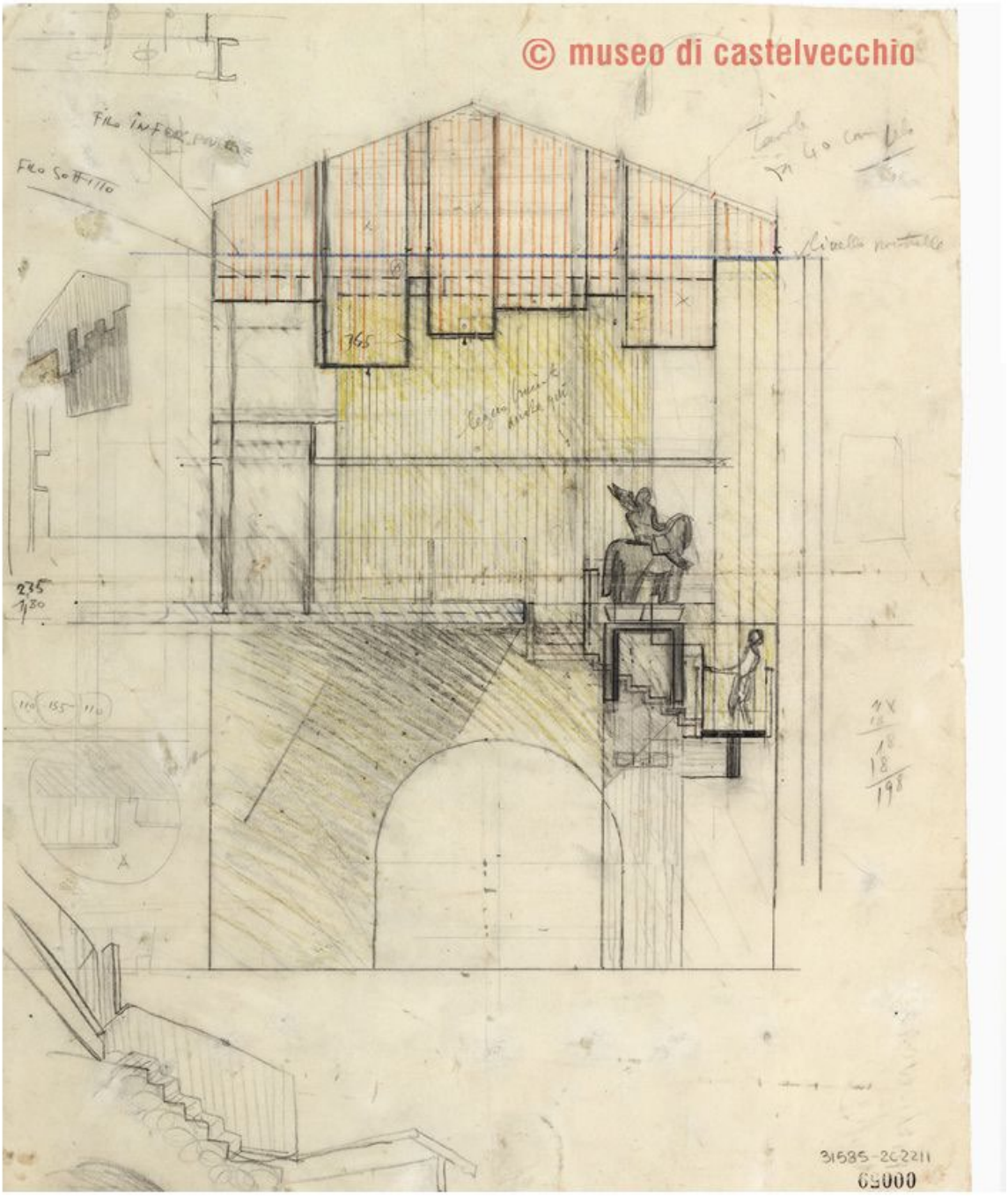
The grand courtyard (Figures 12-17) is a perfect place to understand the joint as dialogue within Scarpa's carnivalesque design process. The courtyard is a joint connecting spaces, time and place to create a profane integration from a multitude of elements.

(Figure 13) Castelvecchio Grand courtyard (photograph by Michael Olney)

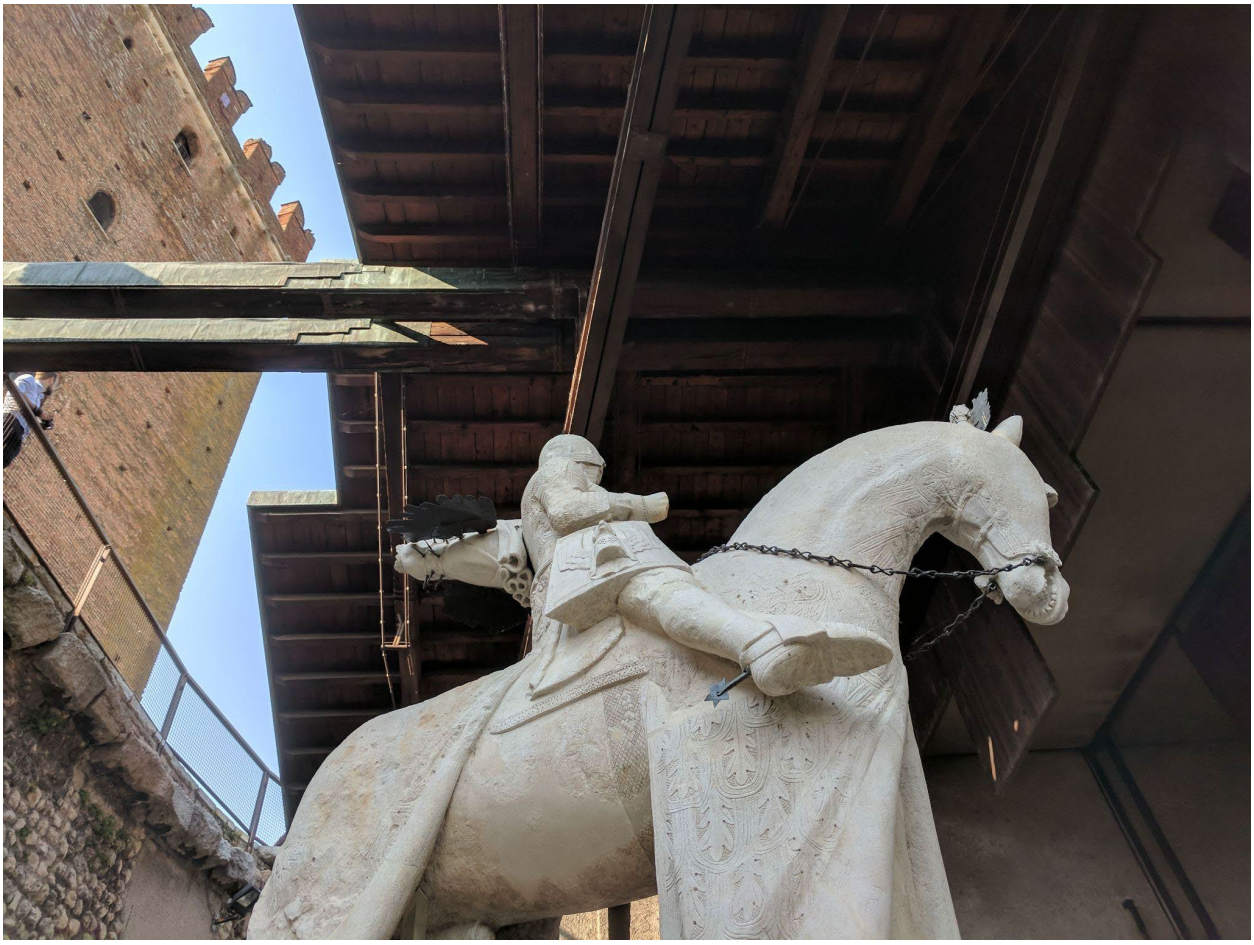
Scarpa’s work could easily be criticized for lacking a unifying structure. (Figure 11) Guiseppi Zambonini pushes back by saying “that to understand his spaces one is required to take infinite spatial-temporal steps to repeat and reconstruct all the moments of invention and the discovery of endless themes to be carried from plan to elevation, from building to building, from the joining of materials to the joining of spaces.” (Zambonini, p26) In short, the unity of Scarpa's designs is structured out of the dialogic. He continues by saying that any unity of Scarpa's work “should not be searched for in the perceived composition of the structure, which would tend to be constantly lost and found, but should be sought in the process or perhaps in the attitude.” An attitude that embraces multiplicity and celebrates the joint as dialogue. “The perceived structure is therefore merely a pretext for a cognitive one, a structure of knowledge, which instead provides an understanding of the dynamics of space, of its relation to nature, of the mechanical and expressive qualities of material.” All the relationships of his design operated in the free and familiar association of the carnivalesque. Scarpa’s work was driven by the idea of connection rather than completion.

> “... he would not start from a general set-up to focus on structural joints and moldings, he would reverse the process, attacking with ferocious inventiveness and extraordinary tension of energy each and every detail, in order to make them signifying, in the certainty that from their dialogue and interlacement it would spontaneously spring the message of the whole.” (Zambonini, p26)

In the character of the carnivalesque Scarpa would invert the typical process by beginning with the detail. In discussing Scarpa's process Zambonini describes form as “being before anything else a system of relationships.” He argues “the attempt of summing up its components, reinvestigating the different levels at which the components interact and how far the interaction is conducted to finally perform a construct of meanings, becomes a way of studying form itself.” (Zambonini, p27) In studying form Scarpa studied relationships, but those relationships developed his understanding of form. His design process is pushed by making space to understand and discover new relationships and let a dialogue emerge from those relationships. It is a dialogue between the pre-existing context of his projects, the emergent responses and the responses to those new discoveries. It is truly a conversation drawn out across the page.

