

**ACTIVATING THE VERTICAL CITY:
CATALYZING ASCENT + CONNECTIVITY
WITHIN THE DELAMINATED DOMAINS**

by

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Submitted in partial fulfilment of the requirements
for the degree of Master of Architecture

at

Dalhousie University
Halifax, Nova Scotia
March 2017

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ABSTRACT

Responding to isolation and the repetitive nature that high-rise buildings typically evoke, *Activating the Vertical City* seeks to respond to the lost sense of place that exists within vertical environments. It proposes to solve this disconnect using variety, connectivity, and the metamorphosis of progression through space.

Coupling the theoretical concepts of space, place, and the in-between, with the mathematical interpretive tools of topology and topological space, the thesis proposes to enhance the experience of moving through space using a series of dynamic intersecting journeys that catalyze ascent and connectivity. These theories will be tested through an *objet-type* investigation of what it means to circulate *through* and dwell *within* the vertical. Pursuing the idea that interaction through edge effects and thresholds can promote a sense of place and alter the experience of multiple environments simultaneously: the *objet-type* will consider ways of occupying the vertical, and the interstitial inhabitation of horizontal planes.

ACKNOWLEDGEMENTS

Activating the Vertical City is dedicated with love to Sharon, Rene and Daniel.

I would like to sincerely thank my parents for this opportunity: for always inspiring me to work hard and follow my dreams. To my friends and family for their continuous encouragement, and my professors who shared amazing ideas, provided fabulous criticism, and taught me to simultaneously look at ideas from multiple of points of view. To my supervisors Cristina Verissimo and Sarah Bonnemaïson who kept me aligned and proposed exciting ways of looking at a project; to my advisor Diogo Burnay who added beautiful tangential ideas and enthusiasm; to my professor Catherine Venart who got me excited about what a thesis project could be; and to Christine Macy and James Forren who unknowingly prompted questions regarding the relationships between space, place and the in-between, and in turn how these ideas could be mapped in the geometric and architectural realms.

Thank you.

I would also like to also thank Emily Cassidy, Emily Wilson, Pearl Chan, Kate Checkeris, Lewis Gallacher, Mark White, Jordan Jones, Jason Butler, Ryan Vandervliet, Lindsay Henwood, Kara Burman, Shalini Makdani, Zheng Txlizmn Li, Odin, Jennifer Kinnunen, Farhan Durrani, Megan Hyslop, Katy Christian Rowley, Gracie Blatherwick, Riley Fontaine, Daniel Fontaine, Robert Whittaker, Diana Whittaker, and the Errington Vaudeville ladies. Having you as part of the cinematic vignettes made creating the illustrations very special and meaningful.

And finally, to the undocumented street artists of Manhattan, New York, and Melbourne, Australia, thank you for sharing your artwork with the world.

CHAPTER 1: INTRODUCTION

1.1 NARRATIVE

Floating some distance above the ground, individuals of the ... 10th through 79th floors ... could exist at any level of the building. Their only tools to negotiate a difference between the identical floor plates of the tower they inhabit, is the glowing number on the elevator or name of the floor. How can this architectural experience contribute to the sense of connectivity that individuals have with other activities that are occurring in the building, let alone with their understanding of how they relate to their neighbourhood or city? Is this the type of atmosphere architects wish to share with the world? Unless their intent is to provide a total sense of isolation and loss of context this is what's being generated.

1.2 ACTIVATING THE VERTICAL CITY, AN OVERVIEW

To solve this disconnect, *Activating the Vertical City* seeks to compose connectivity through the urban domain by inviting common space into the delaminated layers of the vertical city. Can an understanding of topological space be used to create a sense of place in vertical environments through the intersection of journeys and the inhabitation of planes?

Beginning with an analysis of space, place, and the in-between, Chapter 2 *Interpreting Space*, examines contemporary spatial interpretations by the following theorists, artists and architects: Mark Tewdwr-Jones, Christine Boyer, Liangyong Wu, Roberta Gratz, Henri Lefebvre, Michel de Certeau, Gottfried Leibniz, Martin Heidegger, Oskar Schlemmer, and Gordon Matta-Clark, to derive a personal point of view that can inform the design methodology of *Activating the Vertical City*. To contextualize these abstract ideas the thesis delves into the geometrics of space, exploring the concepts of topology, topological space and the topological threshold. To further understand the definitions of space and place by Michel de Certeau and Henri Lefebvre, the chapter interprets the principles set out by the following mathematicians: Johann Listing, Gottfried Leibniz, Leonhard Euler, John McCleary, and Felix Hausdorff. Next, to architecturalize the spatial boundaries within which these concepts exist, Chapters 2.3 to 2.5 examine the perceived and embodied edges, as per the theories of Edward T. Hall, Martin Heidegger, Derk de Jong, Jonathan Hill, Ralph Erskine, David Heeger, Herman Hertzberger, Jan Gehl, Michel de Certeau,

Christopher Meyer, Grant Wanzel, Stan Allen, and Kevin Lynch. From here, a discussion of connectivity in architecture and labyrinthine journeys through topological space ensued: relating the spatial understandings to the cubist movement, specifically to the work of Marcel Duchamp and Pablo Picasso.

Chapter 3, *Spatial Planning Theories*, sought to position the work within historical spatial planning theories and the contemporary architectural context, focusing specifically on projects proposing the inclusion of common space – these include: David Harvey, Henri Lefebvre and Jeanne Gang.

Chapter 4, *Intersecting Spaces*, focuses the conversation of space and place into the relationship of public and private realms – searching for methods of overlapping the two to generate more spaces in-between. Referring to the categorizations of the public to private by Christopher Alexander, the collective and individual spaces of Herman Hertzberger, and the power of semi-public zones according to Oscar Newman, *Intersecting Spaces* investigates the relationships created by different arrangements of the public and private programme. Subsequently, Chapters 4.2 and 4.3 focus on architectural projects that exhibit opportunities for overlap, integration, and connectivity – focusing on the proprietary methods used to achieve each.

Chapter 5, *Circulating Through Layered Environments*, shifts to the urban scale to learn how public spaces can be invited through layered environments. Focusing on three North American urban case studies – Manhattan, New York, Chicago, Illinois, and Vancouver, British Columbia – urban circulation networks were mapped against tower heights of the vertical city and their proximity to public common spaces. Later in the chapter, the tower was examined as a tool, and discussed in terms of verticality, the typical plan, programmatic typologies, alternative design methods and circulation systems, as a means to understand internal elevated street networks. Chapter 5.3, *Typologies of Tower Programming*, also provides a critique on existing tower typologies and discusses the manner in which they do not effectively contribute to the city fabric.

Focusing on visual connectivity, Chapter 6, *Spatial Interventions*, shifts to the detail scale, considering our optical relationship to edges. Through a series of material studies and

comparative analyses, a collection of wall sections were developed to relate the expression of ephemeral gestures across a soft edge. This proposed an alternative method of relating public and private spaces. Further abstracting spatial connections and movement, a group experiment *Twisted Expressions*, questioned ways of representing and capturing the fractal sensations of time and space through shadow studies. This process illustrated undulating and overlapping journeys through space, and was later used to represent topological space as it morphed through the vertical layers of a tower.

Chapter 7, *Selecting Programme*, considers how programme can activate and engage spaces within the vertical domain and discusses programmatic approaches that can be harnessed.

Chapter 8, *Applied Design Methodology*, began with a review of the principles of space, place and the in-between, in accordance with the studies of Michel de Certeau and Henri Lefebvre. The theories are established as a means to understand the geometric notions of topology, topological space and the topological threshold; and subsequently, their material configuration through the hard, soft and polyvalent edges. These base concepts were then used to derive a design methodology that proposes to relieve the disconnect between the horizontal public domain and the private vertical domain. This design methodology was developed as a step-by-step process to abstractly re-consider and re-articulate expressions of connectivity flowing through the volumetric space of the vertical domain. The proposal has been explored through an *objet-type* approach. This means that it was composed as a siteless analysis that investigated a basic idea in great detail. Arthur Ruegg defines Le Corbusier's use of the *objet-type* as an analysis of "objects that fulfill basic functions."¹ As such, the *objet-type* investigates what it means to circulate through and dwell within the vertical. Pursuing the idea that interaction through edge effects and thresholds can promote place and alter the experience of multiple environments simultaneously. It considers ways of occupying the vertical, and the interstitial inhabitation of horizontal planes. Following this approach, *Activating the Vertical City* questions: can an understanding of topological space be used to create a sense of place in vertical

1. Arthur Ruegg, *Le Corbusier, Furniture and Interiors 1905–1965* (Zurich: Verlag Scheidegger & Spiess AG, 2012).
Nina Reetzke, Stylepark, *Le Corbusier's Furniture and Interiors*, created September 12, 2012, last modified 2017, <<https://www.stylepark.com/en/news/le-corbusiers-furniture-and-interiors>>.

environments through the intersection of journeys and the inhabitation of vertical planes?

Following the objectives of the *objet-type* design proposal, Chapter 8.3 *Vertical Catalysts*, presents a series of embedded catalytic examples that have been designed to draw the common social space of the public street network up, through a proposed tower typology, to the public platform of a rooftop plaza. Here, the community is invited to gather in an impromptu celebration or protest, returning Henri Lefebvre's lost 'common sense' space to the urban environment.²

2. Henri Lefebvre, *The Production of Space* (Cambridge: Blackwell, 1974), 19, 35.

CHAPTER 2: INTERPRETING SPACE

2.1 SEARCHING FOR SPACE + DISTINGUISHING PLACE

I have long been interested in understanding the difference between the definitions of space and place. Many people use the two terms interchangeably, however I think that a closer examination could yield a stronger understanding of what architecture is trying to provide. Without first knowing how one reacts to, rests within, or moves through the other in a theoretical and physical sense, how can the design of spaces and places inform the architecture and cities within which they are embedded? This chapter will explore the contemporary interpretations of the two terms and define the relationships and differences between the elements. By establishing a strong basis for these terms, I intend to introduce and explore the conceptual and tangible characteristics of the *space in-between*. To develop what the idea means, I must first establish where this *in-between* occurs. I believe that it exists between place and space: it is on the edge of these two invisible terms that compose the buildings and urban landscape within which we dwell.

Like oil and water, space and place are quite similar in their 'liquid' or theoretical states but differ in specific notions. *Space* is often defined as infinite and all encompassing,³ but how can something so vast be understood at the human scale? And how does the notion of place fit into it? A set of principles have been derived through a literary analysis of the following theorists' and architects' work. Regarding the notion of place, Mark Tewdwr-Jones, Edward Relph, Delores Hayden, Christine Boyer, Liangyong Wu, Martin Heidegger, Roberta Gratz, Sarah Menin, Doreen Massey, Henri Lefebvre, Michel de Certeau, Jan Gehl, Kenneth Frampton and Kevin Lynch, have all spent an enormous amount of time identifying the qualities of space and established interesting conclusions. Similarly, the subject of space has also been pondered by many theorists. I will discuss the spatial interpretations of Henri Lefebvre, Michel de Certeau, Oskar Schlemmer, Alvar Aalto, Martin Heidegger, Doreen Massey, Juhani Pallasmaa and Jonathan Hill, and derive a personal point of view that will inform the design methodology of *Activating the Vertical City*.

3. Ibid., 245–46. For as Lefebvre notes there are three types of space: perceived, conceived, and experienced.

To begin, Mark Tewdwr-Jones defines place through memory – considering it as a constantly re-written component of history that results from the users’ layered perceptions of space over time.⁴ He is thinking of this in the fourth dimension, where the unwritten history of the place plays a silent but ever-present role in its making. This is also mimicked in Roberta Gratz’s perception that a place emerges in an evolutionary manner from its past.⁵

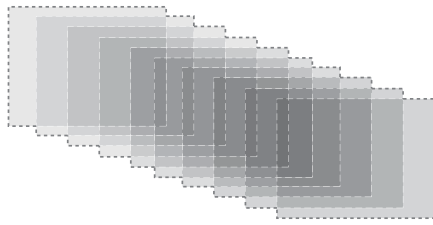


Fig. 1. Place as layered perceptions over time; based on Tewdwr-Jones, *Urban Reflections*

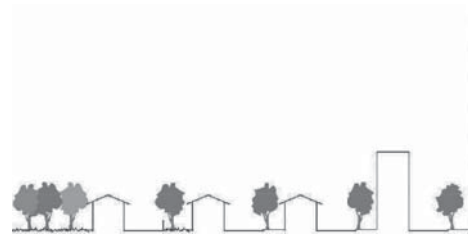


Fig. 2. Place as an evolutionary emergence predicated on the past; based on Gratz, *The Living City*

Similarly, Liangyong Wu considers place to be an instance where people gather. In these instances the architecture of place will slowly form over time.⁶ This notion that the idea of place gradually grows from memorized perceptions of its user patterns is also strongly embodied in Christine Boyer’s work. In *The City of Collective Memory*, Boyer establishes place as the composition of a collective memory. The *collective* corresponds to the users’ layered interpretations and memories of a place: the embodiment of these collected histories essentially alters the overall perception of it as it is described and re-told ad infinitum. In each of these instances, Tewdwr-Jones, Gratz, Wu and Boyer consider the evolutionary and layering ideas that place emerges gradually, and is informed by subtle changes over time. The architecture of place therefore needs to be integrative⁷ and allow

4. Mark Tewdwr-Jones, *Urban Reflections: Narratives of Place, Planning and Change* (Bristol: Policy Press, and University of Bristol, 2011), 237–38. Jones is stating that his explorative analysis of urban planning via film/video/photograph etc. might be the way to capture the ephemeral essence of the multiple invisible users of space.

5. Roberta Brandes Gratz, *The Living City: How America’s Cities are Being Revitalized by Thinking Small in a Big Way* (Washington: Preservation Press, 1994), 294. In reference to the place of the street, as a gradual evolution over time: “they evolved, resisting .., withstanding .., adapting .., and clinging to the character of place.”

6. Liangyong Wu, *Integrated Architecture: A General Theory of Architecture* (Rome: Edizioni Nuova Cultura, 2013), 5. This synopsis is interpreted from Liangyong Wu’s quote regarding place and integrative architecture. “The places where people come to live together form the human settlements. For the ancient Chinese, a place was considered a settlement where people had resided for a long time and started to grow.”

7. So, like a tree’s ever growing bark, the invisible layers that compose the whole are constantly responding and adapting to the edge environments that seek to modify it.

for subtle modifications, to these environments, that can cultivate the essence of place, or they will become redundant and will cease to be successful places for their users.

Henri Lefebvre, Gottfried Leibniz, Michel de Certeau, and Martin Heidegger have more spatial definitions of space and place. In *The Production of Space*, Lefebvre explores the notions of abstract, social and urban space. His conclusions regarding abstract space are strongly based on Gottfried Wilhelm Leibniz's ideas of space. However, unlike Leibniz, his intent was to frame the ephemeral characteristics of space within the absolute and abstract forms.⁸ For Lefebvre, absolute space has "been given [both] a name [and] an origin,"⁹ and as such it differs significantly from Leibniz's. For Leibniz, "space is ... neither nothing nor something: ... [it lacks] assignable form, content, orientation [and] direction."¹⁰ These are interesting geometric descriptors: his space is simultaneously expansive and all encompassing, for there are no limits applied to it: space is equivalent to air.¹¹ Similarly, the emptiness of Lefebvre's absolute space is unlimited, but it is also characterized by "juxtapositions, proximities, emotional distances and limits. It is thus [both] lived and represented."¹²

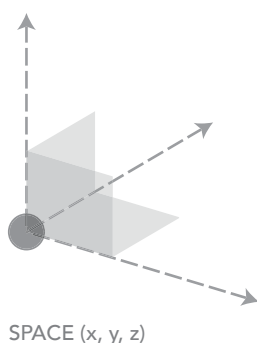


Fig. 3. Abstract space; based on Lefebvre, *The Production of Space*

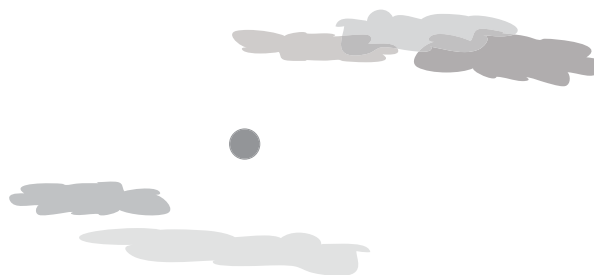


Fig. 4. Space as unoriented; based on Leibniz in Lefebvre, *The Production of Space*

Lefebvre's social space, on the other hand, encompasses the networks of exchange and communications¹³ that occur at a specific location or place, and are understood at the

8. Claire Fontaine, "Designing and Finding Place in Space" (Halifax: Dalhousie University, 2015), 3.

9. Lefebvre, *The Production of Space*, 235. These x, y, z coordinates locate space and define place.

10. Ibid., 160.

11. I understand that there are limits to the extent that air can permeate objects and materials, but this is an interesting concept. It is akin to the idea that if someone were to exhale their breath somewhere in Australia, that same air movement could be felt in Canada. Leibniz's space would take up the same amount of room as this theoretical air movement.

12. Lefebvre, *The Production of Space*, 228.

13. Ibid., 266.

scale of the individual. The space of these social interactions can therefore be defined by an origin. Correspondingly, urban space “presumes a larger scale that attributes aesthetic representations to the entire system.”¹⁴ Urban space can envelope and “commandeer nature” and other spaces at the individual scale.¹⁵ It exists as the private built urban environment, while social space is embodied as the public unbuilt domain of the street network. By Lefebvre’s standards, a representational analysis of the city network would conclude that: the built-up surface of the block represents a conquering *masculine* space; and the open-spaces of plaza and park, symbolize a provisional *feminine* space.¹⁶ “By these rules, the street could be defined as a *bi-gendered* space a shared space where the masculine ground-plane provides openings for nature (the feminine) to be invited through. Likewise, the lived notion states that the paths meandering through the street define it as a space, and the natural pauses along this system become places.”¹⁷

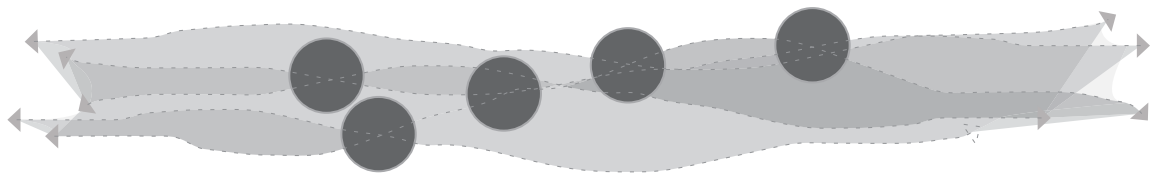


Fig. 5. Paths defining space – with the pauses as places occurring on these vectors; based on Lefebvre, *The Production of Space* and de Certeau, *The Practice of Everyday Life*

In this way, the space of the layered paths in the street mimic de Certeau’s understanding of both space and place. The vertices of movement are the common ground of Lefebvre’s genderization of space, neither belonging to one nor another, but existing in-between. Elaborating on this, by drawing the language of the common space of streets up into buildings, the design proposal will begin to blend my interpretation of how programming can function, and spaces can be used. By transforming a single-type space (masculine) into a mixture of masculine-shared-feminine, the space will be transformed into a hybrid of mixed-uses that inform one another, interact and become activated by the common space of the street.

14. Fontaine, “Designing and Finding Place in Space,” 3.

15. Ibid., 269.

16. Ibid., 261–62, 286, 367–77. As representation of the feminine, the open-spaces of plazas and parks also allude to the essence of the hearth, interiority and natural abundance; while masculinity is attributed to architecture (dominion over the soil) – this is referred to as the representational space of the phallic formant.

17. Fontaine, “Designing and Finding Place in Space,” 4.



Fig. 6. City walkers composing space;
based on de Certeau, *The Practice
of Everyday Life*

Michel de Certeau's understanding of space was derived from watching the subconscious movement patterns of passers-by as they progress along their journeys.¹⁸ This top-down approach yields a volumetric understanding of place according to space: "[The walkers'] intertwined paths give ... shape to spaces. They weave places together."¹⁹ Here, de Certeau's perception of the walker's movements²⁰ speaks again to layered individual-journeys through space, along random paths, which compose the geometric constraints of space – thereby demonstrating the natural locations of place. Lefebvre is also influenced by the geographical notion of place, as defined by the x, y, z coordinates, which is about the *local*. Thus geometrically, "space [is] a composition of intersecting mobile elements that respond to the variables of direction, speed and time."²¹ ... 'Space is a practiced place';²² and place is a pause along this shifting vector, that offers stability within the atmospheric corridor."²³ If a place is a point in space, then a vector is the action-line: moving from one point to the next. The path can therefore "be described as a visual connection or physical movement between spaces, and defined by an invisible vector. These units are then linked by either a visual order of places or by physical spatial actions."²⁴ However, according to de Certeau, the mobile act of walking, or wandering, is a placeless act: 'It is the indefinite process of being absent and in search of a proper.'²⁵ Hence, the geometric coordinates of space are in constant flux and the path is the sole memory of

18. Michel de Certeau, *The Practice of Everyday Life* (Los Angeles: University of California Press, 1984), 91–110, 115–30.

19. de Certeau, *The Practice of Everyday Life*, 97.

20. *Ibid.*, 93. Michel de Certeau is speaking again to the layered discoveries of space through individual journeys, along paths.

21. *Ibid.*, 117.

22. *Ibid.*

23. *Ibid.*, 97.

24. *Ibid.*, 117.

25. *Ibid.*, 103.

each walker's movement. [The] street user's chosen path is [therefore] limited by their movement through spaces, in search of places."²⁶ We can thus conclude that space is a composition of the meandering lived paths through the city; while paths are the journeys that map the interstitial movement of space, and places are the natural pauses along this trajectory.²⁷ We can therefore establish that, according to Henri Lefebvre and Michel de Certeau, space is a geometrically defined vector, and place is a moment of pause along it.

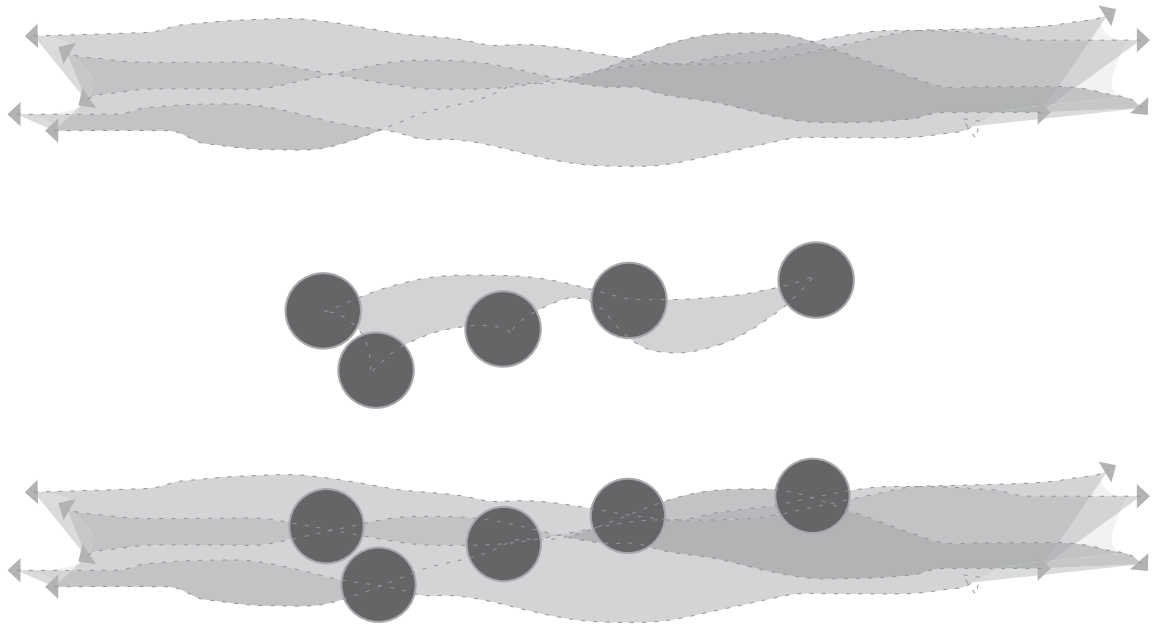


Fig. 7. *Top*, Space as a composition of vectors or journeys; based on Lefebvre, *The Production of Space* and de Certeau, *The Practice of Everyday Life*

Fig. 8. *Middle*, Place as a moment; based on Lefebvre, *The Production of Space* and de Certeau, *The Practice of Everyday Life*

Fig. 9. *Bottom*, Place in space: the moments of pause along a vector; based on Lefebvre, *The Production of Space* and de Certeau, *The Practice of Everyday Life*

As an architectural response, the ideas of vector and moment can be translated into the design of journeys through space, in both the horizontal and vertical orientations; and place can begin to be defined as a moment of pause along this journey. Architecturally this can begin to locate and define how one programme can seep into the space of another, and visa versa.

26. Fontaine, "Designing and Finding Place in Space," 2. A critical analysis of de Certeau's ideas on the notions of space and place.

27. de Certeau, *The Practice of Everyday Life*, 97.

Oskar Schlemmer's interpretation is quite similar to de Certeau's "space as a practiced place."²⁸ For Schlemmer, individuals create space in the way that they occupy it. This interaction is based on both a "visual experience" and "a complete physiological entity with space through movement."²⁹ The invisible organic functions that compose a human, define the parameters and movements of an 'imaginary room'.³⁰ In other words, man exists as an entity of space, and creates it through movement. This is synonymous to Henri Lefebvre's comprehension that space is a made through the layering of individual movements, and complements de Certeau's space because movement composes it in both.

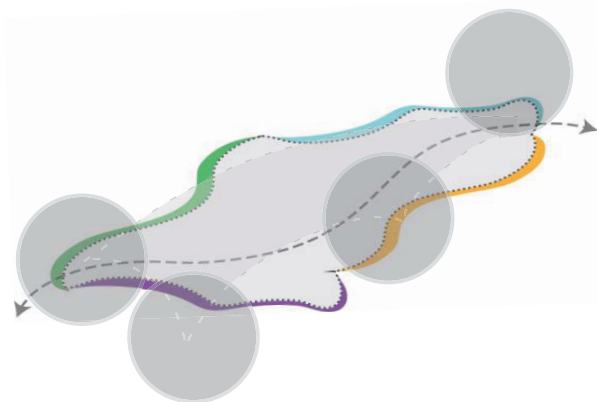


Fig. 10. Space *in-between* as a composition of experienced places; based on Heidegger, *Basic Writings*

Heidegger considers the meaning of space to be a derivative of the places along its peripheries³¹ – imagine an arcade. In this sense, the experience of the space is coloured by the types of places that one journeys past. Therefore encounters with architectural edges characterize our experiences in each unique situation as we journey through space: composing a comprehensive sensation of the journey.

Similar to Heidegger, Gordon Matta-Clark's work explores and considers the spaces in-between through "the journey beneath, through and above."³² In *Conical Intersect*,³³

28. Ibid, 117

29. Eeva Pelkonen, *The Organic Approach to Architecture* (Chichester: Wiley-Academy, 2003), 41.

30. Ibid., 41–42.

31. Martin Heidegger, "'Building Thinking Dwelling' Lecture, presented 1951," in *Basic Writings: From Being and Time to The Task of Thinking* (New York : Harper Perennial Modern Thought, 2008), 356. Heidegger is referencing locales and "accordingly, [how] spaces receive their essential being from locales and not from 'space' itself" – hence spaces are defined by places (locations) within a boundary.

32. Lisa Le Feuvre, forward to *Gordon Matta-Clark: The Space Between*, by James Attlee and Lisa Le Feuvre (Glasgow: Nazaraeli Press, 2003), 7.

33. Ibid., 100–01.

Clark denotes an oculus piercing a building: providing new tangential views of architecture. This analogy can describe the blended boundaries of overlapping programmes in buffer zones – eroding the typical perception of how we conceive of the interaction between architectural spaces. The space and views that *Conical Intersect* evoke remind us of cubism, which demonstrate fractured views of an object from different points of view.



Fig. 11. Gordon Matta-Clark, *space in-between*; diagram based on Matta-Clark's *Conical Intersect Project*, in Le Feuvre, *Gordon Matta-Clark*, 58

With all of these ideas in mind, I conceive of space as an element of movement along a vector, and place as the pause: a moment where the users of space can appropriate a zone to rest or gather along that vector. A place is described less as a singular location and more by the invisible surroundings that compose it. The multitude of thresholds (the spaces in-between) that buffer place, and allow it to exist within space, can be manifested through the windows that look into it. In turn, the position of such openings affects the experience of the space. Place can be many things: it can be a set of stairs; a bench; or even the edge of a fence – separating a small front yard from the sidewalk. It has to do with how public space encroaches into the private: place is a carved area set aside from the motion – within which life can occur.

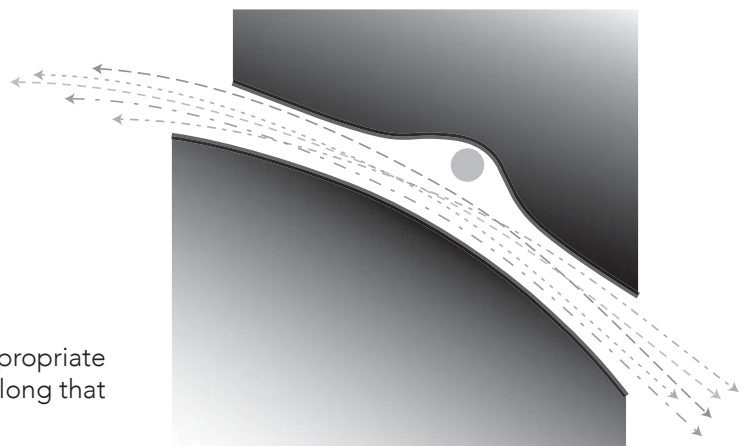


Fig. 12. The users of space can appropriate a zone to rest, or gather, along that vector

SPACE + PLACE MATRIX

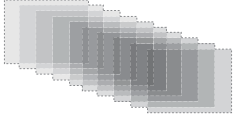

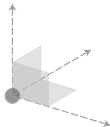



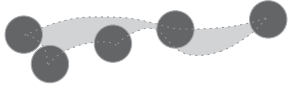

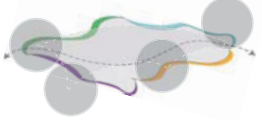

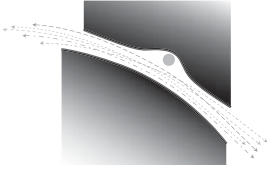
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| Roberta Gratz | Place as an evolutionary emergence predicated on the past |  |
| Henri Lefebvre | Abstract space |  |
| Leibniz | Space as unoriented |  |
| Michel de Certeau | City walkers composing space |  |
| Henri Lefebvre + Michel de Certeau | Space as a composition of vectors or journeys |  |
| Henri Lefebvre + Michel de Certeau | Place as a moment |  |
| Henri Lefebvre + Michel de Certeau | Place in Space: the moments of pause along a vector |  |
| Martin Heidegger | Space as a composition of experienced places |  |
| Gordon Matta-Clark | Space in-between, diagram of Matta-Clark's Conical Intersect project |  |
| Fontaine | The users of space can appropriate a zone to rest, or gather, along that vector |  |

Fig. 13. This matrix diagram is a compilation of all of the illustrations demonstrated in Chapter 2.1

2.2 MATHEMATICS OF PLACE

The mathematical origins of place began in the mid 1670s, during a conversation³⁴ between mathematicians Gottfried Leibniz and Christiaan Huygens – the correspondence yielded to the notion of *analysis situs*. In the mid 1700s, Leonhard Euler expanded this calculation to *geometria situs*.³⁵ The beginning of a notion of place can thus be located in the theories of these men.

Gottfried W. Leibniz,³⁶ 1646–1716, explored the ideas of *analysis situs*,³⁷ which is a scientific analysis of place. Leibniz composed a calculus formula to solve the geometric linear placement of place in space in terms of magnitudes: he called this formula *Analysis situs*. If we compare this idea to Henri Lefebvre’s notions of space and place,³⁸ and my representational conclusions of space as vector and place as moment, then Leibniz’s *analysis situs* can establish a point, or as I like to describe the moment of place, within linear geometric space, through his mathematical calculations.



Fig. 14. Henri Lefebvre, space; based on Lefebvre, *The Production of Space*

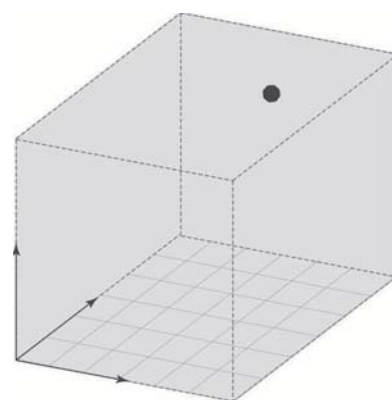


Fig. 15. Gottfried Leibniz, analysis situs; based on McCleary, *A First Course in Topology*

34. John McCleary, introduction to *A First Course in Topology: Continuity and Dimension* (Providence: American Mathematical Society, 2006), viii. Refer to the letter that McCleary identifies between Gottfried W. Leibniz to Christiaan Huygens in the 1670s, where by the subject of requiring an geometric calculation of place in terms of the algebraic formulas of magnitude.

35. Ibid.

36. Garth Kemerling, *The Philosophy Pages: Gottfried Wilhelm Leibniz*, created 1997, last modified November 23, 2011, <<http://www.philosophypages.com/ph/leib.htm>>. Gottfried Wilhelm Leibniz, 1646-1716, was a philosopher and mathematician who explored theories of human understanding through metaphysics and monadology. His treatise *Discourse on Metaphysics*, 1686, and *Monadology*, 1714, proposed phenomenal definitions of space and time, which influenced the work of Henri Lefebvre.

37. McCleary, *A First Course in Topology: Continuity and Dimension*, viii.

38. Ref. Chapter 2.1 *Searching for Space + Distinguishing Place*, 5–6.

The Merriam-Webster Dictionary defines *situs* as “the place where something exists or originates.”³⁹ The etymology is Latin in origin and states that term was first used in 1701 – which I question as to the timeline of Leibniz’s work.⁴⁰ Hence, it is the analysis of place or analysis of site within the confines of space; which I will confer as the establishment of a place-site-moment on a vector, where by this calculation can denote its placement along the three dimensional geometry of the vector; or if we are considering a moment in terms of a sequence in time: as an invisible moment in time established in the fourth dimension of time/space geometry. Leonhard Euler,⁴¹ 1701–1783, expanded Leibniz’s term *analysis situs* to *geometria situs*, establishing place as a relative geometric position through the *Euler formula*. Therefore, Euler established the geometric placement of a moment on a vector through the *Euler formula*. Consequently these two mathematicians generated ways of conceiving the analysis of place and geometric place.

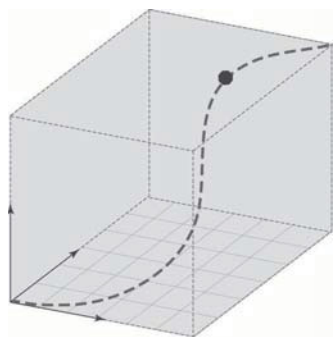


Fig. 16. Leonhard Euler, *geometria situs*; based on McCleary, *A First Course in Topology*



Fig. 17. Johann Listing, topology from *analysis situs*; based on McCleary, *A First Course in Topology*

Meanwhile, the term topology, by Johann Listing,⁴² is from the mid 1800s. It is originally derived from a Greek word, whose Latin translation is *analysis situs* – the analysis of place. The idea of topology was carried forward by Felix Hausdorff,⁴³ in 1914, to become a study of topological space. If, as McCleary states,⁴⁴ topology is an act of continuity, or movement, between spaces, this means that topology is the analysis of place moving

39. Merriam-Webster Dictionary, *Situs*, last modified 2016, accessed November 2, 2016, <<http://www.merriam-webster.com/dictionary/situs>>.

40. McCleary, *A First Course in Topology: Continuity and Dimension*, viii, footnote 1. Perhaps the actual term *analysis situs* was not expanded upon until 1701, or the Merriam-Webster Dictionary is unaware of the correspondence to which McCleary notes, between Gottfried W. Leibniz to Christiaan Huygens.

41. *Ibid.*, viii.

42. *Ibid.*

43. *Ibid.*, ix.

44. *Ibid.*

between spaces, or along a vector. One can therefore expand that topology is in fact defining the movement, or journey, of people through place – the living representational embodiment of the 4th dimension.

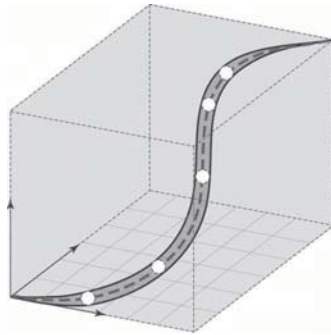


Fig. 18. Felix Hausdorff, topological space; based on McCleary, *A First Course in Topology*

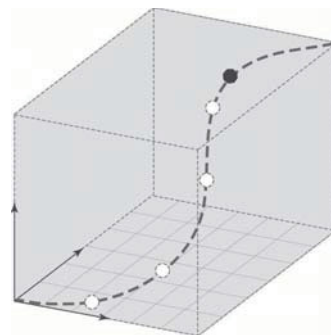


Fig. 19. John McCleary, topology is analysis of space moving along a vector; based on McCleary, *A First Course in Topology*

To reiterate in theoretical terms: *analysis situ*, is the analysis place; while *geometria situ*, is the geometry of place. Simultaneously, topology in Latin is *analysis situ*, but it is also a continuity between two spaces. So this means that topology is the analysis of place as it moves between two spaces; but place is defined by its users, so, to be more specific, topology is the analysis or interpretation of continuous movement between two spaces – which is otherwise known as the journey. Therefore, topology is the act of gradual movement between these two points in space.

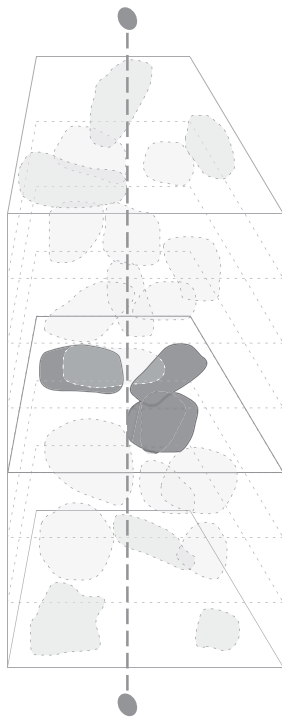


Fig. 20. Topology

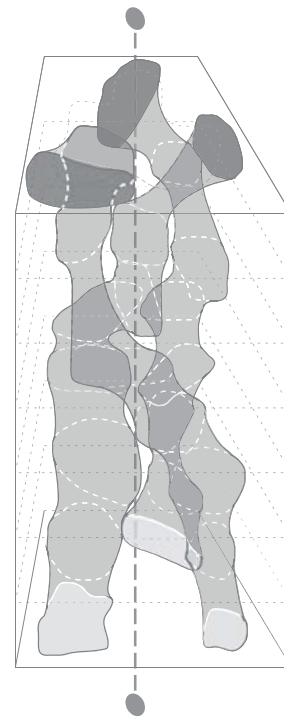


Fig. 21. Topological space

By this understanding, topological space is the entirety of the amalgamated movement, embodied as a residual yet ephemeral thread-like journey, perceived by the walker, translating from one space to the next.

This is a very interesting terminological departure in understanding and establishing the idea of place in space. A topological study is therefore defined in a stop motion-film-like way, capturing stills of this evolutionary journey through space. This definition reinforces Mark Tewdwr-Jones' notion that place is a constantly re-written component of history, that results from the users' layered perceptions of space⁴⁵ – but Tewdwr-Jones is defining place as being re-written by a multiplicity of users' interactions, while I'm referring to the layered perceptions of places that compose a journey through space. Unless you consider that place is based on and altered by all of the 'place' stills that we experience throughout the trajectory of a journey: the ensuing experience continuously alters the former as it is layered over what came before.

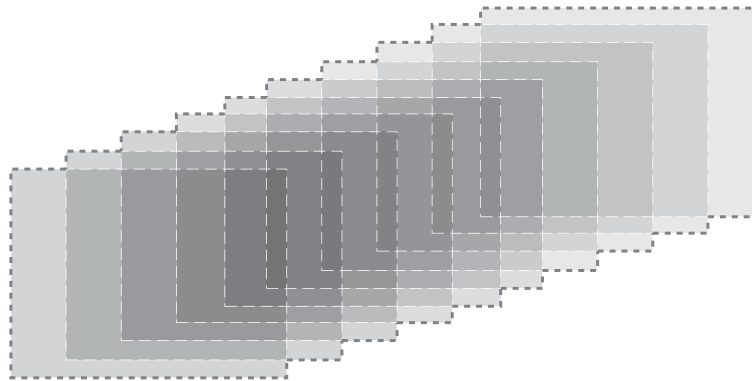


Fig. 22. Layered frames composing space; based on Tewdwr-Jones, *Urban Reflections*

45. Tewdwr-Jones, *Urban Reflections*, 237–38. Tewdwr-Jones states that his explorative analysis of urban planning via film/video/photograph etc. could be a way to capture the ephemeral essence of the multiple invisible users of space.

MATHEMATICS OF PLACE MATRIX


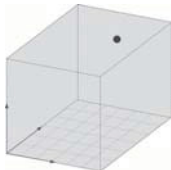
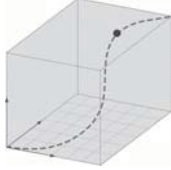
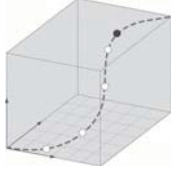
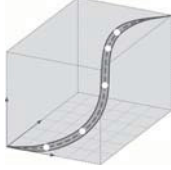
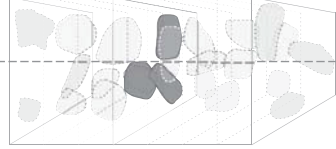
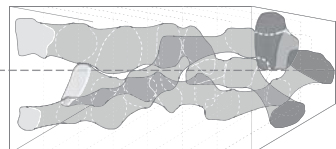
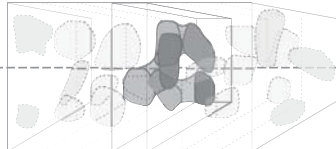
| | | |
|-------------------|---|---|
| Johann Listing | Defined term <i>topology</i> as the analysis of place. establishing site within the 2D plane |  |
| Gottfried Leibniz | Defined term <i>analysis situs</i> as the scientific analysis of space. embedding topology in 3D space |  |
| Leonhard Euler | Defined term <i>geometria situs</i> as the geometric placement of a moment on a vector, providing place with a relative geometric position as mathematically derived by the Euler formula |  |
| John Mc Cleary | Demonstrating topology as an act of continuity or movement between spaces |  |
| Felix Hausdorff | Defined notion of <i>topological space</i> as the composition of space generated by the topological movement between spaces |  |
| Claire Fontaine | Considering <i>topology</i> as the analysis of one moment within a continuous movement between two spaces |  |
| Claire Fontaine | Considering <i>topological space</i> as the entirety of this amalgamated movement – it is represented as the experience of moving from one space to the next (a journey) |  |
| Claire Fontaine | Considering the <i>topological threshold</i> as the experience of passing from one moment in space to the next, and is defined by the edge effects that encircle it |  |

Fig. 23. This matrix diagram is a compilation of all of the illustrations demonstrated in Chapter 2.2

2.3 TOPOLOGICAL SPACE, EDGE EFFECTS + THE IN-BETWEEN

Drawing from interpretations of boundary conditions, the concept of edge effects can be discussed in two ways, those that are perceived and those that are embodied. These can be soft or hard edges. This section will begin with an examination of several theorists who have researched the characteristics of perceptual edges; and then proceed into an analysis of the potential porosity of embodied edge environments whose cores can be inhabited as the in-between.

Both Edward Hall and Martin Heidegger, refer to psychological and social distancing in their work. These subtle distancing cues define how we relate to others in different social contexts, and can provide major architectural design strategies to space, when properly understood. Edward T. Hall has developed a series of edge zones and spatial distancing cues that categorize our social interactions, and define them as the invisible spatial parameters through which we relate to others in our environments. They are defined through a social scale and are strongly influenced by Heidegger's work regarding the distances that regulate animal interactions.⁴⁶ Hall refers to these distances as *intimate*, *personal*, *social*, and *public*;⁴⁷ and has classified a close and far sub-scale to each interaction. As such, *intimate distance* refers to unmistakable proximity and is greatly affected by sensory outputs; while *personal* is commonly interpreted as an invisible bubble. *Social distance* is the breadth of impersonal business, where people can speak easily but there it no physical contact; and finally *public distance* is the respectful distance accorded to public figures – it is

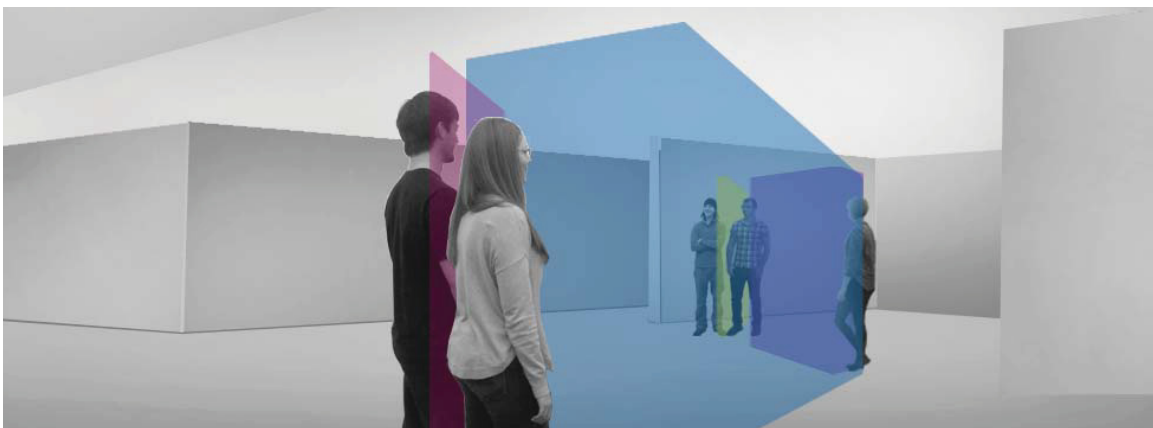


Fig. 24. Edward Hall's spatial distancing cues: intimate (red), personal (yellow), social (purple) and public (blue) distances; based on Hall, *The Hidden Dimension*

46. Edward T. Hall, *The Hidden Dimension* (New York: Anchor Books, and Doubleday Publishing Group, 1990), 116–23.

47. Ibid.

equivalent to being on the other side of a room.⁴⁸ Subsequently, the close to far attributions of each distancing category provide more detailed definitions of the space in-between.

In comparison, Martin Heidegger's personal and social distances are far more compact in scale, and are based on situational and experiential factors as one enters or leaves a space. Personal distance is defined by Heidegger as the "normal spacing that non-contact animals maintain between themselves and their fellows." This can be described as "an invisible bubble that surrounds the organism,"⁴⁹ and is experienced when one enters into the volume of your space. While he explains that social distance is "a psychological distance, one at which [one] ... begins to feel anxious when he exceeds its limits." It is described as a "hidden band that contains the group."⁵⁰ Social distance is therefore situational and experienced from having left the space, or gone beyond the edge of the zone.

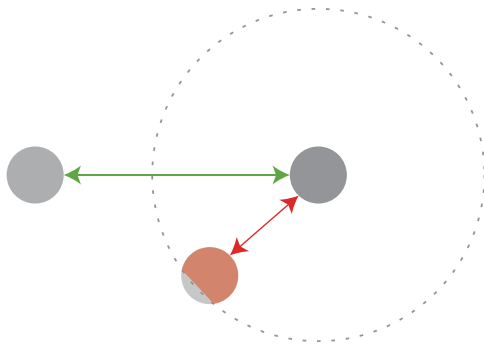


Fig. 25. Personal distance; based on Martin Heidegger in Hall, *The Hidden Dimension*

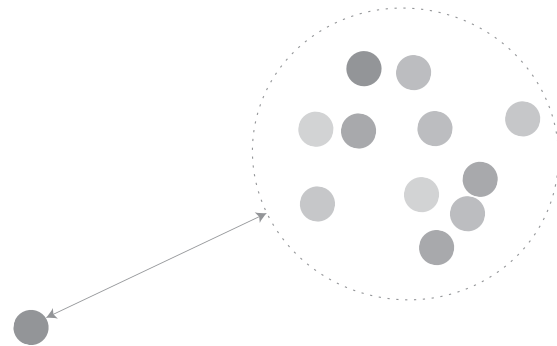


Fig. 26. Social distance; based on Martin Heidegger in Hall, *The Hidden Dimension*

Similar to Hall and Heidegger's experiential explanations of space, Derk de Jong speaks to individuals' natural tendencies to search for protective spaces. When referring to edge zones, de Jong explains that people naturally drift towards the edges of spaces rather than remain in the center. The peripheral spaces are the places to occupy and linger in: these are the staying zones.⁵¹ Spatially, the staying zones are part of the space that is most influenced by neighbouring programmes. A window or door from one space into the next can have a large impact on the experience of the edge zone: whereby the staying zone would likely shift away from the opening and preferably exist against a solid or semi-

48. Ibid.

49. Ibid., 13. Regarding Heidegger.

50. Ibid., 14. Regarding Heidegger.

51. Jan Gehl, *Life Between Buildings: Using Public Space* (New York: Van Nostrand Reinhold, 1987), 151.

permeable surface. Here de Jong is beginning to spatially situate Hall and Heidegger's origin-less, perceptual edges.

How do people subconsciously relate to one another? Each of these terms⁵² can be referenced when designing architectural spaces to ensure that the desired social interactions are provided with environments that cater to their needs. By understanding social distancing, it is possible to hypothesize how people will relate in social environments. Spaces can thus be designed with these interaction cues in mind, so that engagement can begin to occur between strangers. As demonstrated above, there are many authors who refer to the edge condition and its affect on users' interactions. They speak about the social interactions that occur with the edge and how that shapes the architectural spaces through which we move. As Jonathan Hill describes in *Occupying Architecture*, the role of a brief encounter with a border manifests a space. It is not a line, but an area in geometric flux. Interaction with the edge creates a social space and there is a tangential relationship with the way in which it is occupied. This interaction asserts the edge's intrinsic effect upon the users.⁵³ If we combine de Jong and Hill's interpretations of how an edge zone functions, we can redefine staying zones as a space individuals drift towards and interact with in some way. It is a moment where a provisional pause is provided along the vectoral movement through the space;⁵⁴ and so, in some manner, the architecture provides room at its edges for life to gather against it and interact with it. Hill is saying that as we gather and interact with architectural environments, a space is created for this event, and a place is created along the vector.

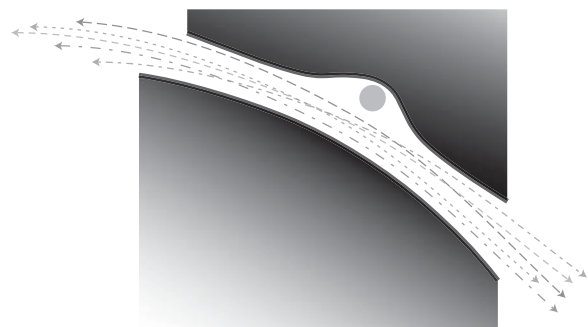


Fig. 27. Encountered edge as an area in geometric flux; based on Hill, *Occupying Architecture*

Jonathan Hill also questions our perceptual relationship to architecture through an

52. Distances of social interaction: referring to Edward Hall's intimate, personal, social, and public distances, Martin Heidegger's personal and social distances and Derk de Jong's staying zones.

