

## Palimpsest & The Computational Environment

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# University of Washington

## Abstract

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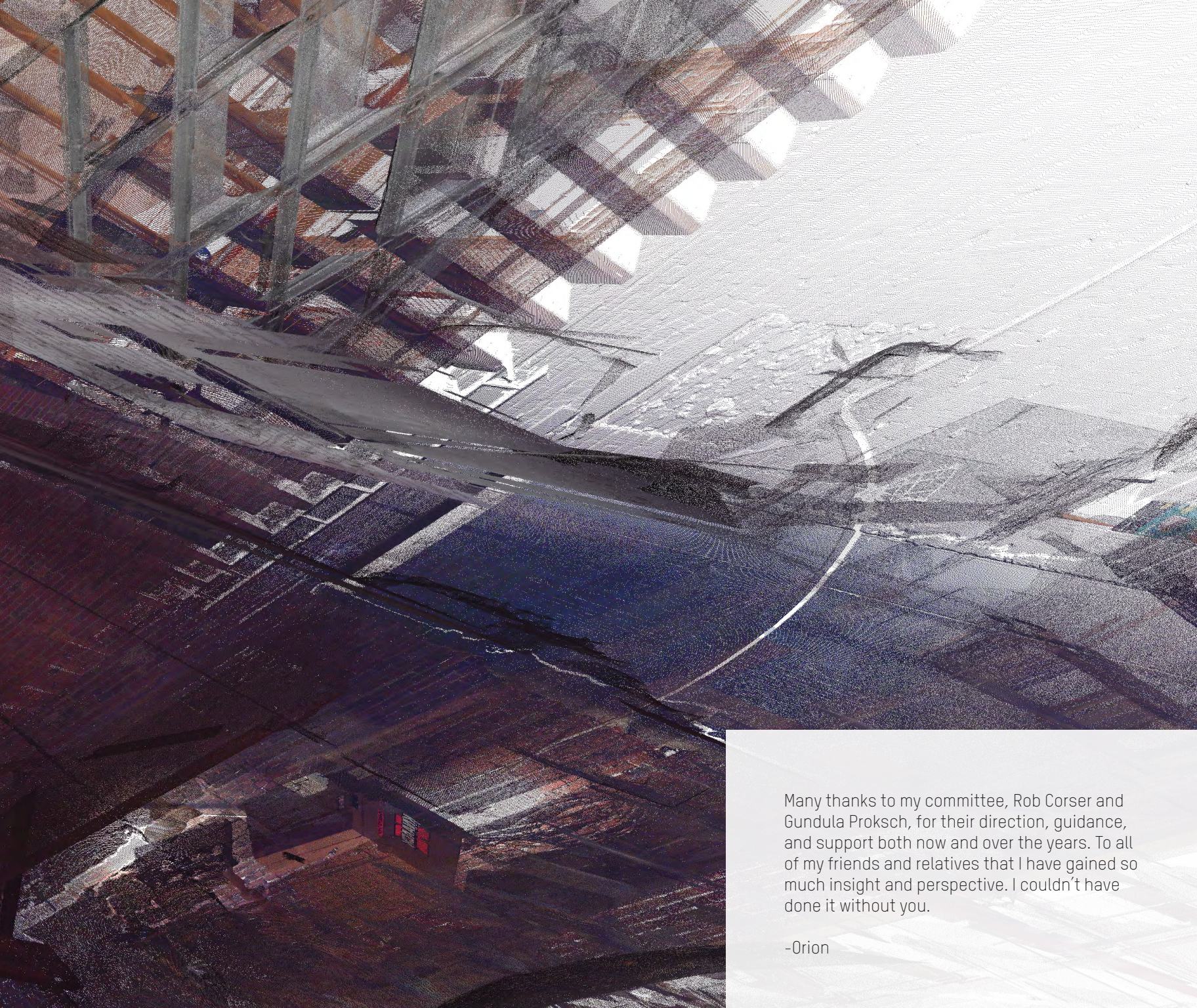
Spatial technologies such as LiDAR scanning are still in their infancy, yet they are quickly becoming part of our daily lives through their employment as sensory systems in self-driving cars, aerial scans of entire cities and landscapes, or portable terrestrial units. As the increasingly becomes a lens through which we view the physical world, there is a greater need for designers to explore the opportunities inherent in this technology.

The process of scanning produces a highly accurate spatial model of an existing space, providing a simulacrum of the physical world. This 3-dimensional collage contains not only the banal information of the architectural environment, but includes artifacts of use and inhabitation. This detritus captured in the scans serves as *witness marks*, or physical manifestations of human intervention whether accidental, incidental or intentional.