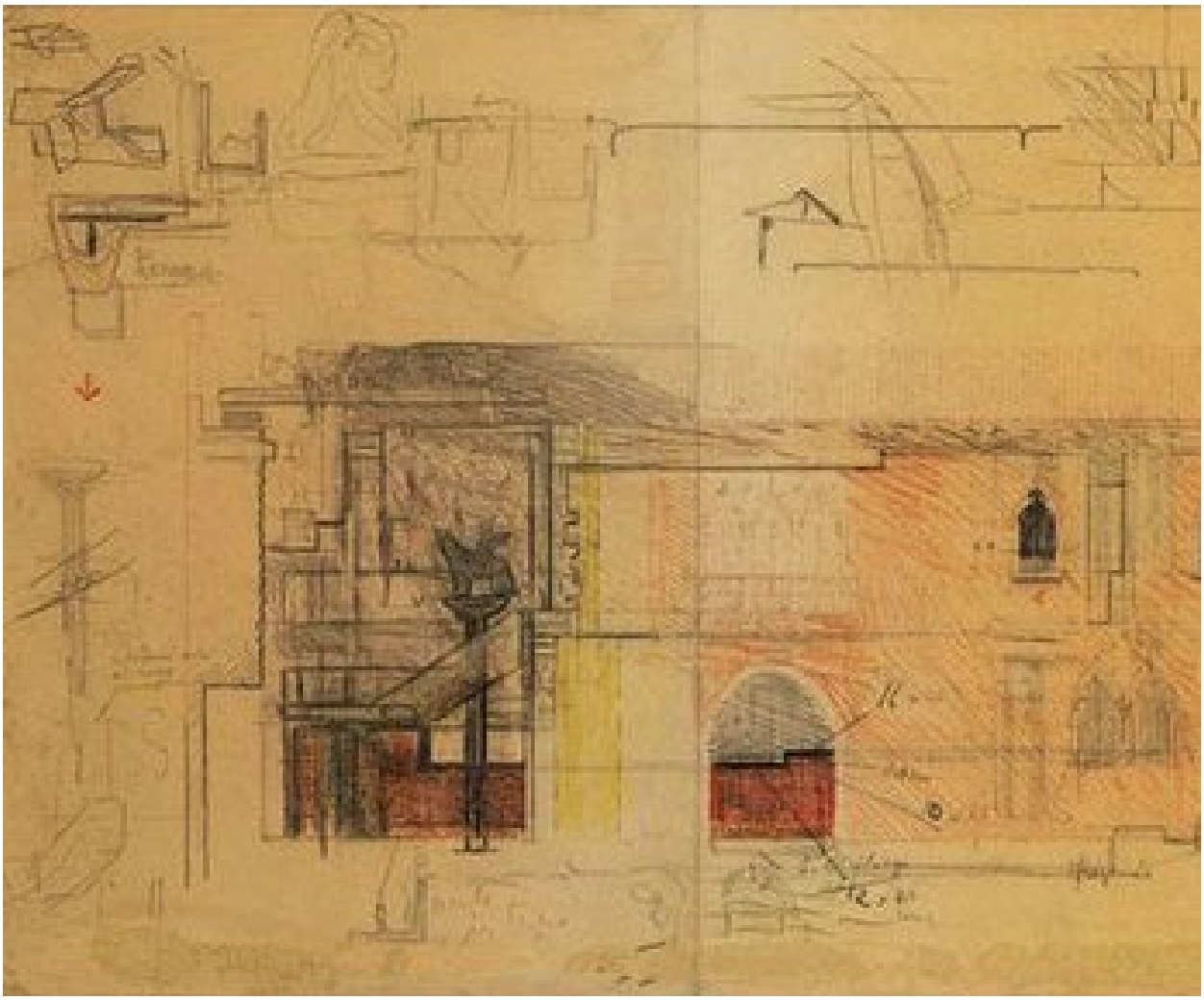


(Figure 14) section of the Grand courtyard (Museum of Castelvecchio)



(Figure 15) View of the horseman sculpture in the grand courtyard (photograph by Michael Olney)

Rather than being held to get there by some structural idea, the courtyard is joined together by a series of relationships that integrate the elements of the castle. At the center of this network of integration is the statue of the horsemen. He appears in every image, plan section and elevation. (Figure 12, 14, 16) We see that the relationship of the horsemen connects to every other element being developed on the pages. It shapes the structural systems, views, circulation and the center of the courtyard as a chronotope. We also see that it is central to how humans experience the place, both in Scarpa's use of scale figures and in photographs. (Figure 13, 15, 17)



(Figure 16) Elevation of the Grand courtyard and main gallery (Museum of Castelvecchio)

(Figure 17) Exterior photograph of Grand courtyard and main gallery (photograph by Michael Olney)

Conclusion

Perception is enacted not sensed, It is a recursive process in which each action develops and refines the understanding of what is perceived. So too is representation an active and recursive process in which an idea is reperceived each time it is represented. The dialogic and the carnivalesque provide frameworks to explain how these designers break free of boundaries and restructure new systems of integration by creating a space for a multiplicity of voices. They show the interaction between hierarchical and network frameworks and how they develop relationships in the process of design representation. In Aalto's work we see the dialogic formed through many discreet drawings that all reference and build on each other. The process of perception and re-perception Is drawn out through his work. The line becomes the central element by which he creates, perceives and recomposes space refining and resolving his designs through a dialogue with himself through his representation.

By establishing the significance of the dialogic we can better understand how the carnivalesque manifests itself in the representational work of Archigram. In the Instant City we see the carnival unfold describing the process of how the arrival instant city breaks down the hierarchies of a town and creates a place for a multiplicity of voices. Archigram describes the stages of the carnivalesque, and we see the transforming character of each stage as the drawings move from the familiar to the profane. The Instant City and its drawings are a good example of how we can understand the carnivalesque as performed in a series of drawings. While Archigram describes the carnivalesque, Scarpa's design process is carnivalesque. We are presented with the carnival in its final state, the profane. All hierarchies have been eliminated and the drawings show the integration of all the elements developed in his marginalia. Archigram tells us a story of the carnival but Scarpa shows us how the carnival can be a space to design within, a lived process of integration. Scarpa's drawings are themselves of the carnival with a multiplicity of voices embodied in his process. This multiplicity is important because architecture must contend with the interplay of static and dynamic elements so that they can synthesize those elements into a coherent whole.

The dialogic and the carnivalesque allows for combination of components or elements to create a connected whole or a synthesis.The dialogic is critical in thinking about these sets of images. Aalto is developing a dialogue through a multiplicity of separate images at many scales. This allows him to understand all of the parts of his design and integrate them into something unified. Archigram creates dialogues between the town and the airship people and space, place and activity and the Instant City emerges from that dialogue. For Scarpa it is the dialogue between the numerous elements of the castle. That dialogue manifests itself as joints and details, systems of connection that integrate the castle. Their work illustrates how hierarchy and networks are in dialogue with each other and how that dialogue is used to organize relationships within a design. The carnival helps us break free of the hierarchies that stand in the way of new connections and relationships and by doing so It provides a space for dialogue to develop deeper relationships.

References

Hewitt, Mark Alan (2019) “Sketches as Cognitive Traces: Alvar Aalto at Imatra.” New Design Ideas, vol. 3, no. 1, pp. 5–20.
Hewitt argues that the sketches of prominent architects can be viewed as "cognitive traces," revealing the historical patterns of thought that inform the design process. The source introduces the concept of "exograms," or external memory triggers, and uses the Church of the Three Crosses at Imatra, designed by Alvar Aalto, as a case study to demonstrate how these

loops operate in practice. Ultimately, Hewitt calls for greater collaboration between architects, historians, and cognitive neuroscientists to further illuminate the connection between design thinking and visual perception.

Hewitt, Mark A (1989) "The Imaginary Mountain: The Significance of Contour in Alvar Aalto's Sketches." Perspecta, vol. 25, pp. 162-77.
Hewitt argues that Aalto's seemingly "irrational" sketches are, in fact, evidence of a systematic and rational design methodology rooted in his academic training and influenced by cartography. Aalto's sketches reveal a deep understanding of the reciprocity between plan, section, and massing, allowing him to explore complex spatial configurations through contour lines. This meticulous approach, combined with his intuitive exploration of forms, allowed Aalto to achieve a unique synthesis of space and mass, producing innovative and celebrated architectural designs.

Ando, Mihoko. 2018. “Reprise and Continuity in Alvar Aalto′s Design Process for Three Churches.” Journal of Asian Architecture and Building Engineering 17 (2). Tokyo: Japan Science and Technology Agency: 237–44. doi:10.3130/jaabe.17.237.

Ando, Mihoko. 2016. “Retracing Alvar Aalto’s Design Process through the Sketches and Drawings of Vuoksenniska Church (1955–8).” Arq (London, England) 20 (4). Cambridge, UK: Cambridge University Press: 333–44. doi:10.1017/S1359135516000567.

Mikhail Bakhtin. 1994. Cultural Theory and Popular Culture Reader, Carnival and the Carnivalesque, The University of Georgia Press: 250-259

Morson, Gary Saul, Emerson, Caryl (1990). Mikhail Bakhtin: Creation of a Prosaics. United States: Stanford University Press,.

Bakhtin, Mikhail (1981). The Dialogic Imagination. Univ. of Texas Press. p. 276.

Bakhtin, Mikhail M. (2020) [1981]. "Forms of Time and of the Chronotope in the Novel: Notes toward a Historical Poetics". In Holquist, Michael (ed.). The Dialogic Imagination: Four Essays. Slavic Series, NO. 1. Translated by Emerson, Caryl; Holquist, Michael. Austin, Texas, USA: University of Texas Press. pp. 84–85

P. Cook (1973). Archigram, Praeger Publishers, New York

Giuseppe Zambonini (1983). “Theory of Making in a Time of Necessity”
“Process and Theme in the Work of Carlo Scarpa

Frascari, Marco. 1981. “The Tell-the-Tale Detail.” In *Semiotics*, 325–36.

Terzic, E. (2019). Chronotopia: A Festival for a Pluralist Public Realm. ProQuest Dissertations Publishing.

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Figure 2	Hewitt, Mark A (1989) "The Imaginary Mountain: The Significance of Contour in Alvar Aalto's Sketches." Perspecta, vol. 25, pp. 162-77.
Figure 3	Hewitt, Mark Alan (2019) "Sketches as Cognitive Traces: Alvar Aalto at Imatra." New Design Ideas, vol. 3, no. 1, pp. 5–20.
Figure 4	Ando, Mihoko. 2018. "Reprise and Continuity in Alvar Aalto's Design Process for Three Churches." Journal of Asian Architecture and Building Engineering 17 (2). Tokyo: Japan Science and Technology Agency: 237–44. doi:10.3130/jaabe.17.237.
Figure 5	Ando, Mihoko. 2018. "Reprise and Continuity in Alvar Aalto's Design Process for Three Churches." Journal of Asian Architecture and Building Engineering 17 (2). Tokyo: Japan Science and Technology Agency: 237–44. doi:10.3130/jaabe.17.237.
Figure 6	Terzic, E. (2019). Chronotopia: A Festival for a Pluralist Public Realm. ProQuest Dissertations Publishing.
Figure 7	P. Cook (1973). Archigram, Praeger Publishers, New York
Figure 8	P. Cook (1973). Archigram, Praeger Publishers, New York
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Figure 10	P. Cook (1973). Archigram, Praeger Publishers, New York
Figure 11	P. Cook (1973). Archigram, Praeger Publishers, New York
Figure 12	Museo di Castelvecchio. Archivio Carlo Scarpa, Sacellum drawing: C. Scarpa 1962-1964. Inv. Num.: 31682. Retrieved November 16, 2023, from http://www.archiviocarloscarpa.it/web/disegni_scheda.php?scheda=463
Figure 13	Photograph by Michael Olney
Figure 14	Museo di Castelvecchio. Archivio Carlo Scarpa, Sacellum drawing: C. Scarpa 1962-1964. Inv. Num.: 31682. Retrieved