53. Jonathan Hill, *Occupying Architecture: Between the Architect and the User* (New York: Routledge, 1998), 85.

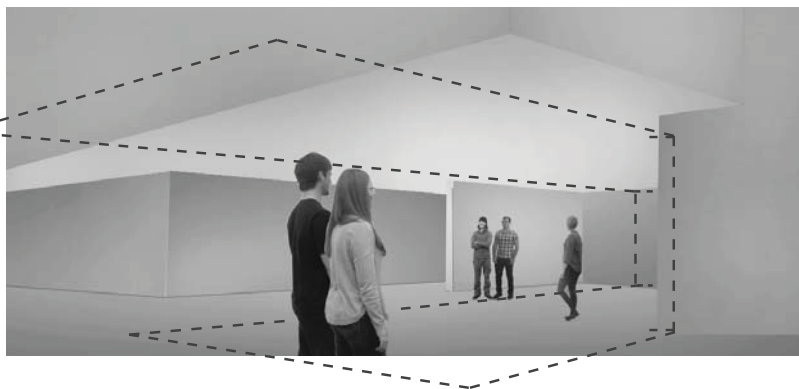
54. Refer to Lefebvre and de Certeau in Chapter 1.2 *Interpreting Space + Distinguishing Place*.

investigation of boundaries between object and subject – and incidentally the threshold between the public realm of the street and the private space of the surrounding buildings. He questions whether architecture should be communicated as something that is viewed from afar; or if the skin, shape, and layout of architecture should instead invite the street users to inhabit it. Should architecture invite people to rest, sit on or lean against it – thereby bringing them into its sheltering spatial presence? He describes architecture as an experience in a state of distraction – something that is subconsciously absorbed, instead of physically lived.⁵⁵ Hill's questions on the matter of architecture as spatially separated versus spatially explored, contribute to a large debate of the underutilized⁵⁶ embedded power of architecture's relationship with the internal and external edges of programmatic environments. It is therefore important to consider how activating the physical use of a building, or space, can influence architecture: changing it from purely viewed space (art or an object) to useable space (occupied).



Fig. 28. *Top*, Spatial separation; based on Hill, *Occupying Architecture*

Fig. 29. *Bottom*, Spatially explored edges; based on Hill, *Occupying Architecture*



55. Hill, *Occupying Architecture*, 6.

56. *Ibid.*, 104.

Ralph Erskine, specifies the quality of de Jong's definition of edge zones by naming the moment between the interior and exterior as a transitional zone. This is a well used term, however he re-establishes the architectural importance of these spaces of the in-between by denoting the contribution that these elements infer when designing for "high quality ... building projects"⁵⁷ and social environments. Such details that enhance the space in-between include: "the bench at the entrance door, [and] the front yard with a little terrace in front of the stairways in multi-storey dwellings," as Erskine suggests.⁵⁸ They can also include, as Gehl notes, a small terrace, a tiny garden, ... and a screen between neighbouring units."⁵⁹ It is therefore important to remember that as architects we are capable of adding minute details to designs that have significant effects in regards to enhancing social environments.

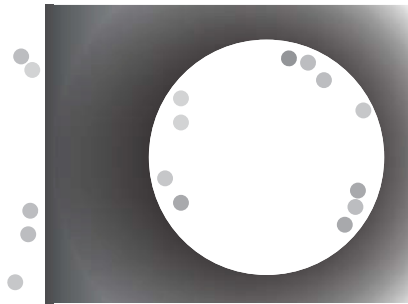


Fig. 30. Ralph Erskine, Edge zones and the staying zone; based on Erskine in Gehl, *Life Between Buildings*

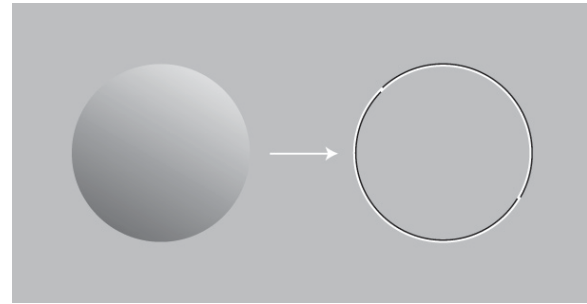


Fig. 31. Experiencing edges: what we see and how we understand through ganglion cells; based on Heeger, *Perception Lecture Notes*

Psychological research in the field of visual perception has determined that our eyes have the capacity to naturally sharpen edges.⁶⁰ According to the perceptive nature of our eyes, there are specific cells, called ganglion cells, that pick up and translate edges into a series of line weights through which we interpret the world. These *center-surround receptive fields* divide the edges of surfaces into 'on' and 'off' sub-regions, made of black and white lines. This differentiation between light and dark effectively emphasizes our experience of edges. Therefore in reality edges are softer than our eyes perceive them. This is a helpful tool for the architecture field because, this means that subtle cues in space have more impact than we may realize. For example, this is why the experience of a long solid wall in space is

57. Gehl, *Life Between Buildings*, 197.

58. Ibid.

59. Ibid., 196.

60. David Heeger, *Perception Lecture Notes: Retinal Ganglion Cells* (New York: Department of Psychology, and New York University, 2006), accessed Jan. 15, 2017, <<http://www.cns.nyu.edu/~david/courses/perception/lecturenotes/ganglion/ganglion.html>>.

more daunting than one that is broken up with an expression of textures and the position of openings, or recesses, along its length. This idea coupled with our natural inclination to gather around or against edges, makes their expression an important aspect of our daily lives.

Jan Gehl also promotes de Jong's idea of staying zones, in the *Life Between Buildings*, because these conditions promote lingering at the edge. "If the edge of a public space works, so does the space."⁶¹ Gehl's work suggests many strategies for threshold devices to stimulate and modify the space in-between. These methods prompt the duality of use in spaces. While his work focuses on users' relationships with the hard edges of things⁶² that differentiate between the exterior and interior; his work also stimulates the production of new ideas to similarly enhance and modify other aspects of the space in-between. For example, overlap or an engagement of different types of programme can be used to activate environments both internally and externally – especially when coupled with a soft edge zone. Architectural examples such as the resting wall,⁶³ photographed by Jan Gehl, demonstrate how you can be sitting in the private domain of a building, with your feet hanging out in the public space of the street. Other similar edge conditions can substitute the physical inhabitation of an edge, and instead allow a sense of visual connectivity to pass through the space in-between. This type of inhabitable space can be thought of as a *soft edge* and refers to the degree of porosity that such an edge exhibits. The soft edge thus begins to invite life into its volume: it is an inhabitable space, that can be passed through, or sat in.

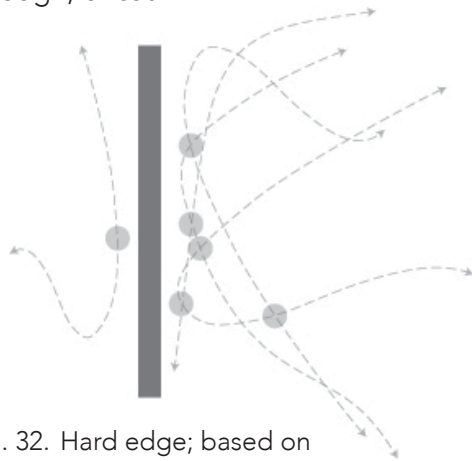


Fig. 32. Hard edge; based on Gehl, *Life Between Buildings*

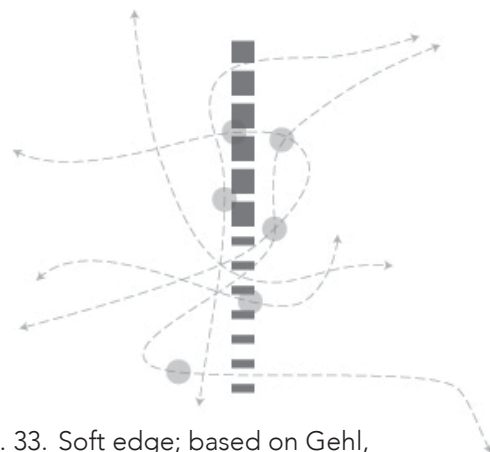


Fig. 33. Soft edge; based on Gehl, *Life Between Buildings*

61. Gehl, *Life Between Buildings*, 196.

62. These hard edge elements can include walls, fences etc.

63. Gehl, *Life Between Buildings*, 154. Refer to the photograph of people sitting within the cavity of a wall, with their legs extending into the space of the street.

In *Lessons for Students in Architecture*, Herman Hertzberger presents multiple examples where the soft edge provides a manipulable degree of privacy to the inhabitants, thereby enhancing their living environments. While, Hertzberger states that: “The architect is not only a builder of walls, he is also and equally a builder of openings that offer views. Both walls and openings are crucial.”⁶⁴ I will agree, for walls are as important as open spaces, but to this statement I will add that a degree of the in-between should also be provided – since, a balance of soft edges in architecture is just as important as hard edge zones. A variety of hard, soft, and open permits a variety of inhabitable situations, which can provide an assortment of social interactions. Developing the space of the in-between is therefore a key to shifting our perception of the power of the soft edges.

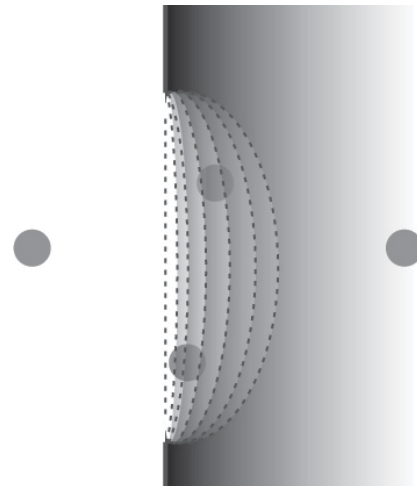


Fig. 34. Polyvalent edge; based on a response to de Certeau, *The Practice of Everyday Life*

The architectural degrees of variation that can occur between soft and hard edges, encourages the design of polyvalent edge environments. The polyvalent edge is my adaptation of the soft edge, it is a flexible edge that responds to de Certeau’s idea that space is composed of layered users’ interactions.⁶⁵ This notion is synonymous to the idea of flexible edges and changeable spaces. The subtle personalization of an edge environment is integral to the composition of a place. If an individual can modify a space in some small way, for the amount of time that they use the space, this will create a place that the user will want to return to and inhabit in their own way. Iterations of the architectural design for the soft edge and the polyvalent edge are explored in the methodology section of this thesis.

64. Herman Hertzberger, *Lessons for Students in Architecture* (Rotterdam: 010 Publishers, 2009), 206.

65. de Certeau, *The Practice of Everyday Life*, 117. For as de Certeau describes: “space is practiced place,” and as such the edges of these spaces need to anticipate a multiplicity of user interactions.

In *Acceptera*, a group of Swedish architects, working on the Stockholm Exhibition of 1930, contested the idea that a city can be a “work of art, [... deeming it] a dangerous concept.”⁶⁶ They state that the space of a city is an “expression of a multiplicity of layered movements.”⁶⁷ This definition of space-making is synonymous with Henri Lefebvre’s. Jonathan Hill’s work similarly criticizes architecture for being considered an object or art. In both of these scenarios, they are warning that if a city or work of architecture are objectified, then they will not be able to respond to the movement that generates their existence.⁶⁸ As such developing edges that are polyvalent is quite important to generate responsive architectural environments.

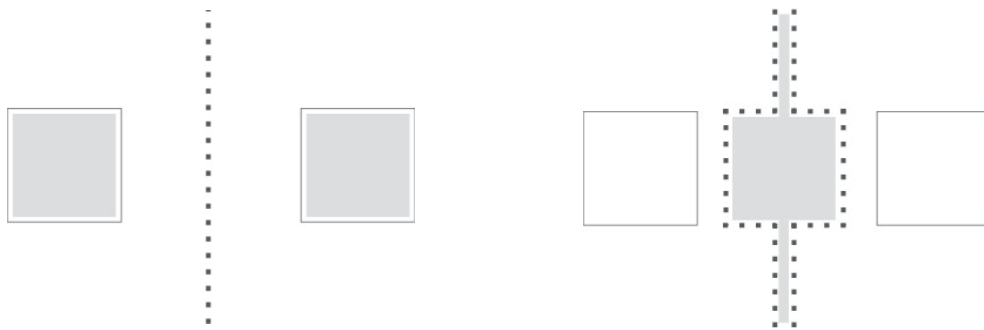


Fig. 35. Christopher Meyer, conceptual edge; based on Meyer, Lecture Fig. 36. Christopher Meyer, transitional edge; based on Meyer, Lecture

Christopher Meyer is also trying to differentiate between types of edges in his work. He is exploring the difference between conceptual and transitional edges.⁶⁹ He presents a conceptual edge as the ephemeral disconnect between two opposing and distanced things (ie. Cities and Ocean – opposing systems) where one constantly affects the other.⁷⁰ In these scenarios, the physical edge condition cannot be seen. It is instead represented as a dashed line between distant bodies. Similarly, a transitional edge on the other hand can be used to describe an inhabitable space between two systems. It is represented as an inhabitable dashed line between distant entities. For example, the transitional edge can be manifested as a delta, where water meets land – the clarity of one thing is not explicitly

66. Pelkonen, *The Organic Approach to Architecture*, 42, endnote 10.

67. Ibid., 10.

68. Pelkonen refers to space as defined by Oskar Schlemmer in Chapter 1.2 *Mathematics of Place*. Ibid., 41.

69. Christopher Meyer, Lecture, 2016. Note both the conceptual and transitional edge diagrams are by Meyer Described. These ideas are presented through the slides: “Terra Firma + Aqua Firma”. Highly influenced by James Corner, Meyer is responding to environmental conditions (at the scale of ecological systems) and his edges are of the regional and global scales.

70. Ibid. However residual effects (garbage float in the ocean) and the ocean can flood the city. Making point that we are always part of a larger system (approach).

defined from the other as a line in space, it becomes more that one thing melts into the space of another. A transitional edge is therefore a soft, porous, edge; and as such, there are a lot of architectural opportunities for designing iterations of this space in-between.

As previously explored, the opposite of a polyvalent edge, is the hard edge. It is also referred to as a *knife edge separation*,⁷¹ due to the severe way that it separates programmes. Grant Wanzel reiterates that designers choose how they wish to negotiate the edge and the spaces in-between. We can choose to express spaces that suggest exclusivity or we can create common places – the edge types will then denote how spaces are interpreted. An edge can be as rigid as a knife, or it can elicit inhabitation within its depth as a common edge – it can invite connectivity and interaction through it or isolate it to each side. The common or inhabited edge is very similar to Christopher Meyer’s idea of a transitional edge.

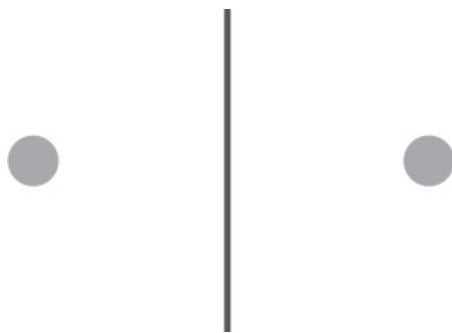


Fig. 37. Knife edge; based on Wanzel, "Response to crit"



Fig. 38. Wall as common space; based on Wanzel, "Response to crit"

Finally, Stan Allen presents functionally-responsive boundary types – essentially he states that an edge either functions as a boundary or invites movement through it. His edges are defined by their obviousness and intention; and they are accordingly described as *boundary discreteness* and *boundary function*. Allen defines *edge effect* as "a distinctive species composition or relative abundance in the outer band of a patch."⁷² He is referring to the material composition, thickness, and porosity of the edge and the informative effect that it imparts to those who engage with it. The *discreteness* of this edge is defined by "the degree of abruptness between landscape elements."⁷³ It can therefore be more

71. Grant Wanzel, "Response to crit" (Halifax: Dalhousie University, 2016). 'Knife edge separation' was Grant Wanzel's response to types of edges that can be created, in Jennifer's final crit, during the final M2 presentations.

72. Stan Allen, *Points + Lines: Diagrams and Projects for the City* (New York: Princeton Architectural Press, 1999), 82.

73. Ibid.

or less present in the environment, and the scale of this will alter the relationship that individuals have with it. When speaking about the boundary function Allen is discussing “the effect [that] the edge [has] on flows [... and deems it as] analogous to a [semi-permeable] membrane.”⁷⁴ Essentially, to make an edge porous is to change the function of a wall: a solid wall physically and socially acts differently in space than a porous one, or even a non-existent one. This notion of functionality is again referring to a series of architectural tools: hard, porous or soft, and open edges. Other examples using the two terms are the presence of a line on the ground or the stone edge of a garden: both can discretely suggest to look at, but not to move into, the space. While a tall wall in the same location would isolate the individual from knowing what is on the other side, and violently state that they are not invited to enter said space – both elements therefore achieve the same function, but to differing effects.

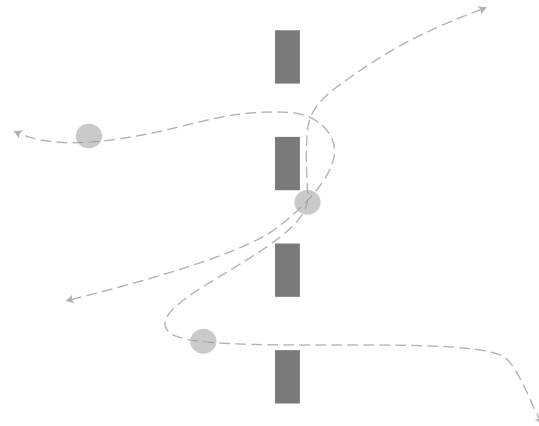


Fig. 39. Sewn edge as a porous entity;
based on Lynch *The Image of the City*

Similar to Meyer, Kevin Lynch approaches the idea of the edge as part of a greater system that composes a city. To interpret the urban environment, Lynch establishes a collection of elements, he calls these: the path, edge, district, node, and landmark.⁷⁵ As such, the entity of the edge can only be understood when situated in relation to the others in this system.⁷⁶ For Lynch, edges are basic “linear elements not considered as paths: [and are often] the [boundary] between two kinds of areas. They act as lateral references.”⁷⁷ Similar to Stan Allen’s statement regarding boundary discreteness, Lynch notes that: “those edges [that]

74. Ibid.

75. Kevin Lynch, *The Image of the City* (Cambridge: Technology Press, and Harvard University Press, 1960), 46–48.

76. This is why *Activating the Vertical City* began by distinguishing between the definitions of space and place. Without understanding, and establishing, what the underlying elemental rules of architecture are – and in turn how it’s users relate to them – it is impossible to fully comprehend what kind of environments are being designed.

77. Lynch, *The Image of the City*, 62.

seem [the] strongest ... are not only visually prominent, but also continuous in form and impenetrable to cross movement."⁷⁸ He also suggests that under certain circumstances an edge can become a seam: "if some visual or motion penetration is allowed through it. [... It then transforms into] a line of exchange along which two areas are sewn together."⁷⁹ I have interpreted Lynch's sewn edge as a soft porous edge. The porous nature of an edge is a subject that I will explore, in Chapter 8, analyzing how its internal spaces can be inhabited using the concepts of topology and topological space, derived in Chapter 2.2 *The Mathematics of Place*. If topological space is the encapsulated experience of moving through a sequence of events, then the topological threshold is the act of passing between two topologies and is defined by the edge effects that encircle it. This means that the spatial zone between two moments can be manifested as anything: the volume of a plaza, the width of a doorway, the frame of a window, the thickness of a wall or the entire space of a room. If it is defined as the space between two elements, then according to Stan Allen's boundary discreteness it can be as subtle as lines in the sand, or as embodied as a porous wall cavity, such as Le Corbusier's Notre Dame d'Haut chapel, in Ronchamp, whose voluminous masonry walls gracefully filter light in through horizontal wells, and provide opportunity to wander into the spatial depth of the structure. This means that the space in-between topologies can be void space, porous or completely solid, and the degree to which it is carved out is the architectural journey through the topological threshold.

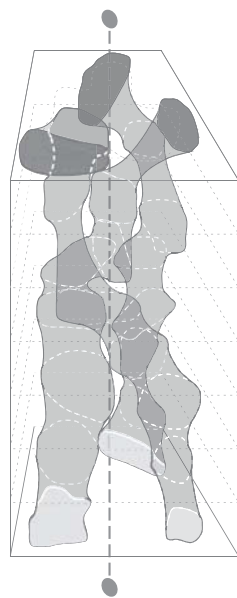


Fig. 40. Topological space

78. Ibid.

79. Ibid., 100.

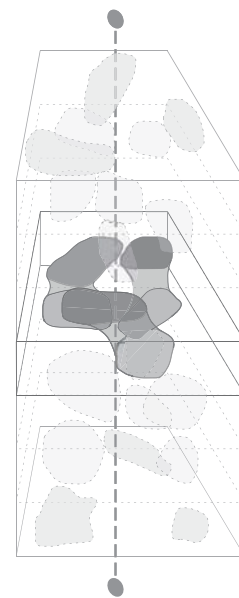


Fig. 41. Topological threshold

In conclusion, the careful design of edge effects can promote open-ended notions of activity, by providing subtle scales of proximity, to encourage interaction and connection between individuals. As discovered above, there are many different types of edge conditions: they can be considered as invisible psychological distances between objects or individuals; they can be porous – where the variance of their porosity yields different results; and they can be solid. It is important to note, that in their solidity they can also provide spaces for life to occur. What this thesis seeks to acknowledge and carry forward from this exploration is the notion that the activation of the spaces and places (that they both separate and weave together) can create different types of experiences; and that thoughtful cross programming can enhance the environment of the in-between.

EDGE EFFECTS MATRIX, PERCEIVED EDGES


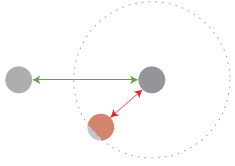
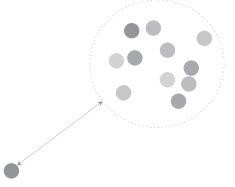
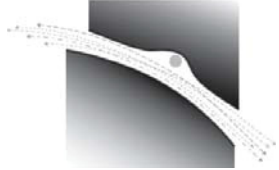

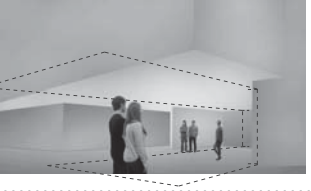

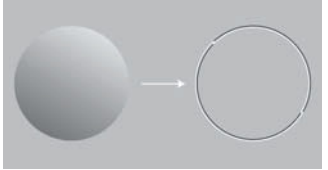
| | | |
|------------------|---|---|
| Edward T. Hall | Spatial distancing cues: <i>intimate, personal, social</i> and <i>public</i> , which are demonstrated as red, yellow, purple and blue, respectively |  |
| Martin Heidegger | Personal distance |  |
| Martin Heidegger | Social distance |  |
| Jonathan Hill | Encountered edge as an area in geometric flux |  |
| Jonathan Hill | Spatial separation |  |
| Jonathan Hill | Spatially explored edges |  |
| Ralph Erskine | Edge zones and the staying zone |  |
| David Heeger | Experiencing edges: what we see and what we understand through ganglion cells |  |

Fig. 42. This matrix diagram is a compilation of the illustrations demonstrated in Chapter 2.3

EDGE EFFECTS MATRIX, EXPERIENCED EDGES

| | | |
|--------------------|--|--|
| Herman Hertzberger | Hard edge | |
| Jan Gehl | Soft edge | |
| Michel de Certeau | Polyvalent edge, an adaptation of idea that space is composed of many layered users interactions and a 'practiced place' | |
| Christopher Meyer | Conceptual edge | |
| Christopher Meyer | Transitional edge | |
| Grant Wanzel | Knife edge | |
| Grant Wanzel | Wall as common space | |
| Kevin Lynch | Sewn edge | |

Fig. 43. This matrix diagram is a compilation of the illustrations demonstrated in Chapter 2.3

2.4 CONNECTIVITY IN ARCHITECTURE

Connectivity is more than a force pulling multiple things together. It is the journey of a force linking elements: in the city, these elements could be places that are joined by the path of an individual moving through space. The nature of this journey is a crucial experience of how we perceive the spaces and places within which we dwell. Here, at the scale of an individual, the perception of connectivity takes the form of edge effects. We can thus harness the idea of connectivity in architecture to deepen our perceptions of space and place.

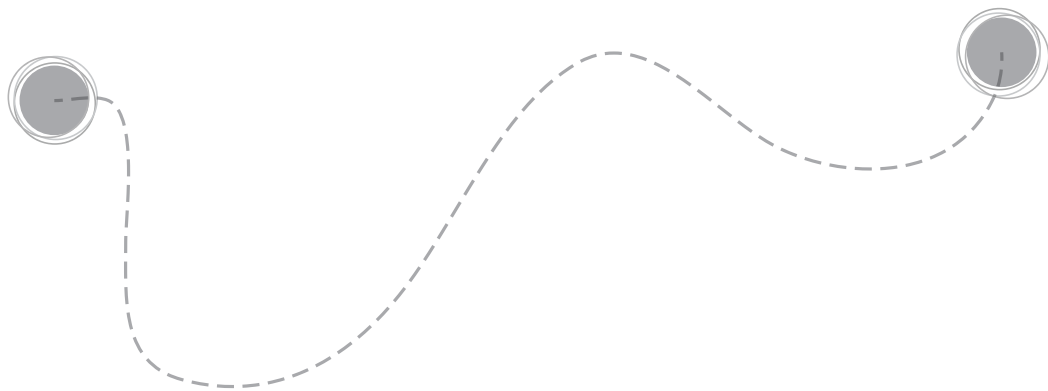


Fig. 44. Journey of a force linking two elements

Connectivity can be interpreted through many forms and has an enormous range of scales. At the scale of the individual, it can be psychological; interpreted visually or experienced physically – through the sensorial (touch or heat) or as movement passing through a volume. At a larger scale, it can be perceived as a network or link between places. This networking can establish context within a city, and usually demonstrates lines of movement that cut through space, at various speeds: pedestrian, bicycles, vehicles, trains, etc. The experience of these movements through space is defined as an element of the journey. To collectively interpret the experience of this path through space we can map the movement as topological space, and design the depth of edges through topological thresholds, as discussed in previous chapters.

A journey can be expressed as a continuous journey through space, or it can take the form of a mapped series of moments. In the most basic sense, naming space, according to Walter Benjamin, embeds it within the “linguistic universe. ... It [then] becomes the

connective space, the passage to other experiences.”⁸⁰ Thus naming physically and mentally connects the space with other similar locations in the city; while synonymously the mnemonic devices of memory connect it within historical contexts.

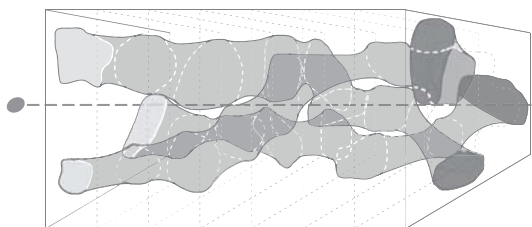


Fig. 45. Topological space: expressing a journey through space

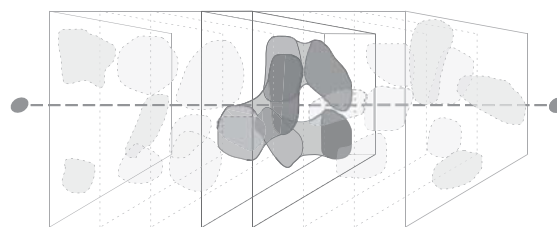


Fig. 46. Topological threshold: expressing the journey's movement through the space in-between

Connectivity is therefore the act of drawing connections between other places, objects, systems, elements, or individuals through space. This can be expressed, as demonstrated below, by weaving together users' understanding of place in relation to their context, be it within a building, or to the external world beyond.

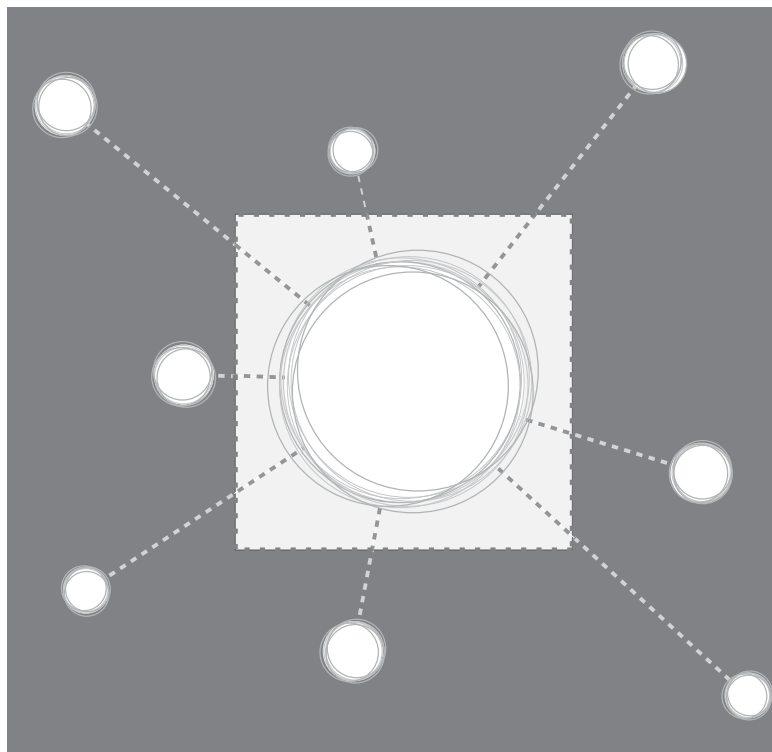


Fig. 47. Connectivity as visual or physical links through space

80. Gary Smith, *On Walter Benjamin: Critical Essays and Reflections* (Cambridge: MIT Press, 1988), 26. Walter Benjamin, quoted by Peter Szondi in "Walter Benjamin's City Portraits," interpreting connectivity.

Connectivity can also be expressed as a physically overlapping zone, where one programme mixes with another. It would be easy to see how one programme relates with or activates the other. A journey can be expressed as a continuous journey through space, or it can take the form of a mapped series of moments. Establishing the nature of spaces in-between will activate the experience of the journey – drawing users through space.

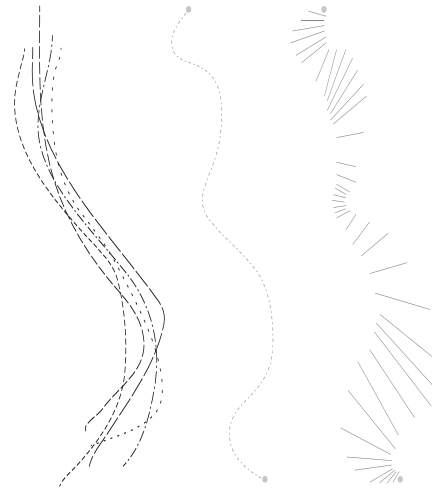
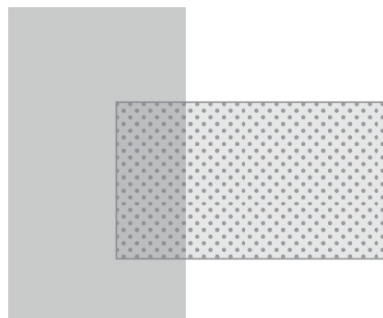


Fig. 48. Connectivity as programmatic overlay Fig. 49. Connectivity as a mapped series of moments

Hierarchical scales, like the public-private scales developed by Christopher Alexander⁸¹ can begin to express different types of spaces that compose a building, or series of buildings. *Activating the Vertical City* proposes that the journey through, past, below, and above these spaces, as demonstrated in Matta-Clark's artwork, can activate spaces and provide different points of view of how these spaces relate and interact with each other.

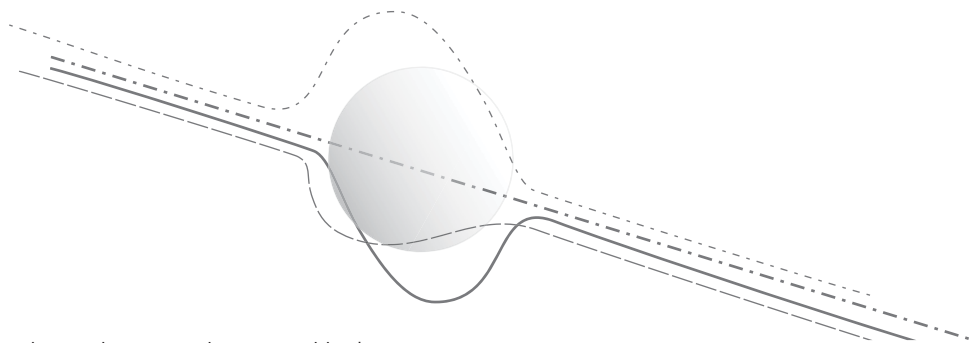


Fig. 50. Through, past, above and below;
based on Matta-Clark in Le Feuvre, *Gordon Matta-Clark*

81. Christopher Alexander and Serge Chermayeff, *Community and Privacy: Toward a New Architecture of Humanism* (New York: Doubleday & Company, 1963), 129. Alexander has developed an urban hierarchy of spaces that spans from what he calls individual-private to urban-public. Each definition is described in relation to the physical spaces these interactions occur within. These spatial typologies include: urban-public, urban-semi-public, group-public, group-private, family private, and individual-private.

2.5 LABYRINTHINE JOURNEYS THROUGH TOPOLOGICAL SPACE

How do you experience a journey through space? As noted earlier, in the 18th century, theorists and mathematicians began searching for a way to geometrically represent place in the context of space. The isolation of this moment, demonstrated in the 2nd and 3rd dimensional fields, began to speak about the representation of these shifting pieces that compose the whole. If a moment can be isolated in space and time, then the experience of that place becomes encapsulated as a topology. So, when these moments are assembled and aligned in time, this series can be considered as topological space. This idea of topological space and the capturing of this constantly translating spatial sequence could be done using Tewdwr-Jones' method of photography where slides are continuously layered one upon another. By thinking about this translation of movement through the medium of space, an ensuing series of interactions begins to occur within architectural spaces.

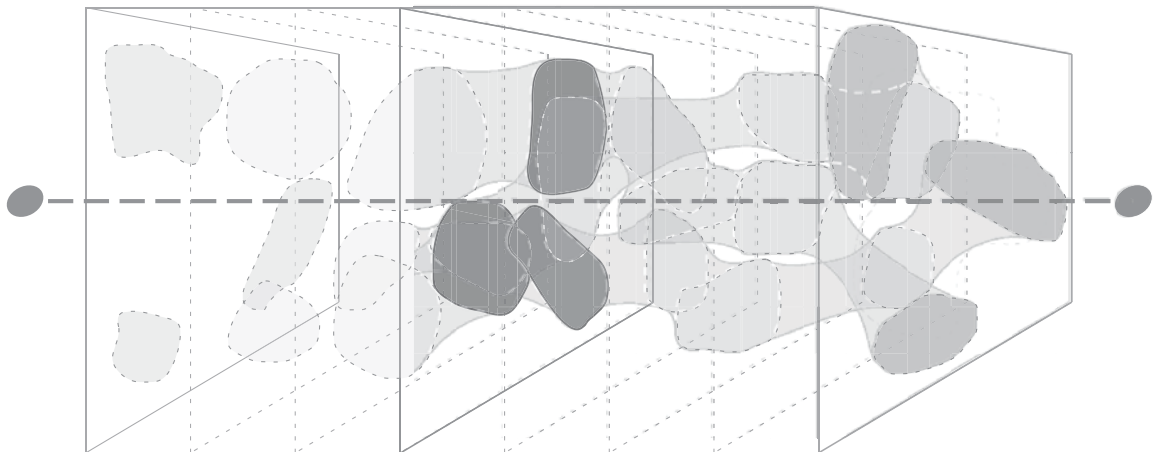


Fig. 51. Transition from individual topological planes to their amalgamation as topological space

Kevin Lynch's understanding of the city as a conglomeration of temporal perceptions layered one over the next is analogous to these ideas. Lynch defines these layered perceptions within his quote: "Nothing is experienced by itself, but always in relation to its surroundings, the sequences of events leading up to it, [and] the memory of past experiences."⁸² His idea is also synonymous to those of both Roberta Gratz and Mark Twedwr-Jones' notions where the composition of many layered understandings compose the whole. This approach also promotes the idea that as a living creature, the space of the

⁸² Lynch, *The Image of the City*, 1.

city is constantly in flux: growing and changing as it is perceived in different ways. These ideas of sequences, that can be used to map space, will be explored as journeys flowing through space and will be represented in exploded section – taking on the characteristics of topological space.

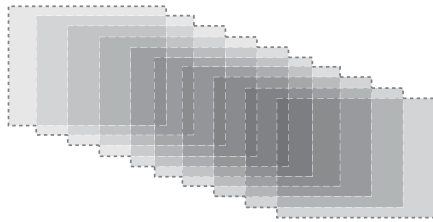


Fig. 52. Place as layered perceptions over time; based on Tewdwr-Jones, *Urban Reflections*

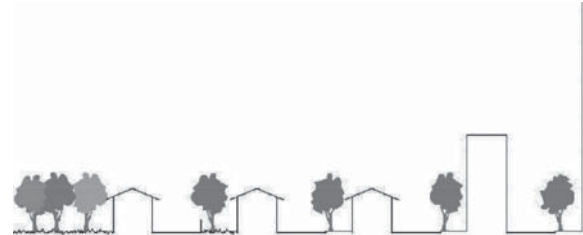


Fig. 53. Place as an evolutionary emergence predicated on the past; based on Gratz, *The Living City*

Since the space of the city and our understanding of it are constantly in flux, the notion of designing a journey through it must consider how it can absorb constant change. To exist in tandem within the “continuous succession of phases,”⁸³ the acts of meandering through space, and charting the invisible journeys of the users must be considered. This third and fourth dimensional movement can demonstrate speed through the wavering spaces between moments, taking the volume of space as well as the essence of time into the layering of routes as they climb, weave, meet and descend through space. Other artists and theorists who have spent time thinking about translations of movement through space include artists of the cubism movement Marcel Duchamp and Pablo Picasso. For example, Marcel Duchamp’s *Nude Descending a Staircase* captures the fractured essences of a multiplicity of layered views of the movement of descent. Similarly, Pablo Picasso’s *The Bull*, fractures the animal’s shifting motion, and assembles it as an entirety of the movement – in this way the life is depicted. By capturing the essence of these movements, the artists are able to capture the lived experience of the gestures and explore how these expressions can articulate temporal architectural space. With these interpretations of space in mind, the themes that repeat throughout are the necessity to have a continuous sense of where you are in relation to where you are going, a thread if you will, that draws users through the evolving and unfolding spaces of the building. A street rarely exists in isolation, there is always an understanding of our position in space. However, the fractal nature of understanding presented by Picasso and Duchamp suggests that perhaps architecture can harness the

83. Ibid., 2.



Fig. 54. Meandering through space: charting the invisible journeys of the users to demonstrate temporal essence of speed between the wavering spaces of moments; based on Marcel Duchamp's *Nude Descending a Staircase No. 2*

experiential qualities, that they are evoking, to change the way we understand space. These in turn could be expressed by weaving users through space, so that they may be invited to contemplate views from multiple platforms and orientations as they translate through architectural space. Such labyrinthine journeys through space should therefore maintain a "basic form, [so that there can be] no danger of losing orientation,"⁸⁴ by providing this type of fractal visual connectivity, which establishes a contextual coherency relative to the users' experience of movement. The journey should therefore not be restricted, but offer options of perception and exploration, so that "the observer[s] [can] play an active role in perceiving the world and have a creative part in developing [their] image [of space and the city]."⁸⁵ The looseness of the flow between these spaces should anticipate activation through the programmatic overlap of its users, by provoking "new patterns of activity."⁸⁶

84. Ibid., 5–6.

85. Ibid., 6.

86. Ibid.

CHAPTER 3: SPATIAL PLANNING THEORIES

3.1 CITY TO SUBURBS TO CITY

OVERVIEW

This chapter seeks to identify how the spatial planning theories have manipulated the built urban landscapes within which we dwell, by exploring how these processes have changed our evolving perceptions of public space.

As a response to the burgeoning population densities and the increasing shortage of space in urban settings,⁸⁷ the 1933 Athens Charter was composed, at the CIAM congress. This urban planning strategy provoked a functional segregation of the city's fabric – by separating it into zones to allocate room for the city's impending expansion.⁸⁸ What was once a tightly woven fabric with active streets threading their way through the system was stretched beyond repair into an isolated set of zones particular to each elemental type of the city plan's repertoire. Residential zones neighboured commercial districts, and industrial zones, and the ensuing composition no longer infused each other with life. In such an atmosphere, Le Corbusier sadly remarked "streets will no longer exist,"⁸⁹ because the essence that once combined them no longer exists: no link or connectivity equates to no street environment.

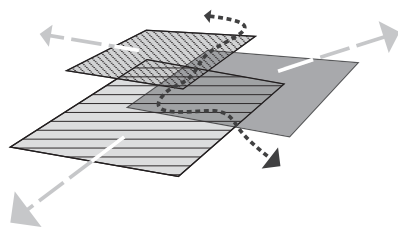


Fig. 55. Urban fabric pre Athens Charter: tightly woven + embedded programs; based on Somer, *The Functional City*

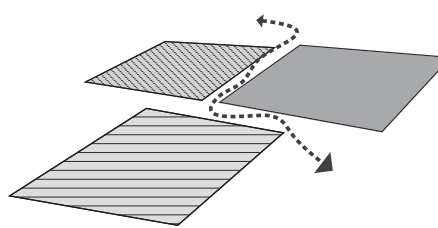


Fig. 56. Urban fabric post Athens Charter: functional segregation of programs; based on Somer, *The Functional City*

In the 1930s, the grandfather of mixed-use building, Raymond Hood instigated the idea of combining life, business, creativity, and leisure in the Unit Building – a single tower

87. Kees Somer, *The Functional City: The CIAM and Cornelis van Eesteren, 1928-1960* (Rotterdam: NAI Publishers, 2007), 84. This investigation regarding the increasing population densities and an increased shortage of space in urban settings, was proposed by Hans Schmidt, in 1930.

88. a+t research group, Javier Mozaz, *This is Hybrid: An analysis of mixed-use buildings by a+t* (Vitoria-Gasteiz: a+t architecture publishers, 2011), 20.

89. a+t research group, *This is Hybrid*, 18. Original quote by Le Corbusier from *L'Intransigeant*, (May 20, 1929): 4.

composing the idea of a multi-functional building, or “City under a Single Roof.”⁹⁰ This vertical manifestation of the urban condition, gathered the components of a neighbourhood and blended them into a series of composite layers, situated on a compressed urban site. As Joseph Fenton recognized, the early hybrid buildings were done as a “response to the metropolitan pressures of escalating land values and the constraint of the urban fabric.”⁹¹ They represented an alternative to functional fracture, that chose to spread the components into specific zones.

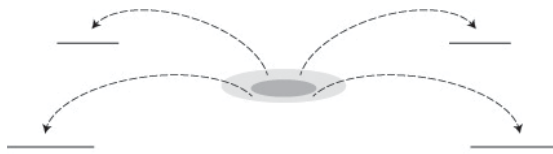


Fig. 57. With the advent of the suburb, the urban population was drawn out to the rural with promises of space and a picket-fenced yard; based on a+t research group, *This is Hybrid*

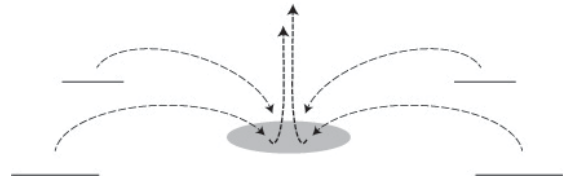


Fig. 58. Resurgence and regeneration of the urban core: densification; based on a+t research group, *This is Hybrid*

In 1959, a group of architects called Team 10 altered the way city planning was viewed.⁹² They proposed that the street was a necessary component of the city and that by so harshly separating the functions of the city, the essence of this connector (or pedestrian link) was being abolished. By re-embedding and re-integrating the programmatic content, the city block and street were again enlivened with variety. This prefigured the ideas of ‘streets in the air,’ by architects such as Peter and Alison Smithson and Le Corbusier, which were also “meant to represent the ‘true complexity of human associations’” in a different physical manifestation of an urban core.⁹³ As can be surmised there was and continues to be a search for ways to combine the fractal components of our towns and cities to compose community and weave the layered complexities of the street back into urban environments. *Activating the Vertical City* seeks to determine a methodology that can draw these enriched common spaces up into the vertical domain to compose more connectivity between the isolated public and private realms.

90. Ibid., 16.

91. Ibid., 38. Original quote by Joseph Fenton from “Hybrid Buildings,” in *Pamphlet Architecture* 11 (1984): 6.

92. Ibid., 26. At the Otterlo CIAM Meeting with further historical discussion of the context.

93. Ibid., 28. Referencing original quote from Peter and Alison Smithson, *Team 10 Primer* (Cambridge: MIT Press, 1968), 78.

3.2 CONTEMPORARY ARCHITECTURAL CONTEXT: SEARCHING FOR COMMON SPACE

In the essay *The Right to the City*, David Harvey expresses the importance of creating “a new urban commons.”⁹⁴ Similar to Henri Lefebvre, Harvey describes this communal space as “a public sphere of active democratic participation. ... [To achieve this, we] must imagine a more inclusive, even if continuously fractious, city based not only upon a different ordering of rights but upon different political-economic practices.”⁹⁵ If our urban world has been imagined and made then it can be re-imagined and re-made. “The inalienable right to the city is worth fighting for. It used to be said [that]: ‘city air makes one free’ – the air is a bit polluted now. But it can always be cleaned up.”⁹⁶ Harvey describes this “right to the city [... as] an active right to make the city different, to shape it in accord with our heart’s desire, and to re-make ourselves thereby in a different image.”⁹⁷ We, the current users and dreamers, must therefore consider, with each move, what we can add to the city fabric and analyse with caution whether this contribution will be additive or destructive.

The thesis proposes to develop methods of deriving more communal spaces in the city, by expanding upon the principles of what it means to create *elevated street environments*. By first understanding what space and place are, how they relate to each other and form the extents of inhabitable spaces; *Activating the Vertical City* seeks to explore through a study of edge effects and the experience of a journey through space, to determine how the public-meets-private environment can be enhanced by developing connectivity between the two. An analysis of the perception of high-rises and the increasing density of our urban environments has developed an interpretation of these two phenomenon: the increasingly dense cores are not capable of providing sufficient communal spaces as private blocks are layered one atop another, add infinitum. These stale environments of duplicated floor plates exude a sense of isolation and being lost in the repetitive layering of sterile similarity.

Jeanne Gang and Studio Gang, in Chicago, has also identified this issue of disconnection

94. David Harvey, “The Right to the City,” *International Journal of Urban and Regional Research* (Malden: Joint Editors, and Blackwell Publishing, 2003).

95. Ibid. Harvey is referencing privatization created by neo-liberalism.

96. Ibid., 941.

97. Ibid.

experienced in high-rises. In Gang's comment that "tall buildings don't necessarily lend themselves to being social buildings – they can seem isolating and inward [looking]." ⁹⁸ Their firm has tried to negotiate this problem by developing relationships between users in the Aqua Tower, Chicago. Built in 2010, the strategy for the building was to create relationships across the horizontal and vertical floor plates. This was done using the external balconies that expand and contract, across the face of the facade, establishing connections between neighbours that transcend the rigidity of the floor plates. The balconies act as "social connectors" ⁹⁹ because the inhabitants can visually and verbally interact – creating community and connection to the outdoors. The residents are then invited up to the communal roof garden to participate in the shared event, thereby activating and reinforcing the community connections. Gang describes these interactions as having a "positive social effect." ¹⁰⁰ This building has determined one way of diminishing the self-isolation experienced by inhabitants; and it also establishes a visual connection between the users and with their context to the city below. In this scenario, the users of the building are largely residents, ¹⁰¹ and the building continues to be a private environment, isolated from the public domain of the street below. *Activating the Vertical City* seeks to determine and expand upon methods, which cross-cultivate similar interactions between the private and the public realms, by inviting the public up into other layers of the city.

98. Jeanne Gang. *Jeanne Gang: Buildings that blend nature and the city*, film, Ted Talk, (recorded at TEDWomen 2016 Conference, San Francisco, California), filmed October, 2016, accessed January 24, 2017, <https://www.ted.com/talks/jeanne_gang_buildings_that_blend_nature_and_city>.

99. Ibid.

100. Ibid.

101. Aqua Tower is a mixed use tower composed of rental-apartments, condos and hotel suites - the firm refers to it as a 'vertical neighbourhood.' Jeanne Gang, "Speaker's Footnotes," in *TED Talk Jeanne Gang: Buildings that blend nature and city*, published January, 2017, accessed January 24, 2017, <https://www.ted.com/talks/jeanne_gang_buildings_that_blend_nature_and_city/citations>.

CHAPTER 4: INTERSECTING SPACES

4.1 INTEGRATING THE PUBLIC + PRIVATE

Public and private, the collective and the individual, and the many versions in-between: these are the contrasting terms used while discussing the types of spaces generated by confining the architectural realm between the horizontality of the public domain and the verticality of the private. The thesis will work in the spaces of the in-between: where one group or individual confronts another through discourse and the degrees that occur within this. This overlap – where public-meets-semi-public; semi-public-meets-semi-private; and semi-private-meets-private – holds huge potential for the design of possible interactions.

The ideologies of public and private, individual and group create large dividing lines in the city. There are plenty of public spaces, but many more private ones. The location of these divisible lines is an interesting one, and often exists as a very hard edge. There are many examples that start to differentiate and inhabit this space of the in-between. *Activating the Vertical City* typically uses the term *public* when speaking about the horizontal landscape, and *private* for the vertical recesses of the city, because the vertical is more often than not inferred in conjunction to impenetrable and exclusive spaces. How can these isolated reaches of the city become more connected to the public-ness of the ground plane?

The concepts of public and private which I wish to discuss in this chapter are attributed to the users of space in the city. Where the horizontal domain of the street is defined as a public space, and the vertical domain of towers are referred to as the predominantly private spaces of the city's composition. The intent of the thesis is to search for and design methods that best articulate and compose this connection, melding one into the other. By using catalysts of ascent, the thesis will explore how the delaminated domains of the elevated and sunken tiers of the city can connect through a public ground plane.

Public spaces by nature are common spaces, shared by all. They sometimes extend into the private domain, through a progression of buffer zones that begin to dictate the expected nature of the users, to a commonly agreed upon standard of mutual respect and safety. Through this progression the public space becomes *semi-public*, *semi-public-meets-semi-private*; and *semi-private* conditions before finally resulting in the private domain.