	November 16, 2023, from http://www.archiviocarloscarpa.it/web/disegni_scheda.php?scheda=463
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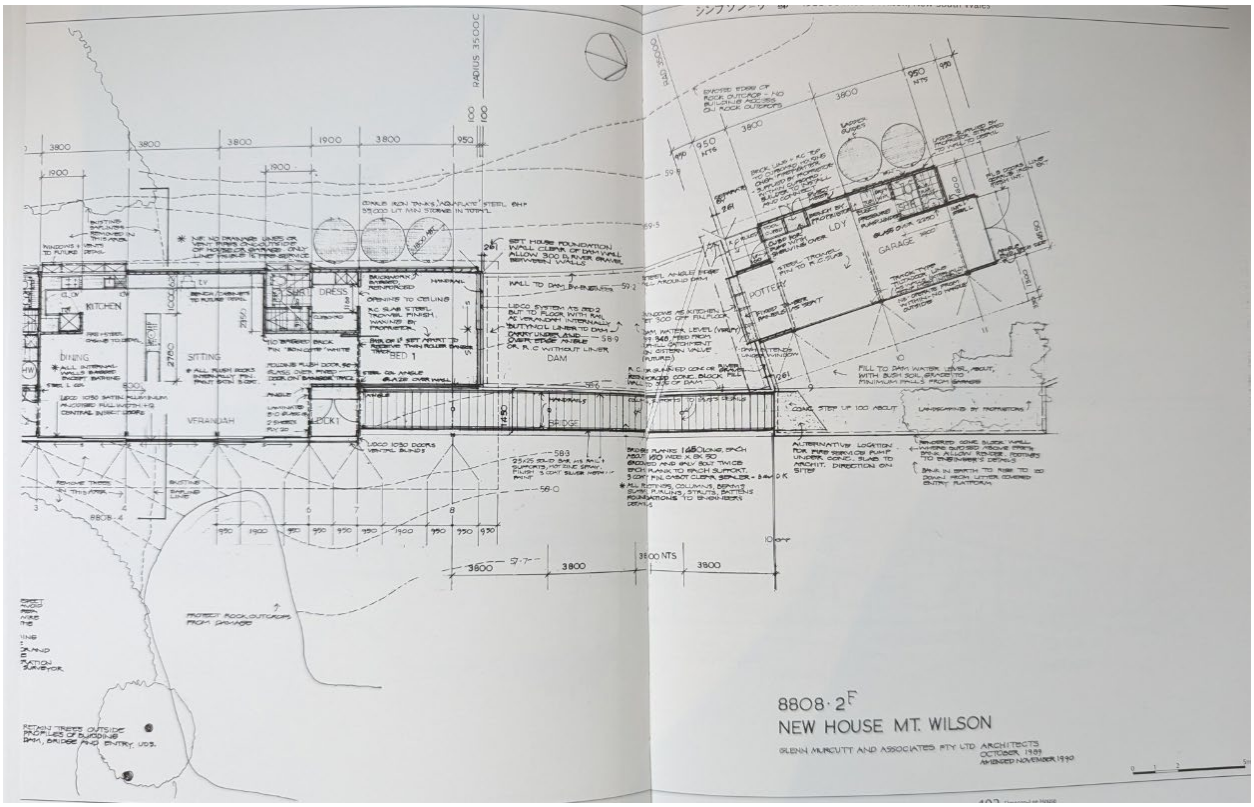
Figure 17	Photograph by Michael Olney

Chapter 4: (The Plan) Mapping the Conceptual Landscape

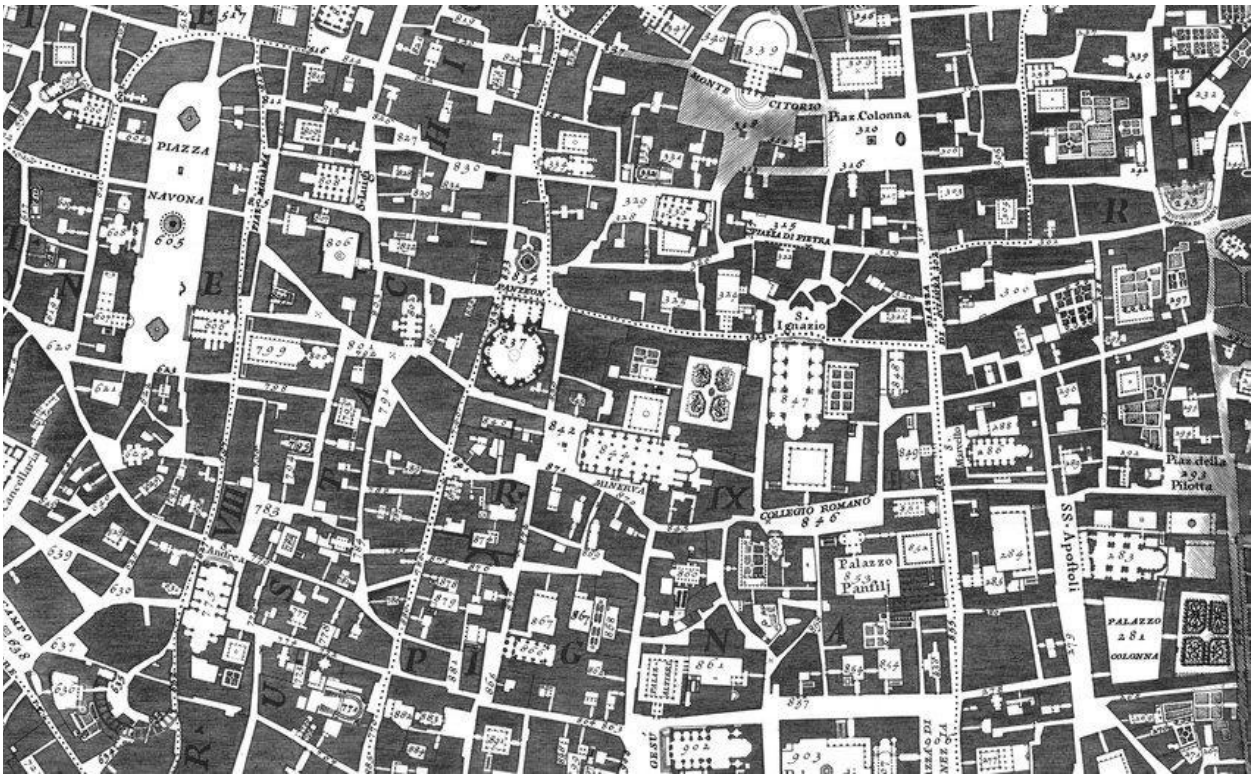
Chapter Abstract

This chapter explores how spatial ideas are mapped into representational systems. It focuses on maps and plans and shows ideas of layer, scale, space, proximity, movement, positive and negative space, boundaries, etc… are developed in plan. The chapter walks through several sets of representation beginning with the Nolli map as a classic representation of urban fabric. It shows the separation of public and private space, the network of the public realm, and the circulation path of pilgrims. With this more classic conceptualization established, the chapter moves to the work of Robert Venturi, Daniel Libeskind, Bernard Tschumi and Sarah Wigglesworth. It shows how the layers of representation used in their work fall into four primary categories, physical, use, perception, and movement. All these categories are abstractions of complex systems and relationships. By investigating how these designers structure these layers into plans we can better understand how representation is used as an abstraction to re-present the conceptual landscape of a space into an abstracted form that helps us understand modes of hierarchy and network.



(Figure 1) Plan for the Simpson-Lee house by Glenn Murcutt

A plan has two meanings in architecture. It is a top-down view cut through the horizontal plane showing the connection and division of spaces. It is also the intention by which a design will be executed. This drawing by Glenn Murcuttt (Figure 1) is an excellent example of how both meanings can exist simultaneously. We simultaneously see how Murcutt has conceived the spatial composition of the home and numerous annotations describing how each component of the building will be constructed.



(Figure 2) Panel from Nolli Map of Rome showing public and private spaces in the city. The map has a particular emphasis on churches and the pilgrim paths between them.

The Nolli Map is a perfect place to begin our conversation of conceptual frameworks in a plan view. As a figure ground map it depicts how space is created through the hierarchical division of figure and ground, public and private. At the same time the solidity of the private space reveals the network of public space that weaves through the city of Rome. In addition, there is a dotted line that describes the pilgrimage route that a visitor would take to see the holy sites of the city.

The network of public spaces, the private structure of the city and the pilgrimage routes each become layers of conceptual information that we map into the city of Rome. In their book Learning from Las Vegas, Denise Scott Brown and Robert Venturi take inspiration from the Nolli Map

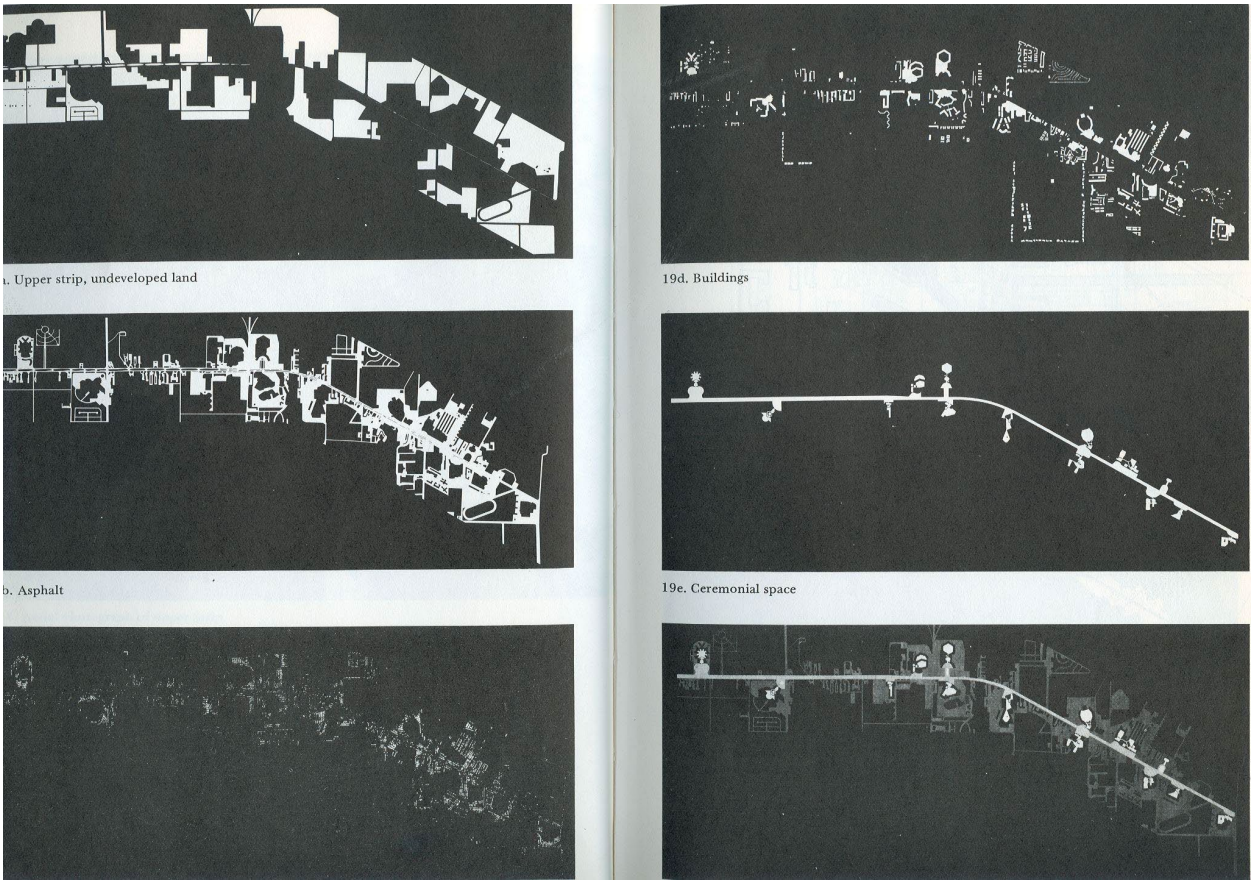
In a figure-ground drawing:
Figure: Represents the built environment (buildings, structures, etc.)
Ground: Represents the open space (streets, parks, plazas, etc.)

Layers

The use of the word "layer" in cartography is linked to the concept of overlaying transparent sheets of information. Before the advent of digital mapping, cartographers would often create maps by hand, drawing different features (e.g., roads, rivers, topography) on separate sheets of transparent material like vellum or acetate. These sheets could then be overlaid on top of each other to create a composite map, with each layer contributing a specific type of information. This physical act of layering transparent sheets naturally led to the adoption of the term "layer" to describe these distinct sets of cartographic information. These ideas of layers are used similarly in architecture. Designers abstract particular sets of spatial information and group them into layers with shared characteristics.

In cartography and design, layers serve as a powerful conceptual tool for understanding and analyzing geographic and spatial information. Conceptually, each layer is a slice or sample of spatial information in a particular area. In a cartographic context it is equivalent to the categories described on a map legend. On a road map, for example, roads, parks, political boundaries, and rivers would be examples of different layers.They offer a way to break down complex spatial phenomena into manageable abstract components, making it easier to visualize and interpret relationships between different types of data.

Layers allow designers to isolate specific aspects of the conceptual landscape, such as topography, land use, parcel boundaries, utility lines or population density. By separating these elements into distinct layers, they can be studied independently and in relation to each other. By isolating, juxtaposing and overlaying different layers, designers can identify relationships, patterns, correlations, and potential conflicts. For example, combining layers on land use and flood risk can reveal areas that are vulnerable to natural disasters or combining layers of paved surface with commercial space might help us understand how circulation and commercial parking relate to each other.



(Figure 3) Figure ground maps from *Learning from Las Vegas*, Denise Scott Brown, Robert Venturi

The "Nolli" style maps of the Las Vegas Strip published in *Learning from Las Vegas* use figure ground to isolate and relate different conceptual layers of the strip. Layers that can be found in the diagrams in *Learning from Las Vegas* include undeveloped land parcels, buildings, paved surfaces, commercial space and more.

Kevin Lynch, in his seminal work *The Image of the City*, introduced the concept of imageability, which refers to the ease with which a city's parts can be recognized and organized into a coherent pattern. (Lynch, 1960) A city with high imageability is one that is easy to understand and navigate, with distinct and memorable features. Lynch identified five key elements that contribute to a city's imageability: paths, edges, districts, nodes, and landmarks. These elements form the building blocks of a mental map that people use to understand and navigate the urban environment.

Paths are the channels along which people move. They can be streets, sidewalks, transit lines, canals, or even railroads. Lynch emphasized that paths are not merely routes for transportation but also fundamental to how people perceive and experience a city. The character of a path, its width, paving, landscaping, and the buildings that line it, all contribute to the overall image of the

city. Well-designed paths can create a sense of direction, encourage exploration, and foster social interaction.

Edges are the linear elements that define boundaries and breaks in continuity. They can be physical barriers like walls, shores, or railroad cuts, or they can be less tangible perceptual edges like changes in land use, character, or building density. Edges can serve as organizing elements within a city, providing a sense of enclosure and separation between different areas. They can also be landmarks that help people orient themselves within the urban landscape.

Nodes are points of intense activity where paths intersect or converge. They can be junctions, squares, or major transit stations. Nodes often serve as centers of activity, attracting people for various purposes like shopping, socializing, or commuting. They can be focal points within a city, providing a sense of identity and orientation. Lynch emphasized the importance of creating visually distinctive nodes that are easily recognizable and memorable.

Districts are medium-to-large sections of a city with a distinct character. They can be defined by physical characteristics like building style, land use, or topography, or by intangible qualities like social or cultural identity. Districts provide a sense of place and belonging within a city, offering unique experiences and opportunities. Lynch argued that well-defined districts are essential for creating a legible and memorable city image.

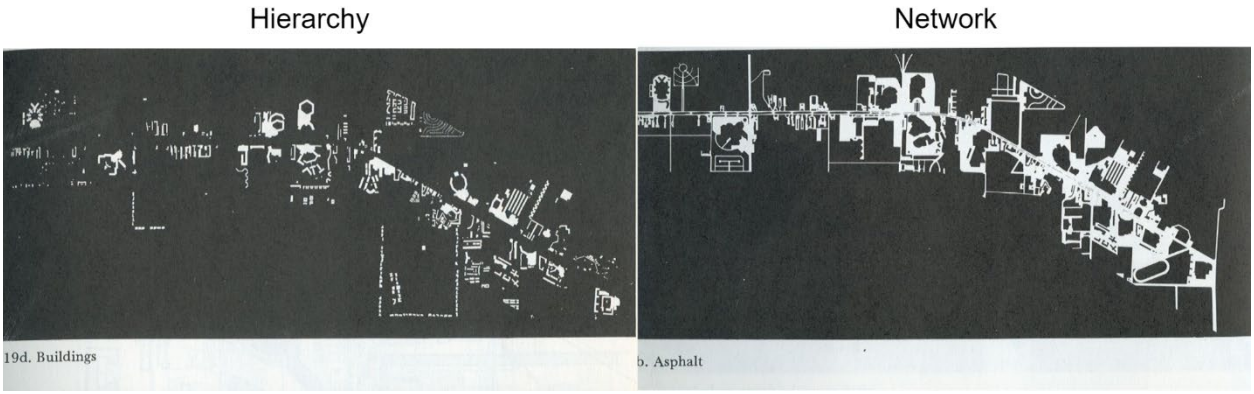
Landmarks are external points of reference that help people orient themselves and navigate. They can be natural features like hills or bodies of water, or they can be man-made structures like towers, monuments, or unique buildings. Landmarks are often visually prominent and easily recognizable, serving as symbols of a city or neighborhood. They can provide a sense of identity, continuity, and history within the urban landscape.

This idea of imageability can easily be extended and be understood as a set of conceptual frameworks that can be imagined and represented as frameworks of hierarchy and of network. the work of Robert Venturi, Daniel Libeskind, Bernard Tschumi and Sarah Wigglesworth demonstrate these conceptual frameworks. The layers of representation used in their work fall into four primary categories, physical, use, perception and movement. Each of Lynch's five elements describes some type of relationship and these relationships span across multiple categories of layer. All these categories are abstractions of complex systems and relationships.

By investigating how these designers structure these layers into plans we can better understand how representation is used as an abstraction to re-present the conceptual landscape of a space into an abstracted form that helps us understand modes of hierarchy and network.

Physical

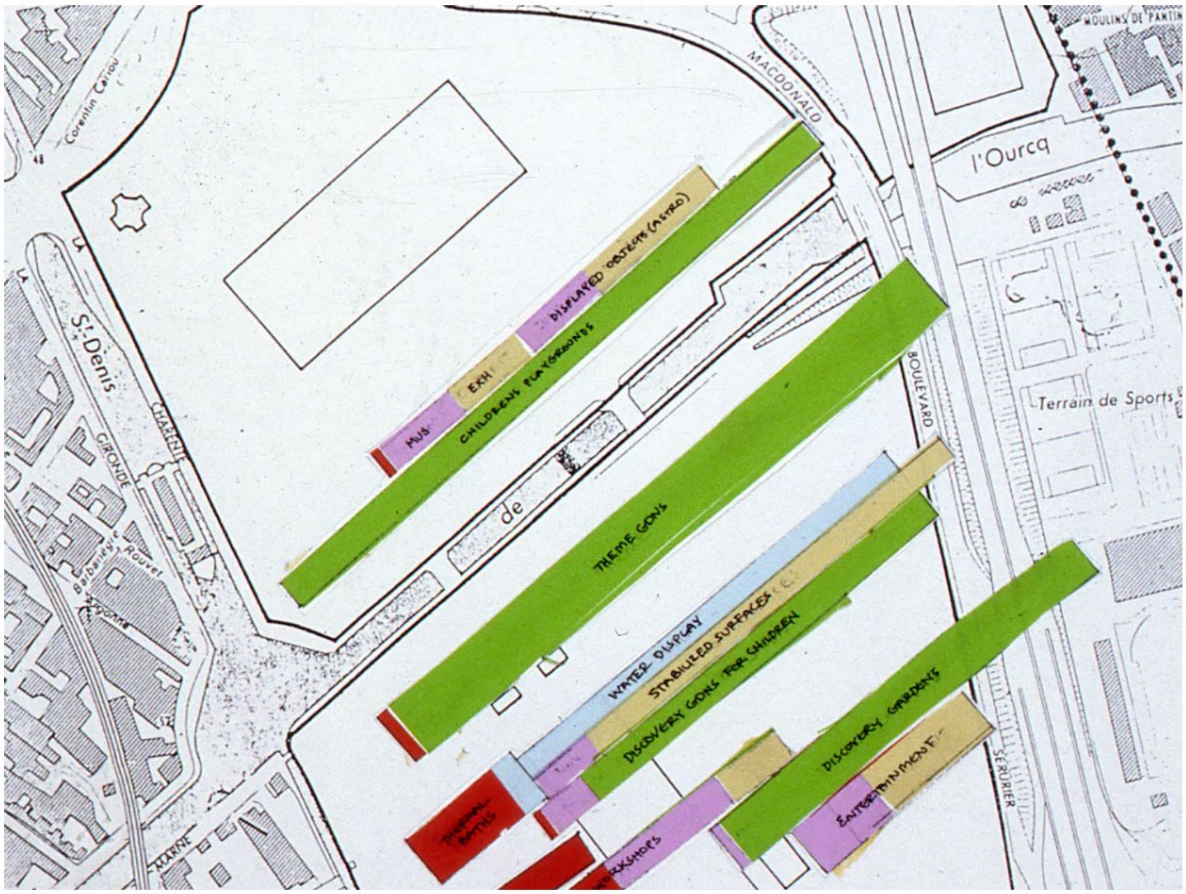
Physical layers map tangible elements into a space. This could be anything from buildings to tree cover; at a very large scale it might show the separation between continent and ocean, and at a small scale it might show particular flooring choices in an interior. Ian McHarg calls these elements of a map “physiographic” and uses The words to describe physical characteristics present in a landscape. The word literally means nature drawn, Physio and graphic which comes from the Greek phusis nature and graphikos, meaning drawn. Embedded in the word is an idea of re-presentation, that we are drawing nature. The word has been adopted by geographers to describe the study of physical geography.



(Figure 4) A map showing buildings and a map showing asphalt surfaces, *Learning from Las Vegas*, Denise Scott Brown, Robert Venturi

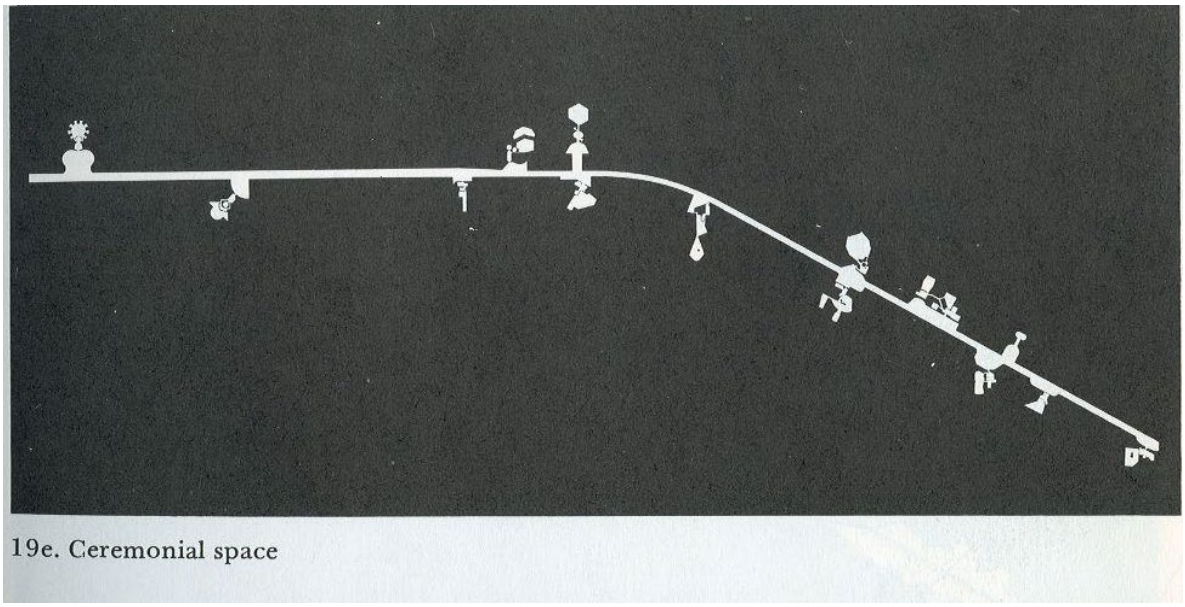
Use

hapter 1 use showed how people use a space, activities they perform and what they need. The drawings did not describe the physical characteristics of the spaces but instead told us the boundaries, adjacencies and integrations of use. This could be a land-use map of a city or a Parti diagram of a building.