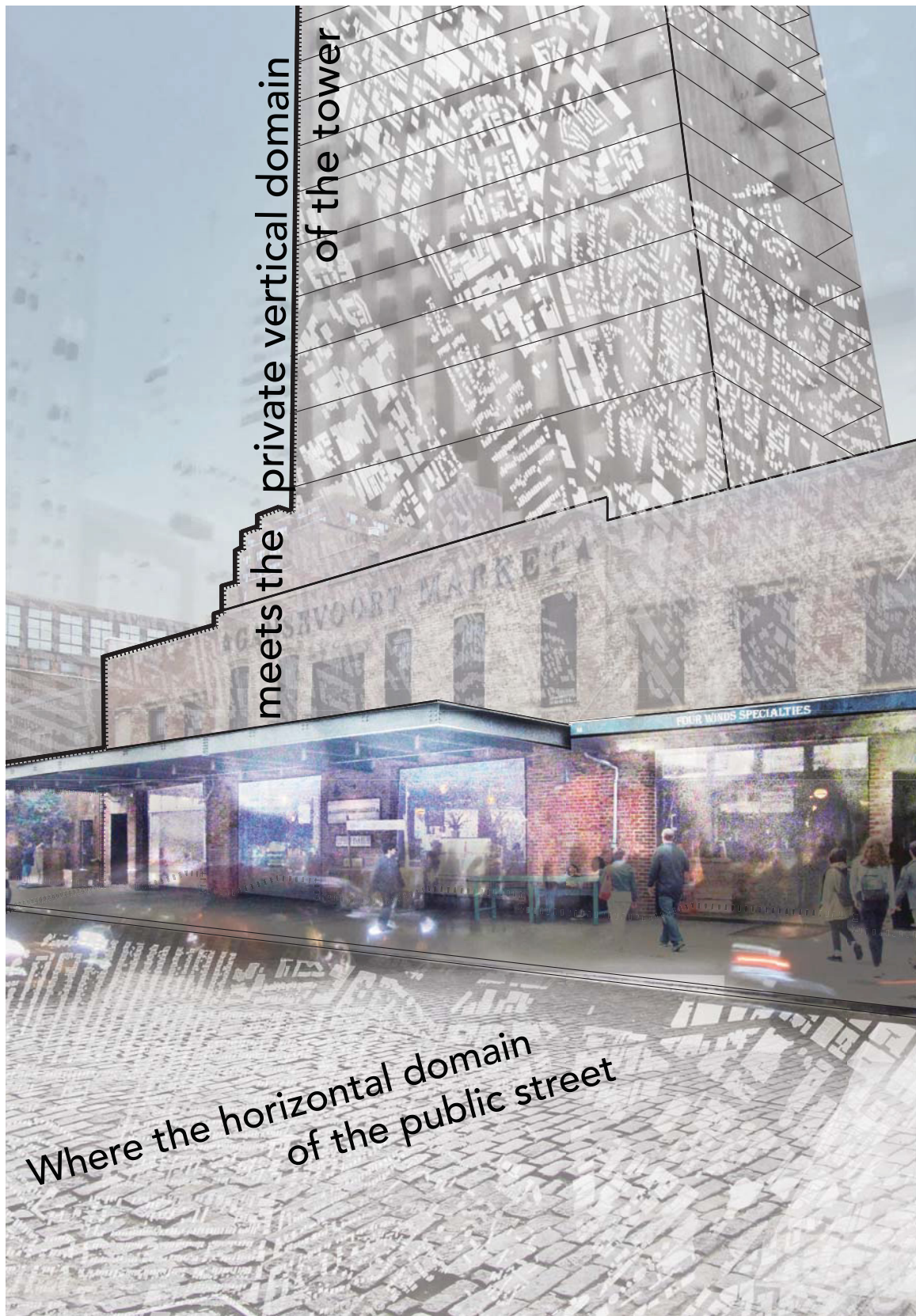


Fig. 59. Where the horizontal domain of the public street, meets the vertical domain of the private tower; illustration incorporates shapefile data from Auckland Council, *building footprints*

This gradual alteration of spatial user types allows for a large range of user patterns; while the use of programmatic overlap composes to varying results different levels of activation. Christopher Alexander has created a hierarchy of urban spaces that explore this evolution in greater detail and has described these through a series of spatial topologies.¹⁰² Defined through six levels of interaction, they are categorized as: *urban public*, *urban semi-public*, *group-public*, *group-private*, *family private*, and *individual-private*.¹⁰³ These delineations are similar to the groups in Edward T. Hall's edge effects which are defined as *intimate*, *private*, *social*, and *public*¹⁰⁴ and are based on the social distancing cues.¹⁰⁵ These can be of great use when developing the interstitial edge scenarios that can activate the overlap of programmes that initiate urban semi-public scenarios next to social interactions.

Similarly, Herman Hertzberger divides users into two categories: the *collective* and *individual*.¹⁰⁶ Stating that in the collective spaces in the public areas are "accessible to everyone" and as such their upkeep is the responsibility of the *collective*.¹⁰⁷ Contrastingly, the individual private spaces are accessible to a limited group, or even to a single individual, and these users are responsible for its upkeep.¹⁰⁸ Through perceptive delineation of the two user groups, Hertzberger also warns that it is a human characteristic to want to exist somewhere between these polar opposites and indeed that there will be groups that balance somewhere in between this interstitial limbo. (This hints that there are user groups who defy the requirement of typical hard edge conditions.) For this reason, it is as important to build walls of division, as it is to construct spaces that are open and allow for gathering. This idea can be applied to the scales of the city: the building, the room and a wall.¹⁰⁹ This search for ways that one group can seep into or influence another, leads to degrees of public (relating back to the semi-public zones of Oscar Newman). In

102. The spatial topologies refer to the types of physical spaces that these interactions typically occur within.

103. Alexander and Chermayeff, *Community and Privacy*, 129.

104. Hall, *The Hidden Dimension*, 116–23.

105. As noted in Chapter 2.3 *Topological Space, Edge Effects and the In-Between*.

106. Hertzberger, *Lessons for Students in Architecture*, 12.

107. *Ibid.*

108. *Ibid.*

109. *Ibid.*, 206. Refer to original quote by Hertzberger: "The architect is not only a builder of walls, he is also and equally a builder of openings that offer views. Both walls and openings are crucial."

semi-public spaces larger groups are invited to inhabit and care for the areas, while also supervising their territory. Newman's book¹¹⁰ also speaks to the idea of safety zones, and how they can look over one another to supervise a community's safety from intruders. This is done by introducing spaces for connections to occur between the individuals. In *Defensible Space*, Oscar Newman describes the boundary lines that separate the private realm from the public, that are developed by the architecture, and critiques the types of spaces that can be self-surveillant. This broad analysis begins to outline that certain types of circulation networks in tall buildings work better than others. For instance, single-loaded, external corridors have the capability of being lightly monitored by residents of the building, so that they can feel secure moving through their building. This type of elevated street offers much potential for the inclusion and introduction of public and semi-public zones in higher levels of a building. Inversely, double loaded corridors offer very different environments in terms of safety. Due to the fact that the space is naturally an enclosed volume, the only penetrations that open into double loaded corridors are the fire-rated doors to each unit. This knife edge separation between the private enclosure of the residential unit and the public walkway, infers no correspondence between the two spaces, and the particularly minimal level of visual connectivity lends to *unsurveyed paths*.¹¹¹ If units were re-organized so that internal semi-private zones could look out at the shared hallway, some small degree of neighbourhood surveillance could occur to make the elevated street a safer zone. Newman notes numerous times, that such a "lack of path surveillance [leads] to feelings of insecurity."¹¹² Security can be achieved by an active system of surveillance and security guard; however the addition of passive architectural elements to it can also provide neighbourhood surveillance – these can be attributed to the shape and layout of a building. It is important to note that while neighbourhood surveillance can be a good thing, it is integral that degrees of public and private spaces are maintained, so that the environment does not become oppressive. Therefore while connectivity is key, it must occur within an open, porous and solid system. As such, Newman provides a series of design elements that can permit natural surveillance over a building, and begin to provide a more transparent pattern of use. These elements can also be used

110. *Crime Prevention Through Urban Design: Defensible Space*

111. Oscar Newman, *Crime Prevention Through Urban Design: Defensible Space* (New York: Macmillan Company, 1972), 152.

112. *Ibid.*, 80.

as a way-finding device, so that from the exterior users can visibly understand to where they intend to move; and inversely from within, they should have the capacity to look out and self contextualize in regards to the building and the surrounding neighbourhood. For example as Newman demonstrates, the simple provision of a roof-deck playground, facing a single loaded corridor entrances and patios, has the capacity to visibly link the proceeding of three to five levels of units as a vertical neighbourhood.¹¹³ He also suggests that by lifting the elevation of a room, the subsequent elevated window into the public space can provide a clear line of sight from private to public, but its angle naturally filters direct eye line from public to private. Embedding windows in a fire stair, provides a visible link to the exterior, and reduces enclosed stairwell from becoming unsafe. Similarly, shared semi-private zones outside of four to six units, accessible by a secondary transparent door, would yield a degree of safety, because the space will become adopted by the residents as a “collective extension of their dwelling units.”¹¹⁴ This semi-enclosed space becomes semi-private, and an area where the residents feel that they can melt out into, in a subtle way, which in turn develops interaction and reinforces neighbourhood inter-connectivity.

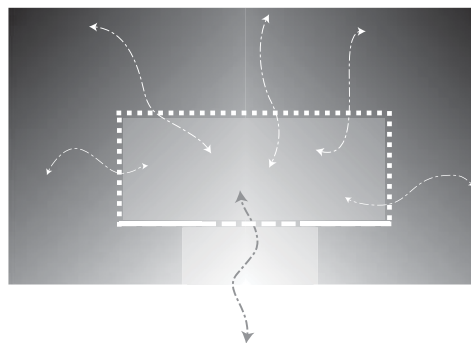


Fig. 60. Semi enclosed spaces to build relationships and interaction; based on Newman, *Crime Prevention Through Urban Design*

Following the logic of Hertzberger and Newman, by creating a criss-cross network of paths through the objet-type tower, in Chapter 8, more of the building will become interrelated and activated by the introduced activity: enlivening the layers of the vertical city. It is important that the programmatic content of each floor should be balanced to maintain a level of activity throughout the day, night, and weekend, so that these vertical spaces may remain safe and inhabitable. By instilling inherent defensibility characteristics into the programmatic content of each floor, similar to some of the aforementioned approaches of Newman, the spaces will be provided with a sense of collectivity that will compose community and connectivity within. This will create an atmosphere that will be self cared for and internally observed, in the internal elevated streets, while providing necessary

113. Ibid., 121–31.

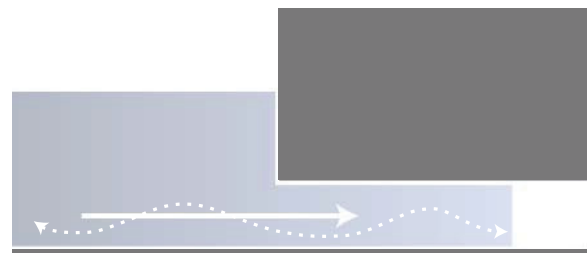
114. Ibid., 68.

places of semi-privacy for the residents, dwellers and the journeying *wandersmänner*.¹¹⁵

Similar methods of integration can take the form of layering spaces, and horizontal and vertical thresholds. The interstitial zone, provided by the semi-public space of the hallway (described in Chapter 4.1) can be categorized as an element of a horizontal threshold. Can our typical concept of thresholds and the layering of these spaces be inverted? This inversion might take the form of a duplicity of grounds where the programme of the tower is reconsidered.

Freeing the ground plane consists of minimizing the private programmatic content from the main floor to change the way internalized space is interpreted from the street. By establishing public content, such as interstitial programmes, and common space for meeting to occur, the space can be interpreted as an extension of the street – giving it the feeling of being public open space that can be appropriated. Several buildings that have done this well are the Seagram Building, in Manhattan, and the Halifax Central Library, in Halifax, Nova Scotia.¹¹⁶ The double-story main floor of the Seagram, coupled with the glass facade, demonstrates how a foyer can melt out into the space of the plaza, and inversely for the plaza to feel as if it is sliding into the open internal space. Likewise, the Halifax Central Library has devoted its main floor to public activities, thereby inviting the city into this space that begins to act like a public living room. The difference between buildings that block off their content from the street and those that act as extensions of the space outside changes the relationship that the buildings have with the street – from walled to a potential for connection. Freeing the ground plane also provides the potential for these buildings to act as shortcuts through the city – thereby further embedding them into the *everyday life* of the city's inhabitants (establishing connectivity with one's surroundings).

Fig. 61. Freeing the ground plane and suggesting shortcuts; based on van der Rohe, Seagram



115. de Certeau, *The Practice of Everyday Life*, 97.

116. The Seagram was designed by Mies van der Rohe; and the Halifax Central Library was designed in collaboration by Fowler Bauld and Mitchell, and Schmidt Hammer Lassen.

4.2 THE SPACE IN-BETWEEN: OPPORTUNITIES FOR OVERLAP

The space of the in-between can be an edge or a middle. It can be the porosity in a wall, or it can be the overlapping middle-space framed by lines. It can be framed using the edge-lines, which can be physical or invisible; or it can also be developed through degrees of transparency; or contrast. Framing the edges of space with walls or lines in space is an understated method of demonstrating an overlapping zone. Where they come together can be considered a shared space between two programmes, where they begin to melt into one another. It becomes an invisible transitional edge.¹¹⁷ This middle-zone might be denoted by a subtle change in floor texture, or programme of the space – suggesting it to be a meeting or gathering space.

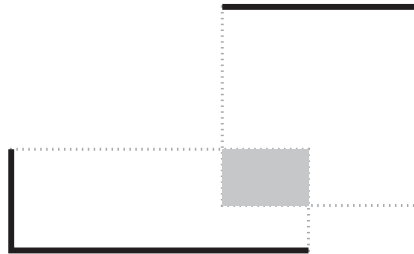


Fig. 62. Lines framing the space in-between; diagram influenced by Talbot Sweetapple

The space of the in between can also exist through studies of visual transparency, as are demonstrated by the Fondation Cartier Pour l'Art Contemporain building, by Jean Nouvel building. Fondation Cartier uses multiple skywalks at different heights to help the user understand ones place in regards to the urban context. The transparency of the building's facade creates visual connectivity, and erases the edge by connecting the interior programme with the exterior. This is used to draw nature in, and creates the effect of being embedded in nature. In fact, the whole project is a celebration of a very old oak tree that was on site. The tools derived from this precedent are to erase edges to create connectivity and establish a dialogue between the interior and exterior programmes.



Fig. 63. Fondation Cartier elevation, by Jean Nouvel: erasing edges as translations through transparency; based on Nouvel, Fondation Cartier pour l'Art Contemporain

117. Meyer, *Lecture*, 2016.

SPACE BETWEEN BUILDINGS – ARCADES

Herman Hertzberger presents several variations of arcades in his *Lessons for Students in Architecture*. These examples demonstrate how internalized routes through space can take many forms. Arcades are covered public spaces onto which a myriad of private businesses open up into. This form of street often exists at the ground and may assume up to three levels. It can also occur sub-street with skylights, providing a connective experience to the world outside. Modern malls are often based off this conceptual typology. In scenarios where the arcade street is widened, a garden or group space can take form.



Fig. 64. Arcade environment, in Melbourne, Australia, 2012

The in-between culture of the arcade and inhabited back alley can begin to take place in these environments. Arcades are a great example of in-between spaces because of their duality of interior-exterior space garnered by their glass roofs that filter light down. Above is an example of one Melbourne, Australia's many arcades weaving a warren of paths through the dense city blocks. Here, the vitalization of even the narrowest of corridors creates a dense urbanization of alleyways and internal spaces in-between that are populated daily by the users of the city, regardless of the weather. Interestingly, this culture imposed at street level does not typically permeate into the upper layers of the city of Melbourne. This character of assembly could vitalize more levels of the city.

THE INTERIORIZED SPACE BETWEEN

The interior street deals with the territorial concerns of public and private in relation to semi-public zones where residents begin to exhort communal territorialism, aka they wish to keep an eye on the activities occurring in these locations. However, from a connectivity point of view, these types of spaces inhibit the behaviour of shared cohabitation (living). The proposed interior street, in Chapter 8 of the thesis, should therefore be an extension of a pre-existing pedestrian network, such as the Pedway system in Chicago.

PROVISIONAL PUBLIC STREETS AND SHAPE MATTER

There are two major case studies that utilize elevated streets: l'Unité d'Habitation, by Le Corbusier, and the Robin Hood Gardens, by Peter and Alison Smithson. Le Corbusier's response to the *disappearing street*¹¹⁸ is manifested in l'Unité d'Habitation as an elevated and interiorized street environment. This interpretation cultivates multiple levels of community, through a notion of coloured neighbourhoods, that envelope the elevated streets. The inhabitants are invited up into these spaces where a scale of thresholds addresses the communication between each unit. Similarly, the Brutalist architecture of Peter and Alison Smithson's Robin Hood Gardens is a proposed form of social housing. The complex is composed of two buildings, of seven and ten stories, housing 213 one and two-story apartments. Like the Unité d'Habitation, they have provided a public 'street' where people can gather and children can play, this time on the exterior of the building, which occur every three floors of the two buildings. The importance of this *street in the sky*, that overlooks the garden, is that it provides a "new neighbourhood street" environment connecting these housing units. Likewise, the inward shape of both buildings' curvatures also provide the inhabitants with a sense of being part of a larger community. Their shape permits visual connectivity, so that they can actually see the edges of their neighbours lives. This contextualizing of their coexistence unites, instead of isolating them amongst straight edges.

118. Jacques Sbriglio, *Le Corbusier: L'Unité d'Habitation de Marseille* (Berlin: Birkhäuser, 2004), 44. Referencing quote from Le Corbusier.

PUBLICLY OWNED PRIVATE SPACES (POPS)

Publicly Owned Private Spaces (POPS) originated during the development of Manhattan, during the evolution of the building bylaws. The commonly recognized intent, composing these spaces, was to decongest the density of the city of skyscrapers – bringing light and air to the street below. However, a contrasting interpretation has been provided by Jerold Kayden. He suggests instead that the widening of the public corridors at the street, were intended to “impose building height restrictions to drive out area manufacturers.”¹¹⁹ Effectively, this was done to remove factory workers and transportation vehicles from the public eye, isolating contact between the rich upper class and the working class.

There are two notable examples pertaining to provisional common spaces, these include the Seagram building, by Mies van der Rohe, and the Lever House, by Skidmore, Owings and Merrill, in Manhattan. These two projects instigated a change to the *New York Zoning Bylaw*¹²⁰ by proposing an alternative way to bring light down to the street: providing provisional common environments in the building fabric, which in turn prompted intense verticality as a result. The Seagram building steps back from the street edge, creating a plaza that appears to melt through the glass of the main floor lobby, while the Lever Building takes a slightly different approach: drawing a public plaza under a section of the building, creating a semi-enclosed common space, embedded in the dense fabric of the urban core. Both of these buildings were used to develop the concept of publicly owned private spaces (POPS), adding common space to the city and enhancing the livability of the urban environment. This is best exemplified through the creation of the POPS plaza at the CBS Building, by Eero Saarinen, 1965.¹²¹ This change to the building fabric was a direct effect of the 1961 *Zoning Resolution*¹²² by the Voorhees architecture firm, and the *White Paper* by John Lindsay.¹²³

119. Jerold Kayden, *Privately Owned Public Space: The New York City Experience* (New York: John Wiley & Sons, 2000), 7–8.

120. New York City Planning Commission and Department of City Planning, *Zoning Handbook: A Guide to the Zoning Resolution of the City of New York* (New York: City of New York, 1961). Voorhees Walker Smith & Smith, *Zoning New York City: A Proposal for a Zoning Resolution for the City of New York* (New York: City of New York, 1958).

121. Diane Lewis, “Block Tour Midtown Manhattan” (New York, 2015).

122. Voorhees, *Zoning New York City*.

123. Jerold S. Kayden, *Privately Owned Public Space* (New York: John Wiley & Sons, 2000), 9.

As a response to this, how can edge effects of buildings and an understanding of the in-between begin to similarly claim quality space for the public realm through design? And as a result, what types of spaces will this generate at both the level of the street below, and in the elevated street, that can negotiate place between the semi-public and the private?



Fig. 65. *Top left*, The Seagram Building, by Mies van der Rohe, plaza, a publicly owned private space (POPS), Manhattan, 2015

Fig. 66. *Top right*, The Lever Building, by Skidmore, Owings and Merrill, semi-enclosed plaza, Manhattan, 2015

Fig. 67. *Bottom*, The CBS Building, by Eero Saarinen, a by-product publicly owned private space of the 1961 Zoning Resolution. This plaza is stepped down from the street, composing a space that is set slightly away from the traffic, Manhattan, 2015.

4.3 THE SCALES OF CONNECTIVITY

The scales of connectivity encompass the philosophical, experiential, physical, programmatic and urban. The notions of philosophical connectivity are discussed in the first chapter. Exploring different ways of speaking and thinking about the spaces in-between moments. The experiential (light and air) are understood through details and layers of perception. The human-physical scales of connectivity, tactile and visual, can be explored through the ideas of porosity and edge effects. Programmatic connectivity encapsulates the overlapping links of public and private spaces. While urban connectivity can discuss the context and its link to a larger network of places – this can be a mapping of mass, open space, and the layered physical networks of movement.

Connectivity can be interpreted through individual perception of space and the interior environment. The experiential quality perceived at the scale of the individual can focus on the tactile, visual and experiential, ie. light and air. Visual connectivity is one of the keys to understanding your position within an architectural context. By being able to look back from moments within the building, and gage yourself within an architectural zone, connectivity can be established at both the individual and neighbourhood scales. This can be achieved through visual links and by using an embedded system of elements.

Fig. 68. Representational connectivity among high-rises; *Twisted Expressions*, 2016



Fig. 69. Layered landscapes; *Manhattan montage*, 2015



BERNARD TSCHUMI, PARC DE LA VILLETTE COMPETITION

Using a system of points, lines, and surfaces, the Parc de la Villette master plan competition, by Bernard Tschumi, in 1982, was organized through an embedded system of memory elements, called follies.¹²⁴ Spread through the expansive park grounds, these 35 markers help travellers understand their orientation within it. Like the standing stones, called cairns, embedded in the Icelandic landscape, they demonstrate orientation and remind the users that they are moving through the system of a larger collective landscape. A similar network of embedded markers has been distributed throughout the vertical expanses of objet-type tower, discussed in Chapter 8, to contextualize inhabitant's vertical orientation. Embodied as a system of orange handrails, the tactile connectivity and colour code of these handrails, guide users through the weaving paths of the vertical streets.

TADAO ANDO, TIMES BUILDING

The Times Building, by Tadao Ando, wraps around an internal core that invites users to look back from whence they came. This labyrinthine building is composed of multiple elements fit together, which are linked by a circulation pattern connecting the warren of rooms. The rooms of this three level building are connected through a warren-like circulation pattern that wrap through the structure. Inhabitants are invited to reestablish context, within this labyrinth, by peering through openings that look back at the path from, different vantage points. Effectively, a sense of orientation is achieved through the use of vision planes that reinforce a sense of contextual connectivity as individuals shift through the site.

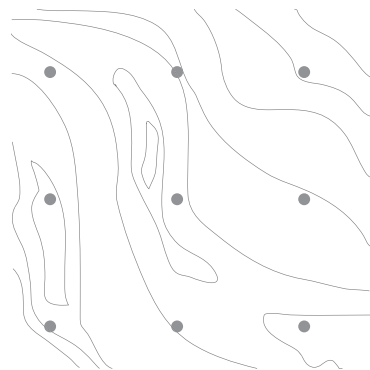


Fig. 70. *Left*, Embedded markers contextualizing the horizontal or vertical landscape; based on Bernard Tschumi's Parc de la Villette, in Koolhaas, *S,M,L,XL*

Fig. 71. *Right*, Orientation through vision planes; based on Ando, Times Building, in Zeballos, *Tadao Ando: Times I & II*

124. Rem Koolhaas, Office for Metropolitan Architecture, and Bruce Mau, *S,M,L,XL* (New York: Monacelli Press, 1998), 921.

4.4 THE JOURNEY: MOVEMENT IN THE HORIZONTAL + VERTICAL

A journey is the act of moving through spaces, and is commonly referred to as a circulation network. It can take many forms: it can be a direct line, where you know exactly what you are moving towards; it can be a curved route, so that you perceive the elements on the path's edges before the destination; or it can be much more complex and take on the form of a maze or labyrinth, where discovery becomes part of the adventurous experience of exploring the space. The same rules apply within a building: where the public zone of the hallway, can be straight-forward, mysteriously curved, or suggestively complex.

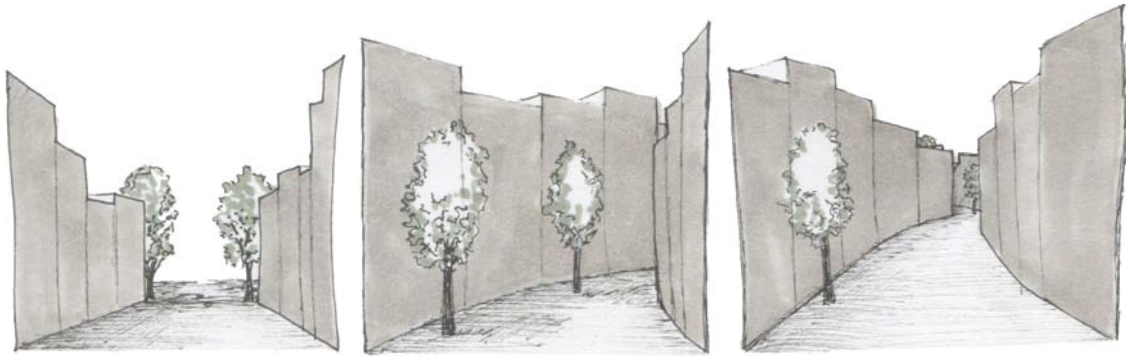


Fig. 72. Left to right: Street perspectives: straight, curved and labyrinth

If you consider a city as a series of paths, or journeys, through space; and a neighbourhood as a series of blocks, embedded with individual programmes, that these paths move through; then a tower, which is in its most basic form simply a series of blocks stacked one upon the other, becomes the demonstration of a vertical neighbourhood. Buildings that best express this idea include the Athletic Club, in Manhattan, whose programme when laid on its side is a complex neighbourhood from the 1st through 18th floor, after which the tallest and narrowest part of the tower is reserved for residential. Imagining how each of these programmes relates to one another with the busy central core of a neighbourhood composed of public amenities, and the quiet residential section (located slightly distanced); with a restaurant buffering the public aspects of the tower's programme from the primarily private residential zones.

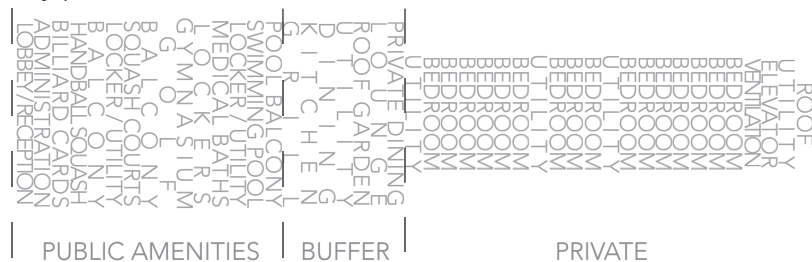
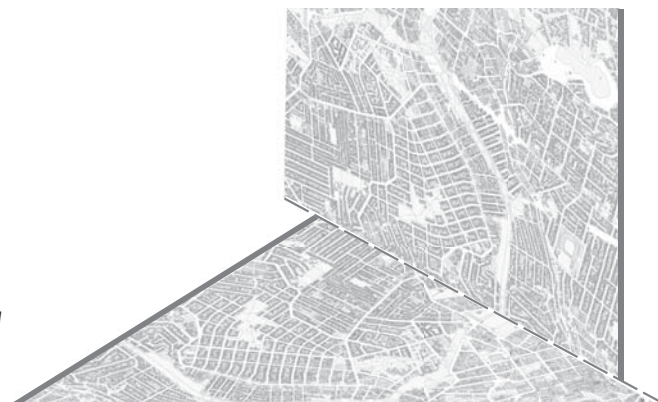


Fig. 73. Athletic Club, section as neighbourhood; based on Koolhaas, *Delirious New York*

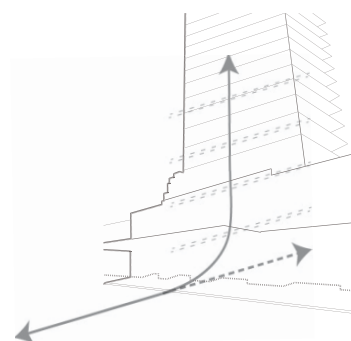
The flipping of a tower on its side is an effective way of interpreting it as a linear relationship of how one type of programme melds into another. This is often illustrated by the hard edges becoming boundaries, and the soft zones, as the place where one programme melts into another – thereby instigating interaction. It is easy to think of a tower as a series of floors, but the connotation of a floor speaks to a sense of separation. If we were instead to call them vertical neighbourhoods, a stronger sense of connection could be implied between both the units and the layers.

Fig. 74. Flipping the interpretation of a neighbourhood; illustration incorporates shapefile data from Auckland Council, *building footprints*



Since the notion of a neighbourhood speaks to a collective, and connotes connection with those who are in close proximity. The re-naming of a floor into a neighbourhood also has to be supported by ways to negotiating movement and connectivity through the vertical progression of these floor plates.

Fig. 75. Reorienting the journey, from the horizontal domain to the vertical



For these strategies of connectivity, we can begin by investigating the lessons of Jane Jacobs and the form of a block. The journey through a building is very similar to a walk through a neighbourhood. The experience of moving among large blocks can make the streets seem self isolating;¹²⁵ while broken up shorter blocks create the experience of more vitality, since more chance meetings are capable of happening. Short cuts are a key to vitality, accidental interaction, and mixed use.

125. Jane Jacobs, *The Death and Life of Great American Cities* (New York: Vintage Books, and Random House, 1961), 179. Referencing the notion of 'self isolating streets' as long blocks.

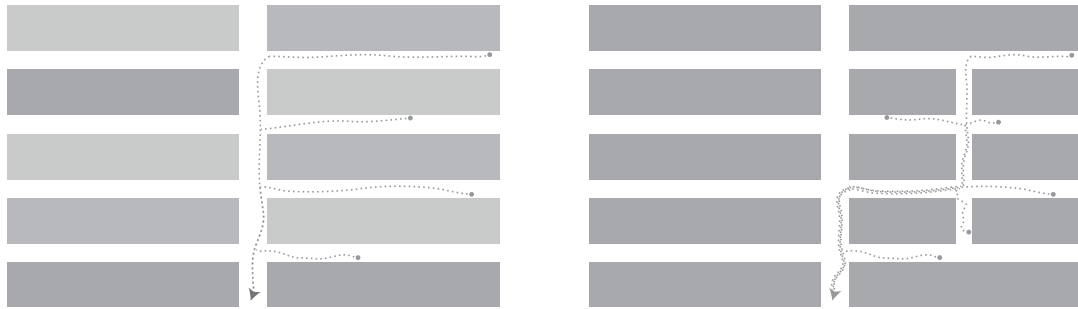


Fig. 76. *Top left*, Blocks in the horizontal, plan view: long neighbourhood blocks; versus *top right*, blocks in the horizontal: short neighbourhood blocks. Demonstrating how the different experiences the increase chance of overlap and interaction; based on Jacobs, *The Death and Life of Great American Cities*

These rules can be applied to both a block environment and a sectional environment of multiple floors, as a way to break up the monotony of identical isolating floor plates.

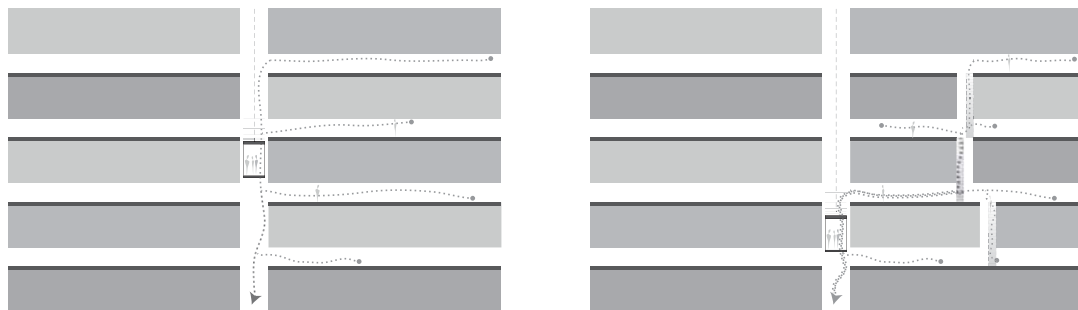


Fig. 77. *Bottom left*, Blocks in the vertical, section view: long corridors; versus *bottom right*, blocks in the vertical: short corridors. Demonstrating how changing perspective causes different spatial experiences, as well as the increase chance of overlap and interaction; based on Jacobs, *The Death and Life of Great American Cities*

The shortening of distancing can be attributed based on programmatic type and requirement so that larger neighbourhood collections can begin to interact and associate, forming larger communities and connections past the boundary of the single block. Similarly, sectionally this would also work as well, creating dynamic configurations of programmatic layouts.

Herzog and de Meuron's New Headquarters for BBVA is a three level podium building with tower. The main floor of this building tests Jane Jacobs and the architects of the Rockefeller Center's advice breaking up the ground floor into a composite of small blocks, so that the experience of wandering through is similar to an arcade. Skywalks have the capacity to weave higher floors together through ramps. It's effect is very similar to the Free University design, in Berlin, but boasts more open air spaces to re-examine the volume. The podium is covered with a roof shading system. Openings are just as integral

in the fabric of a neighbourhood and tower: they become spaces of accumulation, pause, and interaction otherwise interpreted as voids in the system.

Circulation patterns through spaces are very interesting in the variety that can occur. In towers, there are two predominant typologies: internal and external circulation networks. Some buildings will utilize voids to enact openings between a series of floors, and this is where the vertical translation of floors will typically be established. Other buildings will tilt the angle of the floor plates themselves so that they melt into one another; others will limit the tilt

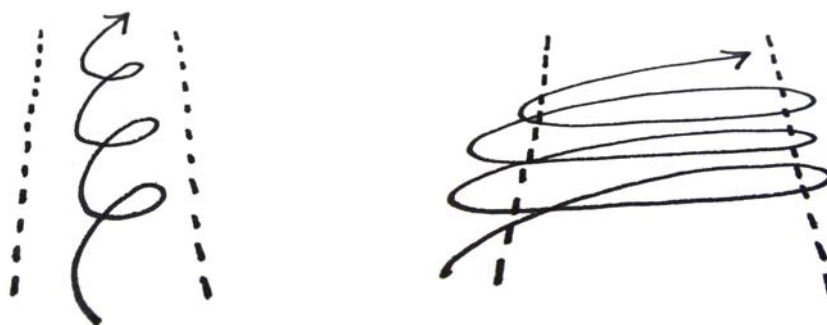


Fig. 78. *Left*, Internal circulation methods; versus *right*, external circulation methods

How then do these journeys wind through vertically layered blocks? Are the levels in a typical grid plan – stacked one upon the other with little variety with exception to the people who live within them? Or, are they perhaps a little more haphazardly assembled, so that now there are short cuts, and different ways to move up, down, across, and through them? Jane Jacobs suggests that shortcuts create better neighbourhoods as they promote more places for chance meetings, and like strong the neighbourhood design of new urbanism, a variety of programme types should also be scattered throughout these neighbourhoods.¹²⁶ It is easy to think of a tower as a series of floors, but the connotation of a floor; speaks to a sense of separation. If we were instead to call them vertical neighbourhoods, a stronger sense of connection could be implied between both the units and the layers.

Like the designers of the Free University, in Berlin, I believe that towers have the problem of isolating people so that they have minimal if no relationship to the outside world. They

126. Jacobs, *The Death and Life of Great American Cities*, 180, 184, 186. In chapter 9, "The need for small blocks," Jacobs explains the difference between short and long blocks, the user patterns that flow through them, and their effect on neighbourhoods.

have called this situation a 'plane of isolation.'¹²⁷ The segregation that naturally occurs due to the floor plates' lack of cross-interaction isolates Floor # 1X90A from those not only closest to it, but also those of farther proximity; "the relationship from one floor to another is tenuous, almost fortuitous, [and passed through only in] the space machine lift."¹²⁸ Their cure is a "landscaper" where the "organization [offers] greater possibilities of community and exchange [because they] are present without necessarily sacrificing any tranquility."¹²⁹

So perhaps this means that one of the problems with towers, is that the layout of the units are described first, while perhaps it is the street that should proceed instead. If the journey is the guiding principle from which we explore and find space, perhaps this should be made more important in architecture. The place, is an architectural moment defined by the space within which it is balanced. As such, the journey to that place is the path through space that was taken to get there. Herman Hertzberger suggests that structuralism is an architectural methodology to get there: for the "openness of the system" is a fundamental ingredient of structuralism, affording the architectural composition the capacity to "keep changing" as needs necessitate.¹³⁰ We can begin to take methods of altering the orientation of floor plates to modify this experience of translating vertically. For example,

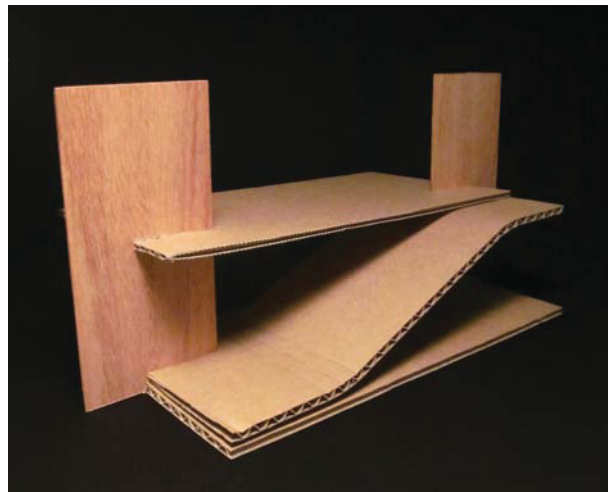


Fig. 79. Sliding planes create fluidity and connectivity through floor plates; based on OMA, Kunsthal

127. Shadrach Woods and Candilis-Josic-Woods, "Articulation of Public and Private Domains," in *Building for People*, 1963, accessed December 2016, <<http://socks-studio.com/2015/10/29/the-free-university-of-berlin-candilis-josic-woods-and-schiedhelm-1963/>>. The 'plane of isolation' is a term by Woods from the Free University Berlin competition, 1963, explaining a building concept through diagram.

128. Ibid.

129. Ibid.

130. Hertzberger, *Lessons for Students in Architecture*, 51.

the floor plates of the Kunsthall, which was renovated by OMA, slide programme from one level to the next. The interchange of these sliding planes of programme creates a continuous journey of movement through which the building can be explored. Embedded into a hill, the Kunsthall uses the idea of slopping floor plates, coupled with a continuously wrapping circulation pattern, to unveil and explore the juxtaposition of programmes composing the building's mixed-use programme. Scattered with moments of pause to peer through the voids, the users are invited to visually contextualize their location in this labyrinth-like building. Finally, visual connectivity is the key to understanding your position within an architectural context. By being able to look back from moments within the building, users can understand architecture and their threaded journeys through it in a new manner.

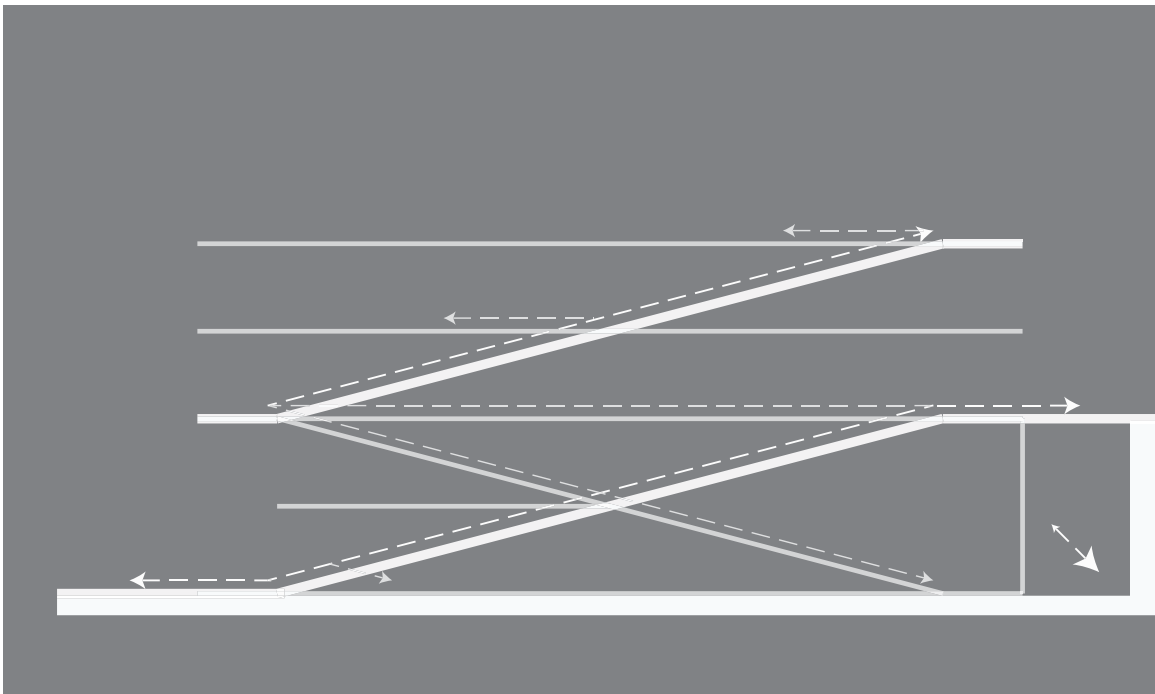


Fig. 80. Sectional circulation diagram, the Kunsthall, renovated by OMA. The slopping floors of the Kunsthall wrap upwards on a continuous journey, with moments to look back and consider from whence users came; based on OMA, Kunsthall

CHAPTER 5: CIRCULATING THROUGH LAYERED ENVIRONMENTS

5.1 MULTI-LEVEL CITIES + BUILDINGS: AN URBAN ANALYSIS

OVERVIEW

My interests in the idea of multiple levels of the city originate from Edmond Texier's plate of the *Five Levels of Life* in Paris, France. Here, Texier explores how these levels are layered otop of one another on the Boulevard Saint-Martin, 1852.¹³¹ This layering is based on demographic segregation and is demonstrated the spatial separation in terms of wealth – where the rich live on the first and second levels, and the quality of life decreases as one moves up through the building.

Enhancing the opportunity for layered experiences of the city, *Activating the Vertical City* seeks to develop methods of inviting the public spaces of the city up into the vertical environments to establish multiple points of view and different interpretations of how we reside, connect to, and fit into the dense life-style of the giant organism of a layered city.



Fig. 81. Layered experiences; MoMA Museum, Manhattan, 2015

131. Edmond Texier, *Tableau de Paris* (Paris: Paulin et le Chevalier, 1852), 65.

Beginning with an investigation of the characteristics of three North American multi-level cities, this section maps methods of connectivity through their layered compositions. The exercise explores systematic approaches for composing circulation networks, and the embedding of elements that create subsequent ground environments. Working with open, green, and built, the public and private domains weave patterns through the urban core. The manner by which they relate to, around and through each other demonstrates the effects of cutting, wrapping, and sliding either above or below the architectural fabric of each city. This mapping exercise will analyze three North American case study cities: Manhattan, New York, Chicago, Illinois, and Vancouver, British Columbia, to demonstrate how multi-layered cities relate to the vertical. By denoting where, why and how this has been done, this analysis will define established methods of orientating layers and investigate how the systems correspond to the architectural fabric of the city, influencing the urban condition. Cities have the capacity to exist in multiple domains of the vertical. By developing an understanding of these layered compositions, the potential of the space in-between can be explored through logic similar to Gordon Matta-Clark's journeyed spaces of "above, between, and below."¹³² Following the logic of Matta-Clark, Manhattan, Chicago and Vancouver were chosen to discover methods of ascending, descending and moving through space.



Fig. 82. Representational connectivity among high-rises; *Twisted Expressions*, 2016

132. Le Feuvre, *Gordon Matta-Clark*, 7.

The series of North American cities were chosen to explore three examples of metropolises at different levels of architectural history in terms of high-rise construction. As a selection, Manhattan was chosen for its dense verticality and its multi-layered circulation network. Chicago was also selected for the complex layering of its circulation system, and the way that these planes have been integrated into the multiple grounds of the city. It was also picked for its history of high-rise construction. Vancouver, the final case study city, was selected as an example of a vertically emerging city that is experiencing a vast increase in tower construction. The subsequent series of maps¹³³ focus on the urban cores and represent a scalar analysis of the skyscraper heights embedded into the complex circulation

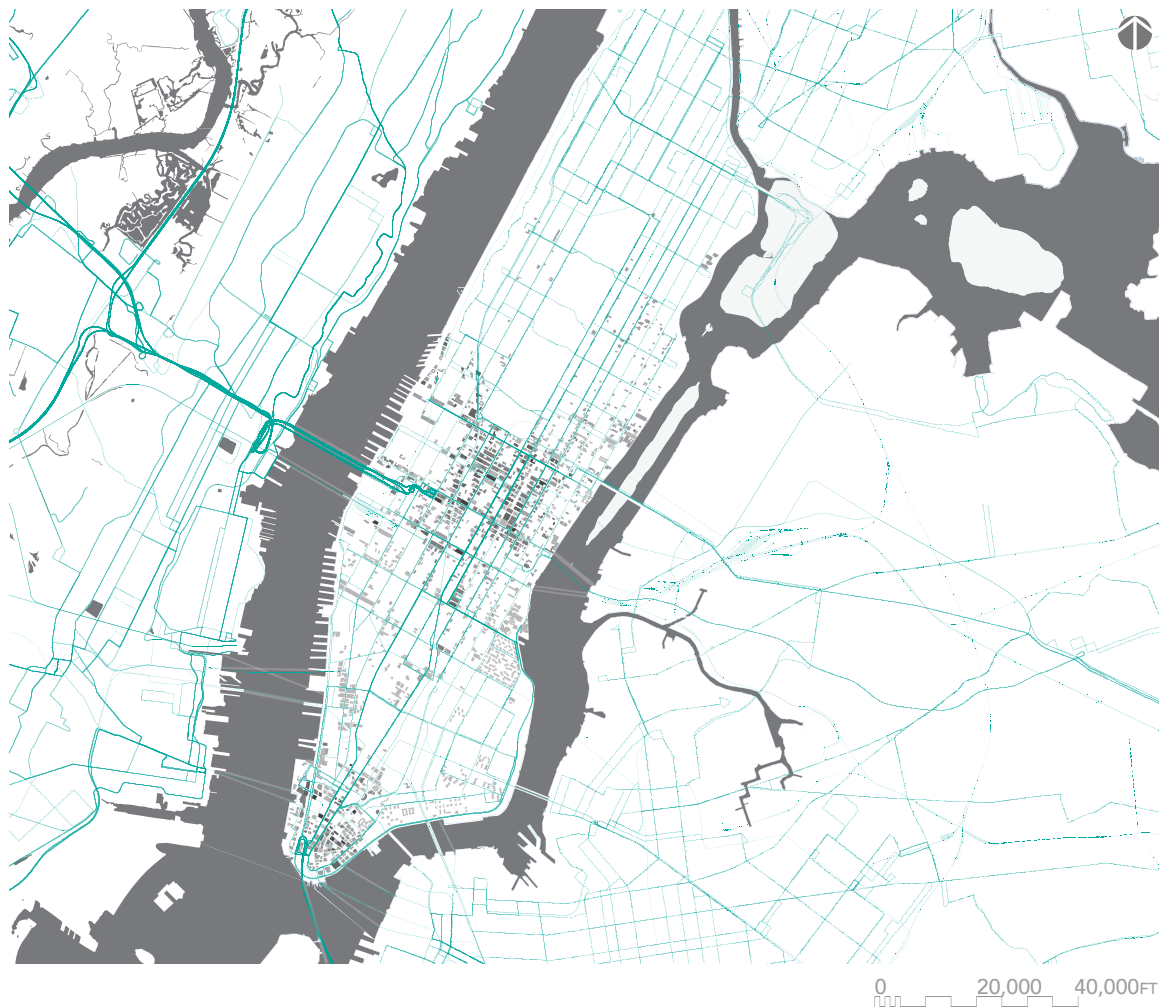


Fig. 83. Manhattan, *Where Horizontal Meets Vertical*, 1:50,000 nts, demonstrating the intersection of major circulation arteries (horizontal) and towers in the urban environment (vertical); map incorporates shapefile data from State of New Jersey, coastline, waterbody and stream network; NJGIN, bus routes, transit, UEZ, transit village, road centerlines; SkyscraperPage, Manhattan Skyscraper Map; and OpenCityMap, Manhattan

133. Map study 1: *Where Horizontal Meets Vertical*; map study 2: *Urban Circulation: Where Horizontal Meets Vertical*, in relation to common spaces.

webs of each city. As a response to Henri Lefebvre's built masculine, unbuilt feminine, and common space of the street¹³⁴ the 'where vertical meets horizontal' map series explores the range of heights of the skyscrapers in relations to the rest of the building fabric and the common space of the circulation corridors (represented in teal). In the next stage of this analysis, the common spaces denote the feminine unbuilt, and are mapped in orange, while the grey rendered towers, represents the masculine vertically of conquered space.

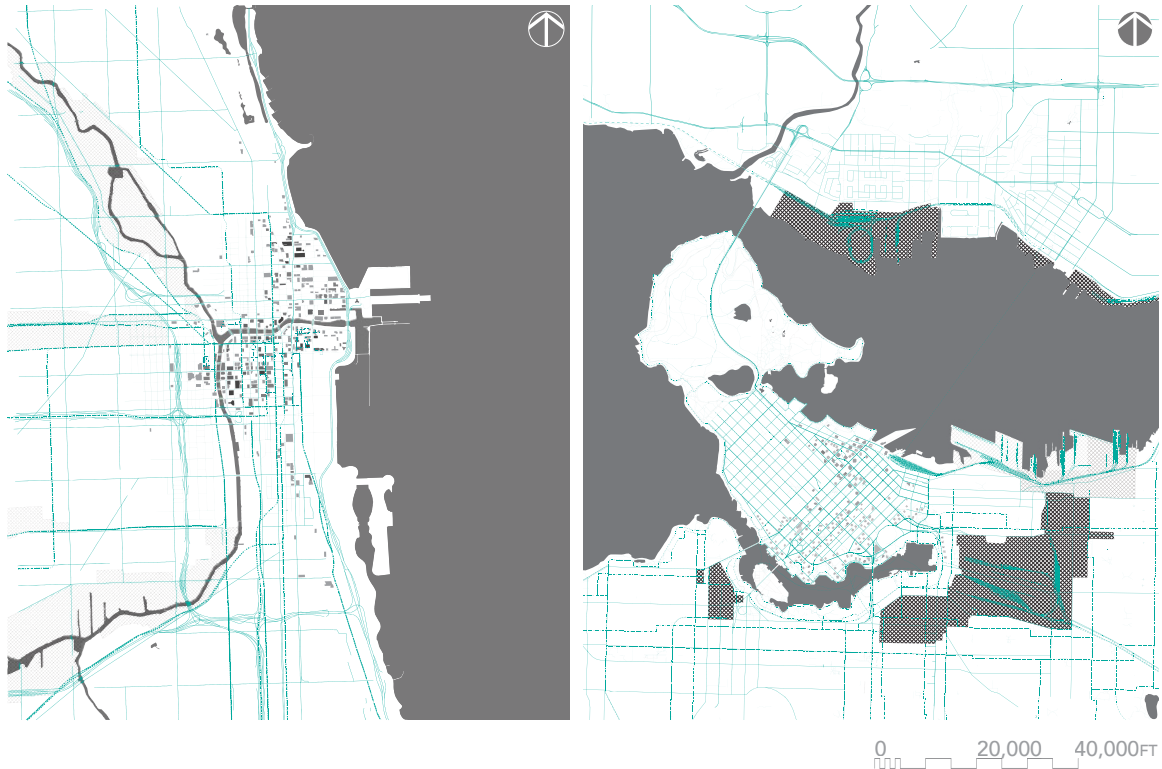


Fig. 84. *Left, Chicago, Where Horizontal Meets Vertical, 1:50,000 nts, demonstrating the intersection of major circulation arteries (horizontal) and towers in the urban environment (vertical); map incorporates shapefile data from City of Chicago, building footprints, major streets, pedestrian streets, rail lines, waterways, metra lines, railroads, pedway routes, industrial corridors; SkyscraperPage, Chicago Skyscraper Map; and Jackson, System Map 1902*

Fig. 85. *Right, Vancouver, Where Horizontal Meets Vertical, 1:50,000 nts, demonstrating the intersection of major circulation arteries (horizontal) and towers in the urban environment (vertical); map incorporates shapefile data from District of North Vancouver, bike routes, islands, lakes, railway, roads, rivers, vehicle bridges, trails for public use; Natural Resources Canada, National Road Network, National Railway Network; City of Vancouver, city streets, bikeways, building footprints, railway, rapid transit, shoreline; OpenStreetMap, Vancouver; White, Vancouver Building Heights Map; and SkyscraperPage, Vancouver Skyscraper Map*

134. Lefebvre, *The Production of Space*, 261–62, 286, 367–77. As representation of the feminine, the open-spaces of plazas and parks also allude to the essence of the hearth, interiority and natural abundance; while masculinity is attributed to architecture (dominion over the soil) – this is referred to as the representational space of the phallic formant. Refer to Chapter 2.1.