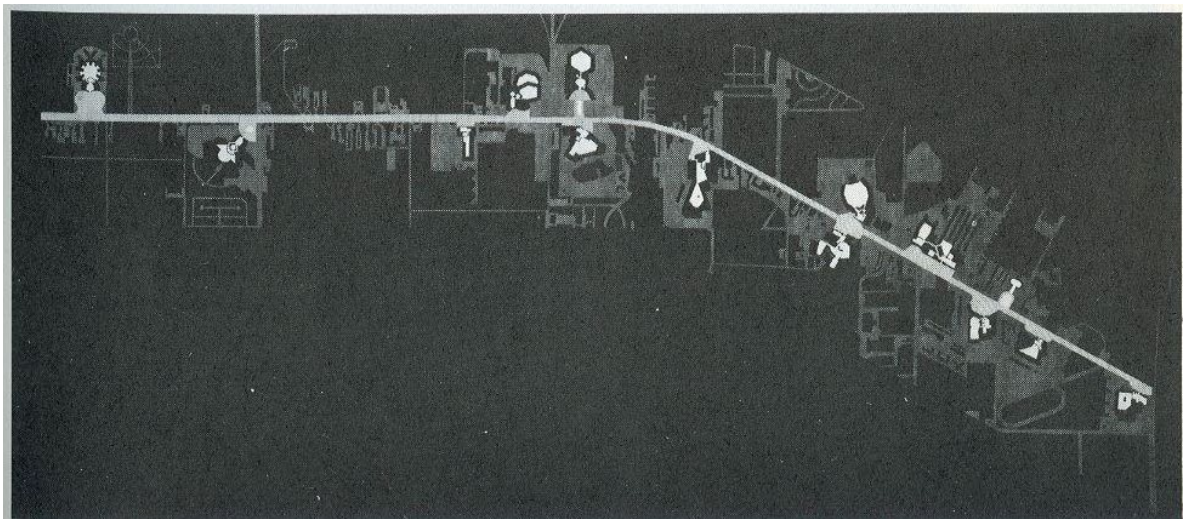
(Figure 5)Parc de la Villette, OMA. Plan showing program elements

Figure 5 shows a parti diagram that OMA submitted for the Parc de la Villette competition. It is mapping the different segments of proposed program into the site, almost as color-coded districts of activity. This is a very hierarchical structure as there is no clear sense of integration, just division of use.



(Figure 6) Plan showing commercial spaces

This map from *Learning from Las Vegas* shows commercial spaces along the strip and it is hierarchical in two ways. The figure ground categorizes the map into two types of space commercial and non-commercial. It also shows each commercial space branching off of the strip as discreet and connecting only to the strip much like the branches of a tree.



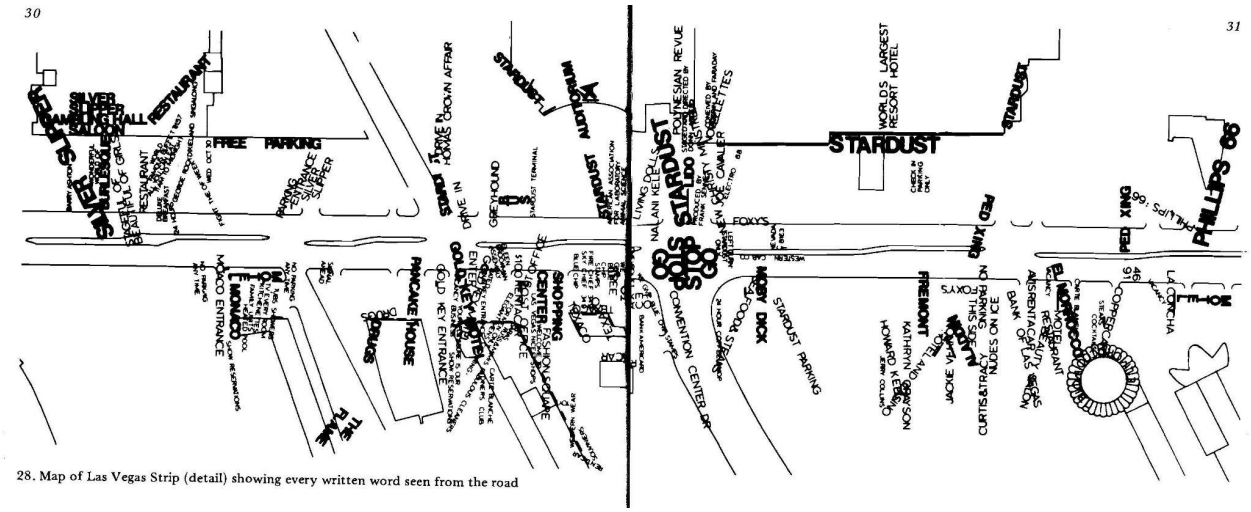
(Figure 7) Plan showing commercial spaces and paved areas together.

In *Design with Nature* Ian McHarg, It focuses on the interactions between physical characteristics and human use in the landscape. This map shows the interaction between the paved surfaces of the strip and the areas of commercial use.

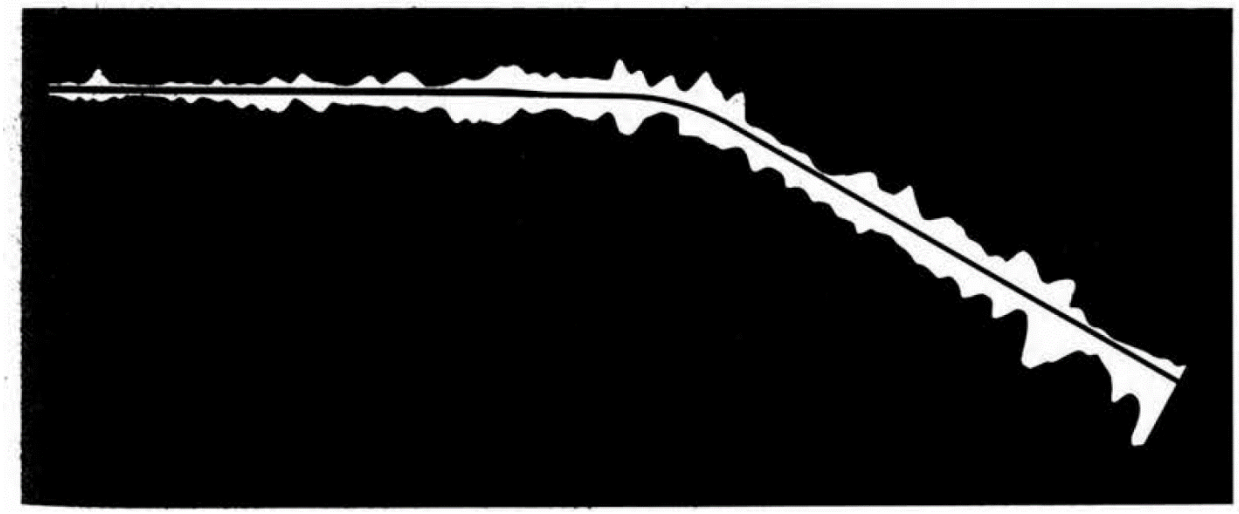
Perception

By mapping perceptual elements of a landscape, we are able to understand the sensory and experiential qualities as conceptual layers embedded in a space. That could be sight, sound, touch, etc…

Figure 8 shows the The signs visible along the Vegas strip with the size of the text showing a hierarchy of visibility. The largest text on the map shows the most prominent sign as seen from the strip.



(Figure 8) Visibility and prominence of signs from the Las Vegas Strip.

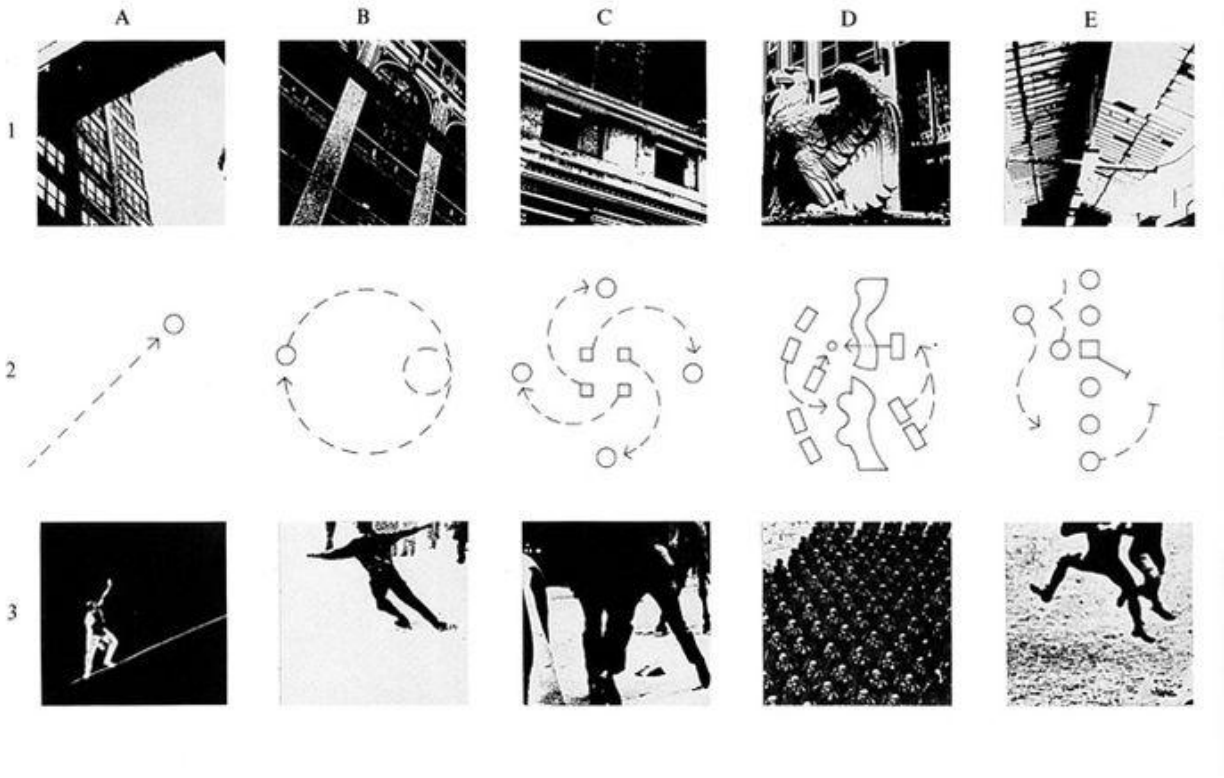


(Figure 9) Intensity of illumination on the Las Vegas Strip

This diagram maps the intensity of light along the strip; again, it is hierarchical because it has divided the layer into two categories of condition, illuminated and dark.