CASE STUDY 1: MANHATTAN, NEW YORK

Manhattan was selected for the way the pedestrian circulation network and densely sited towers engage with the ground plane. Sprinkled throughout the vertical high-rises, and weaving horizontal circulation system, are the common spaces – highlighted in orange. These shared open spaces illustrate the locations of parks, plazas, atriums, arcades, green spaces and publicly owned private spaces, while the teal circulation network shows how

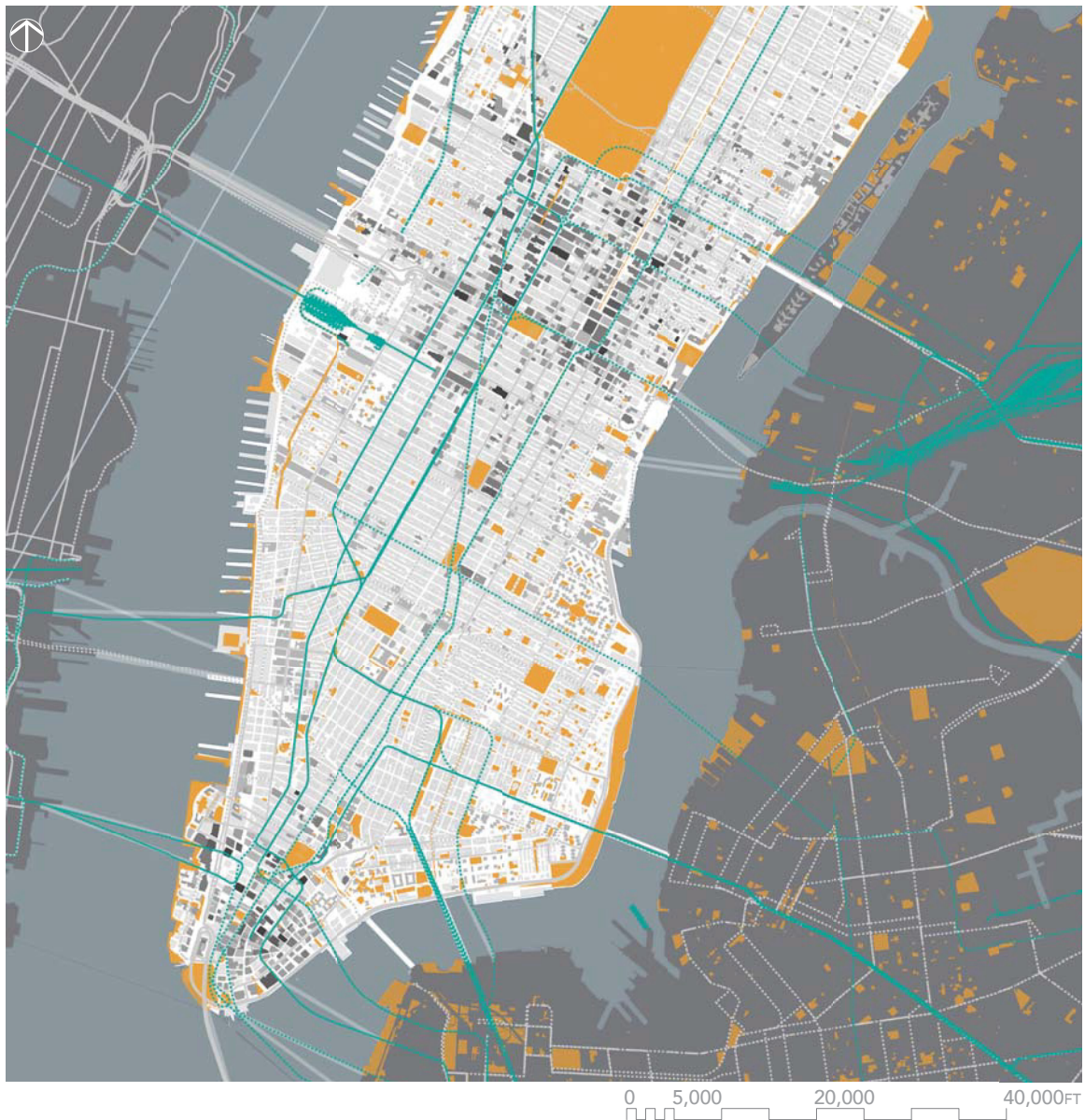


Fig. 86. Map of Manhattan, *Urban Circulation: Where Horizontal Meets Vertical*, 1:25,000 nts, demonstrating the intersection of major circulation arteries with common space and towers in the urban environment; map incorporates shapefile data from State of New Jersey, coastline, waterbody and stream network; NJGIN, bus routes, transit, UEZ, transit village, road centerlines; SkyscraperPage, Manhattan Skyscraper Map; and OpenCityMap, Manhattan

the pedestrian paths, roads, rail and metro lines, and bike paths weave above, below and through each city. By portraying the composition of vertical space and the range of densities, that are spread through the cities, the contrast of dark grey towers to orange common space illustrates the proximity and presence, or lack, of shared spaces. These grey zones of skyscrapers represent nodes of intense urbanity: layering individual building footprints by as many as sixty times their original size. The effect that this type of intensification has on the surrounding building fabric is intense. The lack of shared common space in relation to these nodes therefore becomes immensely telling about the way cities are developing. Zooming into areas such as Midtown Manhattan, this lack of common space in relation to the dense collections of towers is clear. Scenarios such as this could be addressed by embedding shared space into the vertical domain, drawing common spaces up into the worlds above and thinking about the city less in plan, but more in section.



Fig. 87. *Verticality in the system*, 1:10,000 nts, contextualizing the vertical circulation of towers within the horizontal environment of Midtown Manhattan; map incorporates shapefile data from: State of New Jersey, coastline, waterbody and stream network; NJGIN, bus routes, transit, UEZ, transit village, road centerlines; SkyscraperPage, Manhattan Skyscraper Map; and OpenCityMap, Manhattan

Precedents for ascending, descending and moving through space, are all exemplified in this dense city. For example, Grand Central Station is a hub of public space deeply inter-twined in the underground circulation network of the city, drawing users into a beautiful labyrinth of the underground. Many POPS¹³⁵ are in the form of arcades that invite the public to pass through the dense volume of skyscrapers: 6 1/2th Avenue is such a pedestrian pathway that stretches through the built fabric of 51st to 57th streets. Similarly, the Helmsley building, at the South end of Park Avenue, in Midtown Manhattan, ties into the circulation network drawing traffic through two massive tunnels at its base. Contrastingly, the Highline, in South West Manhattan, hovers above, nestles into the side of, and moves through the spaces of a series of buildings as it carries its users through an unexpected journey above the city. The translations between ground planes, of these projects, cause users to question the act of moving through a city.



Fig. 88. *Left*, Lines below, Grand Central Station, Manhattan, 2015

Fig. 89. *Right*, Hovering above, Highline, Manhattan, 2015

135. Publicly owned private spaces.

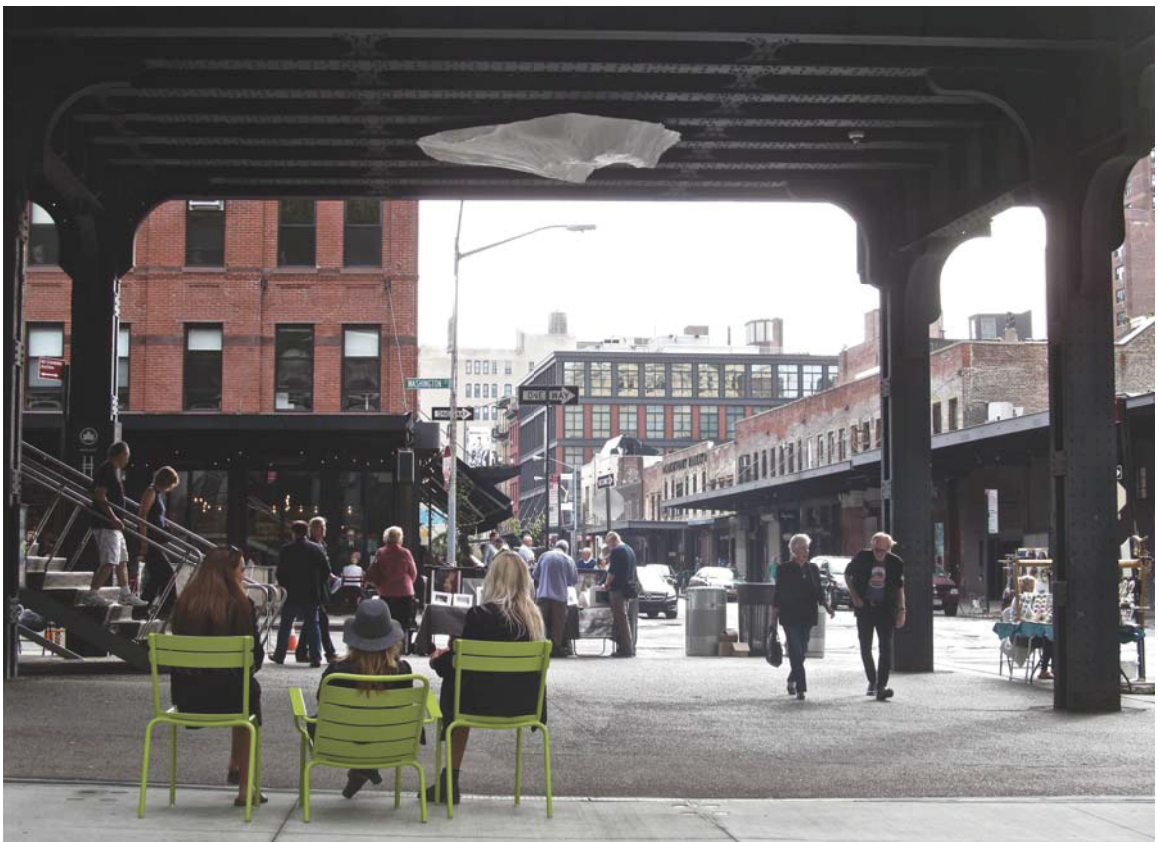


Fig. 90. *Top*, Sliding through, Helmsley Building, Manhattan, 2015

Fig. 91. *Bottom*, Translating between grounds, Highline, Manhattan, 2015

CASE STUDY 2: CHICAGO, ILLINOIS

Chicago's bedrock is submerged deep below a silty soil structure, meaning that many of the city's foundations are floating on grillage, this effect coupled with the flat topology and the city's elevation above the lake level, mean that to drain the grey water and sewage from the city, many of the original sewer lines were built above the surface of the ground. As a response to the geological condition, Chicago's urban core is composed of multiple layers of circulation, which extend across several 'ground' layers: lifting up into the spaces above and plunging into the depths below. The geological base of the city, coupled with its elevation has necessitated the building up of multiple layers of the city. To provide a separation from function-based circulation systems such as freight and train networks, a second ground was built. On this new level, vehicular and pedestrian traffic is invited to move in unison. A metro system then transitions above, through, and below these layers to connect the urban core with the outer neighbourhoods. Sliding through, around, and below, buildings, the metro, vehicular and pedestrian networks create a web of carefully integrated circulation through the dense urban core. The *multiple grounds* section begins to knit together some of Chicago's circulation layers.

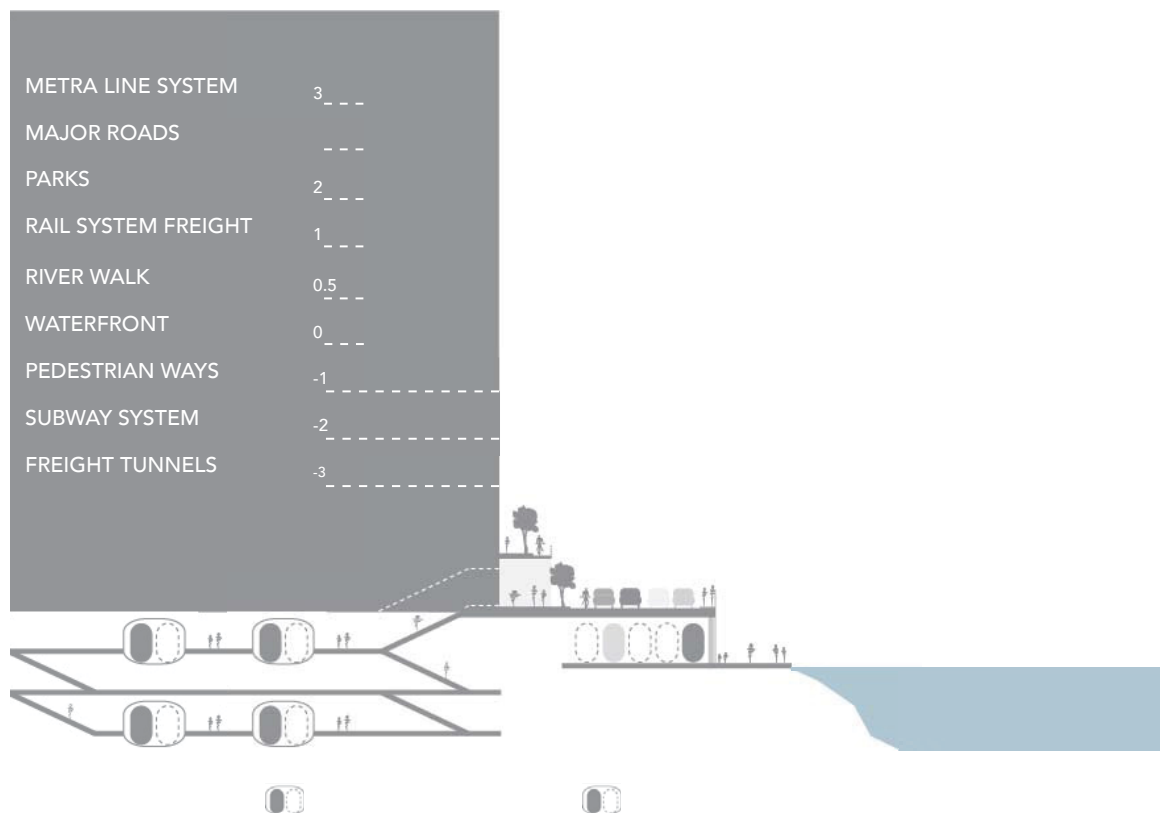


Fig. 92. Multiple grounds, sectional diagram demonstrating the vertical layering of Chicago



Fig. 93. Map of Chicago, *Urban Circulation: Where Horizontal Meets Vertical*, 1:25,000 nts, demonstrating the intersection of major circulation arteries with common space and towers in the urban environment; map incorporates shapefile data from City of Chicago, building footprints, major streets, parks, pedestrian streets, rail lines, waterways, metra lines, railroads, sidewalks, pedway routes, open spaces, parks, industrial corridors; SkyscraperPage, *Chicago Skyscraper Map*; and Jackson, *System Map 1902*

By exploring the extents of the subterranean world of Chicago's subway and freight tunnel systems, I have begun to understand how the complex layering of the urban core was done and why. The area of the Loop was developed to maintain a condensed urban core, where all of the major systems of the city could come together. By densifying this centralized core, they intended to mitigate sprawl. However, as the Chicago expanded outwards the city needed to revitalize the Loop area by redesigning spaces such as the Riverwalk area – to celebrate and add a new layer of circulation to this space.

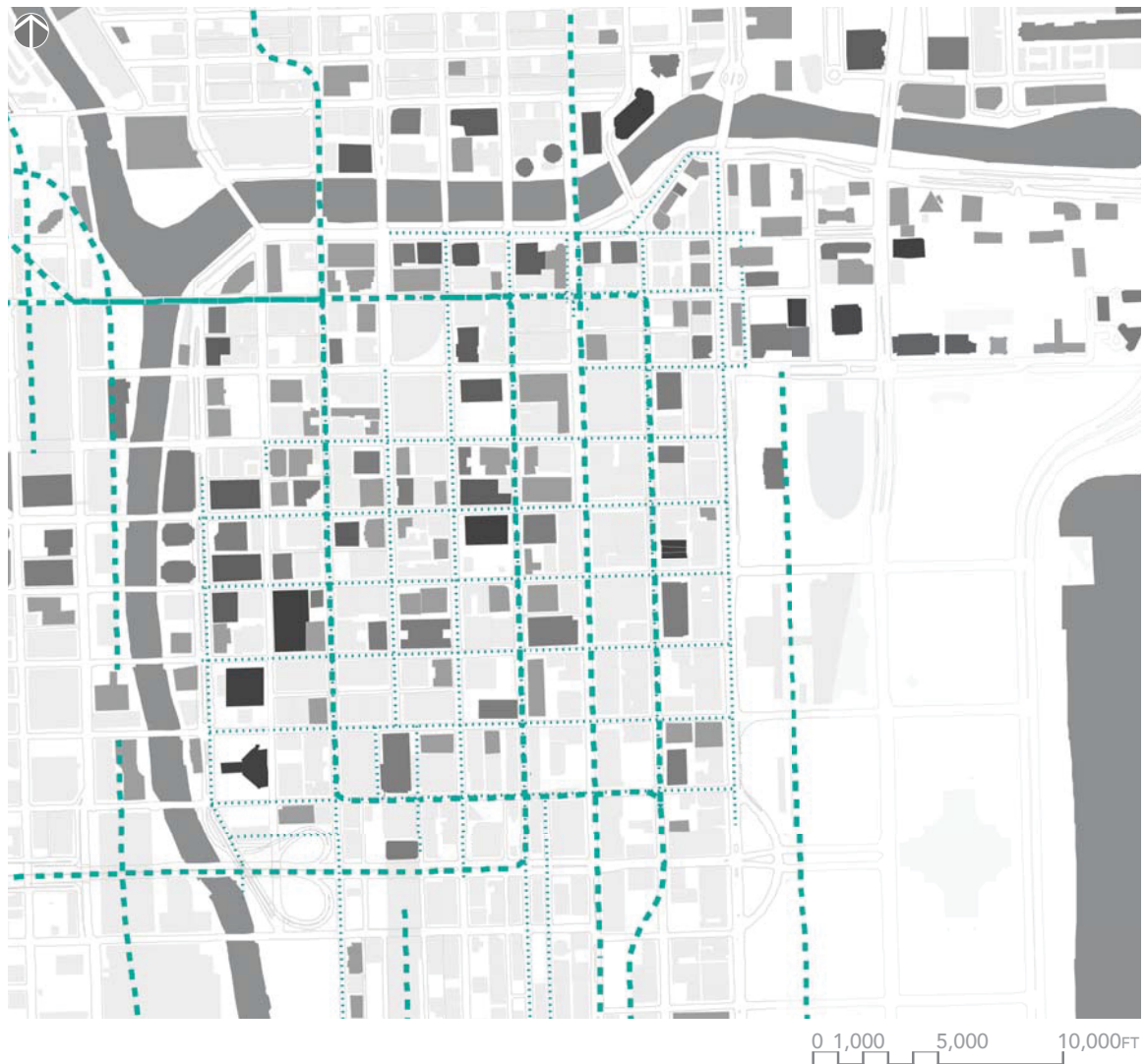


Fig. 94. *Layers of Circulation in the Loop*, the submerged metro system (heavy dashed teal circulates around the Chicago's urban core (known as the Loop), a complex tunnel system weaves the building fabric together below the streets and metro lines, shifting freight along a historic box car rail system (shown in dotted teal), 1:10,000 nts; map incorporates shapefile data from City of Chicago, *building footprints, major streets, parks, pedestrian streets, rail lines, waterways, metra lines, railroads, sidewalks, pedway routes, open spaces, parks, industrial corridors*; SkyscraperPage, *Chicago Skyscraper Map*; and Jackson, *System Map 1902*

Similarly, Chicago's public pedestrian system (shown in orange), has the capacity of linking multiple levels and blocks of the urban core neighbourhood to the building fabric and circulation network. This system is used to mitigate the harshness of environmental conditions such as wind, rain and temperature drops for those moving through the city, inviting users to transition through the Chicago's multiple ground levels. By enhancing the experience of this circulation, more people are propelled to use it. The short cuts also speed up the movement between buildings, and make the experience of moving through many blocks less daunting.

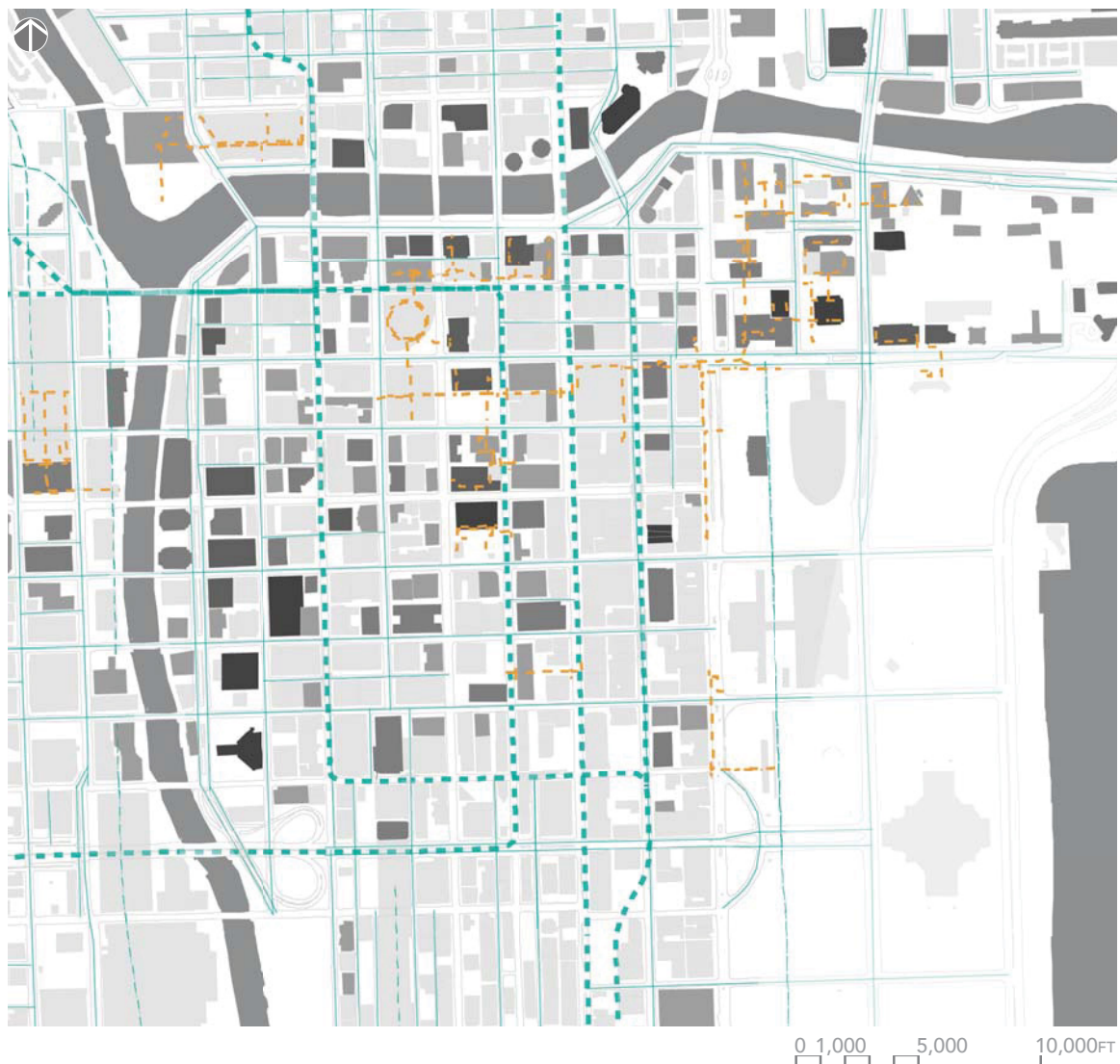


Fig. 95. *Layers of Inhabitation*, pedestrian network (orange) connecting the building fabric (grey) and the submerged circulation system (pale dashed teal), 1:10,000 nts; map incorporates shapefile data from City of Chicago, *building footprints, major streets, parks, pedestrian streets, rail lines, waterways, metra lines, railroads, sidewalks, pedway routes, open spaces, parks, industrial corridors*; SkyscraperPage, *Chicago Skyscraper Map*; and Jackson, *System Map 1902*

CASE STUDY 3: VANCOUVER, BRITISH COLUMBIA

The multi-level elements of Vancouver, British Columbia, are much more subtle than those of the vast Manhattan and Chicago networks. This city's composition and proximity along the coast has provided a lot of space to extend horizontally. Recently, the urban core has undergone an under haul and experienced regeneration.¹³⁶ As a city that is undergoing a dense urbanization of its core, the City of Vancouver was selected as a contrasting case study demonstrating a smaller scaled urban condition. While the towers do not compare in height to the skyscrapers of Manhattan or Chicago, these immersing towers are imparting a questionable sense of connectivity in relation to the rest of the city. Behind the typically reflective glass facades of the high-rises lie a predominance of repetitive floor plates. (A design strategy that has been a fundamental aspect of the history of tower construction and is exemplified in residential high-rises such as Mies van der Rohe's Lake Shore Drive Apartments, in Chicago, which have fine tuned the layouts to maximize rentable floor space and limit the translation of circulation space in the vertical domain.) These "planes of isolation" limit interaction within the individual floors and are completely separated from the life of the city below, causing a loss of context and a lost sense of place.¹³⁷

In terms of connectivity, Vancouver's circulation system also boasts metro lines that dive under the city, and float above the highway systems, however the buildings do not integrate with this fluctuating circulation web in the same way as Manhattan and Chicago's architecture has done. As the city continues to densify these types of conditions will quite likely occur. There are some underground passageways, connecting metro-line systems, but they are limited to the historic downtown core. By embedding interstitial common places in the vertical fabric early in the city's development, the core will be able to grow over time into a complex environment that can maintain ideas of interactive, connected common spaces throughout.

While the city of Vancouver is wrapped by green spaces, the recent development of residential towers in the Downtown and Yaletown district, have created a density that

136. As the spaces of shipping have regressed and been shifted both North-East, and South away from the central core, to provide more room for the residential and commercial purposes who wish to be established centrally.

137. Woods, *Building for People*, 208. 'Plane of Isolation' as termed by Shadrach Woods and Candilis Josic Woods in their design methodology for the Free University of Berlin.



Fig. 96. Map of Vancouver, *Urban Circulation: Where Horizontal Meets Vertical*, 1:25,000 nts, demonstrating the intersection of major circulation arteries with common space and towers in the urban environment; map incorporates shapefile data from District of North Vancouver, *bike routes, lot lines, building footprints, islands, lakes, parks, railway, roads, rivers, vehicle bridges, trails for public use*; Natural Resources Canada, *National Road Network, National Railway Network*; City of Vancouver, *city streets, bikeways, building footprints, property information data, greenway, parks, railway, rapid transit, shoreline*; OpenStreetMap, *Vancouver*; White, *Vancouver Building Heights Map*; and SkyscraperPage, *Vancouver Skyscraper Map*

is not reflected by a plural provision of common spaces to reflect the impact of the ever growing urban core. The Map of Vancouver reflects the height of the skyscrapers in relation to the rest of the building fabric and circulation network. The Age Map, a comparative analysis, explores the abundance of new construction and demonstrates how much of this has taken the form of high-rises. Of the towers identified in the Map of Vancouver, the Vancouver Age Map isolates the high-rise buildings that have been built since 1990



Fig. 97. Map of Vancouver, *Verticality in the System*, 1:10,000 nts, contextualizing the vertical circulation of towers within the horizontal web of circulation in Downtown, Vancouver and Yaletown; map incorporates shapefile data from District of North Vancouver, *bike routes, lot lines, building footprints, islands, lakes, parks, railway, roads, rivers, vehicle bridges, trails for public use*; Natural Resources Canada, *National Road Network, National Railway Network*; City of Vancouver, *city streets, bikeways, building footprints, property information data, greenway, parks, railway, rapid transit, shoreline*; OpenStreetMap, *Vancouver*, 2016. White, *Vancouver Building Heights Map*; and SkyscraperPage, *Vancouver Skyscraper Map*

(in blue), leaving the older towers (in grey) and compares these to skyscrapers that are currently under construction, proposed, or recently completed (in the form of purple circles).¹³⁸ This map demonstrates how verticality is greatly influencing and densifying our cities. Therefore, developing a method for providing adequate common space in the urban core is an essential contribution that needs to be factored in.

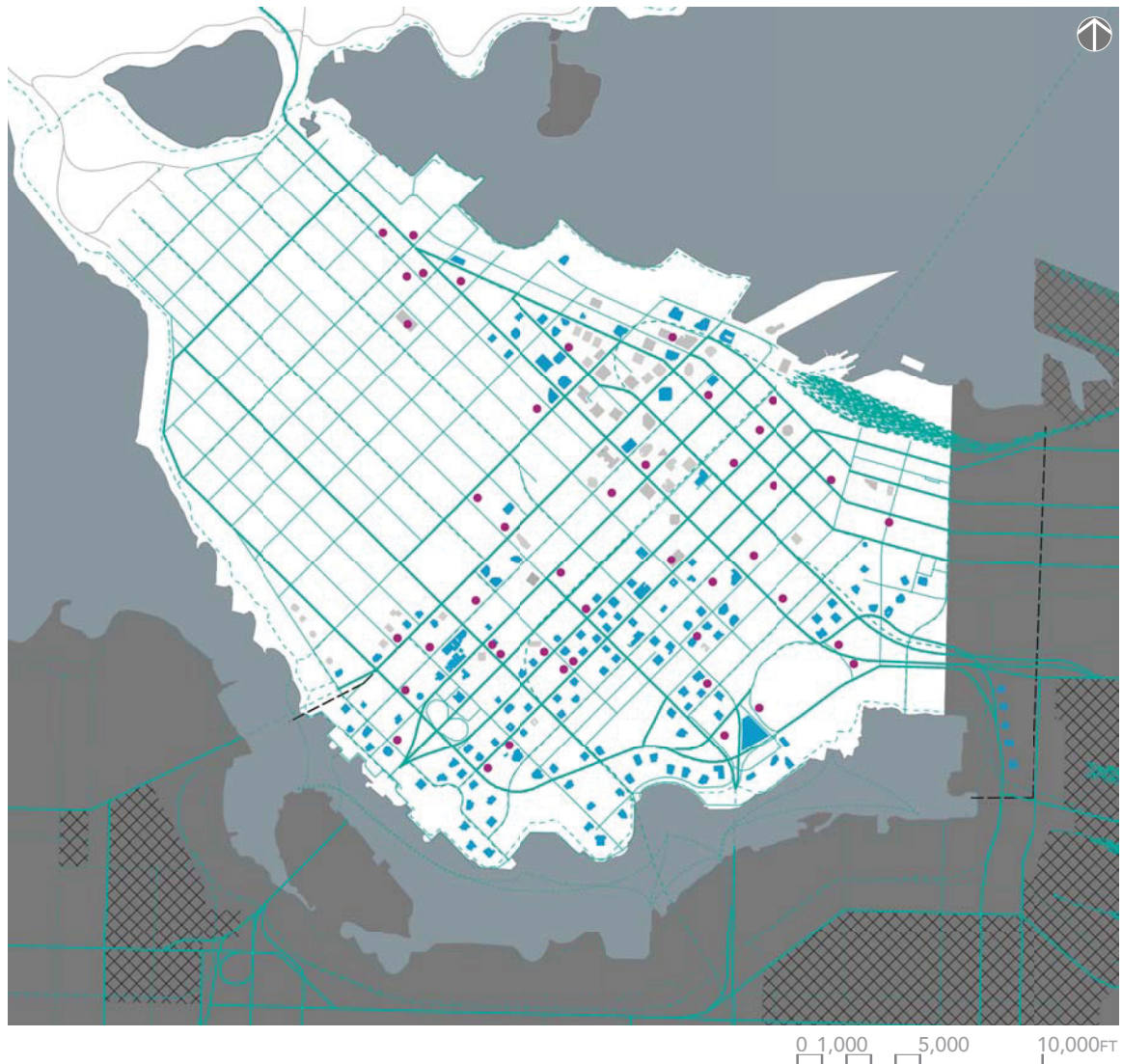


Fig. 98. Map of Vancouver, *Horizontal Path-Node Study*, 1:10,000 nts, identifying the intersection of horizontal and vertical circulation patterns in the urban environment; map incorporates shapefile data from District of North Vancouver, *bike routes, lot lines, building footprints, islands, lakes, parks, railway, roads, rivers, vehicle bridges, trails for public use*; Natural Resources Canada, *National Road Network, National Railway Network*; City of Vancouver, *city streets, bikeways, building footprints, property information data, greenway, parks, railway, rapid transit, shoreline*; OpenStreetMap, *Vancouver*; White, *Vancouver Building Heights Map*; SkyscraperPage, *Vancouver Skyscraper Map*; and Skyriscities, *Map of Vancouver*

138. Skyriscities, "Map of Vancouver," accessed February 20, 2017, <<http://vancouver.skyriscities.com/map/>>.

5.2 TOWER AS A TOOL

The topic of towers has long been a debate. Over the course of history, as cities densified, and building construction evolved to answer it, new tower typologies emerged to collectively inhabit the large groups of people that flow to the cities, in search of work in offices and within industries. However as these towers proliferated, the question became what is the best form and type of a tower?

TYPICAL TOWER TYPOLOGIES

Drawing from the urban analysis case studies, of the cities of Manhattan, Chicago and Vancouver in the previous section, typical tower typologies were devised in an attempt to comprehend how the mapped vertical range of towers were represented in section (as illustrated on the following page). The typical tower typologies for the cities of Manhattan, Chicago, and Vancouver were diagrammed to show how they function in section. As a selection, they range in height: with the Manhattan tower rising 63 floors from the ground; the Chicago tower rising 51 levels; and the Vancouver high-rise climbing 38 floors. With foundations embedded deep into the earth, Manhattan skyscrapers soar high into the sky, stepping back from the street line at intervals, in response to the *1916 Zoning Bylaw*.¹³⁹ Comparatively, the Chicago skyscrapers maintain a slightly different relationship with the ground plane. Resting on grillage-style foundations, the towers float in the silty subsoil of the city. As a response to this, layers of the city have grown up around the towers, meaning that the towers are provided with multiple the ground planes. These levels are often met with platform style bases, similar to the Vancouver tower typology, from which thin vertical piers immerge, reaching up into the sky. Tying into the multi-layered circulation network, the Chicago tower typology has many methods to negotiate with the different modes of traffic. For example, freight can reach the towers from lower levels, the subway system runs below many of the towers, and pedway systems negotiate spaces trough, below and above these many ground planes. Finally, the Vancouver tower typology is known for its platform base, which rises five stories up from the street, in an effort to maintain a human scale, before rising skyward. While the concept of a five story platform is not as alarming as moving past a tower rising fifty stories, directly into the air, this division

139. New York City Planning Commission, *Zoning Handbook*.

of levels is not as “human scaled” as it is intended to be. As a pedestrian, three levels is a better tier to begin to step back the facade of a high-rise – a rooftop deck could be positioned at this level to begin to draw the public higher into the vertical domain, activating interaction between the buildings and the street below. In each of these three tower typologies, vertical circulation is limited to a linear vertebrae of movement, isolated within the confines of elevator shafts and fire stairs, rising through the dense masses of the repetitive floor plates.

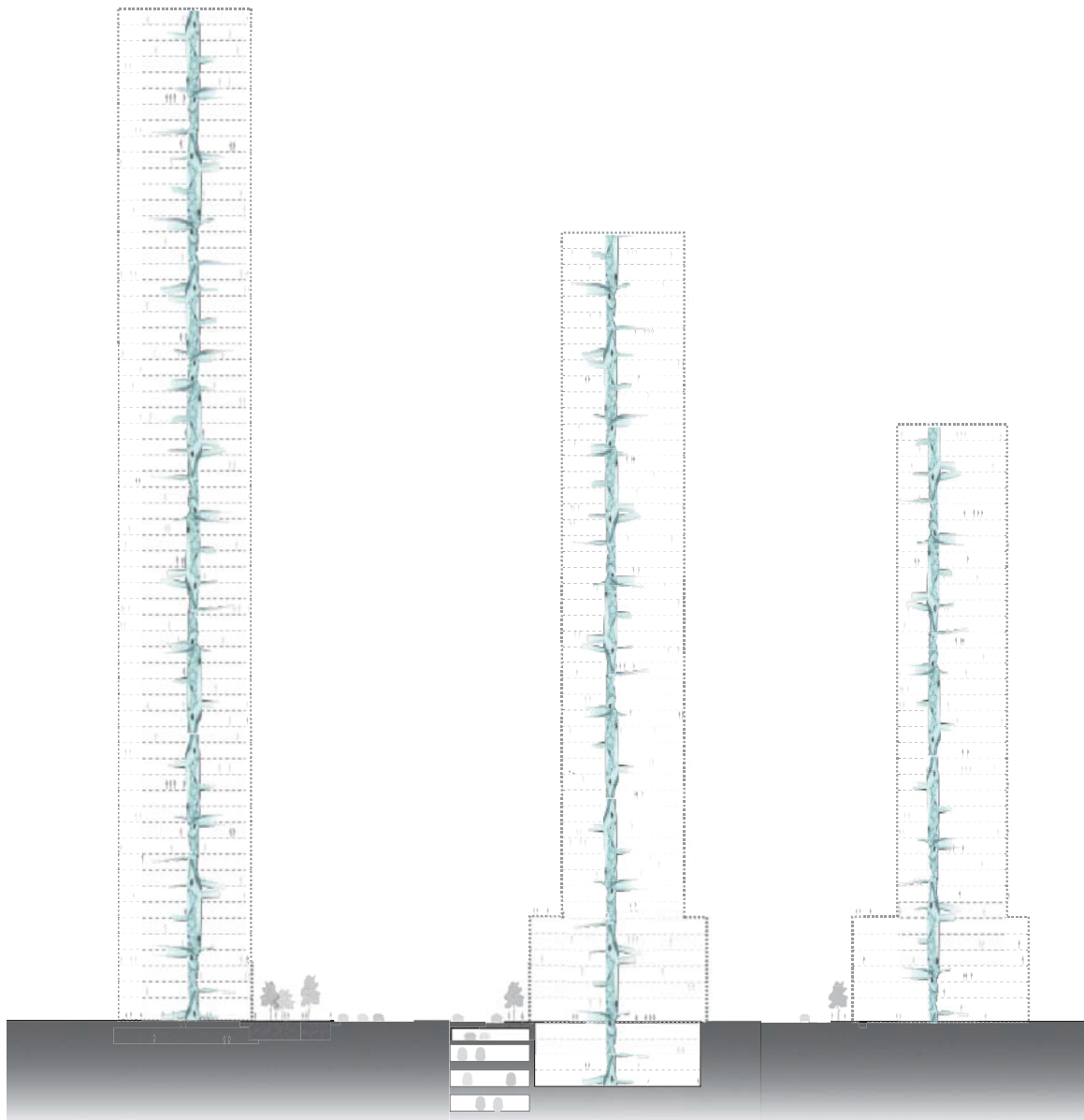


Fig. 99. *Left to right*, Typical tower typologies: for Manhattan, Chicago and Vancouver; the vertical circulation systems are represented as a vertebrae of movement connecting the isolated floor plates of each tower

THE LIMITS OF VERTICALITY

I would like to argue that the typical tower as a typology of repetitive floor plates, creates an environment of disconnection, where as users move vertically through space, they could arrive at level *anywhere*. I think, as Lynch suggests, architecture should respond to this problem, by providing “distinctive and legible environment[s ... which] not only [offer] security but also [heighten] the potential depth and intensity of [the] human experience,”¹⁴⁰ by providing a sense of place, unique in nature, that can respond to the users at a personal scale. The reconsidered tower typology would thus propose that a tower can be a tool that provides a way to get to know your city, rather than an instrument of individual isolation. The vertical journey would provide places to stop, pause, and contemplate the connectivity of life in the building and relationship to the city, within which it is embedded. As an individual example, the proposal would act as a place marker designating how a tower could unite and celebrate the coming together of the occupants of a city at a multiplicity of scales. Contrastingly, as a system of vertical journeys the inhabitation of high-rises would strength the three dimensionality of each city’s circulation system within the building fabric, weaving public space up into the private realms above, and connecting the city as a whole.

Like the designers of the Free University, in Berlin, I believe that towers have the problem of isolating people so that they have minimal if no relationship to the outside world. They have called this situation a *plane of isolation*, the segregation that naturally occurs due to the floor plates lack of cross-interaction isolates Floor #ML from those not only closest to it, but also those of farther proximity; “the relationship from one floor to another is tenuous, almost fortuitous, [and passed through only in] the space machine lift.”¹⁴¹ For the Free University, their cure was a “ground-scraper” where the “organization [offered] greater possibilities of community and exchange [because they could be] present without necessarily sacrificing any tranquility.”¹⁴²

Activating the Vertical City has explored a series of towers and buildings, which have proposed alternative methods of breaking up the monotony of repetitive floor plates.

140. Lynch, *The Image of the City*, 5.

141. Woods, *Building for People*, 208.

142. Ibid.

These case studies have been analyzed to establish a series of concepts that can be drawn forward. One of the key solutions lies in the connectivity method to invite users vertically through levels: this can happen as an atrium space that visually connects users to the subsequent series of spaces and embeds voids that pierce through multiple floor plates; it can also be achieved by inclining floor planes to gently carry users through a building. (Examples of connectivity through circulation are explored in Chapter 5.5 *Circulation Methods: Internal vs. External: Connectivity Through Circulation*).

TOPOLOGY VS. TYPICAL PLAN

Rem Koolhaas describes the *typical plan* as "empty as possible."¹⁴³ It is the definition of atapos: placeless in its character, design and layout: the anti-place. This thesis searches for methods to renegotiate the perception of towers as a series of sub-divided floor plates, and searches for ways to embed the ideas of space and place into the vertical. Koolhaas best identifies the urban vertical-disconnect in the form of the *typical plan*:

Concentrations of [the] *typical plan* have produced the skyscraper: [an] unstable monolith; accumulations of skyscrapers, the only "new" urban condition: downtown, defined by sheer quantity rather than as a specific formal configuration. The center is no longer unique but universal, no longer a place but a condition. Practically immune to local variation, [the] *typical plan* has made the city unrecognizable, an unidentifiable object. The *typical plan* is a quantum leap that provokes a conceptual leap: an absence of content in quantities that overwhelm, or simply pre-empt, intellectual speculation.¹⁴⁴

If this thesis considers the *typical plan* as the source of the grand lobotomy that is segregating the levels of public and private realms.¹⁴⁵ Then topology is the answer: the gradual alteration of spaces, or floor plates, to provide a sense of uniqueness and place within each of these layered vertical blocks. Topology instigates through an alteration of the space in-between. Theoretically, basic units can remain similar if where they meet one another has a variability. The public realm, the inner street, must provide such a space for individual communities, cross overs, and the unplanned fun of daily life to occur.

143. Koolhaas, *S,M,L,XL*, 344.

144. *Ibid.*, 345.

145. *Ibid.*, 335–50.

5.3 TYPOLOGIES OF A TOWER

TPOLOGIES OF TOWER CIRCULATION AND CONNECTIVITY

Four basic tower forms already exist, *Activating the Vertical City* seeks to derive the *Tower 5* typology. For example, *Tower 1*, consists of basic floor plates with an internal core facilitating movement through the center. The vertical disjointedness between floor plates is akin to a lobotomy, where each level is severed from those in close proximity, rendering it a floating element in space, disconnected from the rest. While, towers two and three represent alternative circulation methods. *Tower 2*, has an internal atrium, providing internal circulation, and inversely, *Tower 3* uses an external atrium, creating external circulation.¹⁴⁶ *Tower 4*, uses a slightly different approach. Here internal spaces are created in the form of volumes negotiating and carving space out of the density of the basic tower. This disturbance facilitates movement, be it air, electricity, or people, between the floor plates and introduces the idea of connection between the horizontal planes. *Tower 5* is an amalgamation of the four basic forms. (T1+2+3+4 = T5). This typology will be derived by this thesis, exploring an alternative negotiation of vertical translations, to consider how the activation and programmatic engagement can connect space to create place.

The proposed typology *Tower 5* explored through *objet-type*, in Chapter 8, is quite similar to that of *Tower 4*. This is due to the fact that the meandering vertical streets carve out volumes of the building to embed common space within the building fabric, while simultaneously weaving the spaces together through visual, tactile, and programmatic connectivity. The *Tower 5* *objet-type* also utilizes the atrium approaches of both tower typologies 2 and 3, in an effort to enhance visual connectivity throughout the system. These reconsidered volumes also include otherwise ignored areas, such as the fire stair and roof, in an effort to embed life into them – creating place in space.

Within the five tower forms are other sub-delineations of programmatic space: for example, high-rises can be single use towers, multi-use towers or hybrids. Adding to this logic, I would like to add to Andres Duany and Elizabeth Plater-Zyberk's list of New Urbanism systems, giving them each typologies which fit into the previous descriptions.

146. The atriums tend to work in tandem with a solar chimney system, collecting exhaust heat/ air and shifting it naturally through the building.

Meaning that single use towers are districts, and as such require corridors to link them to the outdoors and the rest of the city. Following this reasoning, multi-use towers are akin to neighbourhoods, because they can “balance a mix of human activity.”¹⁴⁷

TYOLOGIES OF TOWER PROGRAMMING

As aforementioned, high-rise buildings can be separated into single-use and mixed-use towers. Single-use towers typically consists of purely residential or purely office towers; while mixed-use will begin to home a variety of types of programmes – such as residential, commercial, offices, and entertainment. The problem I see with the existing typologies is that by grouping programmes together, these user groups do not mix to provide activated environments. Instead they remain isolated in their massive volumes. For instance, single-use commercial office towers create vast blank spaces on the city fabric: through out the week day they are animated, but by night become atapos, placeless zones of disuse. This stale inactivity blurs the quality of life in the city. Residential towers also have a similar effect, during the evening they are alive with activity, how ever during the day they become quite quiet. Contrastingly, mixed-use high-rises begin to meld programmes in one building, but this strategy is typically applied in a layered effect – with the bottom floors composed of commercial, or office spaces, and the higher floors negotiated as residential. While this begins to activate the ground plane of the city, it does nothing to remedy the vertical sub-divide of building uses.

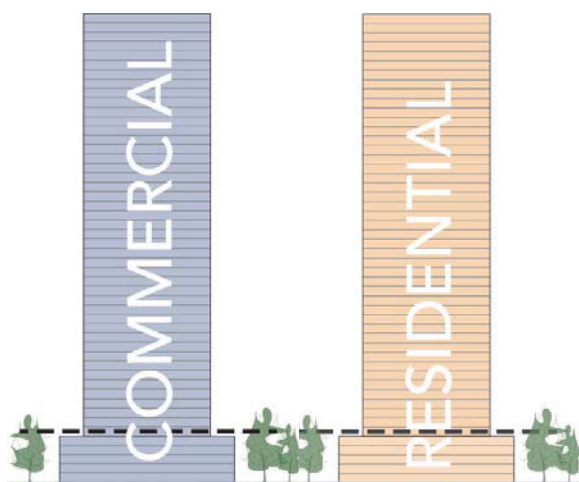


Fig. 100. Single-use programming



Fig. 101. Mixed-use programming

147. Peter Katz, *The New Urbanism: Toward an Architecture of Community* (New York: McGraw-Hill, 1994), xvii.

Therefore to begin to negotiate these problems and infuse the towers with interchange, we can take principles from New Urbanism and apply them to the vertical environments. In *The New Urbanism*, by Peter Katz, Andres Duany and Elizabeth Plater-Zyberk, have established an elemental approach to examining the principles of New Urbanism. According to their elemental list of urban systems: *neighbourhoods* can be defined as “urbanized areas with a balanced mix of human activity; [while] *districts* are areas dominated by a single activity.”¹⁴⁸ *Corridors* on the other hand, act as “connectors and separators of [individual] neighbourhoods and districts.”¹⁴⁹

I propose to add two high-rise typologies to these systems: *single-use* and *mixed-use* towers. *Single-use towers* should be considered equivalent to *districts*, because they too are dominated by a singular activity, that require corridors to link them to the outdoors and the rest of the city.¹⁵⁰ Following this logic, *mixed-use towers* are akin to *neighbourhoods*, as they “balance a mix of human activity.”¹⁵¹ By relating them in this way, we can consider their how the internal distribution of their programmes affect the entire volume. [If you flip the towers on their side and consider them in plan, the distribution of programmatic zoning becomes more apparent.] As vertical neighbourhoods, *mixed-use towers* need to spread their programming throughout the entire building – it cannot be limited to layering the commercial and office volumes at the base, because this creates large inactivated zones.



Fig. 102. Single-use programming, showing the isolation, in plan; based on Katz, *The New Urbanism*



Fig. 103. Mixed-use programming, showing how layers create unactivated zones, in plan; based on Katz, *The New Urbanism*

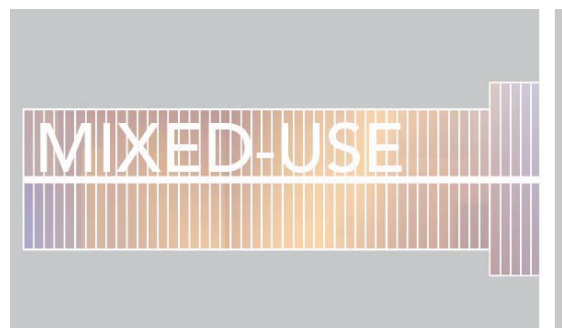
148. Andres Duany and Elizabeth Plater-Zyberk, introduction in *The New Urbanism: Toward an Architecture of Community*, by Peter Katz (New York: McGraw-Hill, 1994), xvii.

149. Ibid.

150. Ibid.

151. Ibid.

Fig. 104. Mixed-use programming, spectrum approach, demonstrating an activated vertical neighbourhood, in plan; based on Katz, *The New Urbanism*



To combat this issue, ideas like the spectrum programme technique can be applied to mixed-use towers, to meld programme types and activate the spaces. By combining and overlapping multiple functions vertically through a tower, there are more opportunities for different types of programmes to meet, interact and activate the spaces between each other: creating diversity in the system.