Movement

Plans that show movement are abstracting the paths, origins and destinations of moving people and objects. Since movement often takes place on the ground the plan is the natural view to conceive of motion.



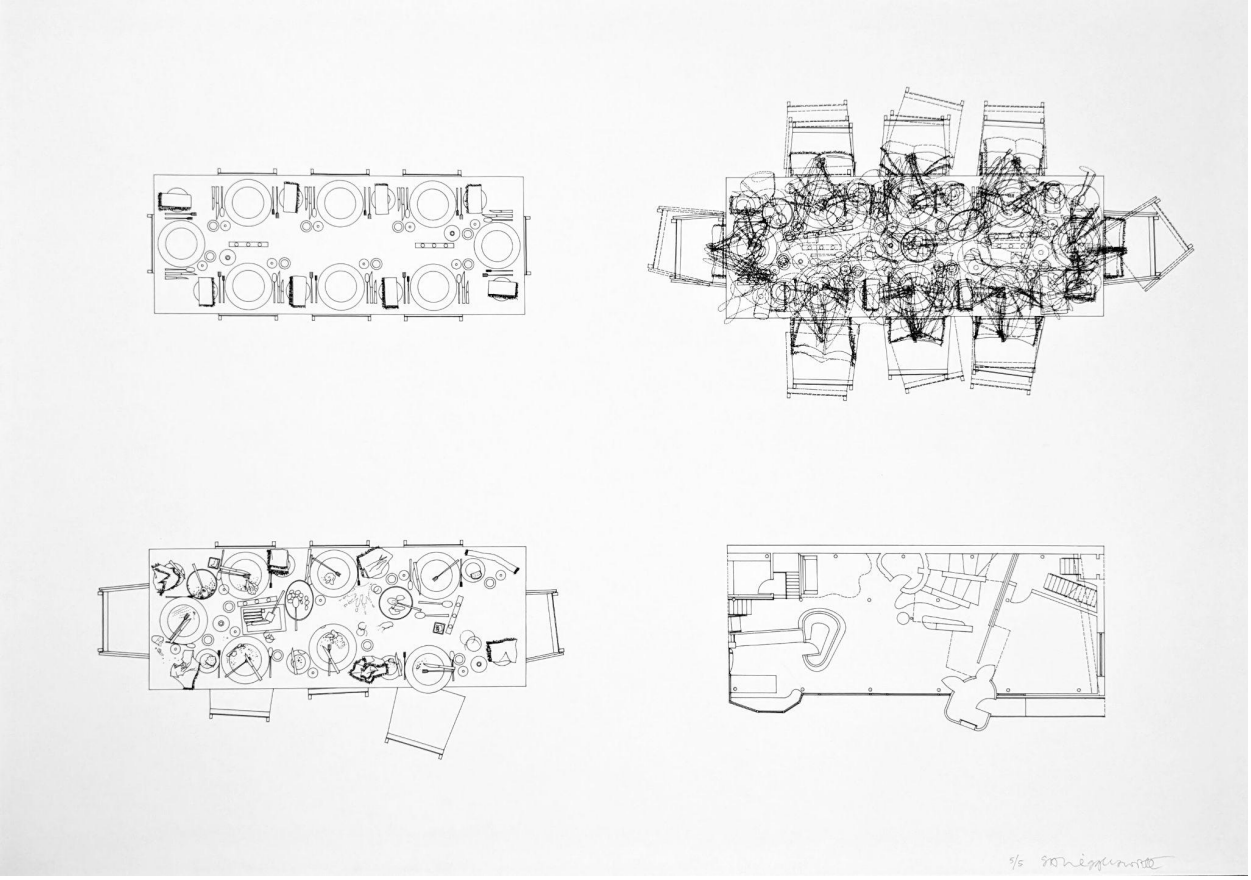
(Figure 10) Diagram showing various spaces in the city, mapping the activities found in each and showing the actors in those spaces.

In *The Manhattan Transcripts* Bernard Tschumi argues that architecture is not just about designing space and form. It is also about understanding events, actions, and what happens in space. In this diagram we see movement as an activity almost like a party of action describing the motion of a tightrope Walker, a skater, etc…

The *Manhattan Transcripts* differ from most architectural drawings insofar as they are neither real projects nor mere fantasies. Tschumi proposed to transcribe an architectural interpretation of reality.

To do this they employed a particular structure involving photographs that either direct or "witness" events (activity, use, need, function or “programs"). Alongside the photographs Tschumi developed plans, sections, and diagrams outline spaces and indicate the movements of the different protagonists intruding into the architectural "stage set.

" The Transcripts' explicit purpose was to transcribe things normally removed from conventional architectural representation, namely the complex relationship between spaces and their use, between the set and the script, between "type" and "program," between objects and events." (Tschumi, 1994)



(Figure 11) The Disorder of the Dining Table, Sarah wigglesworth 2002

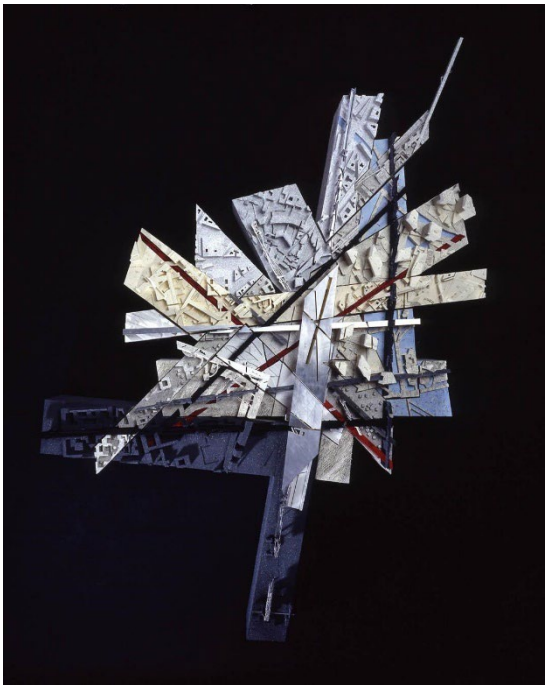
In “The Disorder of the Dining Table” Sarah Wigglesworth draws a series of plans mapping out the movement of domestic life at the dinner table. These drawings of a dining table illustrate the composition of the table setting and chairs before, during, and after a meal. The plans communicate a hierarchical mode in the first drawing of arranged table setting, a deeply integrated and networked mode during the meal and a composition that integrates both hierarchy and network in the aftermath of the meal. This idea of the conversation between strict organization and the necessity of making space for the unexpected elements of domestic life informed the final drawing in this set which is the floor plan of the straw bale house designed by Wigglesworth for her and her partner. It explores how the relationship between diners around a table can be compared to the interactions between occupants in the home. (Wigglesworth,

2002) The home provides specific spaces for specific activities but also creates space for the unexpected and inevitable spillover of domestic activity that binds a house together.

> Just like Muybridge's work, orthography is not the obvious medium to capture time. Like movies, the method involves mini moments of stillness. But put together, these moments add up to an evocation of the event in which your imagination can fill the gaps. Although apparently chaotic, our knowledge of the unfolding meal allows us to understand what is going on. (Wigglesworth, 2002)

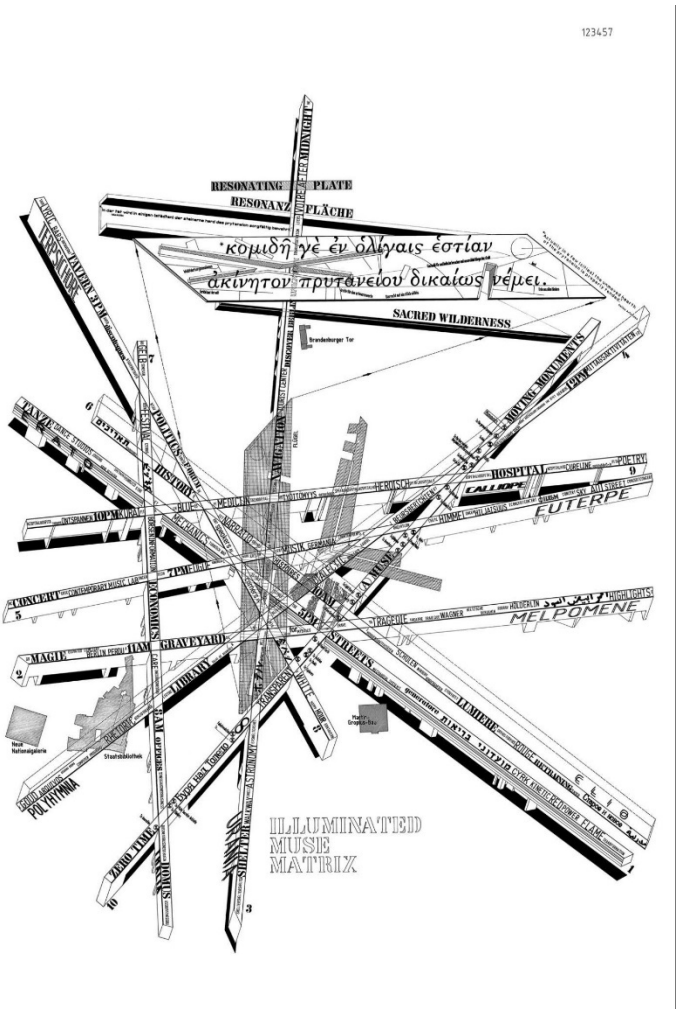
Having seen that the layers of physical, use, perception and movement are an effective way to conceptualize the underlying conceptual frameworks of spatial systems we can now look at the integration of these layers in a design. In 1990, the city of Berlin launched an international competition to redesign Potsdamer Platz, a historically significant area that had been left desolate for decades due to war and the division of the city. Potsdamer Platz was once a vibrant center of Prussian culture and later a showcase for Nazi propaganda. However, it was heavily damaged during World War II and further divided by the construction of the Berlin Wall, leaving it a vast wasteland.

Daniel Libeskind approached the competition with a unique perspective, rejecting the idea of starting from scratch. Instead, his design, titled "Out of Line," aimed to confront the site's complex past and envision a new future. The design featured a matrix of intersecting lines, symbolizing memory fragments and future possibilities. These lines also served as the basis for a series of mixed-use structures, creating a dynamic and multi-layered urban environment.



(Figure 12) POTSDAMERPLATZ, Studio Libeskind, Berlin, Germany. Model of the area's districts and how those districts interact.

This overhead photograph of the model can be viewed as a plan. It incorporates three different types of layer, physical, use and movement. The physical layer shows the built environment of Potsdamer Platz. It shows how Potsdamer Platz can be broken down by districts of different use and character. Finally shows the network of paths that connect all of the districts and knit them together.



(Figure 13) POTSDAMERPLATZ, Studio Libeskind, Berlin, Germany. Plan showing interconnections of POTSDAMERPLATZ.

Studio Libeskind built off of these connecting pathways to create a system of structures that reference the unique character of the different commercial areas while integrating them together

Conclusion

Ideas of layering information into categories of physical, use, perception and movement help develop the underlying conceptual frameworks of network and hierarchy. These categories are abstractions of complex systems and relationships that we use to understand spatial organization and composition.