PROGRAMME TYPOLOGIES

There are two main methods to applying programme to a building: these include the *layered* and *spectrum techniques*. The layered approach tends to segregate programme to divisible layers, while spectrum allows one programme to activate the other surrounding ones. For example a city street utilizes a variety of different building activities to keep it inhabited throughout different times of the day, night and weekend. By moving through different types of programmes, the edges between street and the programme become more engaged because each responds differently to the edge as they come in contact,

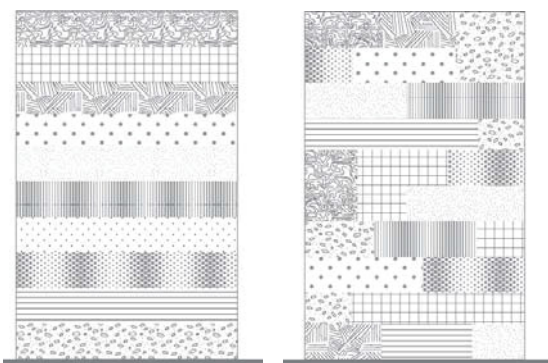


Fig. 105. *Left*, Layered programming
Fig. 106. *Middle*, Spectrum programming

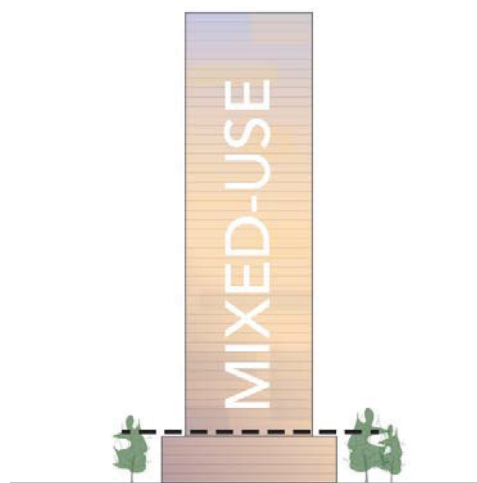


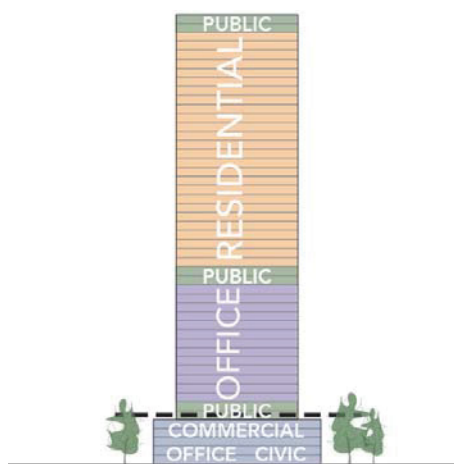
Fig.107. *Right*, Mixed-use programming, spectrum technique, demonstrating an activated vertical neighbourhood, in section

overlap, and blend. This thesis will explore the possibilities of the spectrum approach, in mixed-use high-rises, as it offers the most engagement between different types of programmes and offers variety in terms of vertical translations through space.

HYBRID BUILDING TYPOLOGIES

Similarly, hybrid buildings begin to touch on these ideas of filtering different programmes through individual buildings.¹⁵² The intention of this strategy is to impose elements of porosity to invite public pedestrian oriented places into the volume and create connectivity through out the horizontal and vertical fabric of the city.¹⁵³ The thesis project could be classified as a *vertical hybrid* because its “functions are joined by superposition,” as well as through circulation and other connectivity systems.¹⁵⁴ There are several methods of superposition to consider in hybrid design, because the way in which they are implemented will affect the neighbouring environments.

Fig. 108. Mixed-use hybrid programming, using layered technique (stratifying) with intermittent common levels; based on a+t research group, *This is Hybrid*



Many hybrid buildings use the stratifying technique of layering different programmes one on top of another, while intermittently establishing public terraces, a commercial podium, or plaza levels between programme zones.¹⁵⁵ These plazas act as buffer zones between

152. a+t research group, *This is Hybrid*.

153. Ibid., 9. Referencing Steven Holl, prologue in *Hybrid Buildings* January 4, 2011.

154. Ibid., 45. Holl differentiates hybrid buildings as follows: “In vertical hybrids, functions are joined by superposition and in horizontal hybrids, by on-floor additions.” Dictionary.com, *Superimpose*, accessed November, 2016, <<http://www.dictionary.com/browse/superimpose>>. Superimpose means to place in the space of another.

155. a+t research group, *This is Hybrid*. The group explores the following case studies relating to hybrid buildings that use the layered programming technique include: the John Hancock Center, in Chicago, by Skidmore, Owings and Merrill, 1970; The Galleria, in New York, by David Specter, in 1975; the Scala Tower, in Copenhagen, Denmark, by BIG, in 2007; 111 First Street, Jersey City, by OMA, in 2006; Tour Signal, in Paris, France, by Jean Nouvel, in 2012; and Tour de la Chapelle, in Paris, France, by Abalos+Sentkiewicz, in 2007.

5.4 CONTRIBUTION TO ARCHITECTURAL CONVERSATION

As an addition to the architectural context, *Activating the Vertical City* is trying to determine whether it is a *vertical hybrid* or a *social condenser*.¹⁵⁹ The idea of *social condenser* “was described by Moisei Ginzburg as a building designed to transform the relationships among citizens in the three areas of the new socialist state: collective housing, clubs and factories.”¹⁶⁰ *Social condensers* were developed as a response to the constructivist movement, and their goal was to achieve a self-sufficient state “that can isolate itself from the conventional city.”¹⁶¹ By becoming complete in and of themselves, *social condensers* do not require the context within which they are embedded, and while this is an interesting device, it is not what the thesis is searching to do. It is in effect, searching for the polar opposite. While, it wishes to create community within its confines, it also wants to connect to the city networks beyond, to draw the public in and create lively environments that catalyze ascent into the vertical domains. The answer to situating the thesis can be found in the following quote: “While the condenser concentrated all of its transformation capacity on the members of a closed community, – the inhabitants of communal housing, club members, factory workers – the hybrid opened up to the city and encouraged contact among strangers, intensified land use, densifying relationships and left room for indetermination, as opposed to the control that the condenser imposed.”¹⁶² So, as a wish to connect the urban fabric with the enclosed layers of the vertical neighbourhoods above, *Activating the Vertical City*, will be considered as a thesis proposing a *vertical hybrid* building that carefully integrates programmatic functions with the intent of creating activated public places in the spaces in-between. To achieve this, the *vertical hybrid* design is to be inclusive with, and connected to, the internal and surrounding urban fabric. Further more, it will be achieved by creating a mixed-use environment using the spectrum approach of inter-layered programmes.

159. Ibid., 50, 83. A vertical hybrid example is the Tour Porte de la Chapelle, by Ábalos and Sentkiewicz Arquitectos, in Paris, 2007; while Park Hill, in Sheffield, 1959 is a social condenser. Le Corbusier’s Unité d’Habitation could also be a social condenser.

160. Ibid., 48. Original Ginzburg quote from Leonardo Benevolo. ‘Historia de la arquitectura moderna.’ (Barcelona: Gustavo Gili, 1977), 592–600.

161. Ibid., 55.

162. Ibid., 52. “... As far as relationships are concerned, in the hybrid they are established outside of the domestic area, while in the condenser, they go into the private realm up to the bedroom door.”

5.5 CIRCULATION METHODS: INTERNAL VS. EXTERNAL

Circulation patterns through spaces are very interesting in the variety that can occur: in towers there are two predominant typologies: internal and external networks. This section, will focus first on the *elevated street* as an internalized and externalized corridor system, examining how units relate to these common spaces; it will then expand on alternative methods to enhance vertical and horizontal connectivity.

THE ELEVATED STREET

The idea of the *elevated street* has been explored in depth in the designs of Le Corbusier and Peter and Alison Smithson. In both of their projects they explored ways of changing the perception of corridor space to an elevated communal street environment, where residents would have sufficient space to interact, and where elements of their lives would be invited to spill out into this shared space. Le Corbusier used this method, in the Unité d'Habitation, as an *internally elevated street* that united the residents by physically wrapping their interchanging two-story units around the volume of the street – this was achieved by floating the connective artery amidst the residential units of each floor.

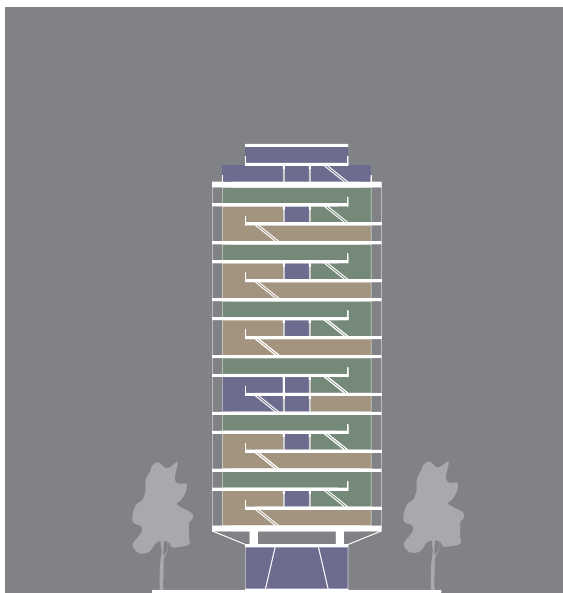


Fig. 110. Unité d'Habitation's wrapping units hold the elevated internal streets; diagram based on StudyBlue, *Unité d'Habitation*

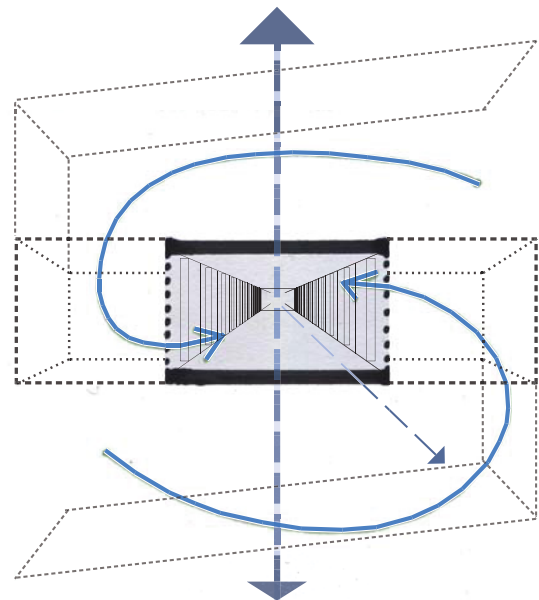


Fig. 111. Internal elevated street; based on Le Corbusier, *Unité d'Habitation*

Developed with the intent of diminishing urban sprawl, Le Corbusier's response to the *disappearing street*, has been made manifest in l'Unité d'Habitation as an approach to living in a community of layered inward-looking neighbourhoods in the air.¹⁶³ Here, he has treated the corridors as internally elevated streets. By doing so, he has tried to change the way buildings are used and considered. The Unité d'Habitation cultivates multiple levels of community, through a notion of coloured neighbourhoods, that envelope the elevated streets. The entrances are individually painted to reflect the exterior colour of each unit, and act as a way-finding device on each level internally and externally. The inhabitants are invited up into these spaces where skilfully scaled thresholds address and invite communication between units.

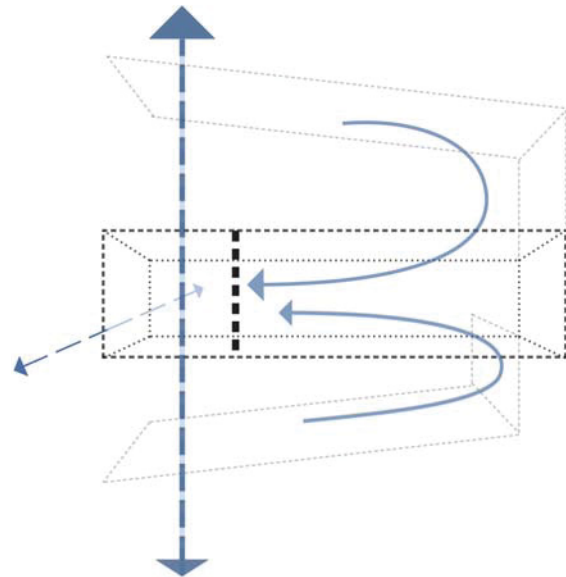


Fig. 112. External elevated street;
based on Smithson,
Robin Hood Gardens

The Brutalist architecture of Peter and Alison Smithson's Robin Hood Gardens is also a proposed form of multi-level social housing. Like the Unité d'Habitation, they have also provided an elevated common street on each third floor to connect the units with the outdoors. However, unlike l'Unité d'Habitation, the Smithson's corridor is an *external street* where people can gather and children can play in the sunshine. The importance of this *street in the sky* that overlooks the garden, is that it provides a "new neighbourhood street" for these housing units. The complex is composed of ten-story and seven-story buildings, housing 213 people in one and two-story apartments, which open onto the singly-loaded elevated streets. Both of the Robin Hood buildings also curve inwards, in a concave form, to provide users with a sense of being part of a neighbourhood. This

163. Sbriglio, *Le Corbusier*, 44. Quote from Le Corbusier.

arrangement permits visual connection between units; however, subsequently, the responding rear facade would create isolation, through its convex shape, by eclipsing neighbours from view. This shape study could similarly be applied to interior corridors opening onto an expansive space such as an atrium.

CONNECTIVITY THROUGH CIRCULATION

There are several other methods of transforming and enhancing connectivity in circulation spaces: these include atriums, voids, inhabiting the edge, transformed floor plates, walkways, the journey, and elevated street environments. Some architects embed atriums,

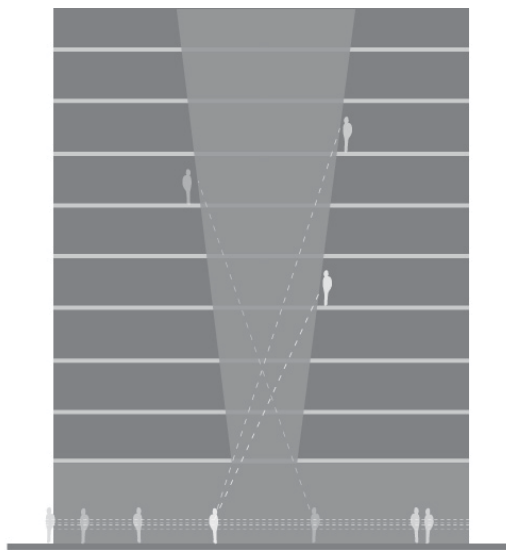


Fig. 113. Visual connectivity through atrium; based on Hadid's Leeza Soho Tower, in Sourceable, *Zaha Hadid Designs World's Tallest Atrium*

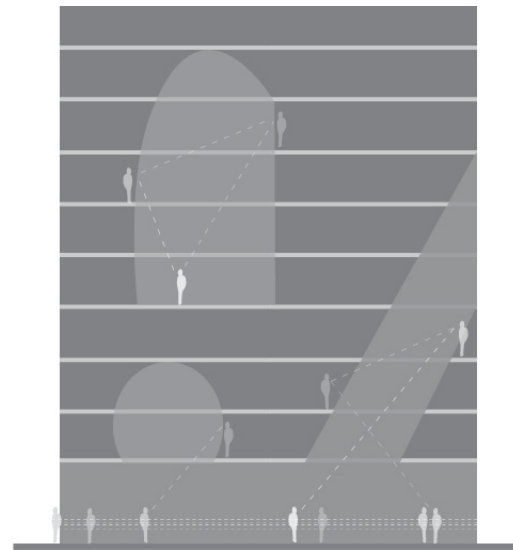


Fig. 114. Visual connectivity through voids; based on Jussieu Library, in Koolhaas, *S,M,L,XL*

as a way of opening up the internal volume of a structure. This can be done in portions of the building or along large vertical sections of the structure.¹⁶⁴ The circulation will then naturally wrap around these volumes, circling up the edges, where the inhabitants are offered different points of view of the architectural spaces and consequently a sense of context in a transforming environment. Atriums¹⁶⁵ are a great way to invite extra space

164. Atrium examples of this nature are explored in Chapter 5.2: *Tower as a Tool*, 81.

165. Spanning 46 floors, Zaha Hadid's Leeza Soho tower, which is under construction, is currently the largest atrium in the world. Leeza Soho's 46 stories also extends an additional 4 levels below ground. The subterranean component is programmatically composed of retail and parking, with a tunnel connecting it to the subway system. This subterranean pedestrian link from the metro leads up through the building to a West facing park. The atrium, that spans the entire height of the tower, instigates the internal circulation to wrap around the core - visually linking vast vertical expanse of the building. This kind of vertically connective point of view is seldom experienced internally.

into buildings, and they are also useful to provide visual connectivity to pass vertically across floor plates – demonstrating a sense of context. The removal of vast volumes can also be done through the reductive technique of systematically carving out voids in the system. The absence of these large volumes of space horizontally and vertically within a building's mass can invite new programmes to visibly penetrate through the volume.¹⁶⁶ Typically circulation will inhabit the hollowed-out areas, as they are understood to connect levels, but they can also be used to draw natural light in.

These ideas of connectivity are exemplified in two scalar examples of atriums: the Beijing Tower and the Nicolas Hayek Center. For example, the Beijing Tower's internal atrium, by Zaha Hadid architects, rises 46 floors and visually connects the sea of inhabitants from a variety of different levels.¹⁶⁷ While this is an extreme example, the architecture of the building none the less connects the users within their environment demonstrating the internal expansiveness, and relates them from whence they came. Contrastingly, the Nicolas G. Hayek Center example, presented by Philip Jodidio, demonstrates how vertical spaces can be divided into multiple large levels and provides a visual link of where the pedestrian is in relation to their context.¹⁶⁸ In this example, a series of layered atriums delineate the space of a twelve story building into three floor intervals, creating zones where users can gather, but also have a visual connection to the other levels in close proximity. The facade of this building, in turn, is fully glazed, so that pedestrians, at street level, can recognize the volumetric division and integration of the buildings' levels before they enter the space, creating visual connectivity and a sense of understanding of the architecture's organization.

Similar to the atrium, void penetrations can slice through a building, expressing porosity through the depth of a building, and linking users with levels above, through and below. Such an opening is present in Herzog and de Meuron's Forum in Barcelona, Spain. The cuts slicing through this building, also filter light into the depths of the building and onto the open ground plane below. Similarly to the embedded void strategy of the Barcelona

166. Refer to buildings such as the Paris Library Competition, OMA - where the absence of voids is used to embed contrasting programme into the system.

167. Sourceable, *Zaha Hadid Designs World's Tallest Atrium*, created October 7, 2015, accessed November 14, 2016, <<https://sourceable.net/zaha-hadid-designs-worlds-tallest-atrium/>>.

168. Philip Jodidio, "Nicolas G. Hayek Center," in *Shigeru Ban: Complete Works 1985 - 2010*, by Philip Jodidio, (Cologne: Taschen, 2010), 413–15. As demonstrated through the case study of the Nicolas G. Hayek Center, in Ginza, Tokyo, Japan.



Fig. 115. Void penetration, visually pierces the mass of the Forum, by Herzog and de Meuron, reflecting light down to the public plaza below, Barcelona, 2012

Forum, the stair in the Diane von Furstenberg Studio invites light into the internal depths of the six-story fashion house by bouncing light down the reflective ephemeral edges of the stairwell. Scaling four consecutive flights, the stair transforms the act of ascending into an experience. By acting both as a device to climb through the building and as a light well, the reflective materiality of the stair's guardrail disperses¹⁶⁹ and reflects light down the shaft – making it an engaging element that waits to be explored. The porosity of the edges invites visual connectivity to relate to the internal programmes that the stair climbs past. Sliding across a double height volume, and then strategically cutting through floors, this explorative link uniquely interacts with each level and offers a variety of types of spaces to the building. For example, the underside of the stair also acts as a contextual device composing spaces of rest under its detailed slopping canopy. An alternative approach is to use these void penetrations as a way of embedding a different type of programme into the space, while simultaneously spanning multiple floors – this method was explored in the Très Grand Bibliothèque Competition, by OMA.¹⁷⁰

169. WORKac, *Diane von Furstenberg Studio Headquarters*, published 2007, accessed January 25, 2017, <<http://work.ac/diane-von-furstenberg-studio-headquarters/>>. The Diane von Furstenberg Studio headquarters was designed by WORKac (Work Architecture Company), and completed in New York, in 2007.

170. Koolhaas, *S,M,L,XL*, 603–61.

Contrastingly, by translating the movement to the exterior, the inhabitants can visually connect themselves to their surroundings. The following projects demonstrate two ways of inhabiting the outer edge: the first utilizes the exterior space of the building, while the second slides into the volume of the double facade. The Campus 2 Apple headquarters,¹⁷¹ by Norman Foster, is a four story office building that has shifted its circulation network to the exterior of the building, allowing the interior to become a core of activity. The glass wrapped corridor zone naturally conditions the air¹⁷² before it reaches the inhabitants in the interior. A problem that shifting movement to the exterior could create is that the natural light is not invited into the depths of the work spaces. Campus 2 has negotiated this by creating a long skinny building that wraps like a thin band through space, ensuring light can enter from both sides.

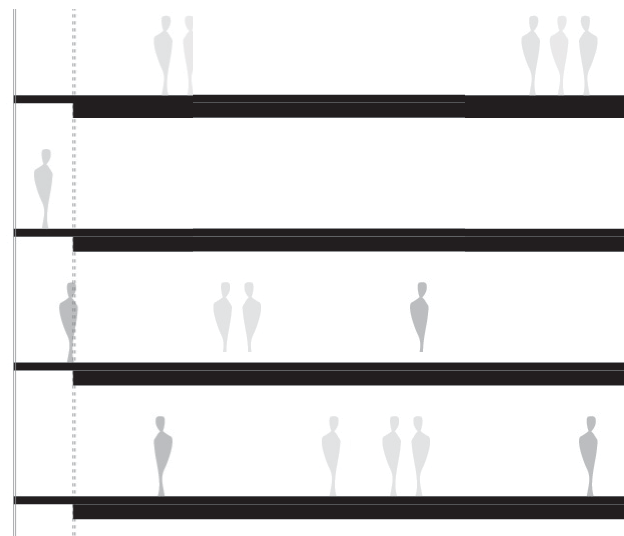


Fig. 116. Inhabitation of an edge; section based on Gensler, *Gensler | The Tower at PNC Plaza*

The Tower at PNC Plaza, by Gensler, explores yet another approach to inhabiting the outer edge. Described as a “building that breathes,” the PNC Plaza Tower’s double facade synonymously operates at several scales of porosity.¹⁷³ The building facade’s vertical

171. Roger Fingas, *Apple Insider, New Apple Campus 2 tour highlights ‘breathing’ concrete, glass panels, power tech & more*, created June 11, 2016, accessed December 15, 2016, <<http://appleinsider.com/articles/16/06/11/new-apple-campus-2-tour-highlights-breathing-concrete-glass-panels-power-tech-more>>. The circular Campus 2 Apple headquarters is located in Cupertino, California, and was designed by Norman Foster and Partners.

172. As the fresh air slides across the surface of the sun-warmed concrete corridor slab, it is conditioned before being drawn into the internal work spaces.

173. Gensler. *Gensler | The Tower at PNC Plaza*, film, created 2015, accessed November 28, 2016, <<http://www.gensler.com/projects/the-tower-at-pnc-plaza?l=featured>>. Paladino and Company, *The Tower at PNC Plaza*, created 2015, accessed November 28, 2016, <<http://www.paladinoandco.com/case-studies/tower-at-pnc-plaza/>>.

rectilinear louvers mechanically open outwards to draw air into the double facade cavity. This space of the in-between is synonymously accessible to the occupants of the building, as a secondary corridor space. This space of translation, through the lungs of the facade, architecturally acts as a walkway or short-cut between the programmed space and the world beyond.

While these systems consider visual connectivity to explore relationships between spaces of the internal and external context, by embedding voids in the system, they do not relate to the physical act of passing from one space to the next. The journey is a tool used by the likes of Alvaro Siza, whose slow unveiling of an architectural journey through a series of spaces provides an embedded sense of understanding: establishing the user's relation to the whole – where a variety of transforming architectural perspectives are provided along the winding path. For example, the Fondation Ibère Camargo, by Siza, tempts users to explore the inclined ramps that pass through the volume of the structure, relating the users to the inside and outside, as they ascend or descend between gallery spaces.¹⁷⁴ The experience of a such a journey can be interpreted as an accumulation of fractured compositions, or points of view, that gradually transform as the inhabitant moves through the architecturally orchestrated series of spaces. This considers the overall experience of the space to be akin to the definition of topological space, discussed in Chapter 1.3: *Mathematics of Place*, and can also be related to the way cubist artists were able to capture the essence of life, movement, and engagement between the viewer and the composition. This was achieved by fracturing the composition's shifting movements and re-assembling it as an entirety of the movement – thereby depicting the subject's essence of life.

In examples such as the Jussieu Library proposal by OMA,¹⁷⁵ inclined sections of floor plates draw users on a journey through the mass of the building. As individuals ascend vertically through the Library, they will discover a series of floor plates that transform from one level to the next, activating the spatial experience of the user. The Kunsthaal, also by OMA, uses a similar approach, sloping the internal street to invite the users on a

174. Kirsten Kiser, ArcSpace, *Ibere Camargo Museum (ICM): Alvaro Siza*, created June 8, 2009, accessed December 28, 2016, <<http://www.arcspace.com/features/alvaro-siza/ibere-camargo-museum-icm/>>.

175. Koolhaas, *S,M,L,XL*, 1304–44. The 2 Bibliothèques Jussieu Competition, by OMA in 1993.

continuously inclined journey, looping up through the programmatic levels of the building, with moments of pause, where the inhabitants are invited to visually reflect upon the way they had come.

Circulation can also be considered as a ribbon flowing through space, as Steven Holl demonstrates. In the *Four Towers in One* competition entry, he rethinks the way we consider the ground by carrying a green space across the surface of an extruded podium, that connects four towers. By climbing up the inclined and undulating surface¹⁷⁶ of the fourth tower, the 'green' surface is drawn from the ground, up to the tower's roof. The inhabitation of this inclined wall demonstrates a way that the public space could be physically drawn up the vertical face of a tower, like a ribbon in space, providing a rich visual cue to the observers. By manipulating the surface and translating the way it meets each level, verticality can become contextualized. Using visual connectivity, the inhabitants are able to see their unique level's interaction with the ribbon facade, from below, and from above by looking back at the undulating surface of the podium below.¹⁷⁷

Considering these many examples of strategies to establish connectivity, they do not necessarily all rule out the monotony of duplicated levels, but begin to represent several methods of beginning to accomplish such a task. The thesis proposal design seeks as a proposal, to continue along this line of inquiry, by developing alternative methods of circulating to provoke connectivity, that is readable from both the exterior and from within, and will act as an invitation to common spaces embedded in the vertical domain. This clarity will be achieved by establishing an understandable logic, such as material continuity or a grid, that permeates horizontally and vertically through the volume of the building.

176. Karen Cilento, Arch Daily, *Four Towers in One Competition / Steven Holl Architects*, published August 8, 2009, accessed January 14, 2017, <<http://www.archdaily.com/31457/four-towers-in-one-competition-steven-holl-architects>>. Holl expands upon Jeanne Gang's Aqua Tower, which utilizes the undulating surface of the facade decks as a moment of connectivity between the residents.

177. Ibid. This elongated rooftop podium is embedded with social programmes and its surface functions as a 'public promenade.'

5.6 EXAMINING THE VERTICAL VERTEBRAE

As described above, there are many ways to embed circulation into a vertical neighbourhood. However, the expansiveness of a tower often needs to be broken down into manageable components to re-establish the human scale.

Beginning with movement, people generally have limits as to how far they will walk: it is therefore very important to factor these in. It is safe to say that the maximum number of levels people would ascend is four consecutive stories. I am thinking about how to diminish the use of elevators in high-rise buildings, because minimal interaction occurs on them. Therefore, if a building was broken into four-level components, users would only need to walk at maximum up two sets of stairs, because they could just as easily descend the same number by going up another stage. A secondary elevator system could then slide to the intermittent floors and the break between floors from the express elevator system can facilitate interaction between people. This would also break up the volume of a tower into smaller more comprehensible chunks, that users can relate to. By making the users interact with specific moments of the building (lift to lift; stair landings; movement down corridors etc...), more passive moments of interaction between the users will be composed. These levels can be characterized as landing levels, which become the spaces of connectivity occurring every four-floors; and inner levels, which operate at a lower degree of intense movement.

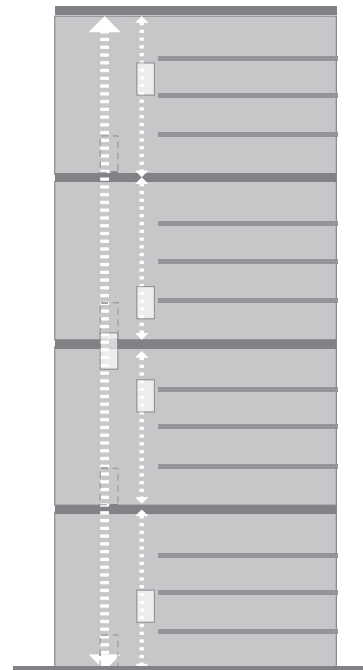


Fig. 117. Proposed sub-sectioning of floors

In terms of connectivity, the internal and external corridor both offer elements that unite users to the elevated streets. However, upon closer inspection, the double loaded corridor is inward oriented and self-isolated because, while it develops relationships between the users, it does not create a sense of connection with the context: since users cannot establish themselves vertically in the system. However, if this movement system ran perpendicular to a common vertical volume, it could ascertain a sense of context. The single loaded corridor, when located either externally or paired next to an atrium (or other vertical void space) will similarly offer this visual connectivity over multiple floor plates. Thus the moments where vertical is invited to meet horizontal become very important. By stepping back the levels as the floors ascend, more visibility is offered and the spaces will feel more expansive. Consequently, light is also invited deeper into the recesses of the building, creating more enjoyable environments.

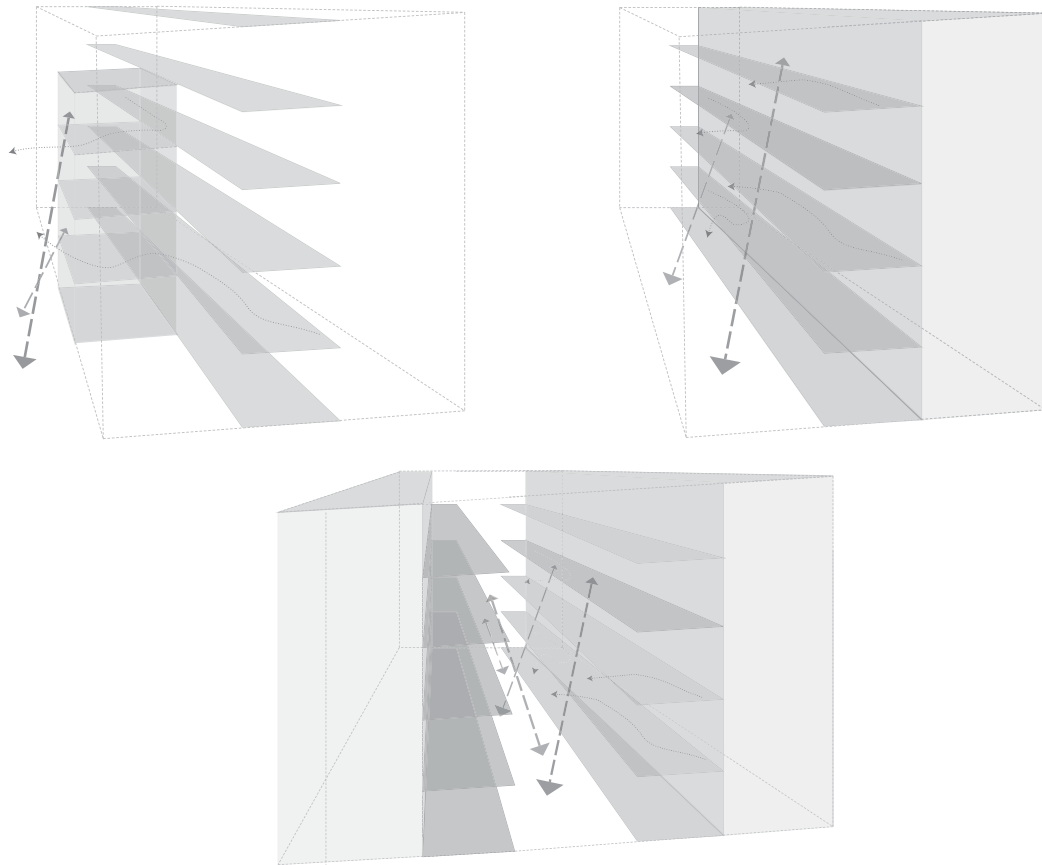


Fig. 118. Top *left*, Double-loaded corridor meets vertical

Fig. 119. Top *right*, Single-loaded corridor meets vertical exterior environment

Fig. 120. Bottom, Single-loaded corridors meets vertical atrium environment

INTERNAL / EXTERNAL ELEVATED STREET

The effect of internally elevated circulation versus external assumes two basic types of organization: the double loaded corridor and the single loaded corridor. The question becomes how to activate a relationship between the private programme within the units and the public corridor. In both of these instances the thresholds navigating between these greatly different programmes are typically *hard edges* – because there is no overlap or in-between.¹⁷⁸ The typical double loaded corridor has no aspect of porosity; it is composed largely of solid doors that offer minimal interaction or overlap into the space. In contrast, the single loaded corridor can open externally of the building, or against a partially glazed wall (protecting it from wind and other weather). A single loaded corridor would likely also offer a slightly larger level of overlap - providing a single series of doors into the space, that are never opened. How can the relationship between the two zones be enhanced? One way to ratify this experience could be by restructuring the orientation of the internalized programme: shifting it towards the public corridor.

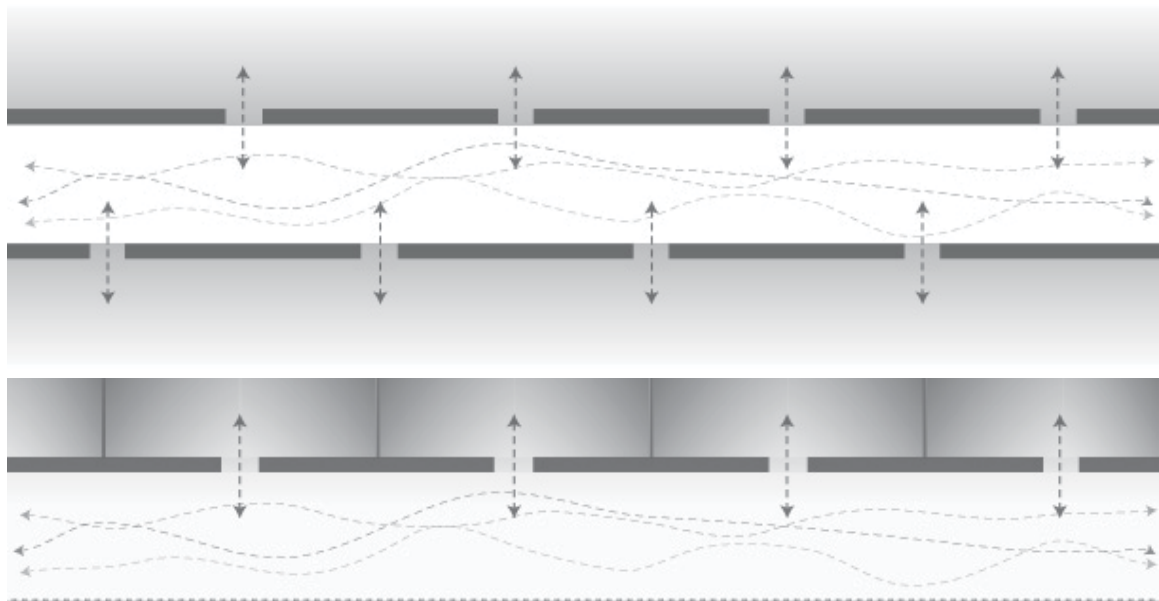


Fig. 121. *Top*, Double-loaded corridors meet street, plan view;
based on Hertzberger, *Lessons for Students*

Fig. 122. *Bottom*, Single-loaded corridors meet street, plan view;
based on Hertzberger, *Lessons for Students*

Another solution could be to offer visible interaction out, and less visible connectivity in – this would maintain a level of semi-privacy for every day life to occur, but offer visible connectivity into an otherwise visually isolated zone.

178. Hertzberger, *Lessons for Students*, 63. Hertzberger describes this condition as “hermetically sealed dwellings.”

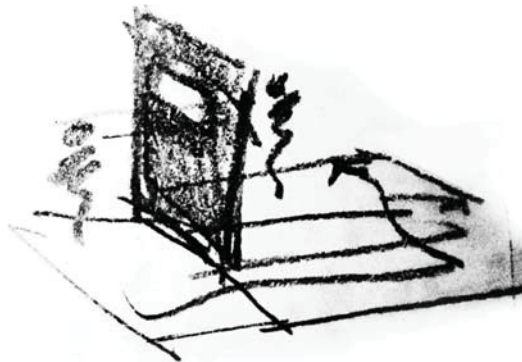


Fig. 123. Cross-grain interaction, sketch of elevation change; based on Hertzberger, *Lessons for Students*



Fig. 124. Passive visual connectivity, units step up to over look the internal street; based on Hertzberger, *Lessons for Students*

A semi-private programming of residential units that allows certain elements of living units to relate to the semi-public corridor would permit certain spaces to over-look the space of the internal street. This could be done by raising the elevation of said re-organized semi-private room. By raising the interior above the exterior corridor,¹⁷⁹ passive visual connectivity will be provided from the interior out, while establishing an understanding of connectivity within the corridor.

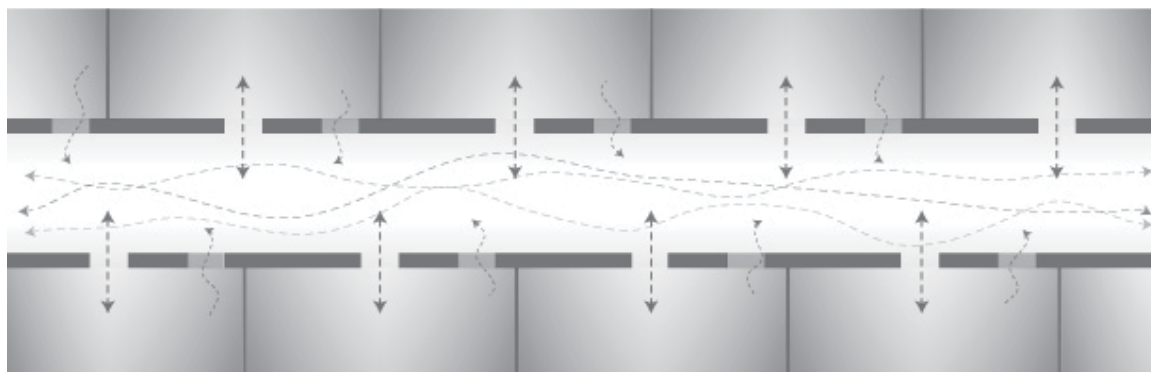


Fig. 125. Cross-grain interaction, diagram of double-loaded corridor, plan view; based on Hertzberger, *Lessons for Students*

This method can be applied to both the double and single loaded corridors: integrating and activating the public spaces beyond. This can be classified as *cross-grain interaction*, because the visual connectivity extends from within the units out into the hallway. The semi-public aspect of this method could be programmed as the kitchen, an office, or an art studio - a place that requires a degree of separation, but not total privacy. The opening could be transparent glass, transitioning etched glass or a series of slit windows.

179. *Ibid.*, 34, 40, 54–55. Herzberger also presents his idea of ‘intermediary spaces’ but in his case study, the Weesperstraat Student Accommodation, the bedroom with windows is raised to a level that provides visibility to the otherwise unobserved hallway, which he refers to as a ‘gallery street.’ This ‘gallery street’ is similar to the Smithson’s Robin Hood Gardens.

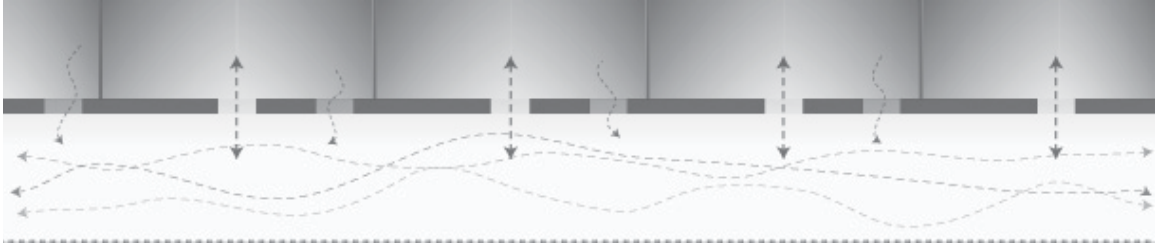


Fig. 126. Cross-grain interaction, diagram of single-loaded corridor, plan view; based on Hertzberger, *Lessons for Students*

The important factor is that their presence demonstrates that the space beyond becomes connected to the interior, if only as a brief visual connection from within to the exterior. Such an element that physically extrudes the programme of one space into another can be classified as *parallel-grain interaction*, because the visual connection can occur while walking down the hallway – there is the experience that a second type of space begins to negotiate within the realms of the first.

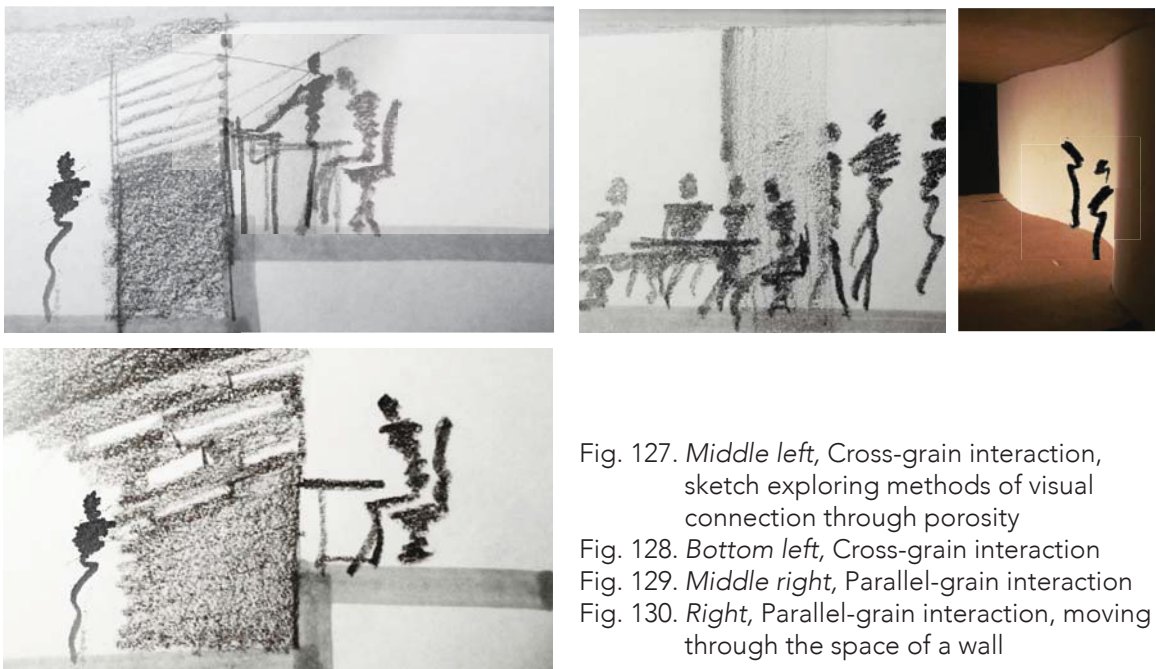


Fig. 127. *Middle left*, Cross-grain interaction, sketch exploring methods of visual connection through porosity

Fig. 128. *Bottom left*, Cross-grain interaction

Fig. 129. *Middle right*, Parallel-grain interaction

Fig. 130. *Right*, Parallel-grain interaction, moving through the space of a wall

The acts of moving into the space of the wall or sitting on the internal edge establishes an understanding of connectivity within the corridor. This method can be applied to both double and single loaded corridors, and integrates and activates the public space beyond. This can be classified as *cross-grain interaction*, because the visual connectivity extends from within the units out into the hallway. The physicality of one programme can similarly blend out into the common space to denote the presence of an activity, with out necessarily previewing the activity.



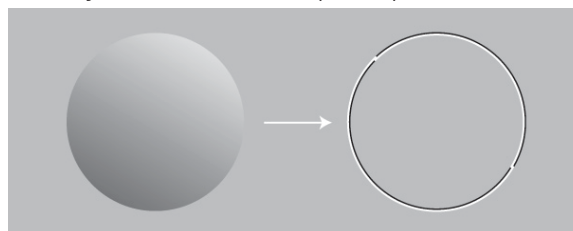
Fig. 131. Intersecting environments: parallel-grain interaction material exploration, transparent wall with tightly spaced rhythmic etched bands feeding into completely translucent surface, back-lit. Notice the softness of the shadows and the way that the gesture of a person can be seen, but there is a degree of visual separation: the curved section of glass wall protruding into the corridor space acts like a polyvalent edge, where internal program becomes visibly part of the common space of the elevated street as parallel grain interaction; *left to right*: Jordan, Emily, Jason, Emily, and Lewis

CHAPTER 6: SPATIAL INTERVENTIONS

6.1 EXPERIENCING MATERIAL EDGES: SOFTENING THE EDGE

The way we perceive edges is complex. According to David Heeger, as described in Chapter 2.3, the ganglion cells in our eyes naturally sharpen the appearance of edges, translating them into subregions composed of black and white lines.¹⁸⁰ The expression of these contrasting zones emphasizes our experience of edges.¹⁸¹ The following material studies explore how thickness, translucency and rhythm affect visual perception.

Fig. 132. Experiencing edges, what we see and how we understand through ganglion cells; based on Heeger, *Perception Lecture Notes*



This first series of material studies (on the subsequent page) explores the effects of openings along an edge, asking questions such as: is there a specific rhythm to the openings; are the sizes of the physical bands consistent or do they vary; can you move through the volume of the openings and inhabit the space in-between? The material studies consider how the rhythm of opening sizes could vary, from slim apertures, that transfer thin bands of light across space; to wider cavities, that suggest that users could pass from one space through to the next – weaving their way along the length of the soft edge. A thick wall with openings in it reacts differently to light passing through it, than one composed of a translucent material. The first two images show the intensity of dark-to-light contrast that occurs when such a rhythmic wall is back-lit versus front-lit. The first three images also show how the lack of translucency, of these edges, makes them read as thicker bands, so that even though the walls are porous, they still portray harder edges than is intended. The intent of this study is to explore how to divide spaces in alternative ways, while maintaining a sense of visual connection between them – typically spaces that wish to achieve this type of separation use a solid glass wall. In the second series, etched translucent lines play across the surface of a transparent material in a rhythmic fashion, toying with different ideas of how to subtly connect unusual programmes. This type of edge functions much in the same manner as how we think of a painting: the etched surface resides in the foreground, distracting

180. Heeger, *Perception Lecture Notes: Retinal Ganglion Cells*, 2006.

181. Refer to Chapter 2.3 *Topological Space, Edge Effects + the In-Between*, 21–22.

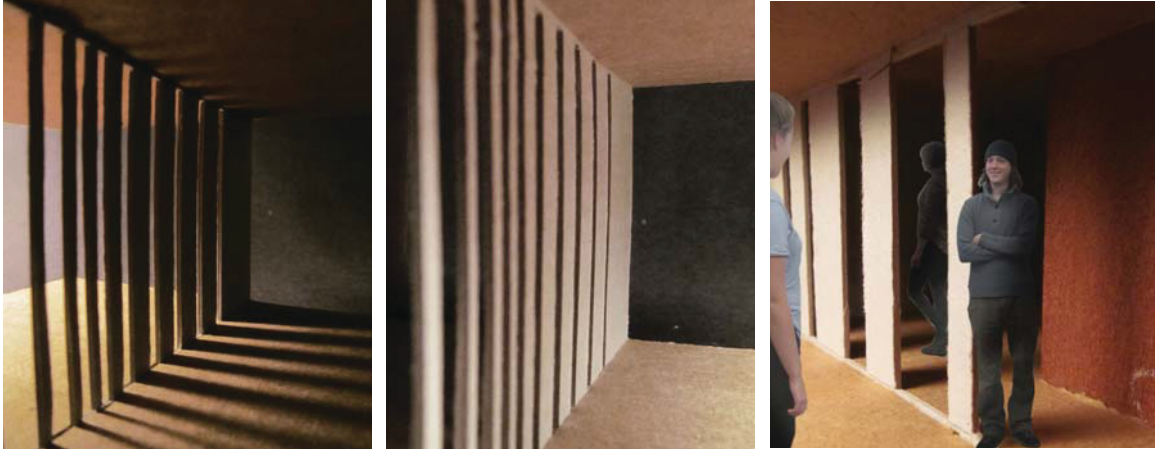


Fig. 133. *Top left*, Opaque wall with slim rhythmic openings, back-lit
 Fig. 134. *Top middle*, Opaque wall with slim rhythmic openings, front-lit
 Fig. 135. *Top right*, Opaque wall with wide rhythmic openings, front-lit;
left to right: Kate, Emily, and Jason

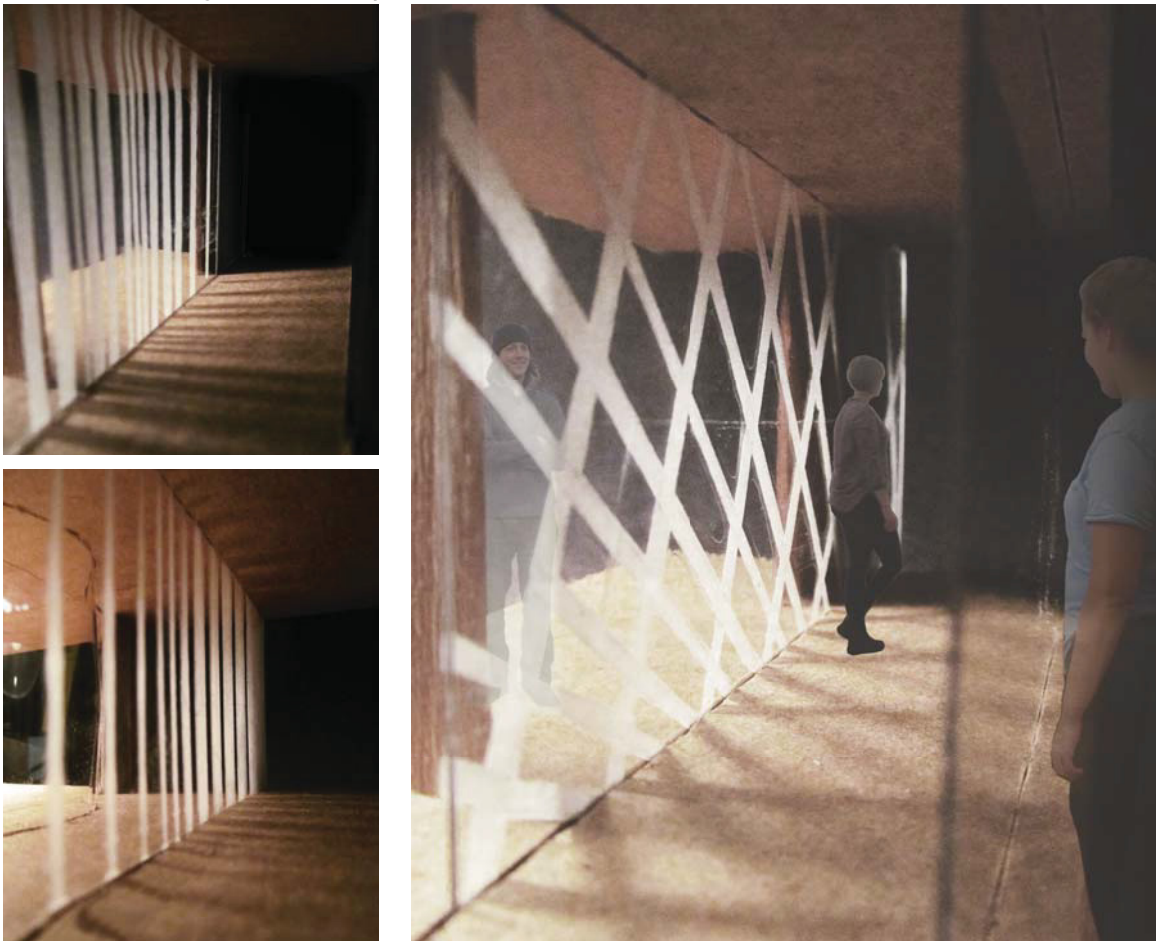


Fig. 136. *Middle left*, Transparent wall with tightly spaced etched rhythmic bands, back-lit, notice the softness of the shadow
 Fig. 137. *Bottom left*, Transparent wall with wide spaced slim etched rhythmic bands, back-lit, etching provides a degree of privacy between programs
 Fig. 138. *Bottom right*, Transparent wall with criss-crossed etched surface, back-lit, translucent etching plays with the way shadows subdivide space; *left to right: Jason, Emily, and Kate*

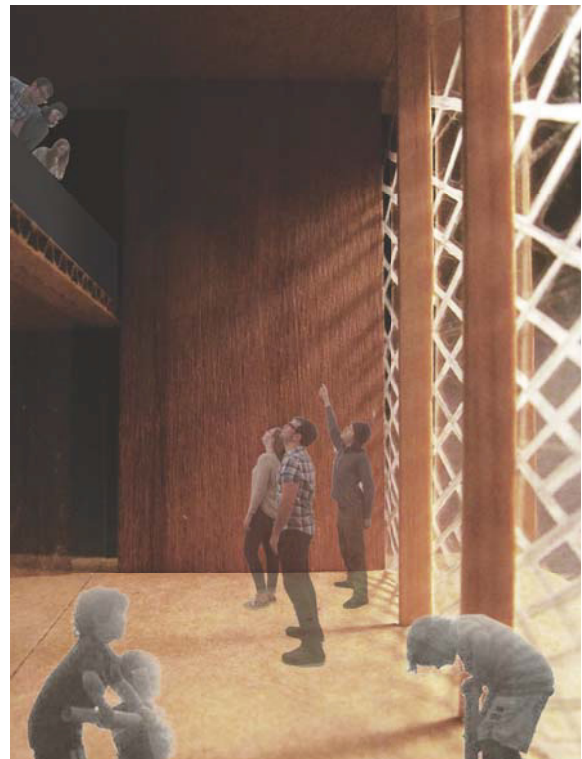
and diffusing the activities that are occurring in the background. These material studies search for a way to subtly break up space, in a manner that minimizes distraction and maintains a necessary level of privacy, while also creating a sense of unity between people in different programmatic spaces. They simultaneously explore how light and shadows can enliven the experience of spaces, spreading the feeling of one space into another.