Lynch's idea of imageability can be extended as a way to look at representations of space and understand how spaces are divided and integrated through paths, edges, districts, nodes and landmarks. In the same way that a city that is imageable helps construct a mental map the drawings explored in this chapter show that we construct a

mental map of the spaces represented in a similar way. An imageable plan is easy to navigate and understand. These elements of imageability work in the conceptual frameworks of hierarchy and of network. They become a way to understand how those frameworks are being mapped into space. The work of Robert Venturi, Daniel Libeskind, Bernard Tschumi and Sarah Wigglesworth make it clear that designers are constantly using these frameworks. The layers of representation used in their work show how the ideas of physical, use, perception and movement are organized, separated and integrated. Lynch's five elements describe relationship, and these relationships can all be conceived as networks and hierarchies.

Designers structure layers into plans to re-present the conceptual landscape of a space into an abstracted form. This abstraction allows the designer to understand modes of hierarchy and network. All of these categories are abstractions of complex systems and relationships. By abstracting a complex system, we are able to interact directly with the abstraction and understand it. The abstraction is not the reality but a representation of reality.

"The map is not the territory"

" the name is not the thing named"

-Alfred Korzybski

And this is not a pipe.

(Figure 14) The Treachery of Images (French: La Trahison des Images) 1929 painting. "Ceci n'est pas une pipe", French for "This is not a pipe".

References

Lynch, Kevin. 1960. The Image of the City. Cambridge, MA: MIT Press.

Ian McHarg. (2002) “An Ecological Method,” in Simon Swaffield, ed., Theory in Landscape Architecture: A Reader (Philadelphia: University of Pennsylvania Press, 38-43.

Ian L. McHarg. (1992) Design with Nature, 25th anniversary ed.(New York: John Wiley & Sons, Inc.79-93

Denise Scott Brown, Venturi, Robert, and Steven Izenour. (1972) *Learning from Las Vegas.* Cambridge, MA: MIT Press, 1972.

Tschumi, Bernard. 1994. The Manhattan Transcripts. 2nd ed. London: Academy Editions.

Tschumi, Bernard. 1983. “ILLUSTRATED INDEX: THEMES FROM THE MANHATTAN TRANSCRIPTS.” AA Files, no. 4. The Architectural Association: 65–74.

Wigglesworth, Sarah. 2002. The Disorder of the Dining Table. Sarah Wigglesworth Architects.

Studio Libeskind. POTSDAMERPLATZ. Libeskind.com. Accessed Date, 05/2024. https://libeskind.com/work/postdamer-platz/

Figure	Source
Figure 1	Gusheh, Maryam, and Glenn Murcutt. 2008. Glenn Murcutt : Thinking Drawing, Working Drawing = Guren Mākatto : Shinkingu Dorōingu Ūkingu Dorōingu. Tokyo: Toto.
Figure 2	Nolli, Giambattista. Map of Rome, 1748. Earth Sciences & Map Library-University of California, Berkeley, 2009. Accessed May 20, 2024. http://www.lib.berkeley.edu/EART/maps/Nolli_Rome_1748.html.
Figure 3	Denise Scott Brown, Venturi, Robert, and Steven Izenour. (1972) Learning from Las Vegas. Cambridge, MA: MIT Press, 1972.
Figure 4	Denise Scott Brown, Venturi, Robert, and Steven Izenour. (1972) Learning from Las Vegas. Cambridge, MA: MIT Press, 1972.
Figure 5	OMA. "Parc de la Villette." OMA, Accessed May 02, 2024https://www.oma.com/projects/parc-de-la-villette.
Figure 6	Denise Scott Brown, Venturi, Robert, and Steven Izenour. (1972) Learning from Las Vegas. Cambridge, MA: MIT Press, 1972.
Figure 7	Denise Scott Brown, Venturi, Robert, and Steven Izenour. (1972) Learning from Las Vegas. Cambridge, MA: MIT Press, 1972.
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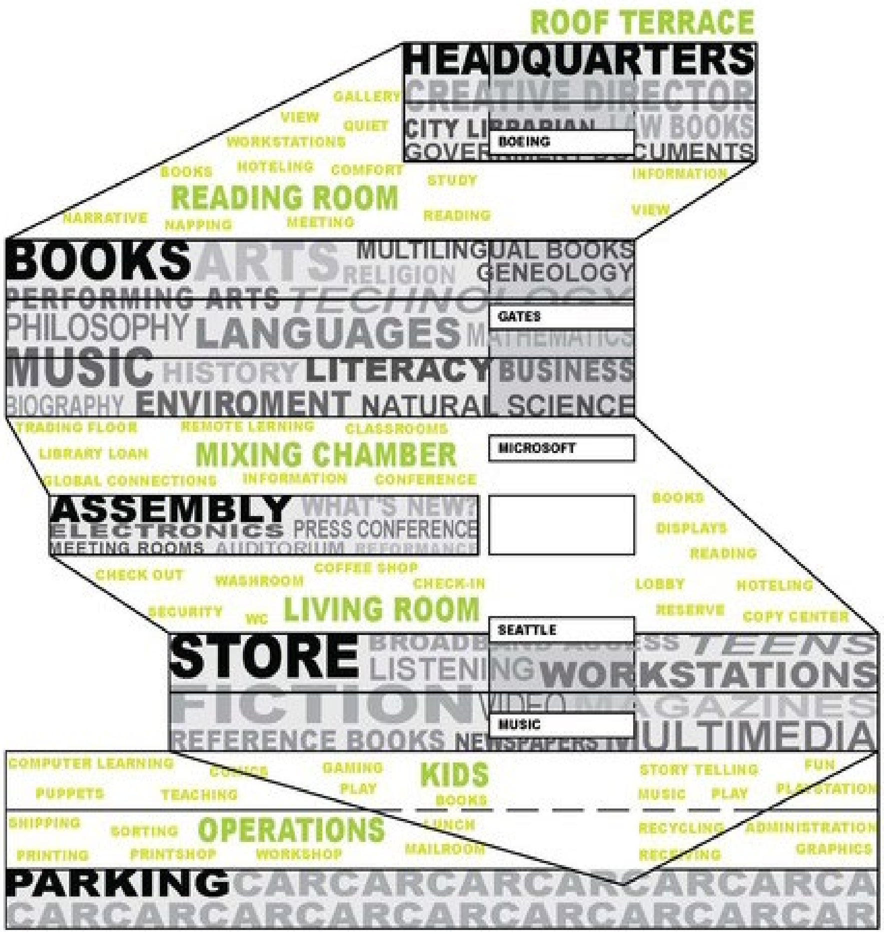
Figure 12	Studio Libeskind. POTSDAMERPLATZ. Libeskind.com. Accessed Date, 05/2024. https://libeskind.com/work/postdamer-platz/
Figure 13	Studio Libeskind. POTSDAMERPLATZ. Libeskind.com. Accessed Date, 05/2024. https://libeskind.com/work/postdamer-platz/

Figure 14	Los Angeles County Museum of Art. La Trahison des Images, Los Angeles County Museum of Art [LACMA],. Retrieved from https://collections.lacma.org/.

Chapter 5: (Synthesis) Conclusion

This chapter concludes the thesis by synthesizing the findings from the previous chapters, which explored the conceptual frameworks of hierarchy and network in architectural representation. The exploration of these concepts spanned across multiple aspects of architectural representation including the program, the line, the process, and the plan. A concept is a driving idea that structures a design. A conceptual framework is a way of organizing concepts in a structure that allows the designer to make decisions about relative importance and relationship within a design process. We use these concepts of structural organization to model ideas that have not yet been made physical. Different concepts require different levels of complexity at various stages of conceptual development. Designers edit the structural framework they are using within these two modes to help clarify the relationship of a concept's components.

In the last four chapters we have examined how conceptual frameworks of hierarchy and network are embedded in multiple aspects of architectural representation. We looked at both design drawings and presentation drawings. The design drawings show how the designer developed their conceptualization of network and hierarchy by thinking in representation. In contrast, presentation drawings show how the designer is communicating ideas of integration and separation to a specific audience. It is clear that these conceptual frameworks are central to how we think about space since they are embedded in both the thinking (design) and speaking (presentation) drawings. These frameworks structure conception through the program, the line, the process and the plan.

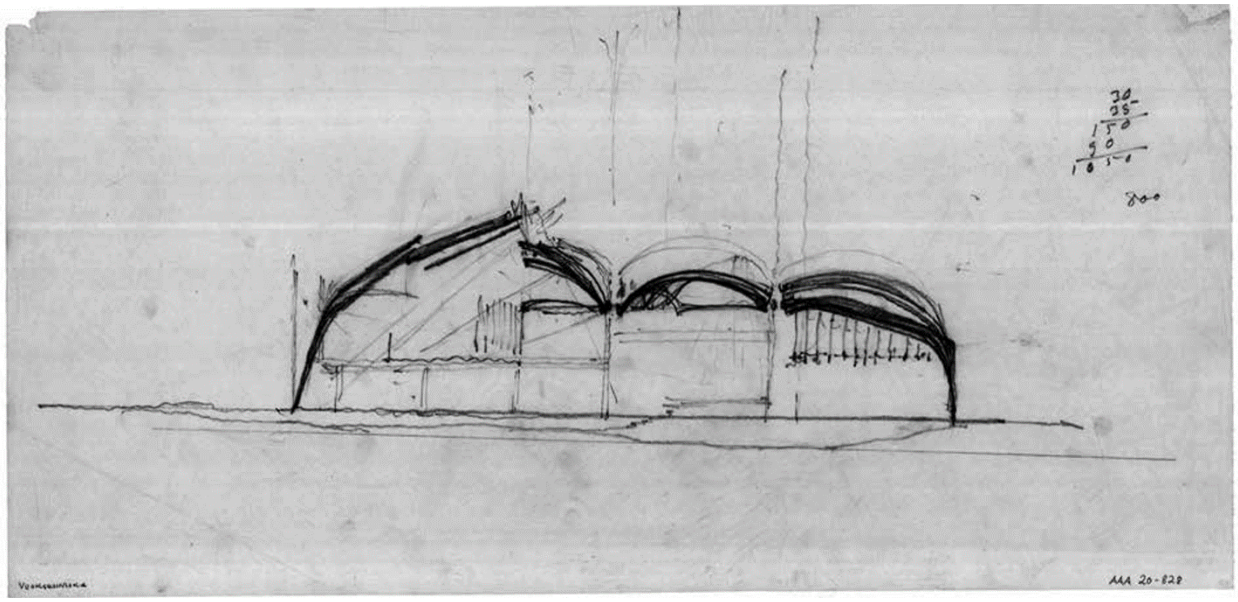


(Figure 1) Parti diagram showing the library's program in section. Dynamic spaces in green and static spaces in grayscale.

Chapter 1 explored the program as a type of architectural representation used to understand conceptual frameworks of activity, use and need in terms of hierarchy and network. The images from the Seattle Public Library proposal embody how conceptual frameworks are integral to architectural representation and how they are used to organize relative importance, division, and integration within a concept.

Through the case study of the library, we can understand the role that hierarchical and network thinking play within architectural representation through the parti diagram. Designers conceptualize design organizational frameworks through representation. We see that both hierarchies and networks can be used to demonstrate what is most important in the concept represented by an image. Through that, we can understand the relationship and significance of components within the larger project being conceptualized.

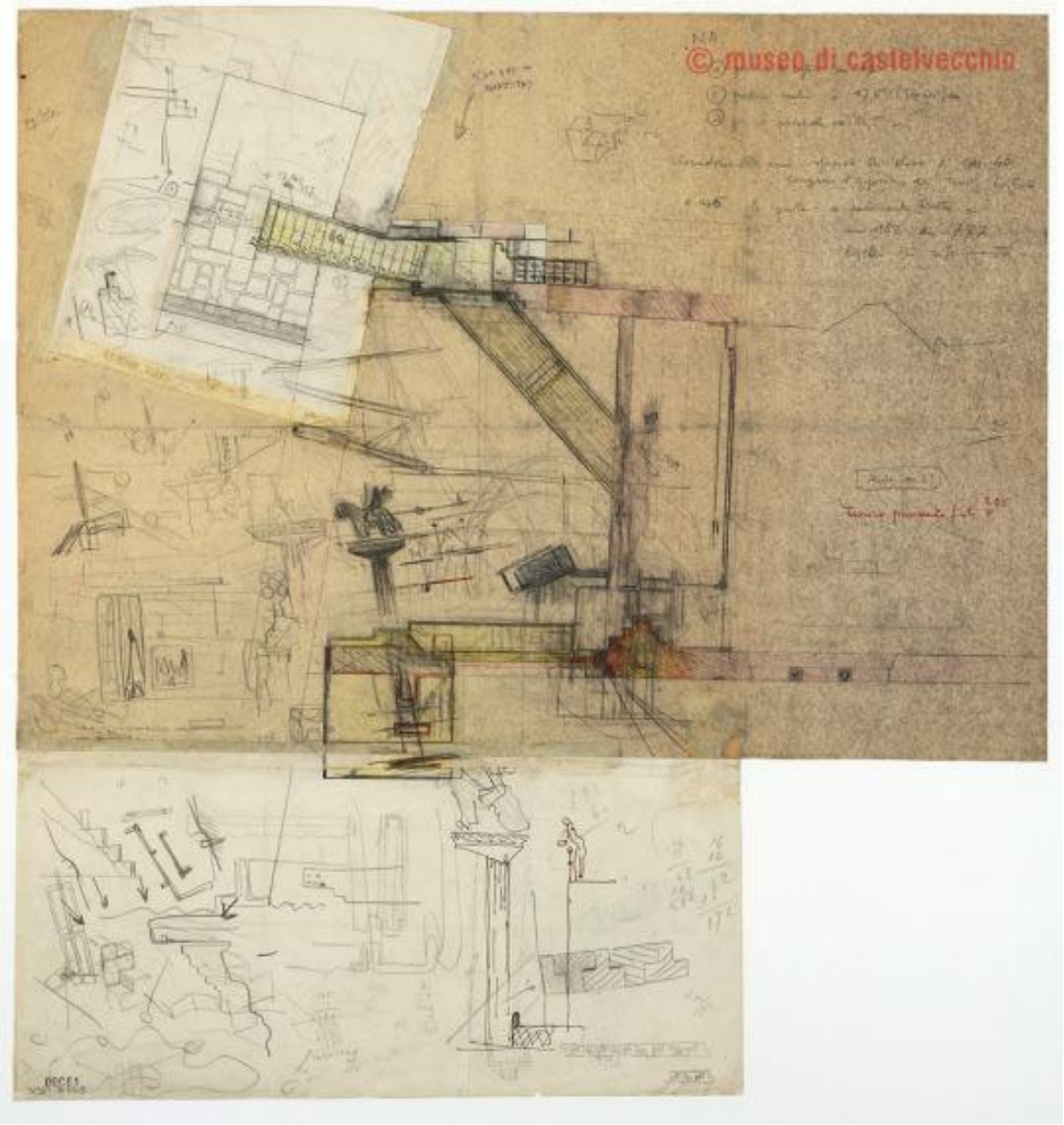
They also can reveal the relative importance of aspects of that concept. By developing this system of conceptual frameworks in representation, we understand the role that hierarchical and network thinking play within the development of architectural program.



(Figure 2) Church of the three crosses, Alvar Aalto,1955

Chapter 2 focuses on how the line is used to draw relationships throughout architectural representation. The line as a force of integration and separation is central to the conceptual frameworks that we represent. The line is a fundamental element in architectural representation, capable of conveying both hierarchy and relationships within designs. By exploring the work of Alvar Aalto we understand how the conceptual frameworks of hierarchy and network can be shaped by the line. We see it in his masterful use of line weight and contour lines to shape the concept of his architectural spaces in his drawings. Aalto's sketches and built works demonstrate the line's versatility in dividing and connecting spaces, revealing the conceptual depth and richness achievable through skillful manipulation of this seemingly simple tool.

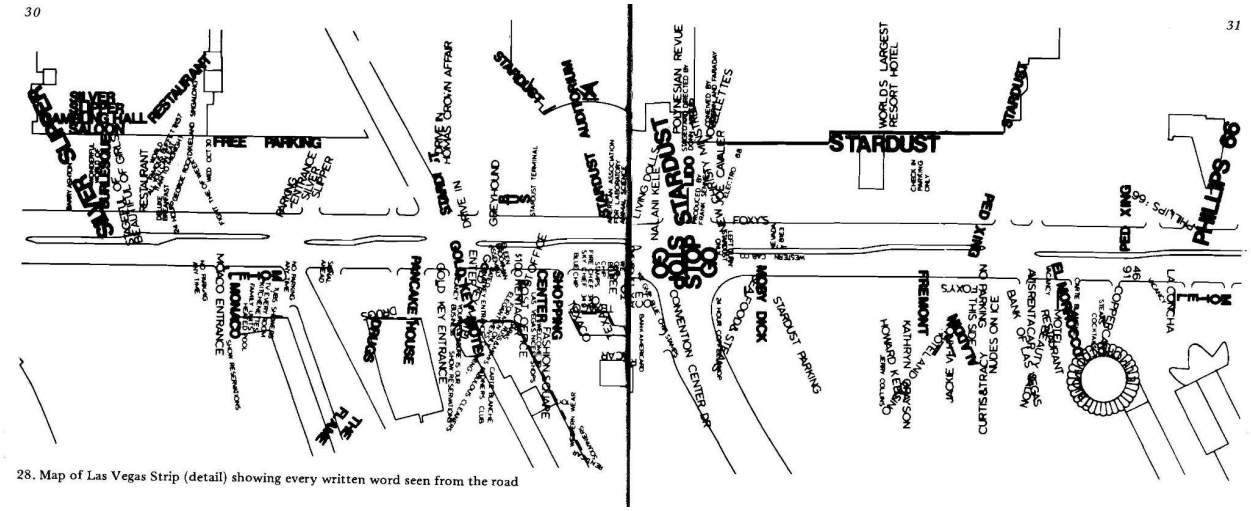
The line is a versatile conceptual tool, capable of dividing or connecting, symbolizing edges or paths, and ultimately shaping both form and concept in architectural design. Lines describe the abstraction edges and connections. Edges, that separate space, are conceived as lines, and lines also describe connections such as paths, bridges, and sightlines. Lines are the primary force that organizes a drawing, defining boundaries and describing interdependencies. Ultimately, the line transcends its literal presence on paper, serving as a symbolic form that shapes our understanding and perception of the built environment.



(Figure 3) plan of the Grand courtyard (Museum of Castelvecchio)

Chapter 3 illustrates the role these conceptual frameworks play in the representational process of architectural design. The dialogic and the carnivalesque allow for the combination of components or elements to create a connected whole or a synthesis. The dialogic is critical when thinking about these sets of images. Aalto develops a dialogue through a multiplicity of separate images at many scales. This allows him to understand all the parts of his design and integrate them into something unified. Archigram creates dialogues between the town and the airship, people and space, place and activity--the Instant City emerges from that dialogue. For Scarpa, it is the dialogue

between the numerous elements of the castle. That dialogue manifests itself as joints and details, systems of connection that integrate the castle. Their work illustrates how hierarchy and networks are in dialogue with each other and how that dialogue is used to organize relationships within a design. The carnival helps break free of the hierarchies that stand in the way of new connections and relationships, and by doing so, it provides a space for dialogue to develop deeper relationships. Perception is enacted not sensed, It is a recursive process in which each action develops and refines the conception of what is perceived. So too is representation an active and recursive process in which an idea is reperceived each time it is represented. The dialogic and the carnivalesque provide frameworks to explain how these designers break free of boundaries and restructure new systems of integration by creating a space for a multiplicity of voices. They show the interaction between hierarchical and network frameworks and how they develop relationships in The process of design representation.



(Figure 4) Visibility and prominence of signs from the Las Vegas Strip.

In Chapter 4 we map out how the frameworks hierarchy and network are integrated into the representational mode of the plan. This chapter has explored the ways in which spatial ideas are mapped into representational systems, with a focus on maps and plans. Through an analysis of the Noli Map and the works of Venturi, Libeskind, Tschumi, and Wigglesworth, we have seen how spatial concepts such as layer, scale, space, proximity, movement, positive and negative space, and boundaries are developed in plans. The chapter has also shown how the layers of representation used in architectural plans can be categorized into four primary types: physical, use, perception, and movement. These categories, which are abstractions of complex systems and relationships, help us to understand how representation can be used to present the conceptual landscape of a space in an abstracted form that enhances our comprehension of hierarchy and network. Lynch's idea of imageability can be extended as a way to look at representations in plan and to understand how spaces are divided

and integrated through paths, edges, districts, nodes and landmarks. These elements of imageability work in the conceptual frameworks of hierarchy and of network. By understanding how designers structure these layers into plans, we can gain a deeper appreciation for the role of the plan in architectural design.

Conclusion Conclusion

Architectural design is the composition, integration and division of the complex systems that organize the built environment. How we think about these spatial relationships is essential. This investigation of conceptual frameworks in hierarchy and network spanned various aspects, including the program, the line, the processes, and the plan. Through these lenses, we have examined how architects employ these frameworks to organize and articulate complex spatial relationships, both in the initial stages of design conception and in the presentation drawings. The program shows the significance of integrating and separating a project's activities, uses and needs. The line, as a fundamental element of representation, plays a crucial role in both dividing and connecting spaces, thereby shaping both form and concept. The process demonstrates the dynamic interplay between hierarchy and network, revealing how designers create discreet parts and integrated designs through a dialogic process. The plan helps divide and integrate multiple elements of a project including its physical aspects, uses, perceptual experience and movement. Architectural representation can be understood as an articulation of the dialogue between division and integration, hierarchy and network. These frameworks are essential to conceptualize the composition of complex spatial systems. Ultimately, a deeper understanding of these conceptual frameworks can empower architects to make more informed design decisions and enrich the field of architectural education and practice.

Table of Figures	
Figure	Source
Figure 1	Koolhaas, Rem. 1999. Seattle Public Library. OMA/LMN.
Figure 2	Ando, Mihoko. 2016. “Retracing Alvar Aalto’s Design Process through the Sketches and Drawings of Vuoksenniska Church (1955–8).” Arq (London, England) 20 (4). Cambridge, UK: Cambridge University Press: 333–44. doi:10.1017/S1359135516000567.
Figure 3	Museo di Castelvecchio. Archivio Carlo Scarpa, Sacellum drawing: C. Scarpa 1962-1964. Inv. Num.: 31682. Retrieved November 16, 2023, from http://www.archiviocarloscarpa.it/web/disegni_scheda.php?scheda=463
Figure 4	Denise Scott Brown, Venturi, Robert, and Steven Izenour. (1972) *Learning from Las Vegas.* Cambridge, MA: MIT Press, 1972.