Fig. 139. *Top left*, Opaque wall with slim rhythmic openings, divides space in ever decreasing scale of openings to suggest connection between spaces, while offering degree of privacy, much like walking through a grove of trees, you might not see what is occurring next to you until you are perpendicular to it, front-lit; *left to right*: Emily, and Kate

Fig. 140. *Top right*, Transparent wall with tightly spaced rhythmic etched bands feeding into completely translucent surface, back-lit; *left to right*: Lewis, Emily, Jason, Emily, and Jordan.

Fig. 141. *Bottom right*, Transparent wall with criss-crossed etched surface, translucent etching plays with the way shadows interact with space, back-lit; *left to right*: Jordan, Emily, Jason, Emily, Emily, and Jason



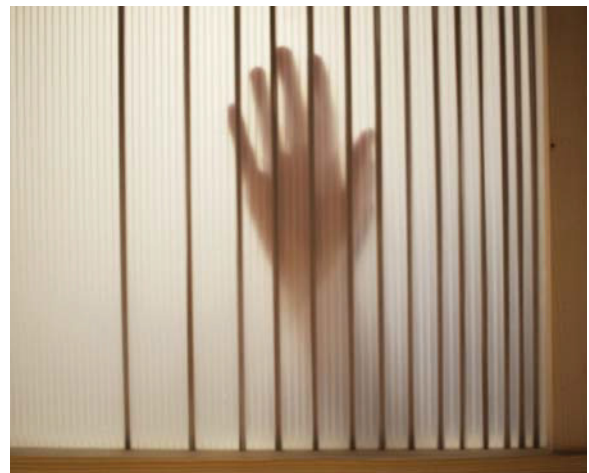
In yet another instance, a semi-opaque material such as corrugated plastic could act as a soft wall whose surface speaks to this duality of programmes while maintaining diffused visual separation, offering privacy to different programmes. The softness of this type of edge could also translate detailed movement occurring on one side into a series of ephemeral gestures read from the other space – much like the etched glass does in the

Fig. 142. *Top right*, Rhythm of opaque lines in translucent corrugated wall to soften expression of the edge as it moves from translucent to 100% opaque, portraying a hand being drawn towards the surface

Fig. 143. *Middle right*, Ephemeral gestures, the hand's proximity to the surface changes its clarity

Fig. 144. *Bottom right*, Ephemeral gestures touching the surface, degrees of clarity at the edge

Fig. 145. *Bottom left*, Ephemeral gestures through semi-opaque corrugated wall, the surface speaks to a duality of programs, while maintaining diffused visual separation, offering privacy to different programs.



second material series. The voids in the corrugated plastic could be filled to soften the transmission of light and visibility through the edge, and create a dynamic rhythm of opaque lines in space (in either the vertical or horizontal orientation). They can also be used to soften the experience of an opening in relation to a hard edge. (See how they soften our gradient perception of 100% open to 100% closed, in Figure 142.)



Fig. 146. Experiencing the ephemeral gestures of movement through the soft edge;
left to right: Claire, Ryan, and Emily

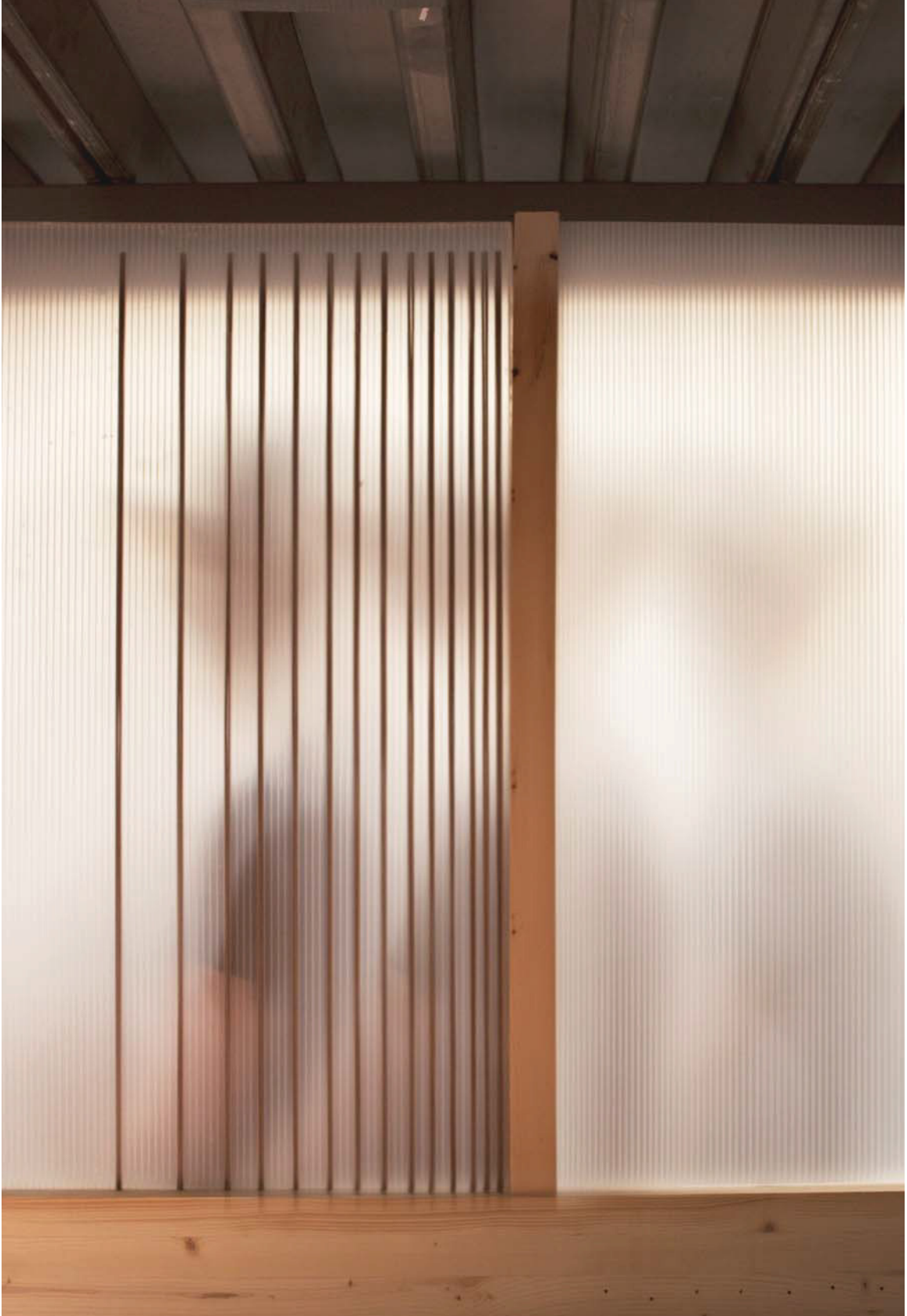


Fig. 147. Ephemeral edges, allowing the experience of movement to pass through the edge; Ryan

By re-examining the rhythmic perforations of a hard edge material through a ganglion cell lens, we can begin to see the intensity of the contrasts. As is to be expected, a deeper wall creates a series of double black-white contrasting lines, while etchings in a translucent surface maintain a single set of black-white lines, thereby further softening the edge. [These comparative studies are demonstrated below.]

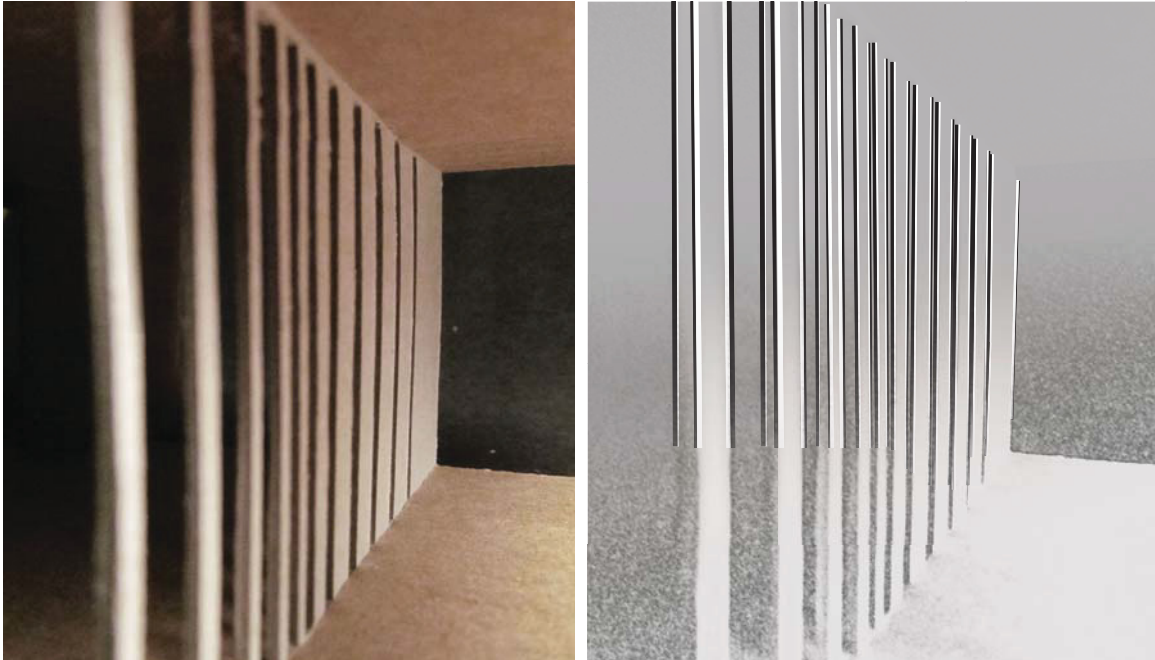


Fig. 148. *Top left*, Examining the hard edge of an opaque wall with slim rhythmic opening, front-lit
 Fig. 149. *Top right*, Ganglion cell lens, depicts a series of double black-white contrasting lines

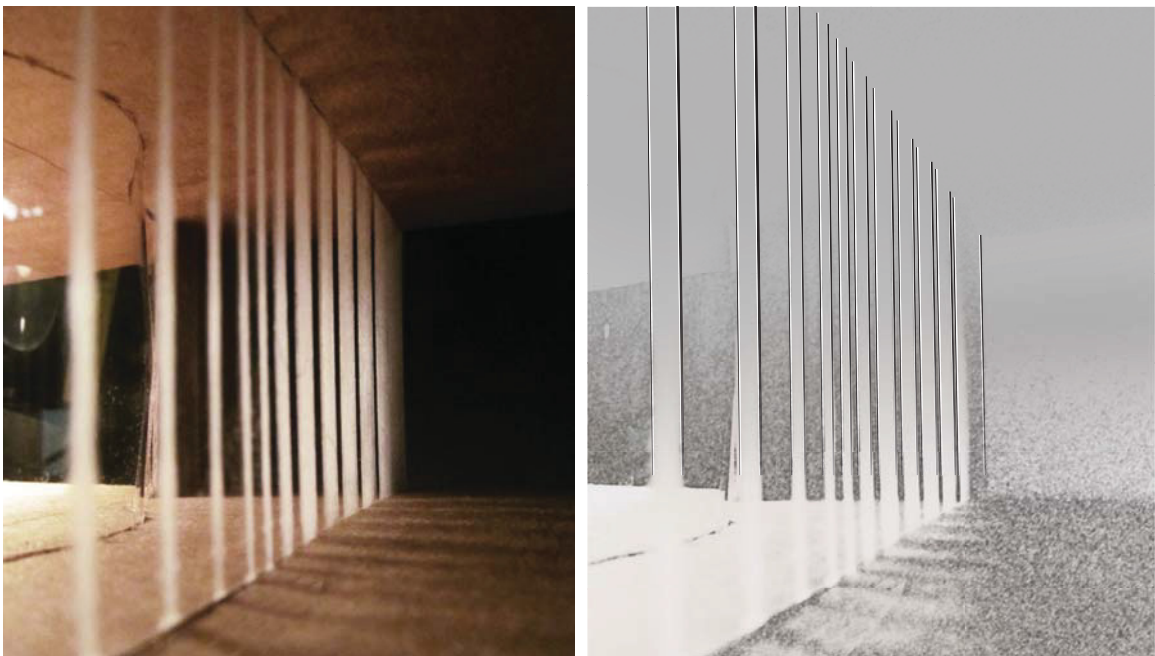


Fig. 150. *Bottom left*, Examining the soft edge of a transparent wall with rhythmic etching, back-lit
 Fig. 151. *Bottom right*, Ganglion cell lens, depicts a series of single black-white contrasting lines

In comparison, when applying the ganglion cell lense to gestural movement perceived through the semi-opaque materiality of the corrugated plastic, the corrugation would likely perceive fine black-white contrasting lines across its surface, while the soft ephemeral movement registering beyond would also be registered with a secondary set of black-white lines. By drawing this shadow movement into the volume of the wall the space of the wall itself begins to register what lies beyond, just out of reach.



Fig. 152. Examining the soft edge of a translucent corrugated wall portraying ephemeral edges of the space beyond, back-lit; *left to right: Claire, and Ryan*

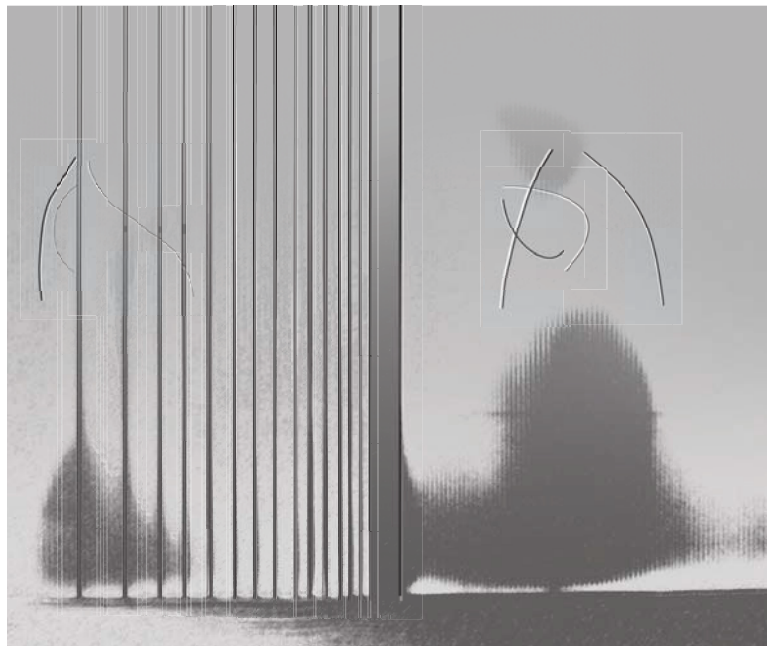


Fig. 153. Ganglion cell lense, mapping ephemeral edges as a series of single black-white contrasting lines of the corrugated surface

6.2 MAPPING THE FOURTH DIMENSION

As part of technology research to explore the inherent properties of Plexiglas, a series of ductile connections were generated using thermal deflection. The intent of this group project was to consider how two surfaces could come together in an alternative way.¹⁸²

Plexiglas is a thermoplastic and as such its composition and inherent properties allow it to naturally meld together with heat. Through this process, it can take on anamorphic shapes when pushed past its breaking point. The creation of these heat adhered connections were produced by transforming straight surfaces into curved and twisted joints. In turn, these twisted nodes thread and float through space, forming connections through a variety

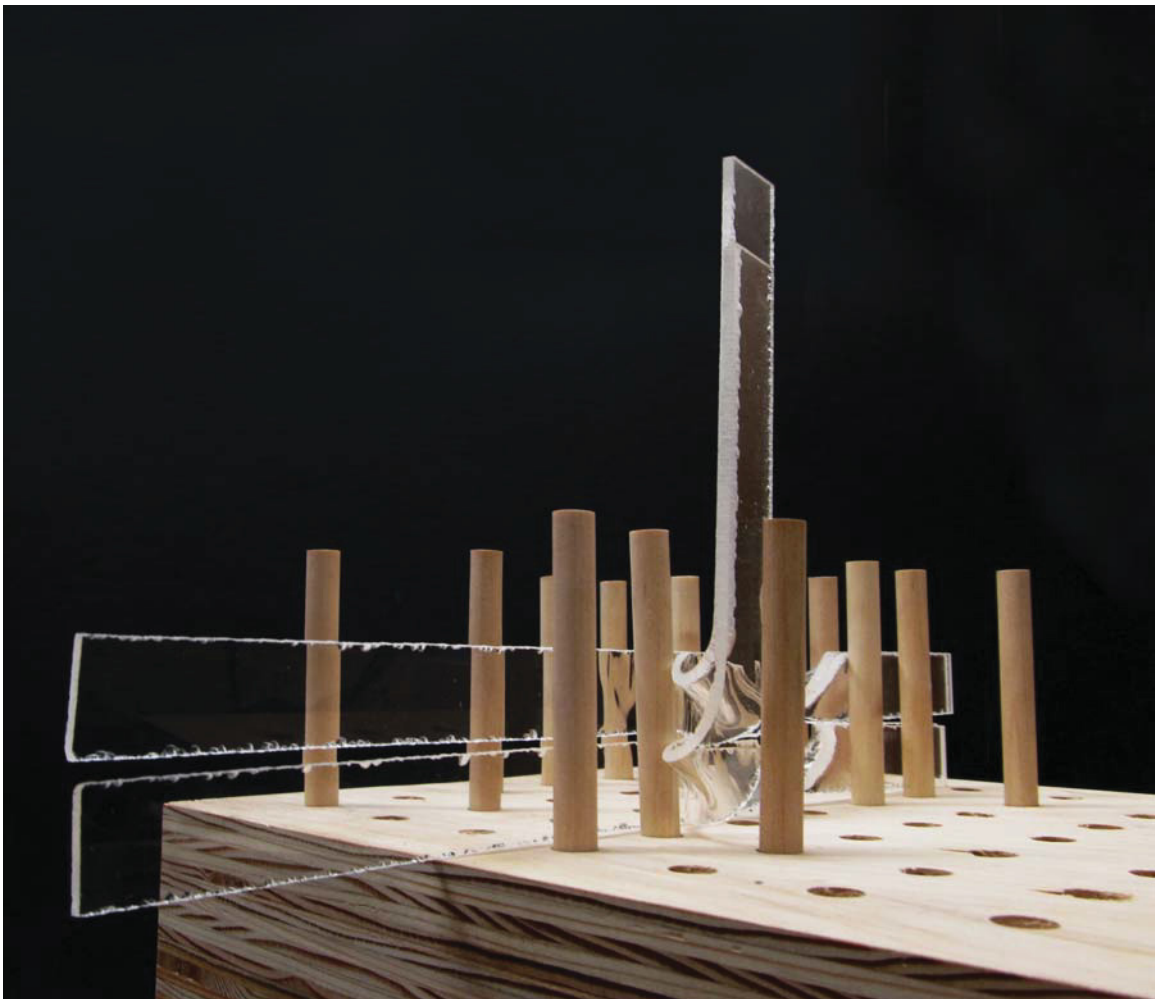


Fig. 154. Framework tool to generate curved connections; from *Twisted Expressions*

182. The group project was called *Twisted Expressions*, and was done by Claire A. Fontaine and Adam Sparkes for an architectural *Technology Seminar*, Winter 2016.

of material planes. To derive abstract interpretations of spacial connections and flows, I used these material studies to explore different ways of bringing a series of spaces together – considering how they would meet, their orientation, and what their relationship would be to each other.

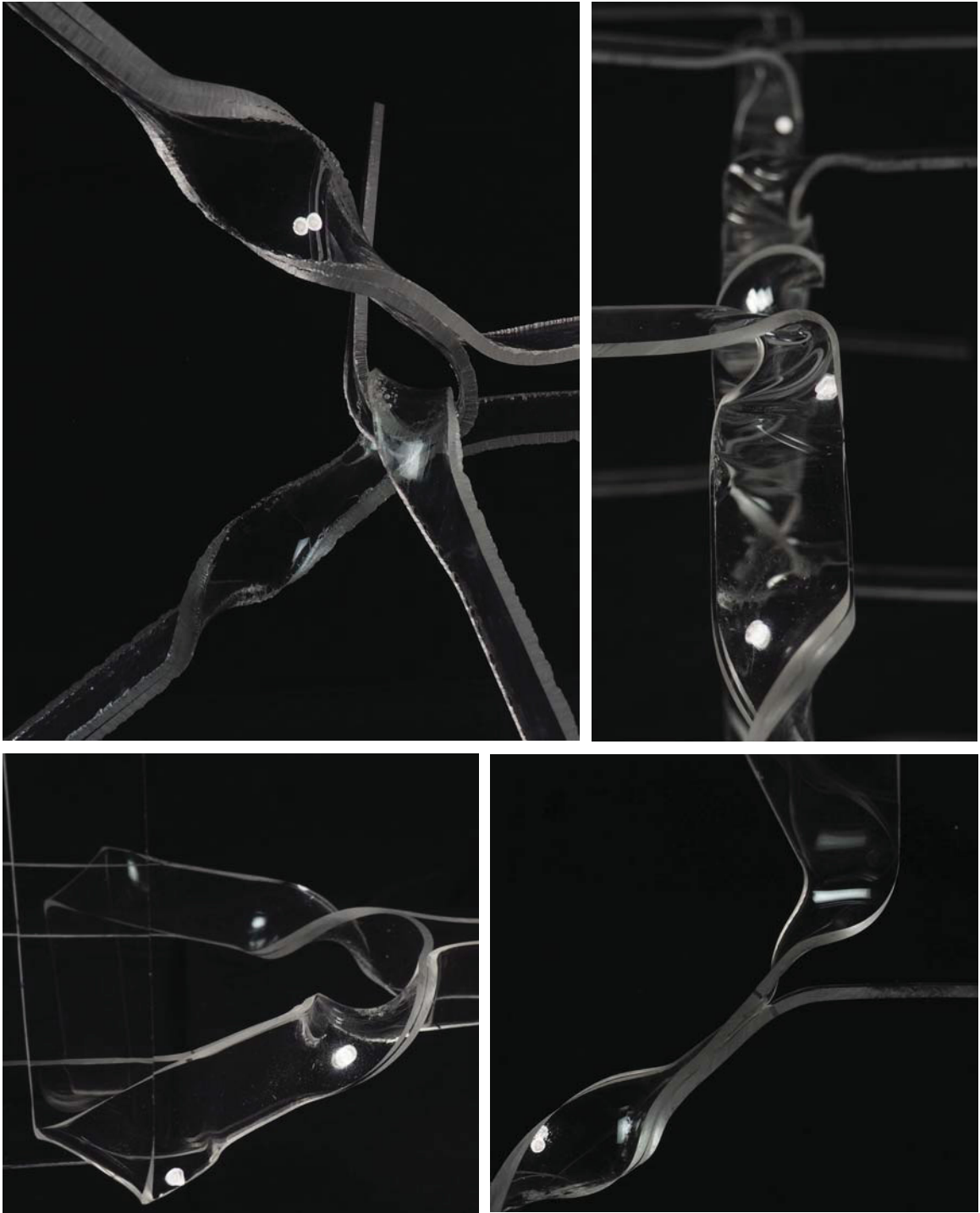


Fig. 155. Series of images considering possible spatial configurations; from *Twisted Expressions*

We created a formwork to manipulate multiple iterations of our curved connections. The shape that this tool took on reminded me of a sea of towers, while our material studies became abstract expressions of spatial flows through space and the potential connection nodes became representations of how people gather in space. This point of view piqued my curiosity and became an important representational method of talking about vertical connectivity and flows of movement. This led to a search for similar modes of representation that could be used to map movement between spaces, while simultaneously demonstrating the progression of time.



Fig. 156. Spatial flows compose connectivity, while undulating through a sea of towers and extending into the space of the city skyline beyond; from *Twisted Expressions*

While considering readings that allude to the fractal sense of time and space,¹⁸³ I wondered if shadows studies of the Plexiglas models could capture the essence of movement passing through space. By back-lighting the twisted expressions of the Plexiglas through the rhythmic sequence of translucent corrugated plastic, journeys through space could be considered as temporal and ephemeral flows. This type of image gives the impression of overlaid movement patterns, captured in a time based sequence, mapping the invisible element of the fourth dimension: time.



Fig. 157. Journeys as temporal and ephemeral flows connecting and weaving through space;
from *Twisted Expressions*

183. Sanford Kwinter, "The Judo of Cold Combustion," forward in *Atlas of Novel Tectonics*, by Jesse Reiser and Nanako Umemoto (New York: Princeton Architectural Press, 2006), 12–16. Sanford Kwinter, "The Computational Fallacy," in *Computational Design Thinking*, ed. Achim Menges (Chichester: John Wiley, 2011), 211–15.

By returning these three-dimensional models into the two-dimensional shadow world, the brightness-darkness levels display how these Plexiglas volumes undulate through space – first in close clear proximity to the corrugated surface, and then move farther away into fainter versions of themselves – illustrating the complexity of movement patterns over time. These expressions show the colliding journeys of inhabitants as they weave through a building, gather in nodal places, and then continue on their ascent or descent through the volume of space.

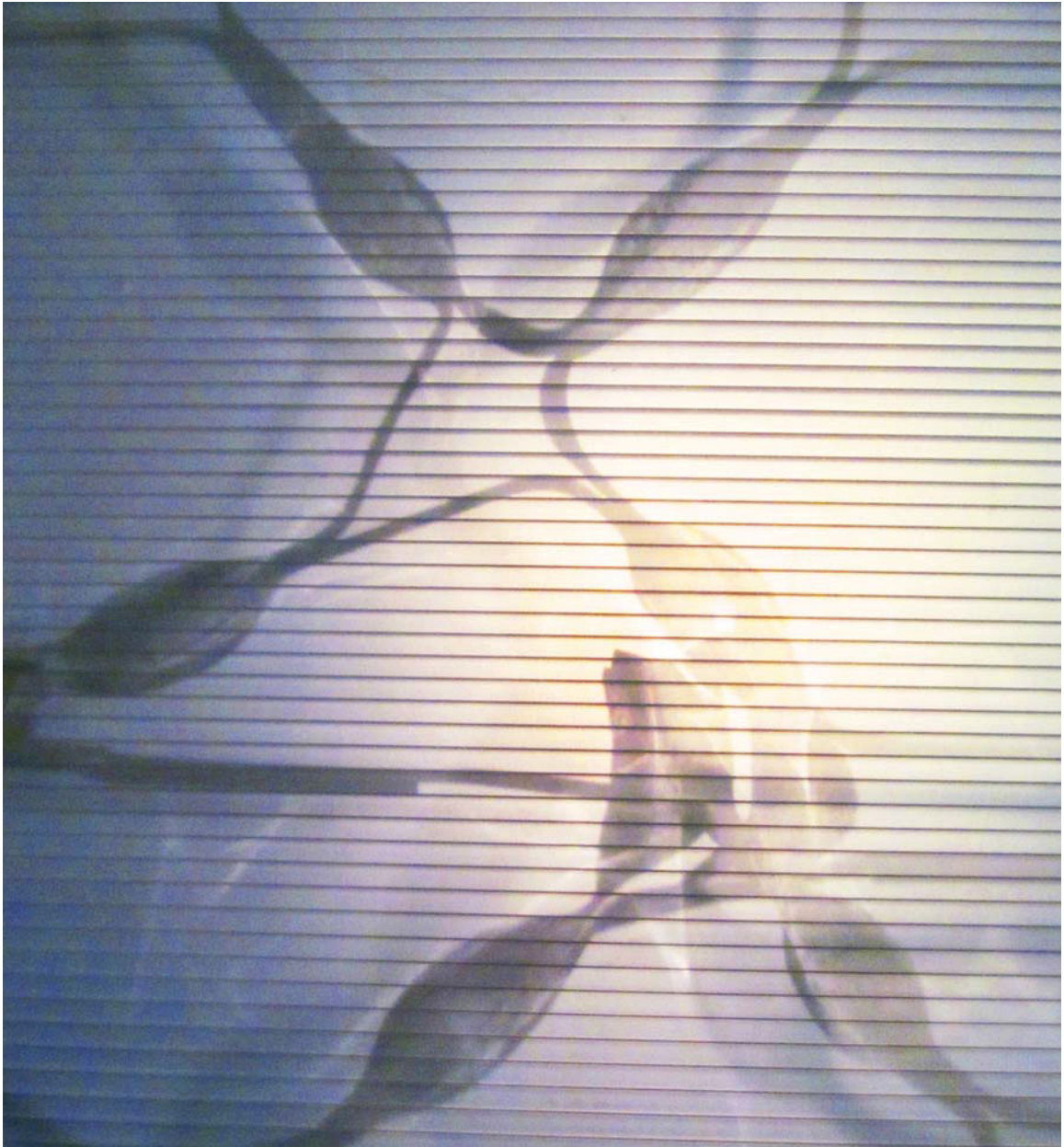


Fig. 158. Colliding journeys of inhabitants as they weave through a building, gather in nodal places, and then continue on their ascent or descent through the volume of space; from *Twisted Expressions*



Fig. 159. *Top*, Illustrating the overlapping of journeys as they undulate through space; from *Twisted Expressions*
Fig. 160. *Bottom*, Inhabiting nodal places along journeys; from *Twisted Expressions*

During these material manipulations exploring the ductility, thermal deflection, surface tension and deformation of Plexiglas, we also discovered interesting forms, such as the one shown below, that demonstrate how material can be used to connect spaces. The concave volume was generated by overheating the planar surface of Plexiglas. The nature



Fig. 161. *Top*, Concave volumes were generated by overheating the planar surface of Plexiglas; from *Twisted Expressions*

Fig. 162. *Bottom*, Manipulated surfaces, melting program through the depth of a soft edge and creating a place *in-between*; left to right: Mark, and Pearl

of this undulating form can be used to generate many interpretations of how one space can relate to another. For example, the curved nature of the transparent surface could be used to allow one programme to visibly seep from one edge through to the next.¹⁸⁴ The engagement generated from these relationships could then provoke other similar soft edge scenarios.

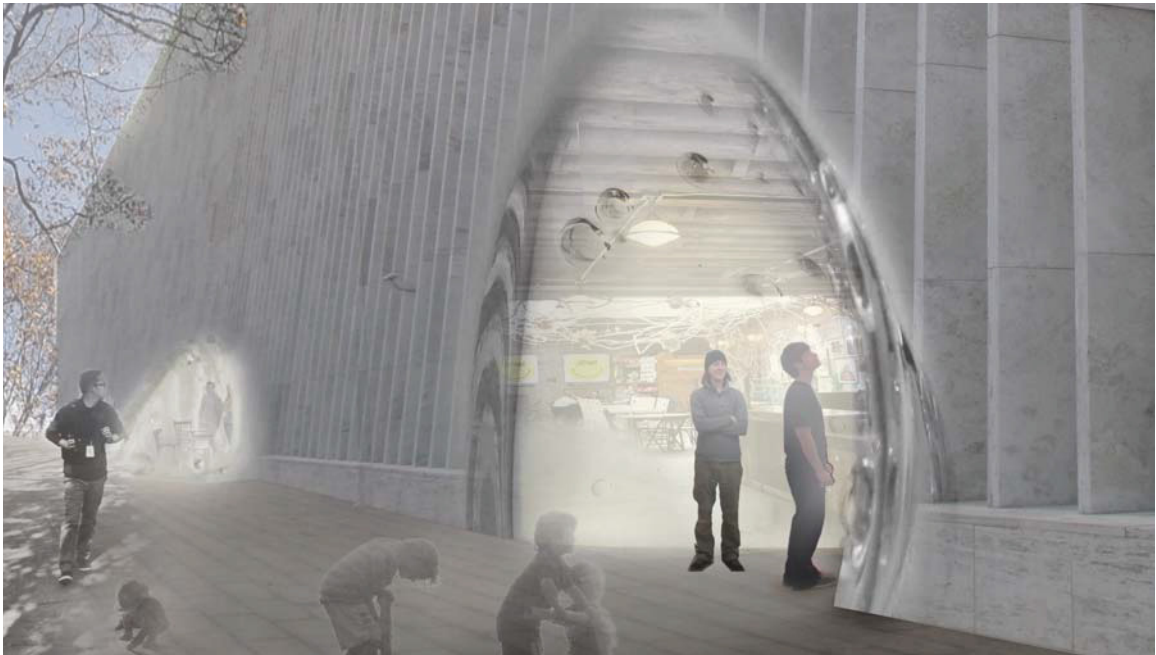


Fig. 163. *Top*, Spatial interventions at the edge, internal or external, the way we create edges can have a large impact on the way we use and understand our relationship with spaces

Fig. 164. *Bottom*, Spatial interventions at the edge, inhabiting the *in-between* where street meets interior; *left to right*: man, Jordan, Emily, children, Jason, and Lewis

184. These ideas of visual connectivity through surface manipulations are explored in more depth in Chapter 8.

CHAPTER 7: SELECTING PROGRAMME

7.1 PROGRAMME AS ACTIVATOR OR CATALYST

The concept of integrating the public realm with the private requires different types of programmes to be aligned, so that they can speak to each other; enliven the internal elevated street at different times of the day and have the capacity to invite people up into the volume of the building. Following the principles of the parti diagram, the embedded programme will utilize soft porous edge conditions to promote connectivity between programmes. The desired edge effect is to allow for the spilling-out and drawing-in of alternative programmatic experiences. Weaving the principles of creating place through the occupation of architecture,¹⁸⁵ and the inhabitation of the spaces in-between,¹⁸⁶ a cross-pollination of interaction between conversing programmes will begin to propagate engagement in the elevated spaces of the city.

The way we create edges can have a large impact on the way we use and understand our relationship with spaces. Material studies were done, in the previous chapter, to provoke interaction by exploring the possibility of different spatial interventions that can occur at the edge – be they internal or external. The following set of material studies explore how one programme can diffuse into another, to create spatial interventions. In the first case, a surface deformation becomes a seat melting the common space of the street into another programme. The volume of this space could also be enlarged so that it could be stood in – morphing the volume of the wall through what would typically be a hard edge, refer to Fig. 164. The second example uses a cavernous shape, but it could also be a curved wall or even a jagged shape – intersecting one spatial volume with another. Opportunities of this nature of engagement are endless. However, the placement of these cross-pollinating zones must be carefully considered so as not to offend or improperly disrupt either party and instead act as a catalytic space that can influence life between the programmes for the better.

185. Hill, *Occupying Architecture*, 104.

186. Gehl, *Life Between Buildings*, 154. As illustrated by his photograph, Gehl exhibits how the public have utilized the edge of a facade as a comfortable sitting location.



Fig. 165. *Top*, Spatial interventions at the edge, internal or external, the way we create edges can have a large impact on the way we use and understand our relationship with spaces, surface deformation becomes a seat; *left to right*: Lewis, Emily, Jordan, mother and daughter, Mark, Pearl, and Emily

Fig. 166. *Bottom*, Iterations of edge interventions, jagged shape having one volume intersect the space of another; *left to right*: Emily, Lewis, Jason, Mark, Jordan, Emily, Pearl, and daughter and mother

7.2 PROGRAMME EXPLORATIONS

There are two main typologies to applying programme to a building: these include the layered and spectrum techniques, which were briefly explored in chapter 5.3 *Typologies of a Tower*. The layered approach tends to segregate programmes into divisible layers, while spectrum allows one programme to activate the other surrounding ones. The mixed use nature of the design proposal will use the spectrum approach, coupled with an internal elevated street that utilizes a mixture of internal and external atrium spaces to draw different routes of circulation through the building. A series of floor studies were developed to explore programme configurations that can tie into this vertical circulation network. The concept of drawing the users above, below, through and around programmes, was greatly considered throughout the floor studies, with the intent of offering a variety of views, while simultaneously creating a web of interactions. Common flex spaces are incorporated into and adjacent to the internal elevated street, creating place in the vertical domain that can be used for the day or rented for a short period. These flex spaces take the form of short-term office spaces, flex art studios, a theater or media space, lounge, art gallery, meeting rooms, larger spaces to gather, or even the space of a small seat in a wall. Some other kinds of programmes that can begin to inhabit this type of mixed-use building include: residential units, commercial, public amenities, a bookstore, racketball court, tennis court, gym, preschool, theater, shared roof decks, recycling center, community library, pottery studio, a variety of office types, and restaurants. Together the programmes will act as activators encouraging vertical movement through the building.

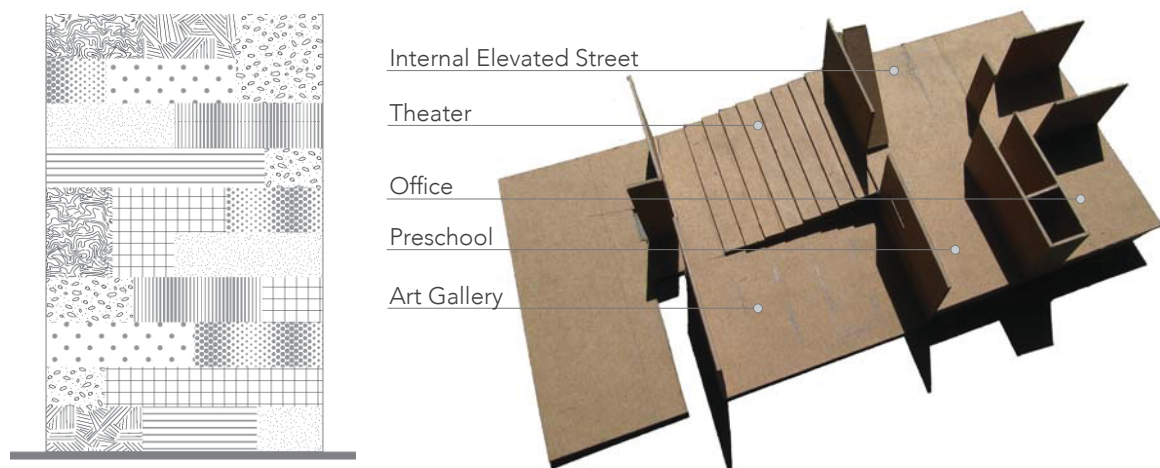


Fig. 167. *Left*, Spectrum programming

Fig. 168. *Right*, Floor study, theater seating adjacent to an art gallery, with a window from the small preschool looking into the art gallery – influencing the youth while they play

CHAPTER 8: APPLIED DESIGN METHODOLOGY

8.1 REDEFINING THEORY + ESTABLISHING METHODOLOGY

SPACE, PLACE, + THE IN-BETWEEN

The thesis began with a search for the contemporary definitions of space, place and the in-between to understand of what architecture intends to provide for its users. This was done with the intent to contextualize the space of the in-between and the edges that characterize it. It will be sewn together through my interpretation of how these theories act and react with one another, to derive how architecture can use their embedded characteristics. Following the spatial definitions of many theorists and architects, the research began to lean towards geometric interpretations of space and place. For instance, according to Henri Lefebvre and Michel de Certeau, space is defined by movement passing through it: it is “a practiced place,” and place is a pause along this shifting vector, that offers stability within the atmospheric corridor.”¹⁸⁷ If a place is a point in space, then a vector is the action-line: moving from one point to the next. The path can therefore “be described as a visual connection or physical movement between spaces, and defined by this invisible vector.

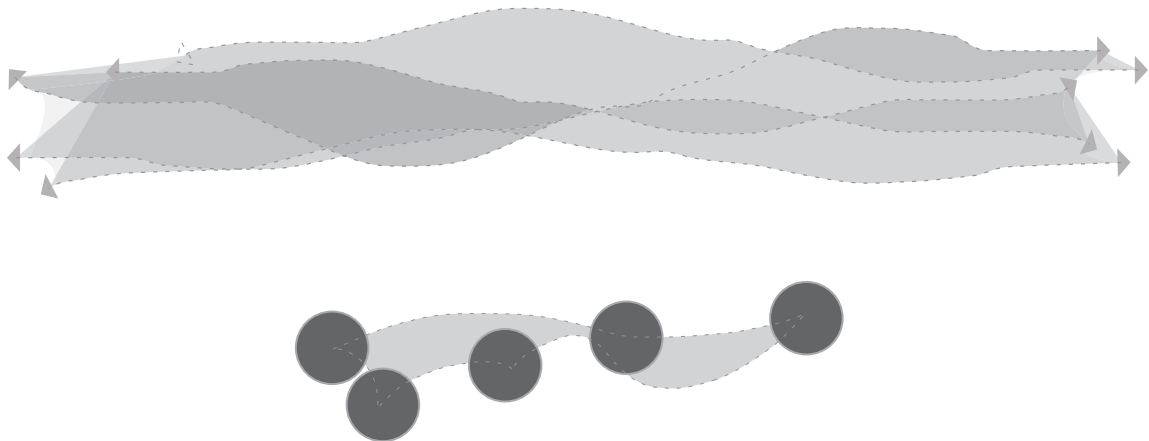


Fig. 169. *Top, Space as journeys; based on Lefebvre, *The Production of Space* and de Certeau, *The Practice of Everyday Life**

Fig. 170. *Bottom, Place as a moment; based on Lefebvre, *The Production of Space* and de Certeau, *The Practice of Everyday Life**

187. de Certeau, *The Practice of Everyday Life*, 97. de Certeau's walkers “weave places together.”

We can thus conclude that, space is a composition of the meandering lived paths through the city; the paths are the journeys that map this movement; and places are the natural pauses along this trajectory."¹⁸⁸ The temporal experience of moving, from one place to the next, colours users interpretation of the space in-between: because these interstitial spaces are a composition of experienced peripheral places. With this in mind, the act of moving through the in-between spaces is just as essential an experience as the moment of pause, because in-between spaces are lived and have the capacity to connect users.

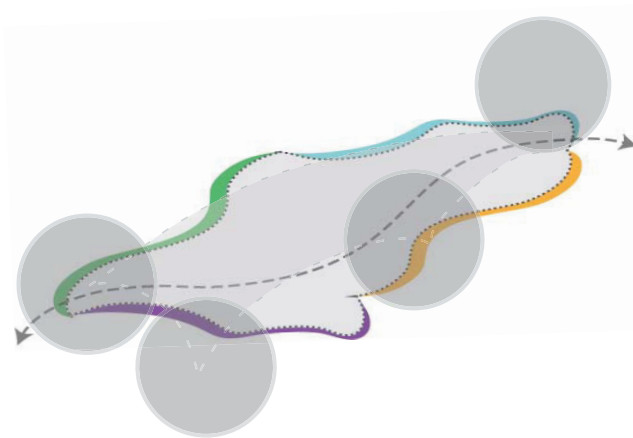


Fig. 171. *Left*, Space *in-between* as a composition of experienced places; based on Heidegger, *Basic Writings*

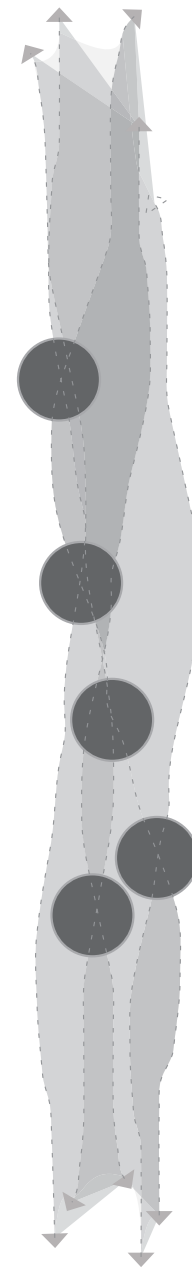


Fig. 172. *Right*, Place in Space: the moments along journeys; based on Lefebvre, *The Production of Space* and de Certeau, *The Practice of Everyday Life*

188. Ibid.

TOPOLOGY + TOPOLOGICAL SPACE

The Mathematics of Place delved into the geometric origins of the space in-between, and led to the ideas of topology, topological space and the topological threshold. Topology can be understood as an evolving series of spaces or fractured moments that compose our experience of a journey; while topological space represents the amalgamated movement through these spaces and can be thought of as the residual yet, ephemeral memory of the journey perceived by the walker. Likewise, the topological threshold is the experience of passing between one space to the next, and is defined by the edge effects that encircle it.

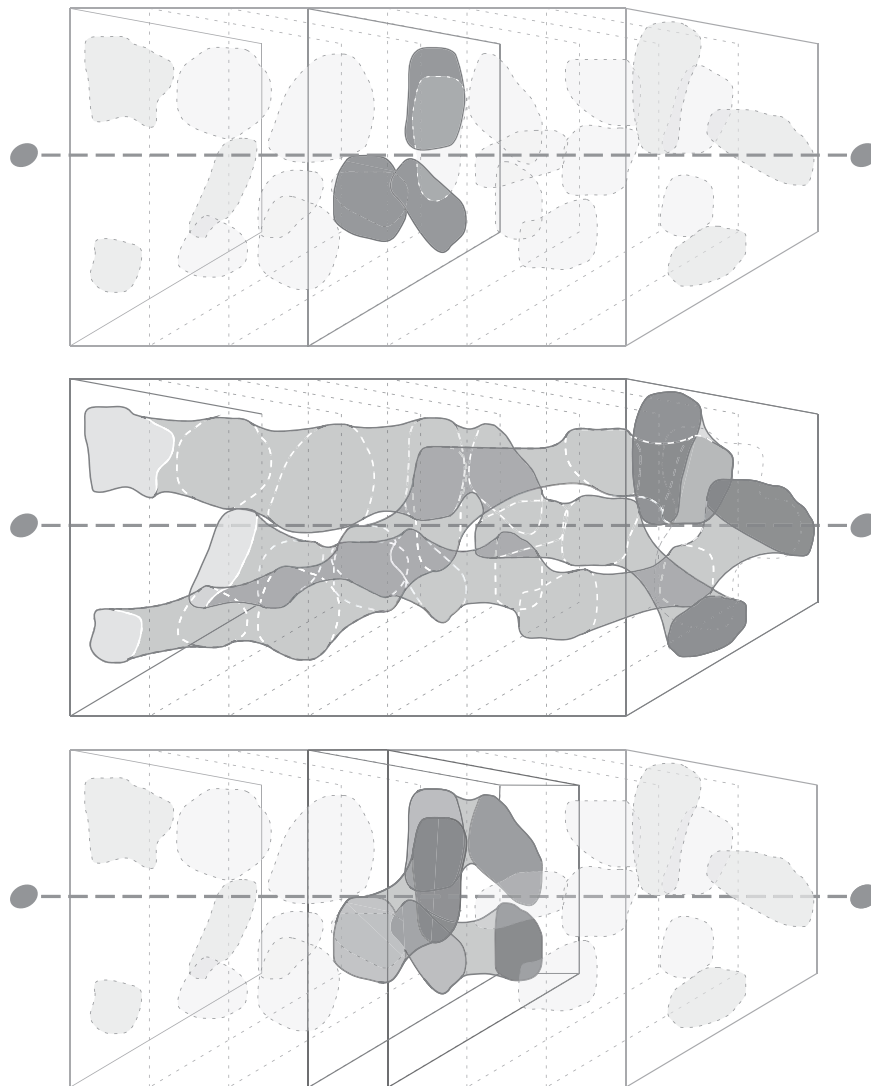


Fig. 173. *Top*, Topology

Fig. 174. *Middle*, Topological space

Fig. 175. *Bottom*, Topological threshold

EDGE EFFECTS

To understand space, we have to understand the role of the perceived edge. Typically architecture is composed of two types of edges: a hard edge or an opening.¹⁸⁹ However, I think that we need to add another type to this library: the soft edge. This type of edge begins to invite life into it's volume: it is an inhabitable space, that can be passed through, or sat in. The polyvalent edge is an adaptation of the soft edge, it is a flexible edge that responds to de Certeau's idea that space is composed of layered users' interactions.¹⁹⁰ The subtle personalization of an edge environment is integral to the composition a place. If an individual can modify a space in some small way, this will create a place that the user will want to return to and re-inhabit in their own way.

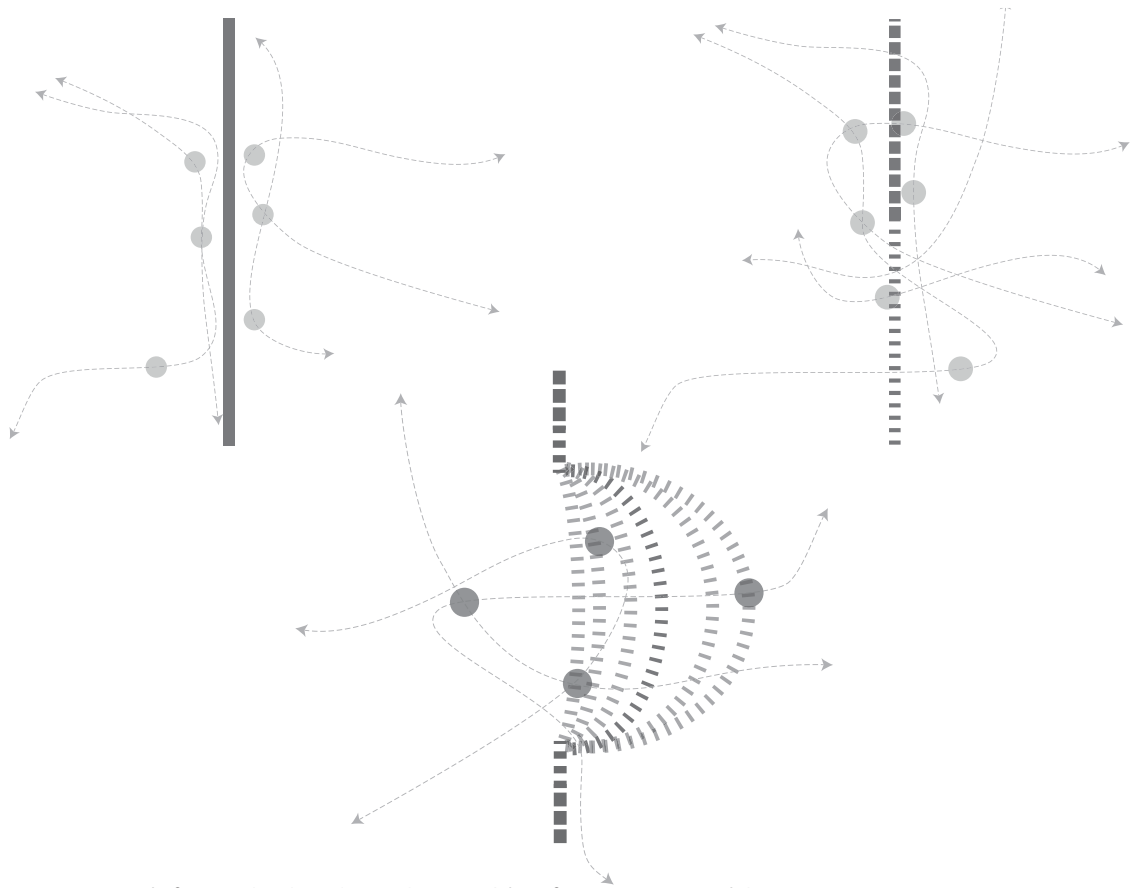


Fig. 176. *Top left*, Hard edge; based on Gehl, *Life Between Buildings*

Fig. 177. *Top right*, Soft edge; based on Gehl, *Life Between Buildings*

Fig. 178. *Bottom*, Polyvalent edge; based on a response to de Certeau, *The Practice of Everyday Life*

189. Hertzberger, *Lessons for Students in Architecture*, 206. According to Herzberger, "the architect is not only a builder of walls, he is also and equally a builder of openings that offer views. Both walls and openings are crucial." I intend to add the soft edge to this edge language.

190. de Certeau, *The Practice of Everyday Life*, 117. For as de Certeau describes: "space is practiced place," and as such the edges of these spaces need to anticipate a multiplicity of user interactions.

CONNECTIVITY

Establishing a sense of connectivity, be it spatial, visual or tactile is another important theme embedded in the thesis, as it seeks to weave together the users understanding of place in relation to their context, be it within a building, or to the external world beyond.

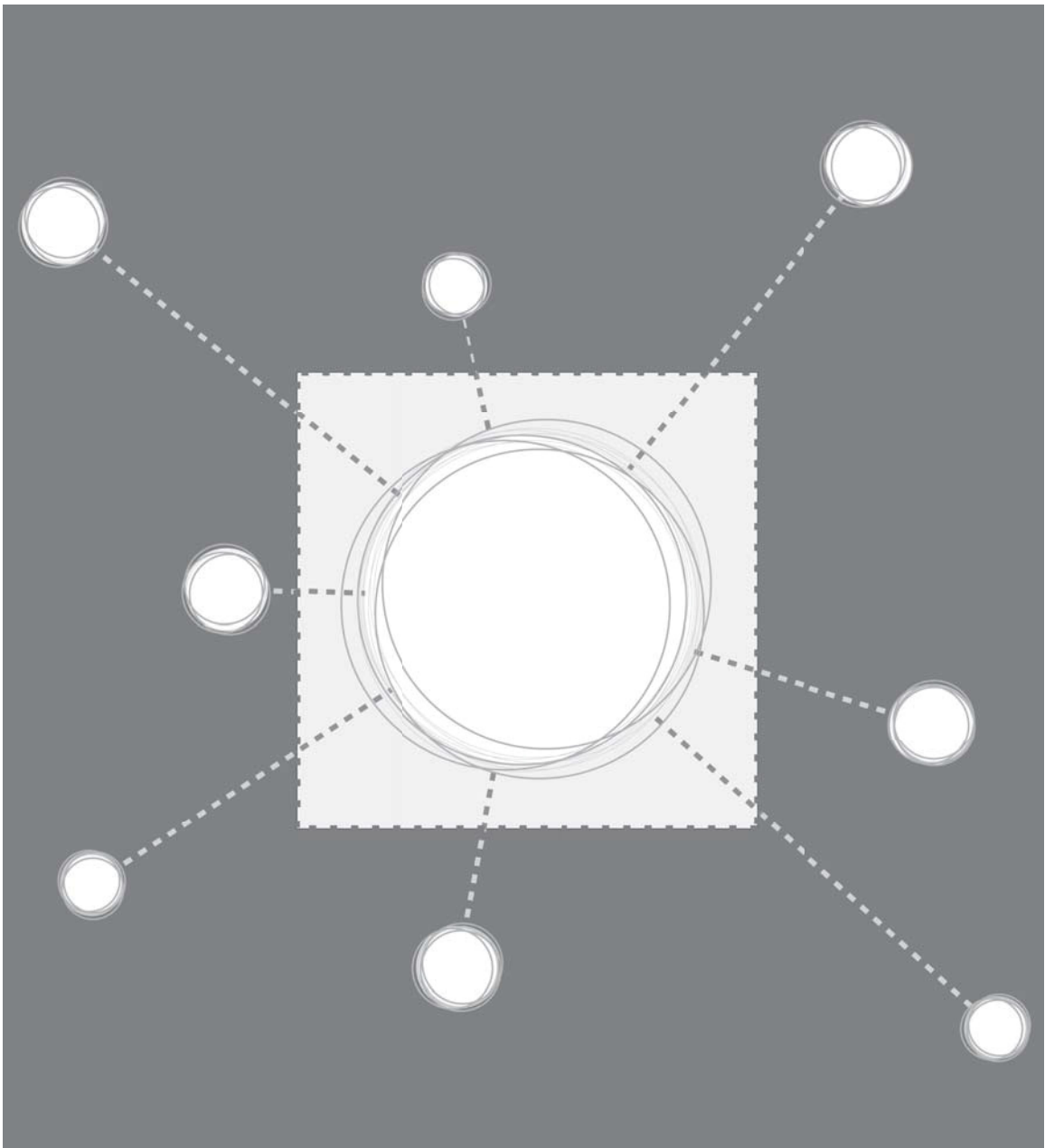


Fig. 179. Parti diagram, *connectivity as spatial, visual and tactile*

While exploring the material extents of connecting and manipulating Plexiglas, different ideas of how to connect spaces and program were rendered. For example, by heating up the surface, a volumetric surface was garnered from a flat transparent plane. This curved edge allows one program to visibly seep from inside one space through to the next.



Fig. 180. Material explorations, concerning connectivity at the edge; *left to right*: man, Jordan, Emily, children, Jason, and Lewis

PRECEDENTS

Some architectural precedents that have begun to draw the outer world up into vertical domain include l'Unité d'Habitation, by Le Corbusier, which treats corridors as elevated internal streets, that are wrapped by the programme; and the Kunsthal, renovated by OMA, which invites users on an encircling journey up though the building where they are invited to moments where they can reflect from whence they came.

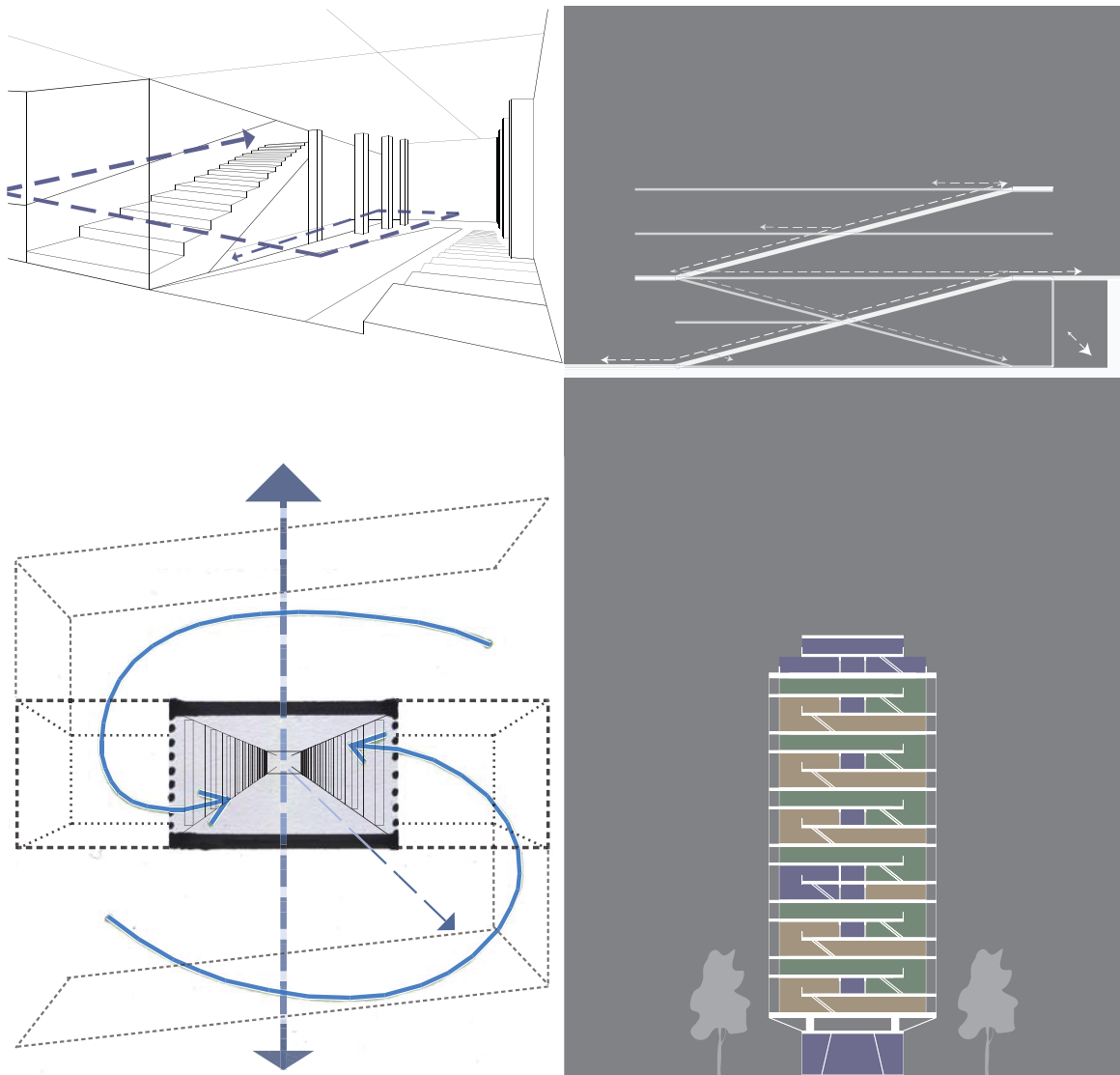


Fig. 181. *Top left*, Kunsthal, inclined internal streets: carrying users on an encircling journey through space; based on Stevens, *OMA renovates the Kunsthal in Rotterdam*

Fig. 182. *Top right*, Circulation diagram sliding planes of circulation; based on OMA, Kunsthal

Fig. 183. *Bottom left*, Internal elevated street; based on Le Corbusier, Unité d'Habitation

Fig. 184. *Bottom right*, L'Unité d'Habitation, internal elevated streets wrapped by programme; diagram based on StudyBlue, *Unité d'Habitation*

PROBLEM

The repetitive nature of floor plates in tall buildings is causing a disconnect between the vertical and horizontal domains of the city. This abstract separation causes a large proportion of the population to experience a sense of urban isolation. This sensation is best demonstrated through images of fog shrouding the towers of cities – visibly isolating the world above in the void of space. By rigidly dividing the city into public and private, many opportunities to stretch public spaces into the vertical domain are neglected.

Returning to the opening narrative of the thesis:

Floating some distance above the ground, individuals of the ... 10th through 79th floors ... could exist at any level of the building. Their only tools to negotiate a difference between the identical floor plates of the towers they inhabit, are the glowing numbers on the elevator or name of the floor. How can this architectural experience contribute to a sense of connectivity that individuals have with other activities occurring in the building, let alone with their understanding of how they relate to their neighbourhood or city? Is this the type of atmosphere architecture wishes to share with the world? Unless the intent is to provide a total sense of isolation and loss of context: this is what's being generated.

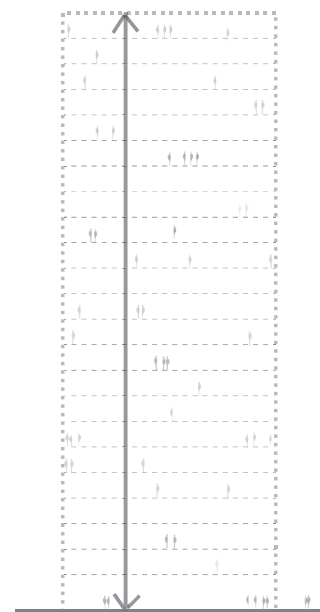


Fig. 185. *Left, Fog Shrouding Towers of Chicago; watercolour based on Ledbetter, 11 Photos that Prove Fog Isn't a Ruiner*

Fig. 186. *Right, Isolation in repetitive floor plates*

UBBAN ANALYSIS

An urban analysis was done of three North American cities: Manhattan, New York; Chicago, Illinois; and Vancouver, British Columbia. Manhattan was chosen for its dense verticality and its multi-layered circulation network. Chicago was also selected for the complexity of its circulation network, and the way that this layering is integrated into the multiple ground planes of the city as well as for its history of high-rise construction; and Vancouver was selected as an example of a vertically emerging city that is experiencing a vast increase in tower construction. Map study 1, explores how the horizontal web of connectivity relates to the vertical neighbourhoods of each city. In this series, the movement corridors are shown in teal, while the verticality of the tower environments are shown through a spectrum of greys, at 50m, 75m, 100m, 150m, 200m and 250m, with the tallest being attributed as the darkest.

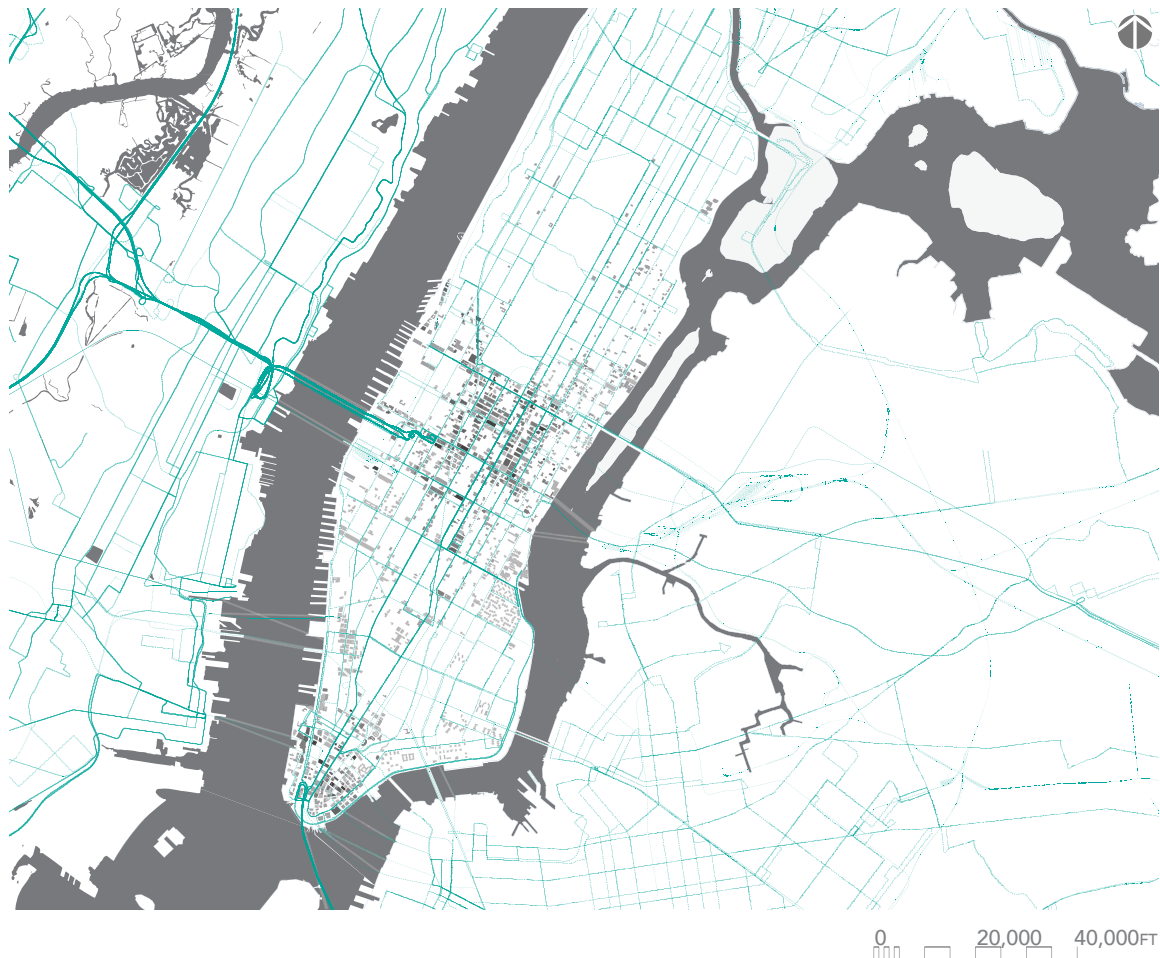


Fig. 187. Manhattan, *Where Horizontal Meets Vertical*, 1:50,000 nts, demonstrating the intersection of major circulation arteries (horizontal) and towers in the urban environment (vertical); map incorporates shapefile data from State of New Jersey, *coastline, waterbody and stream network*; NJGIN, *bus routes, transit, UEZ, transit village, road centerlines*; SkyscraperPage, *Manhattan Skyscraper Map*; and OpenCityMap, *Manhattan*



Fig. 188. *Left, Chicago, Where Horizontal Meets Vertical, 1:50,000 nts, demonstrating the intersection of major circulation arteries (horizontal) and towers in the urban environment (vertical); map incorporates shapefile data from City of Chicago, building footprints, major streets, pedestrian streets, rail lines, waterways, metra lines, railroads, pedway routes, industrial corridors; SkyscraperPage, Chicago Skyscraper Map; and Jackson, System Map 1902*

Fig. 189. *Right, Vancouver, Where Horizontal Meets Vertical, 1:50,000 nts, demonstrating the intersection of major circulation arteries (horizontal) and towers in the urban environment (vertical); map incorporates shapefile data from District of North Vancouver, bike routes, islands, lakes, railway, roads, rivers, vehicle bridges, trails for public use; Natural Resources Canada, National Road Network, National Railway Network; City of Vancouver, city streets, bikeways, building footprints, railway, rapid transit, shoreline; OpenStreetMap, Vancouver; White, Vancouver Building Heights Map; and SkyscraperPage, Vancouver Skyscraper Map*

Drawing in closer, Map study 2 analyzes the vertical urban cores to common shared spaces in the city, noting the lack of these types of spaces looking at the horizontal web of circulation, (demonstrated in teal), in relation to the dense verticality of the urban cores, (shown as a spectrum of greys, where darkest is equivalent to the tallest) and their relationship to the common spaces that are sprinkled throughout the system (illustrated in orange). These three cities demonstrate different densities of vertical inhabitation, and where the density becomes greatest, there is an obvious lack of common space in close proximity.

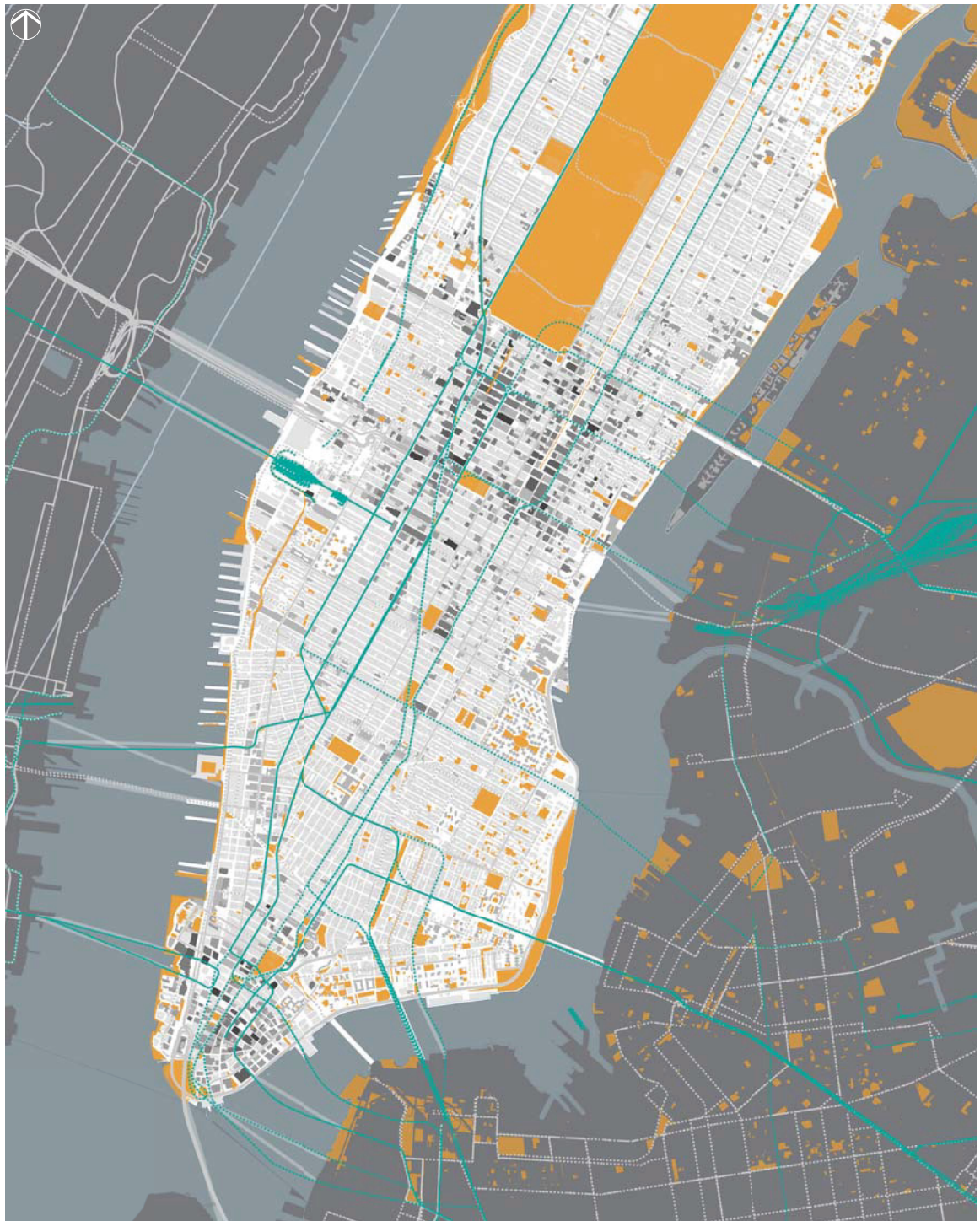


Fig. 190. Map of Manhattan, *Urban Circulation: Where Horizontal Meets Vertical*, 1:25,000 nts, demonstrating the intersection of major circulation arteries with common space and towers in the urban environment; map incorporates shapefile data from State of New Jersey, coastline, waterbody and stream network; NJGIN, bus routes, transit, UEZ, transit village, road centerlines; SkyscraperPage, Manhattan Skyscraper Map; and OpenCityMap, Manhattan



Fig. 191. Map of Chicago, *Urban Circulation: Where Horizontal Meets Vertical*, 1:25,000 nts, demonstrating the intersection of major circulation arteries with common space and towers in the urban environment; map incorporates shapefile data from City of Chicago, *building footprints, major streets, parks, pedestrian streets, rail lines, waterways, metra lines, railroads, sidewalks, pedway routes, open spaces, parks, industrial corridors*; SkyscraperPage, *Chicago Skyscraper Map*; and Jackson, *System Map 1902*



Fig. 192. Map of Vancouver, *Urban Circulation: Where Horizontal Meets Vertical*, 1:25,000 nts, demonstrating the intersection of major circulation arteries with common space and towers in the urban environment; map incorporates shapefile data from District of North Vancouver, bike routes, lot lines, building footprints, islands, lakes, parks, railway, roads, rivers, vehicle bridges, trails for public use; Natural Resources Canada, National Road Network, National Railway Network; City of Vancouver, city streets, bikeways, building footprints, property information data, greenway, parks, railway, rapid transit, shoreline; OpenStreetMap, Vancouver; White, Vancouver Building Heights Map; and SkyscraperPage, Vancouver Skyscraper Map

In an effort to contribute more communal spaces to the city, the thesis proposes to treat indoor corridor space as an extension of the public street to promote connectivity and engagement between the public and private realms. The journey through these interior elevated streets will be interpreted as movement through topological space. This urban section demonstrates the effect of the current vertical movement, which is synonymous to vertebrae running through the system.

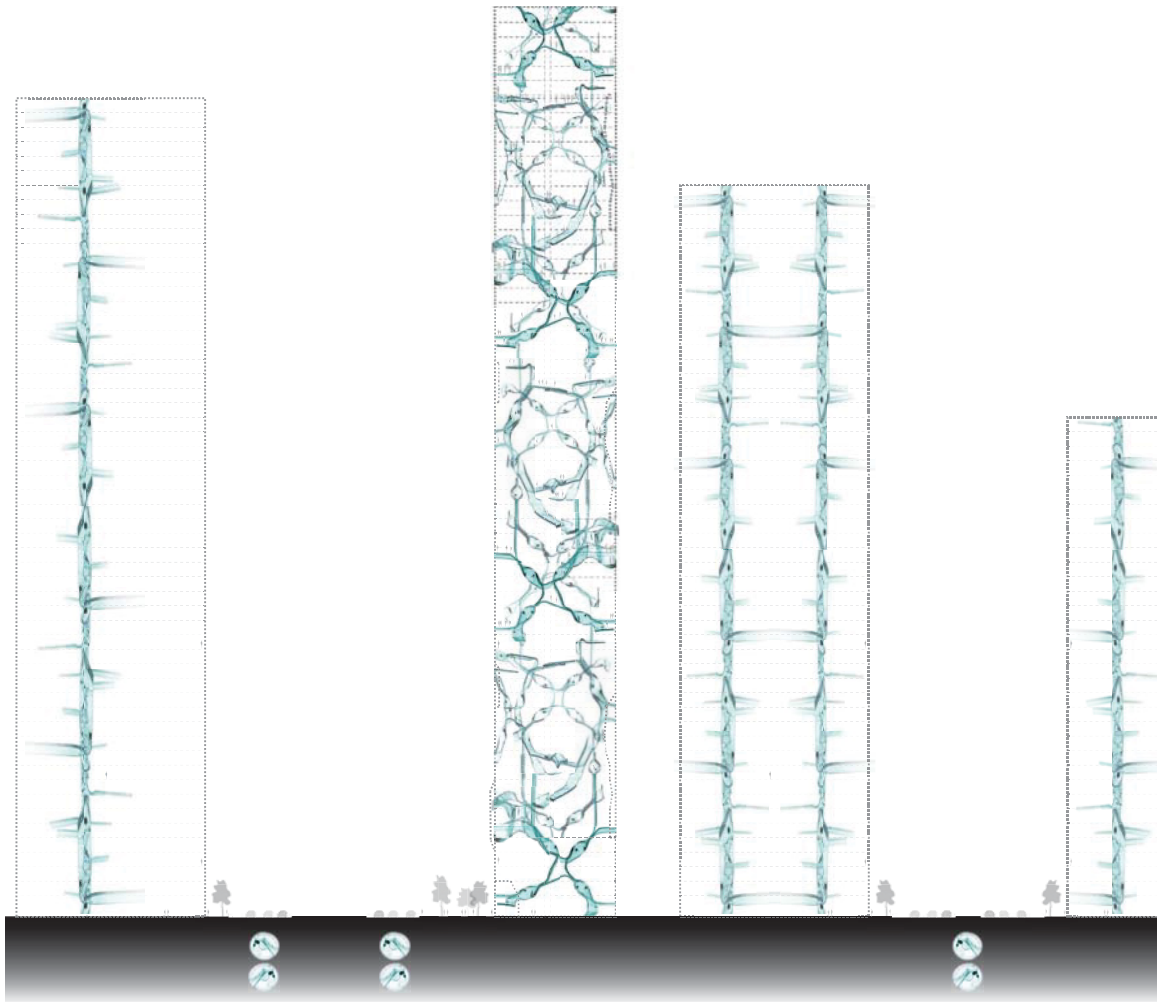


Fig. 193. Vertical circulation systems, the vertebrae and the vertical street, contextualizing the vertical catalysts within the horizontal urban environment, in section

TYPICAL TOWER TYPOLOGIES

As demonstrated in Chapter 5.2, by altering the ascent through the typical tower typologies of Manhattan, Chicago and Vancouver, moments of activation will be generated as these spaces weave vertically through the architectural volume, connect with each other, and interact with the evolving topological planes.

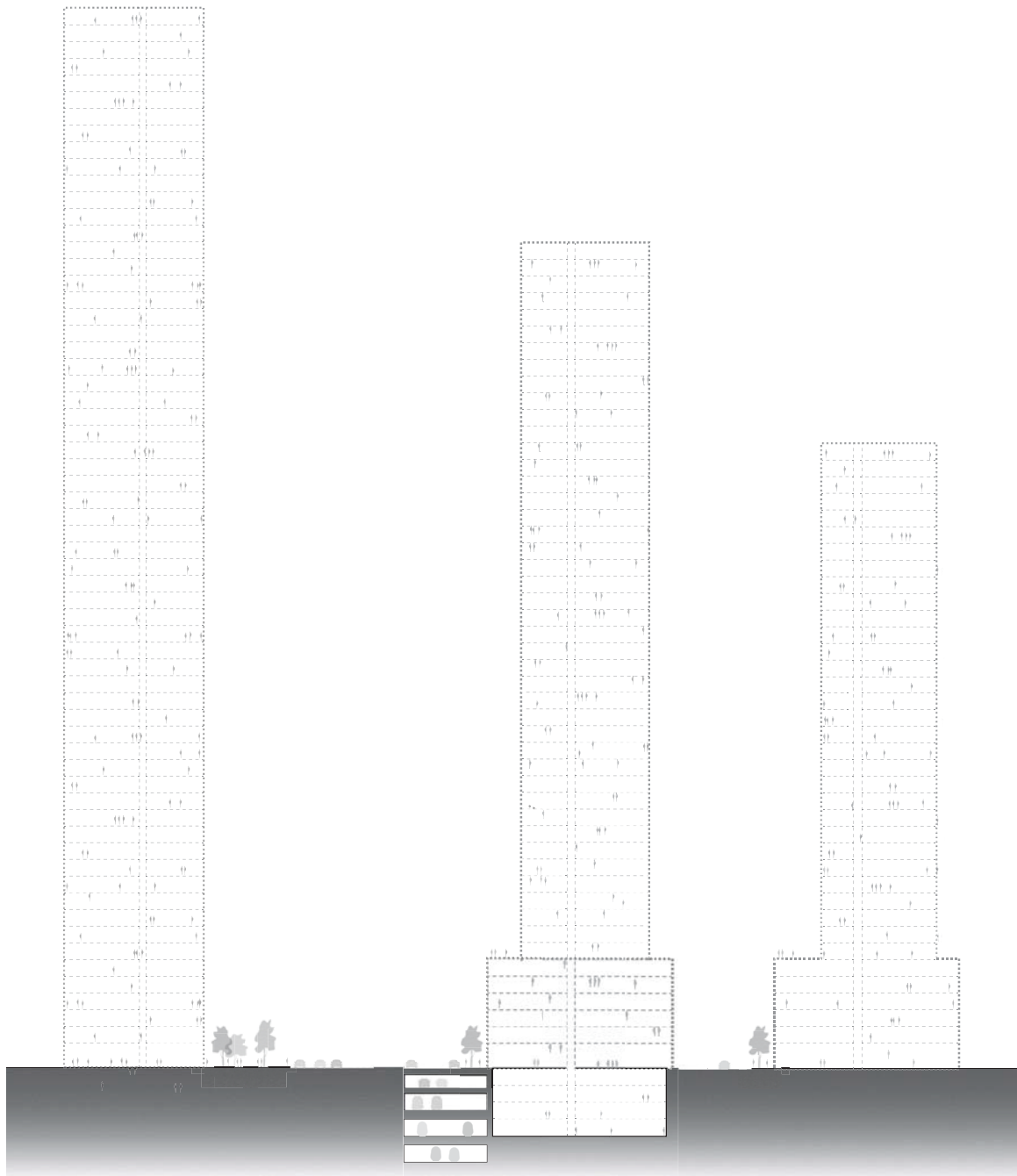


Fig. 194. Left to right: Typical tower typologies for Manhattan, Chicago and Vancouver

ALTERED TOWER TYPOLOGIES

This interaction between spaces will strive to blend, overlap and activate by weaving life through above and below them. This exploration will add another layer of life to the city and provide more opportunities for space to take place within.

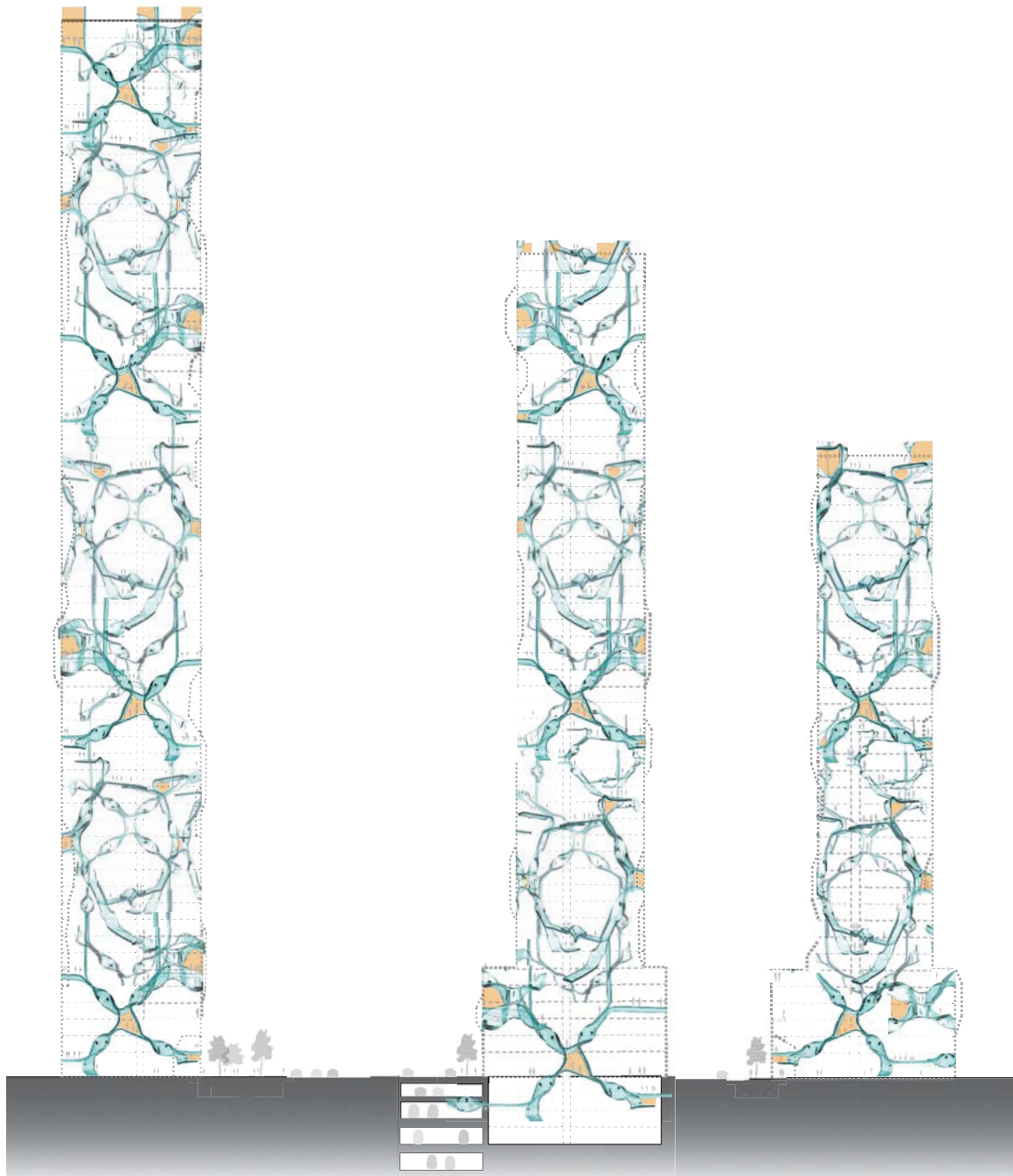


Fig. 195. Left to right: Altered tower typologies for Manhattan, Chicago and Vancouver

METHODOLOGY: OBJET-TYPE PROPOSAL

To create engagement between a larger volume of people, the methodology proposes to rationalize the vertical domain into four floor increments. By using a skip-stop lift for express movement, the users are promoted to walk up or down through the levels and engage with the activities of their local environment. Secondly, by abstractedly re-interpreting the journey as flows and the common spaces as nodal points we can begin to anticipate the intersection of a variety of paths. Third, the progression through floor plates can be reconsidered as a metamorphosis through a series of topological planes. The nodal points can then be assessed as they intersection between path and floor plane. Finally, we can consider how programme overlap and edge effects can begin to activate these nodal places – catalyzing ascent and engaging with the delaminated domains.

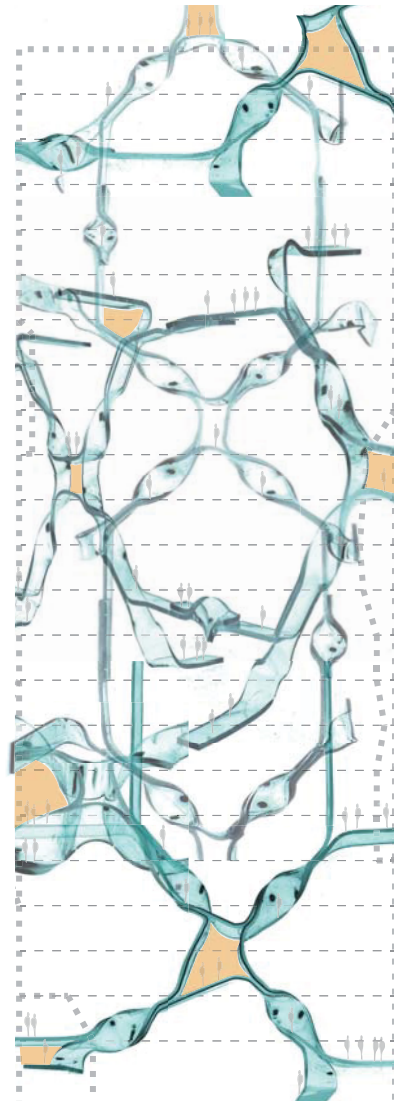


Fig. 196. Objet-type proposal, imbue variety and connectivity to activate the vertical city by catalyzing ascent and connectivity within the delaminated domains of high-rise architecture, using a step-by-step methodology

As a collective, these steps are about the relationship of one space (or journey) with another, while implying an evolution of form to activate through threshold space. This demonstrates how one space can influence and impact the next.

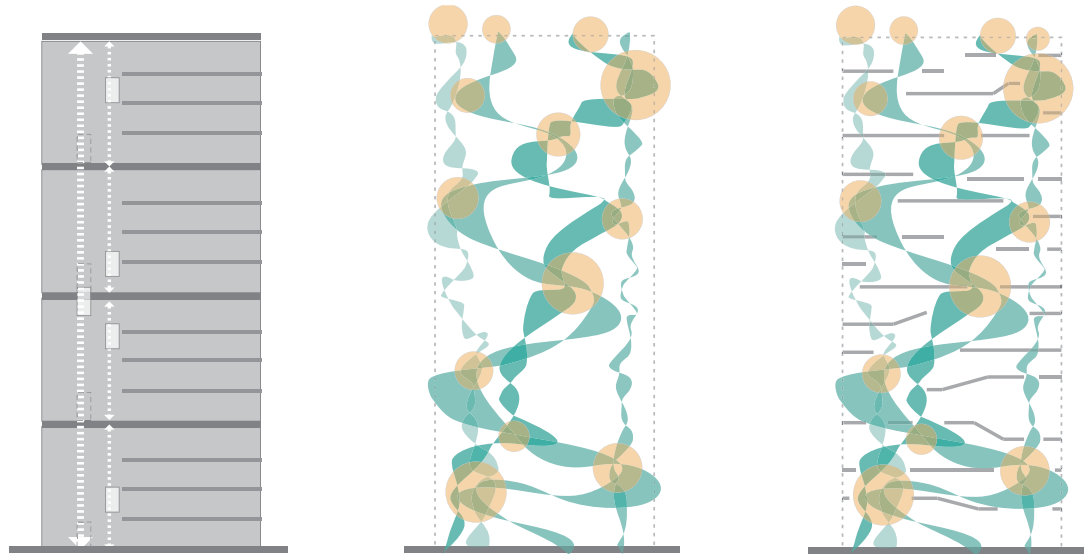


Fig. 197. *Methodology*, as a step-by-step process

Top left, Break floor plates into 4 floor increments – the rational division of space describes understandable volumes

Top middle, Consider circulation as a system of journeys and nodes, for example, a line = movement; while the intersection of line = interaction denoting the occurrence of points = which define a place or activated spaces

Top right, A gradient of path types + a variety of planar breaks at the ground condition = Evolving notion of repetitive floor plates, demonstrated through a typological space diagram

Middle right, Intersection, explore how these nodal points interact with path and plane to create different conditions of activated spaces, where path = journey through space; point = interaction point = place; and plane = surface horizontal or vertical

Bottom right, Demonstrate how program and threshold can enhance these types of spaces, while simultaneously evolving through the building



TOPOLOGICAL ENVIRONMENTS

Following this methodology, the ascent was considered as a series of intersecting journeys through space to create place in vertical environments – this is represented through topological space. Synonymously, the topology of each floor underwent a gradual metamorphosis to establish a sense of place through variety. This idea imbues the floor plates with interstitial moments that can be lived in, and acts like a soft edge.

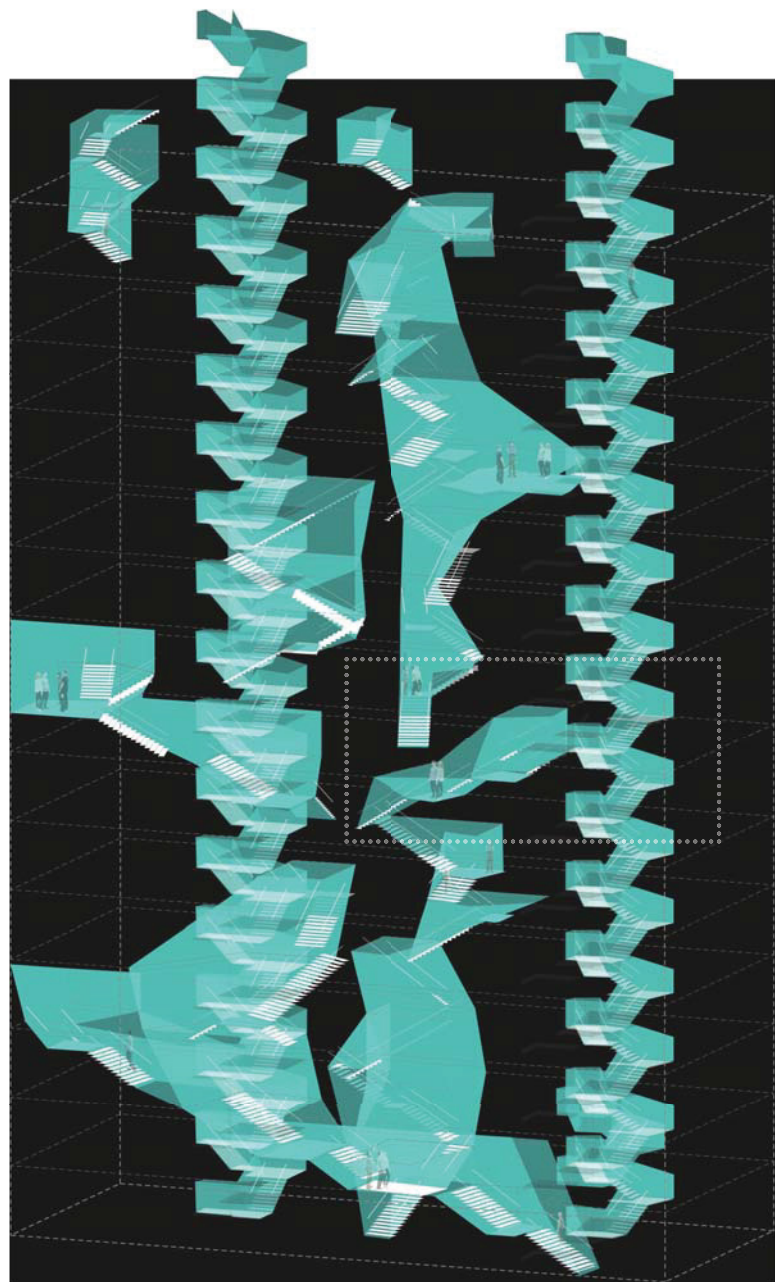


Fig. 198. Topological space, intersecting journeys through space to create place in vertical environments

0 4 20 40 60FT

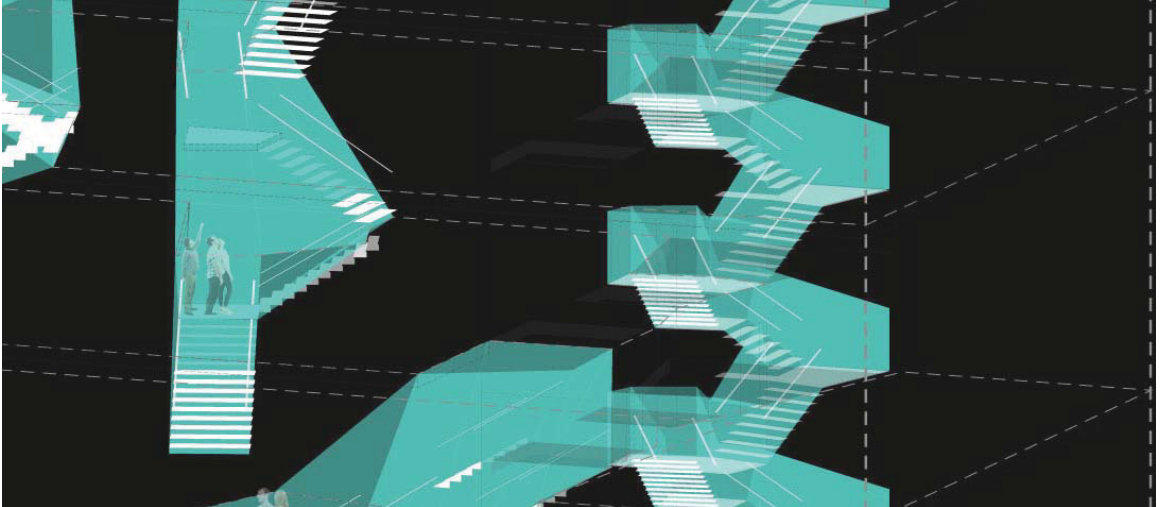


Fig. 199. Topological space,
inhabiting
the in-between

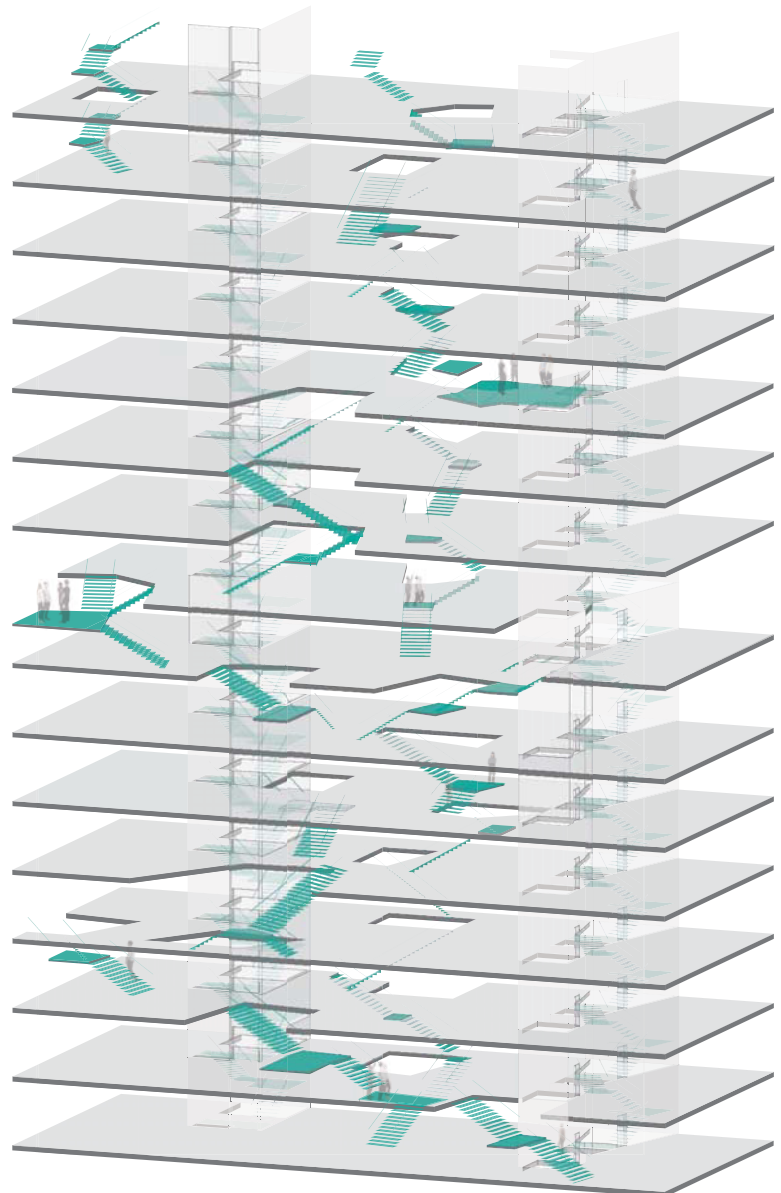


Fig. 200. Metamorphosis
through topological
planes, inhabiting
the space between
horizontal planes

0 4 20 40 60FT

MATERIALITY OF SOFT EDGES

A series of soft edges were explored with the intent to intersect programmatic environments and engage with the common space of the elevated street. These studies explore how the material opacity and form of a wall can act as a threshold between spaces.



Fig. 201. *Top left*, Interactive edges through intersecting environments, rhythmic edge; *left to right*: Emily, and Kate

Fig. 202. *Top middle*, Interactive edges through intersecting environments, transparent wall with criss-crossed etched surface; *left to right*: Jordan, Emily, Jason, Emily, Emily, and Jason

Fig. 203. *Top right*, Interactive edges through intersecting environments, transparent wall with rhythmic etched bands and curved transparent wall; *left to right*: Jordan, Emily, Jason, Emily, and Lewis

Fig. 204. *Bottom right*, Interactive edges through intersecting environments, transparent wall with criss-crossed etched surface; *left to right*: Jason, Emily, and Kate



8.2 OBJET-TYPE DESIGN PROPOSAL

FLOOR PLANS

This thesis seeks to respond to typical high rise building designs, such as the Lake Shore Drive Apartments, by Mies van der Rohe, shown on the next page. While this set of apartments is perhaps one of the most beautifully refined examples of what a series of floor plans can be, I have added Mies van der Rohe's towers as an example of what many high-rise buildings aspire to. They provide a clean example of the most ideal use of a floor plate ratio in relation to the maximization of unit sizes. I also chose this as a precedent because, as a highly acclaimed apartment, I wonder what this does in relation to the thesis's proposal of drawing common spaces up into the vertical environment? As a circulation method, the vertical movement runs directly through a series of minimally changing floor plates, limiting interaction and engagement with the majority of the building, remember the circulatory vertebrae; while the common spaces are limited to a double loaded corridor system whose units remain predominantly inward looking.

Alternatively, the *objet-type's* floor plans act a series of evolving topological planes whose mixed-use programme simultaneously transforms to create engaging environments. As demonstrated on the subsequent page, the flowing circulation network is represented in teal, with the voids opening to below; while common spaces are shown in deep orange and denote the location of interstitial inhabitable planes. The orange edges highlight soft edges through which one programme can engage with another. In higher levels of the tower, the polyvalent edge begins to catalyze connectivity between multiple floor plates as its movements reverberate through the system.

OBJET-TYPE LEGEND

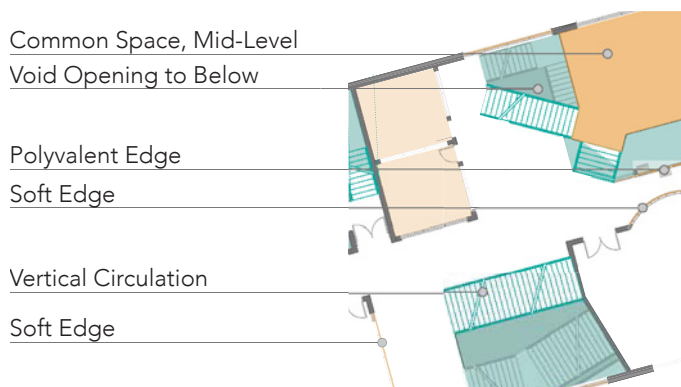


Fig. 205. *Objet-type* legend for figures 207–10

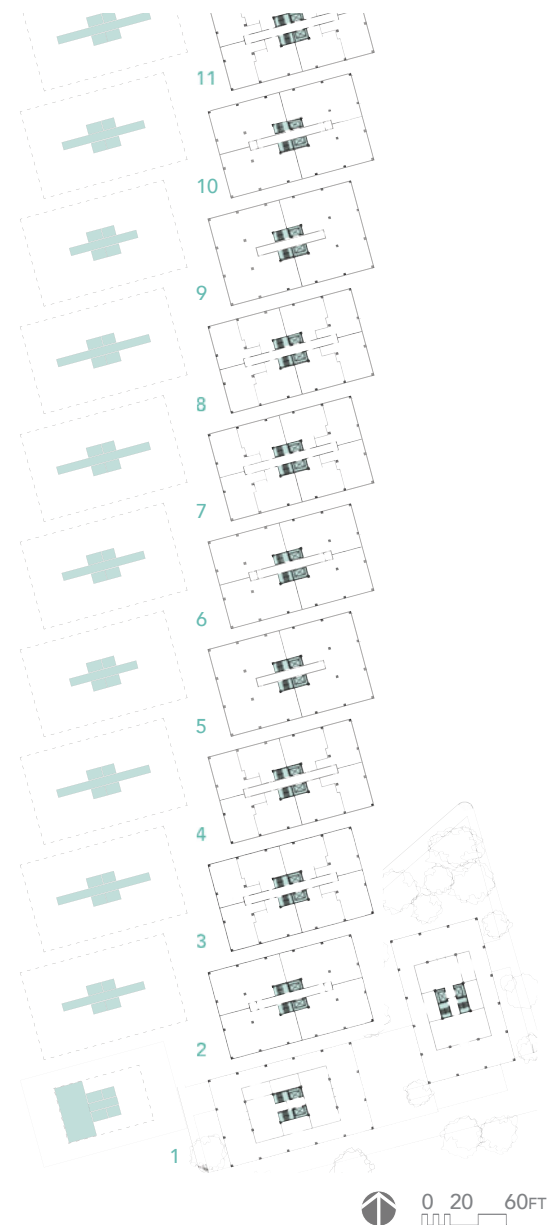


Fig. 206. Left, Lake Shore Drive Apartments, diagramming the vertical vertebrae circulation and double loaded corridor; diagrams based on Lake Shore Drive Trust, *Living at 860/880 Lake Shore Drive: Flexible Floor Plans*; and Carter, *Mies van der Rohe at Work*

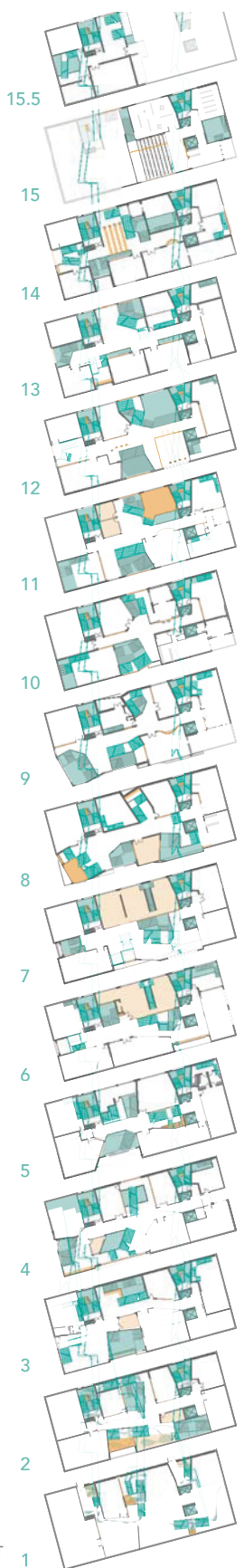


Fig. 207. Right, *Objet-type* floor plans as topological planes connected through topological space, material connectivity and inhabited interstitial planes

Fig. 210.

Fig. 209.

Fig. 208.

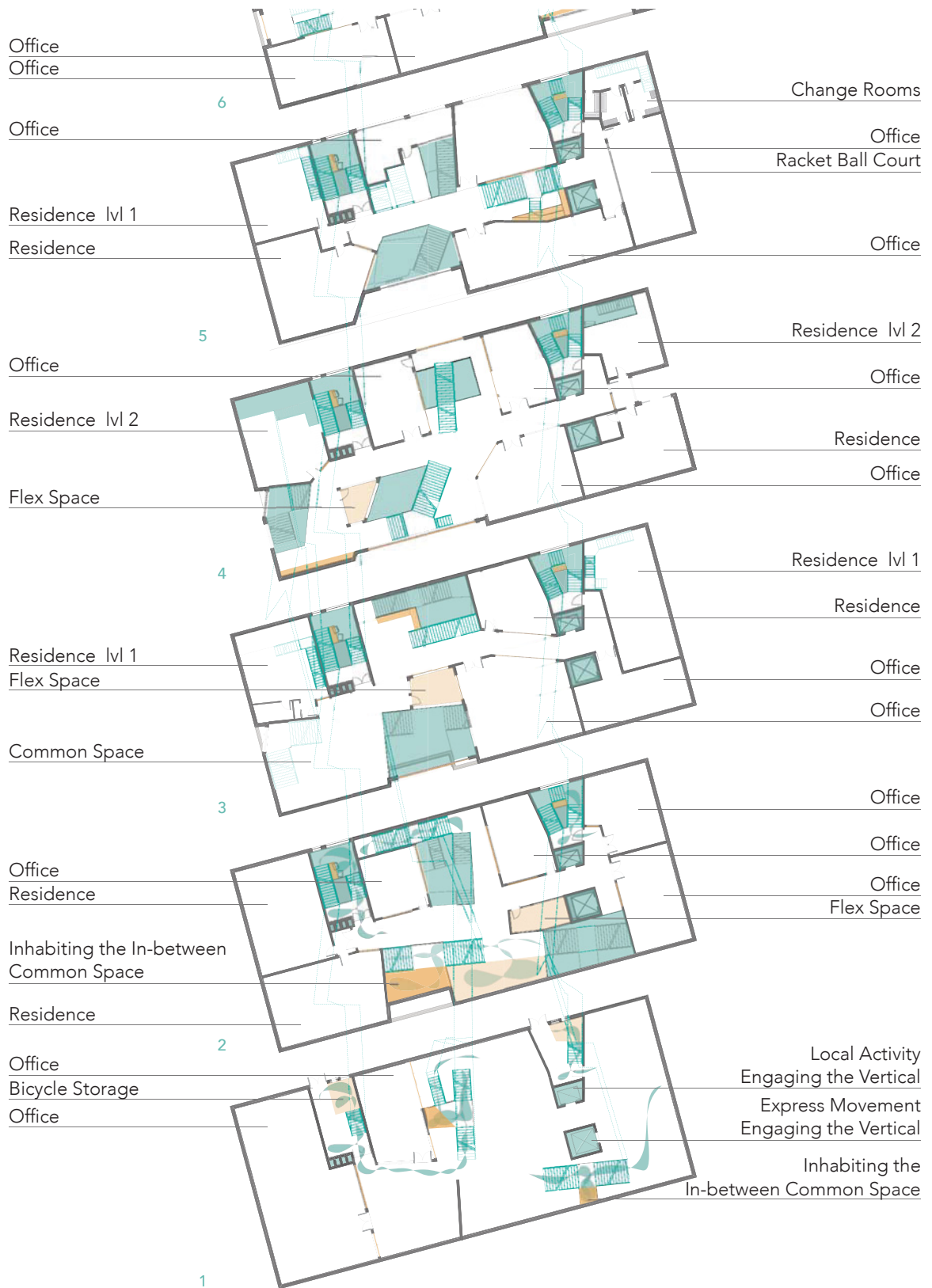


Fig. 208. *Objet*-type floor plans, levels 1–5



Fig. 209. *Objet*-type floor plans, levels 6–11



Fig. 210. *Objet*-type floor plans, levels 11–16

TOPOLOGICAL SPACE

By transforming progression through space, context can be established using visual, physical and tactile connectivity. As the inhabitants move through the building, visual and spatial connectivity reinforces a sense of place in the vertical volume. (These are demonstrated below, as the flowing teal and purple view planes.)

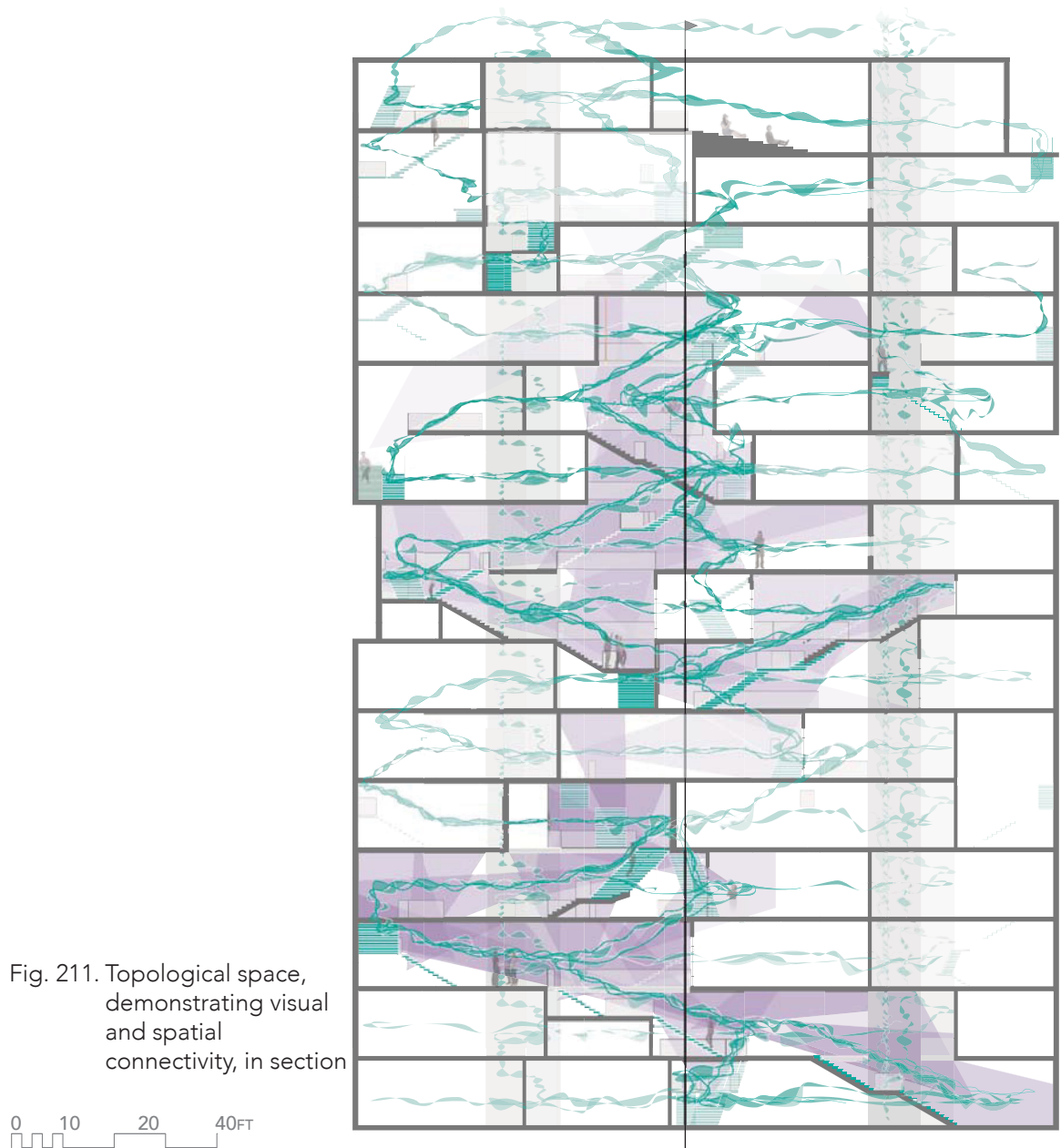


Fig. 211. Topological space, demonstrating visual and spatial connectivity, in section

0 10 20 40FT

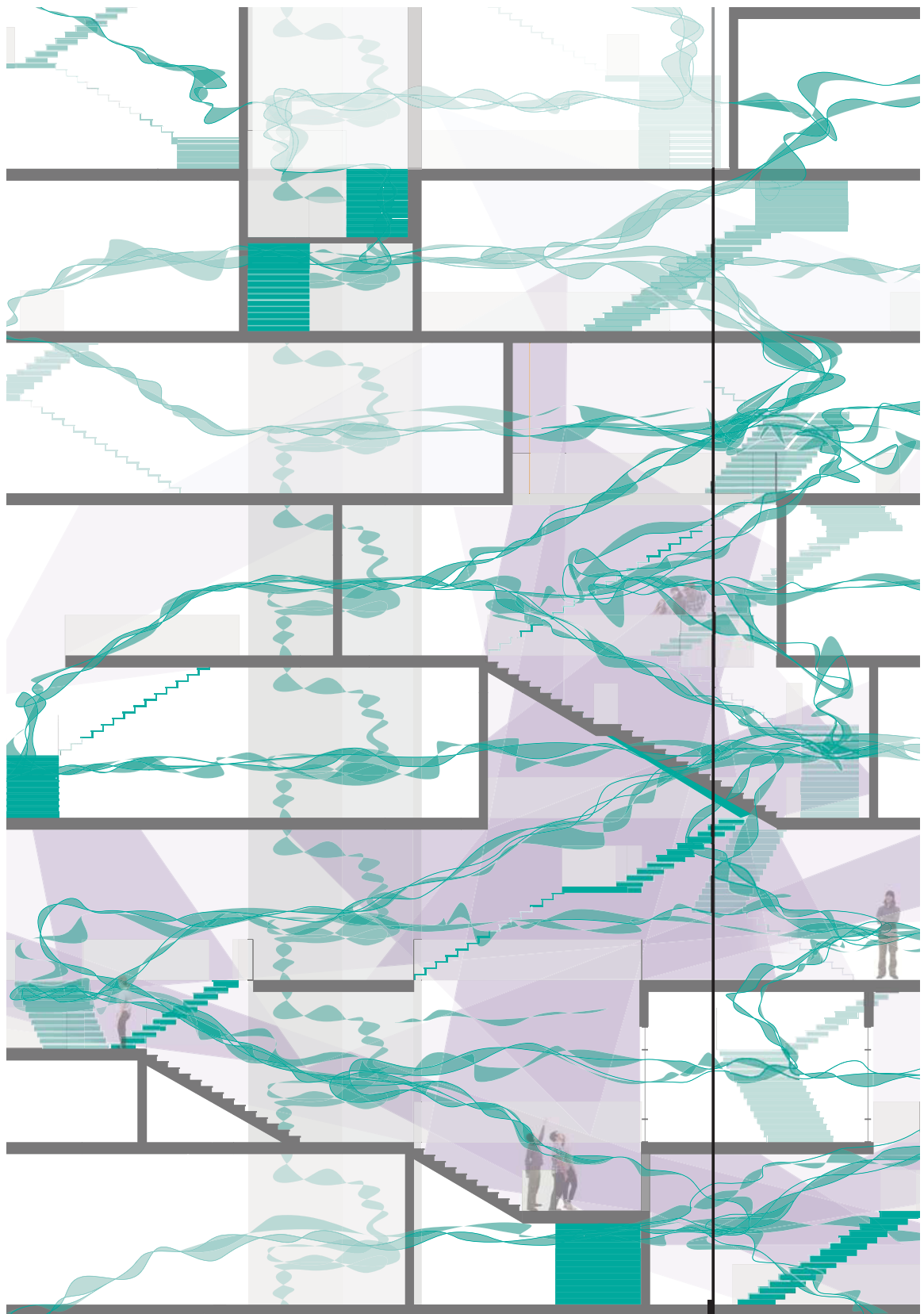


Fig. 212. Topological space, demonstrating visual and spatial connectivity

0 5 10 20FT

TOPOLOGICAL PLANES

While touch, edge effects and threshold carry the users through the building (as shown in orange). Following the orange hand rails, tactility acts as a way-finding device to weave the users through the vertical journey of their choice.

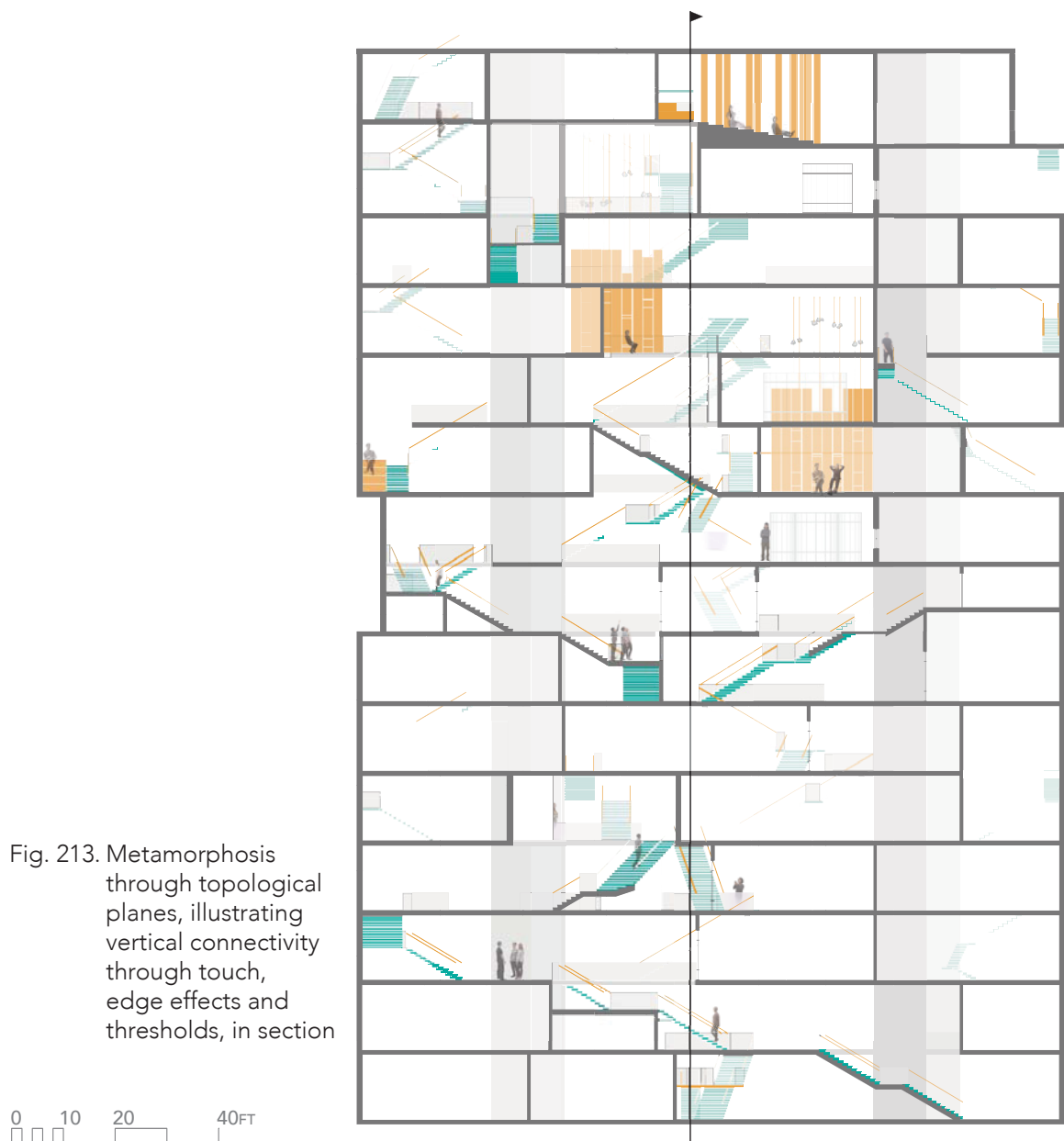


Fig. 213. Metamorphosis through topological planes, illustrating vertical connectivity through touch, edge effects and thresholds, in section



Fig. 214. Continuity through ascent, inhabiting the interstitial, connectivity through tactility and the polyvalent edge



ESTABLISHING CONNECTIVITY

To reinforce connectivity, interstitial moments of life happen at the enlarged mid-floor landings spread throughout the system and in the egress stairwells. A recycling center exists in one of these fire stairs, with the intent to vertically connect the system and activate otherwise neglected zones with life. These stairs are similarly adapted to be lived, one as a reclined and relaxed space to look out at the city; the other as perhaps a desk space.



Fig. 215. Continuity through ascent: inhabiting the interstitial, using tactility as a way-finding device to weave users through the vertical journey of their choice; *left to right*: Emily, Mark, Claire, Jordan, Lewis, Jordan, Emily, Emily, Pearl, Lewis, Jordan, and Emily

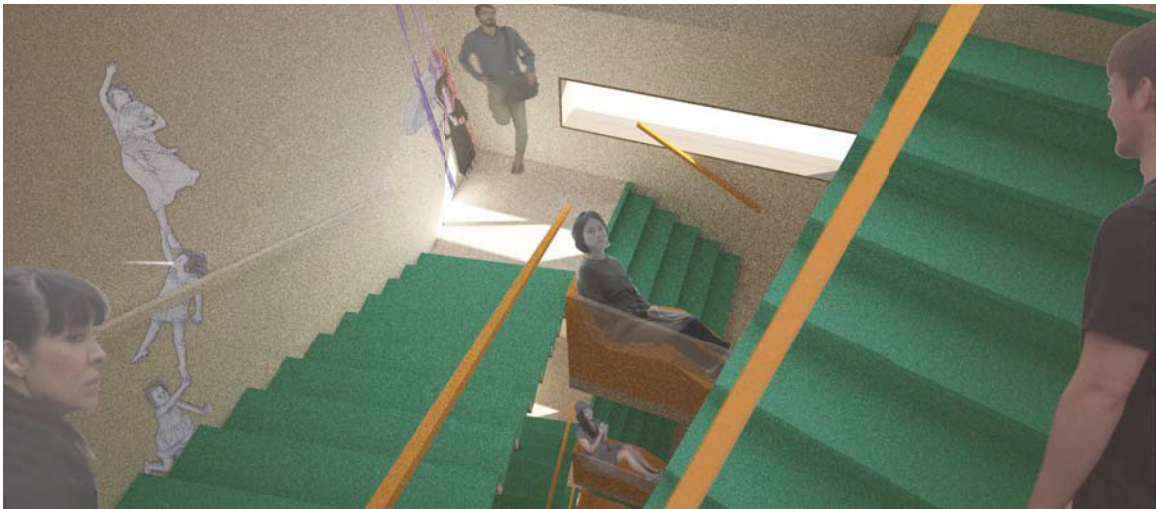


Fig. 216. *Top*, Embedding desk space into egress stair; *left to right*: Emily, Jason, Claire, and Lindsay

Fig. 217. *Middle*, Embedding a recycling center into egress stair; *left to right*: Lewis, Emily, woman, Emily, Jordan, Jason, Farhan, and Kate

Fig. 218. *Bottom*, Embedding life into egress stairs, reclined reading spaces; *left to right*: woman, Farhan, Pearl, Claire, and Lewis

EXPERIENCING THE EDGE: CONTINUITY THROUGH ASCENT

Visual connectivity draws users through the building as they ascend, hinting at possible routes to travel, and links them back down to where they began. Materiality, such as this translucent screen also provides hints of what lies just beyond. This occurs both, on the exterior of the building – where it follows the undulating path of ascent and speaks to the ephemeral journeys up; as well as in the form of a subtle screen between the private residential units and the interior elevated street. Since visual engagement occurs only when people are close to the soft edge, unusual placement of these moments in corridor spaces will remind users that they are part of a larger web of residents.



Fig. 219. Soft edge material study, relating the public and private domains connecting environments by engaging through ephemeral translucency, wood and corrugated plastic model; *left to right*: Claire, Ryan, and Emily

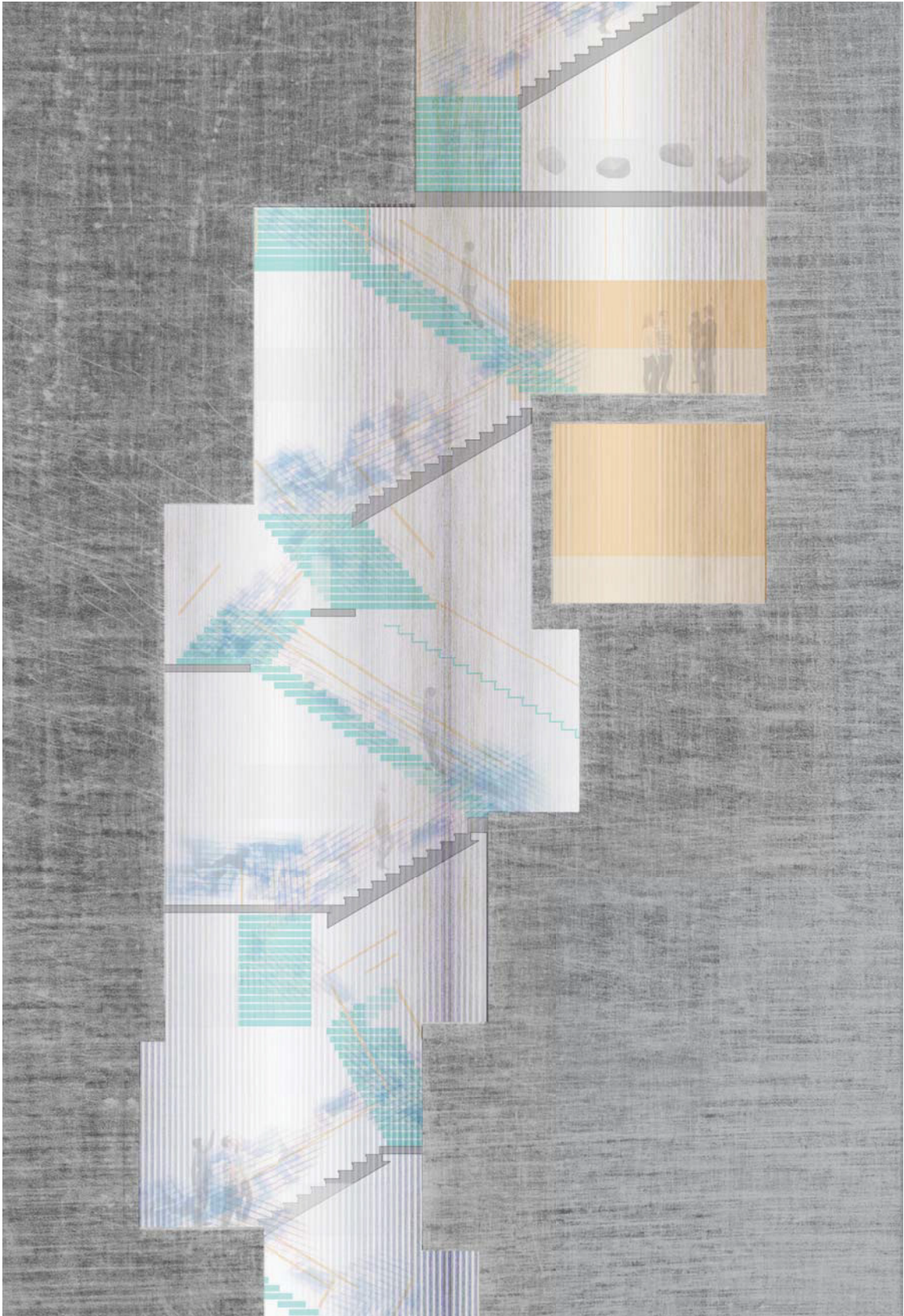


Fig. 220. Soft edge connecting environments, engaging through ephemeral translucency; elevation

8.3 VERTICAL CATALYSTS

To draw users through the expansive spaces of the vertical domain, catalysts have been embedded in the system – encouraging ascent, exploration, interaction and gathering. By creating catalytic environments, such as the vertical street, polyvalent edge conditions, pavilions and the public platform of a rooftop plaza, the social space of the streets below are encouraged to engage with that of the vertical: inciting interaction through different layers of the urban environment.

THE POLYVALENT EDGE

To provide moments of connectivity within the delaminated domain, the polyvalent edge explores the idea that an interaction with an edge can alter the experience of multiple environments simultaneously. For instance, as a person pushes against the polyvalent wall, a seat emerges, that in turn slides a vertical plane down on a different level to reveal life beyond, and on yet another floor a counter weight stone lifts to accept the weight of the person below as they sit in the space of the wall. The person seated can also witness a secondary set of the counterweights and will notice their movement in space. This sense of connectivity establishes the notion that we are part of a larger space than our immediate surroundings suggest: demonstrating how a continuity of common spaces coupled with edge effects can imbue a sense of connectivity between the delaminated layers of the vertical domain.



Fig. 221. The polyvalent edge material study at the chair, connecting vertical environments by providing interstitial moments of engagement



Fig. 222. *Top*, Catalyzing ascent, providing moments of connectivity within the vertical domain, unactivated polyvalent edge; *left to right*: Emily, Emily, Jordan, Jason, and woman
 Fig. 223. *Bottom*, Catalyzing ascent, activated polyvalent edge; *left to right*: Farhan, Jordan, Emily, woman, Emily, Jason, and Lewis

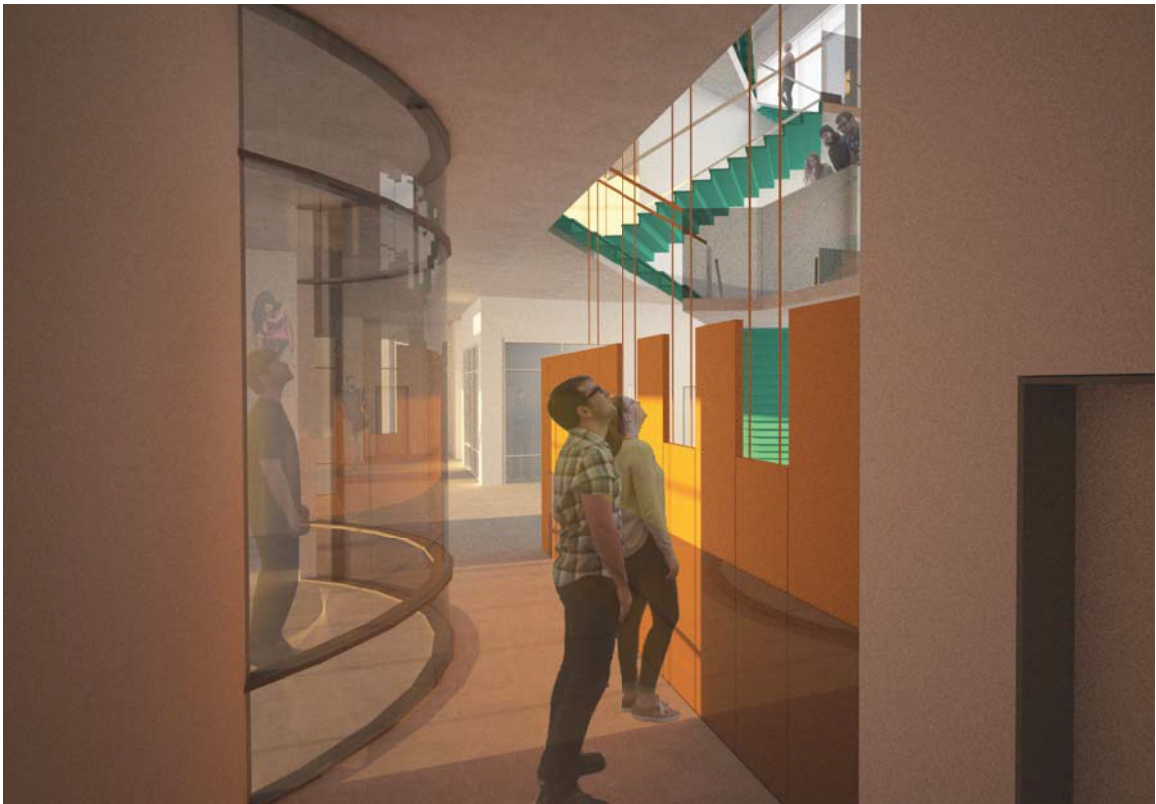


Fig. 224. *Top*, Catalyzing ascent, providing moments of connectivity within the vertical domain, unactivated polyvalent edge; *left to right*: Emily, Lewis, Jordan, Emily, Jason, and Kate
 Fig. 225. *Bottom*, Catalyzing ascent, activated polyvalent edge; *left to right*: Lewis, Jordan, Emily, Emily, Emily, Jason and Jordan



Fig. 226. *Top*, Catalyzing ascent, providing moments of connectivity within the vertical domain, unactivated polyvalent edge; *left to right*: Kate, Jordan, woman, Emily, Megan, Emily, Jordan, and Lewis

Fig. 227. *Bottom*, Catalyzing ascent, activated polyvalent edge; *left to right*: Lewis, Jordan, Megan, Jason, Emily, Katy, Pearl, Odin, Shalini, Emily, Kate, and woman



Fig. 228. Catalyzing ascent, providing moments of connectivity within the vertical domain, showing an activated polyvalent edge relating three levels simultaneously; left to right: Emily, Lewis, Emily, Lewis, Pearl, Jason, Mark, Claire, Emily, Jordan, Jason, Jordan, Emily

THE VERTICAL STREET

Wandering through the intertwining streets of vertical domain and shaping space as they ascend, Michel de Certeau's walkers, the *Wandersmänner*, begin to write the text of the vertical city, while their 'bodies follow the thicks and thins' of circulation patterns.¹⁹¹ Here, they embrace the internal vertical street network, finding places in the common spaces to pause, engage with others, reflect, and express themselves. As individuals, in groups or as a *swarming mass*, they ascend, descend and pass through the labyrinth of vertical streets to discover the common space of the rooftop plaza.¹⁹² Their collective story, that began on the ground, has been invited to unknowingly map the undiscovered layers of the city.

Characterized by its users, the street has many personalities, it can be a place of tranquility and of terror, a place for the gathering of community and for the masses of a revolution. For the elevated internal street to function as a typical street, provisional space for the freedom of expression needs to be considered by architects, just as much as safety through visibility.¹⁹³



Fig. 229. The vertical street a space for everyday life, personal expression and revolution, a mass of protestors flood the vertical streets on their way to the common space of roof top plaza; *left to right: Kate, Jordan, Emily, and Emily*

191. Ibid., 93, 97.

192. Ibid., 97.

193. Chapters 4.1 and 5.6 examine corridor spaces and discuss safety through visibility.

Like the circulation network in the city below, the vertical streets can instantly become a space of revolution: filling with protestors, as they ascend through the weaving stairwells, mass in common spaces, and march towards the public platform of the rooftop plaza to gather and proclaim their case – overwhelming the public space above with activity.

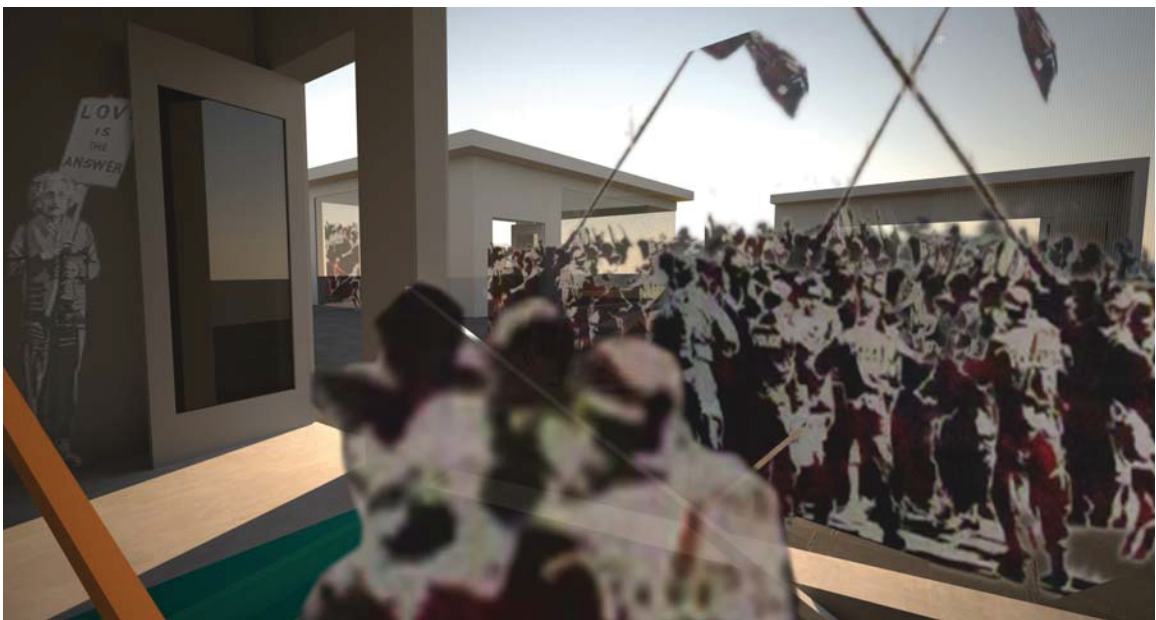


Fig. 230. The vertical street as a space for revolution: protestors flooding the vertical streets on their way to the common space of roof top plaza, gathering in volume as they ascend; *left to right*: Lewis, Emily, Jordan, Emily, Jason

Fig. 231. Protestors overwhelming the roof top plaza, defending their cause

THE ROOFTOP PLAZA

High above the city streets, a series of nodal pavilions cap the climbing movement as it protrudes through the roof plane. Here, the vertical street emerges from illuminated pavilions, melting out into the space of a public plaza. The journeying *wandersmänner* emerge through this threshold – gathering sometimes as a community in celebration and at other times in revolt – where together they embrace the public social space of the rooftop plaza.¹⁹⁴

While each of the pavilions are unique, they share a common intent: to provide interior common spaces that expand out into the public plaza when the weather is mild, yet provide an inhabitable space of refuge at other times of the day or year. As backdrops for a myriad of social activities, the pavilions all engage with the rooftop plaza, spilling life out onto its surfaces when the weather is mild; while still providing internal spaces to gather and inhabit at other times of the day and year. The three rooms of the pavilions each offer a unique series of interactions with the shared rooftop environment: The Morning pavilion gathers early sunlight; the Day pavilion soaks it deep into its recesses and the Afternoon pavilion, acts as a sieve: drawing and framing the sunset as it dips below the horizon.



Fig. 232. Morning pavilion: the common space of rooftop plaza is also a place for calm, retrospection, and fun; *left to right*: Emily, Zheng, Claire, Kara, Gracie, Riley, and Emily

194. *Ibid.*, 93, 97.

The Morning pavilion, capping the elevator shafts and North-East stairwell, is larger in scale than the others, anticipating individual, family, and community gatherings. This space boasts a large bench that is embedded into a perforated wall, creating spaces for the walkers and inhabitants to sit within the space of the wall and bask in the sheets of sunshine. The large doors on the east facade slide away to spill internal activities out onto a smaller secluded plaza, composing an alternative common room above. Acting as both a place to be and a major entrance to the rooftop environment, the morning pavilion acts as a final space of compression, suggesting interaction before proceeding onto the main plaza or returning back down through the vertical domain. Emerging through the fire stair in the morning pavilion, the walkers appear as blurred ephemeral motion behind the corrugated semi opaque screen, to those already on the rooftop plaza. Inversely, the semi visibility obscures the final unveiling of the rooftop gathering from the view of ascending walkers, yet hinting at experiences to come.

The Day pavilion is south oriented, with full sun exposure to act as a warm solarium-like space for its users. Its peripheral window walls connect the length of the rooftop, providing full visibility to the different zones of the plaza. Using a polyvalent edge, the space engages multiple environments simultaneously. By reclining into the wall-seat, embedded into the space of the wall below, the wood screen above slides down, opening



Fig. 233. The polyvalent edge and stair emerge into the common space of the Day Pavilion, where the sunlight fills the room like a warm solarium; *left to right*: boy, Riley, Gracie, Emily, Diana, Robert, Claire, Daniel, Emily, Jordan, Lewis, woman, and Jason

up the room of the pavilion to the plaza beyond – shifting layers of visibility, and altering the character of the space as it interacts with the plaza. Similar to other polyvalent edges, scattered through the vertical street, the counter weight stones shift in yet another space, rippling movement and activity through layers of the building.

The Afternoon pavilion has a slightly different relationship with the central plaza than the first two. Arranged to face the public plaza, the east facade opens spilling programme out or drawing it in – blurring the lines of inside and out. The design of this pavilion could be acoustically optimized to act as a stage backdrop, providing more presence to activities occurring on the roof-scape when necessary. Such a space could host a band, play, film night, class presentation, or even be used to address a speech or protest.

So, on warm evenings, ascending through the illuminated nodal pavilions, the vertical community gathers in the public plaza for impromptu fun: dancing and singing to concerts; laughing and watching the artistic fun of the theater; and conversing, playing and feasting at potluck dinners. Together these social spaces of expansion and contraction host the life of the community.



Fig. 234. Ascending through the illuminated nodal pavilions on the roof, the vertical community gathers in the public plaza for an impromptu party. In the distance, the Afternoon pavilion frames the sunset as it dips below the horizon; *left to right*: Emily, Jordan, Lewis, Farhan, Jason, Riley, Emily, Emily, Gracie, Errington Vaudeville ladies, boy, and Megan

CHAPTER 9: POST SCRIPT

9.1 THE COMMON SPACE ABOVE



Fig. 235. Systematic sea of activity, spreading across the city skyline;
watercolour based on Ledbetter, *11 Photos that Prove Fog Isn't a Ruiner*

Activating the Vertical City's reconsideration of a rooftop is not alone, it joins the ranks of the Rockefeller Center and the Unité d'Habitation, by Le Corbusier.¹⁹⁵ Both of these buildings also gave over their rooftops to provide public places to gather, employing a space that is typically neglected. The bountiful rooftop surfaces of our cities greatly need to be reconsidered. These unused spaces should begin to contribute to the cities they cover in new innovative ways: bringing life to the world above as shared gardens, small parks, and common plazas. Imagine if there were a network of similar towers spread throughout a city skyline. As a series of typological towers, the vertical catalysts embedded on the roof would create an illuminated dialogue of activity by night; and by day demonstrate the social inhabitation of space – creating a systematic sea of activity that can spread across the city skyline.

Similarly, the facades of each tower will share their own daily stories with the street, enlivening, and inviting those below to explore what lies within. The undulating facades

195. Referring to the rooftop plaza and preschool on the expansive surface of the Unité d'Habitation, by Le Corbusier, and the rooftop gardens of Rockefeller Center, by Raymond Hood, principal architect.

follow the weaving nature of the elevated internal streets as they climb their way up through the tower. As passers-by gaze up at these high-rises they will notice the fleeting ephemeral movement of ascent and descent through the semi translucent surfaces of the facades – whispering stories of an internal life. These fleeting gestures will hint of an expansive space that should be explored within the vertical domain. The passers-by will also be intrigued by the activity flowing through the vertical streets and occurring on the rooftop plazas, and wonder how to take part in the merrymaking. Following the theme of the Jean Jacques Rousseau's dance, in his *Letter to l'Alembert*, this unexpected gaiety will draw humanity from far and wide up into the building to join in the events.¹⁹⁶ The visual presence of such an affair will stimulate the community, gathering unexpected people together, to meet, to talk, and to dance: composing connectivity and community in a once isolated space.

In the event that the vertical streets became swollen with the movement of a protest, the climb through the skyscrapers would be celebrated, as the streets came to life with activity. This excitement would be visibly reflected out through the facades, to the city below, before the mob flowed out onto the roof. By exhibiting the internal inhabitation and circulation in such a way, the vertical spaces encourage the social acts of community gathering, freedom of speech and freedom expression to swell through the vertical domain, inhabit the pauses, and flow through the pavilions to arrive on the rooftop plaza. These common spaces, scattered throughout the vertical city, embody the social space that Henri Lefebvre spoke about in the *Production of Space*. By *Activating the Vertical City*, the lost 'common sense' space, that was shattered in 1910, is returned to the urban environment: this "space of common sense, of knowledge (savoir), of social practice, of political power, ... [of] everyday discourse, ... [and of] abstract thought," will once again have a place to exist.¹⁹⁷ For in each of these scenarios, there can be found places to gather and communicate – accommodating a social atmosphere that will enrich the layers of the vertical city. In this way, place will manifest in vertical space.

196. Tracy B Strong, *Jean-Jacques Rousseau: The Politics of the Ordinary* (Lanham: Rowman & Littlefield, 2002), 61-62. Strong references the "Letter to L'Alembert," by Rousseau

197. Lefebvre, *The Production of Space*, 25. Referring to the lost 'common sense space.'

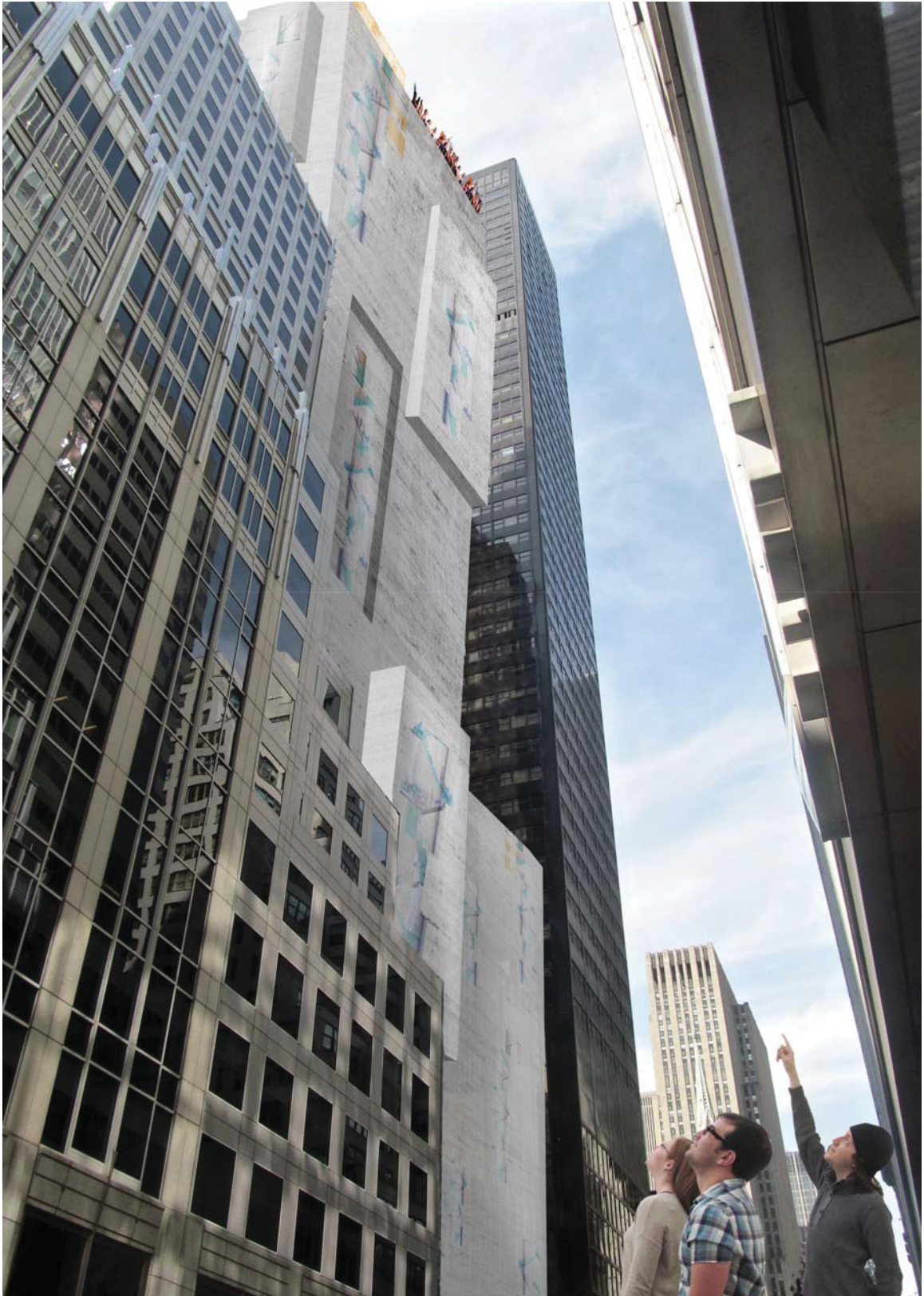


Fig. 236. Undulating translucent surfaces of the facade exhibiting virtual circulation climbing to the roof top plaza, activating the journeying wandersmänner in city streets below; *left to right*: Errington Vaudeville ladies, Emily, Jordan, and Jason

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