This project explores the human interaction on the built environment through a forensic study of the present condition of the Metropole Building, a historic site in Seattle's Pioneer Square. The spatial data of the existing conditions gathered through scanning becomes the foundation for a designed intervention. Antecedents in art and theory are used to provide a framework for the design of a series of architectural interventions into the existing space that form a continual conversation between the building's history and inherent memory inscribed on the architecture.

Fig. 1 - Spatial Errata





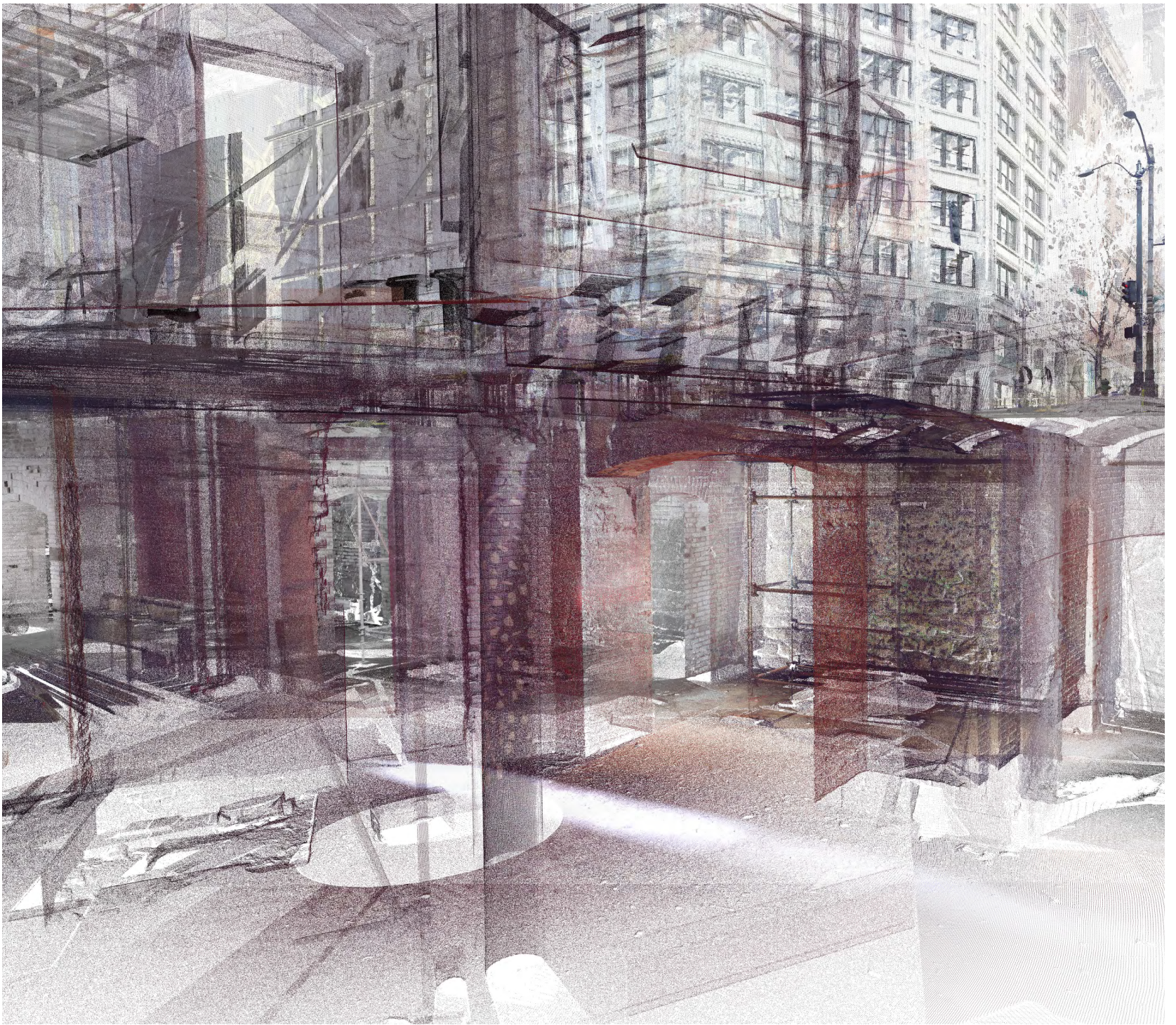
Many thanks to my committee, Rob Corser and Gundula Proksch, for their direction, guidance, and support both now and over the years. To all of my friends and relatives that I have gained so much insight and perspective. I couldn't have done it without you.

-Orion



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## INTRODUCTION

This thesis explores the use of emergent 3-dimensional scanning technologies and highlights opportunities for their use within a design framework. The collected scan data provides a hyper-saturated spatial representation of not only the built environment but also the layers of inhabitation represented on that environment. This stands in contrast to traditional analyses of the building context in that the scans provide a highly accurate 3-dimensional representation of physical space that provide a greater understanding of the temporal nature of place and being in architecture.

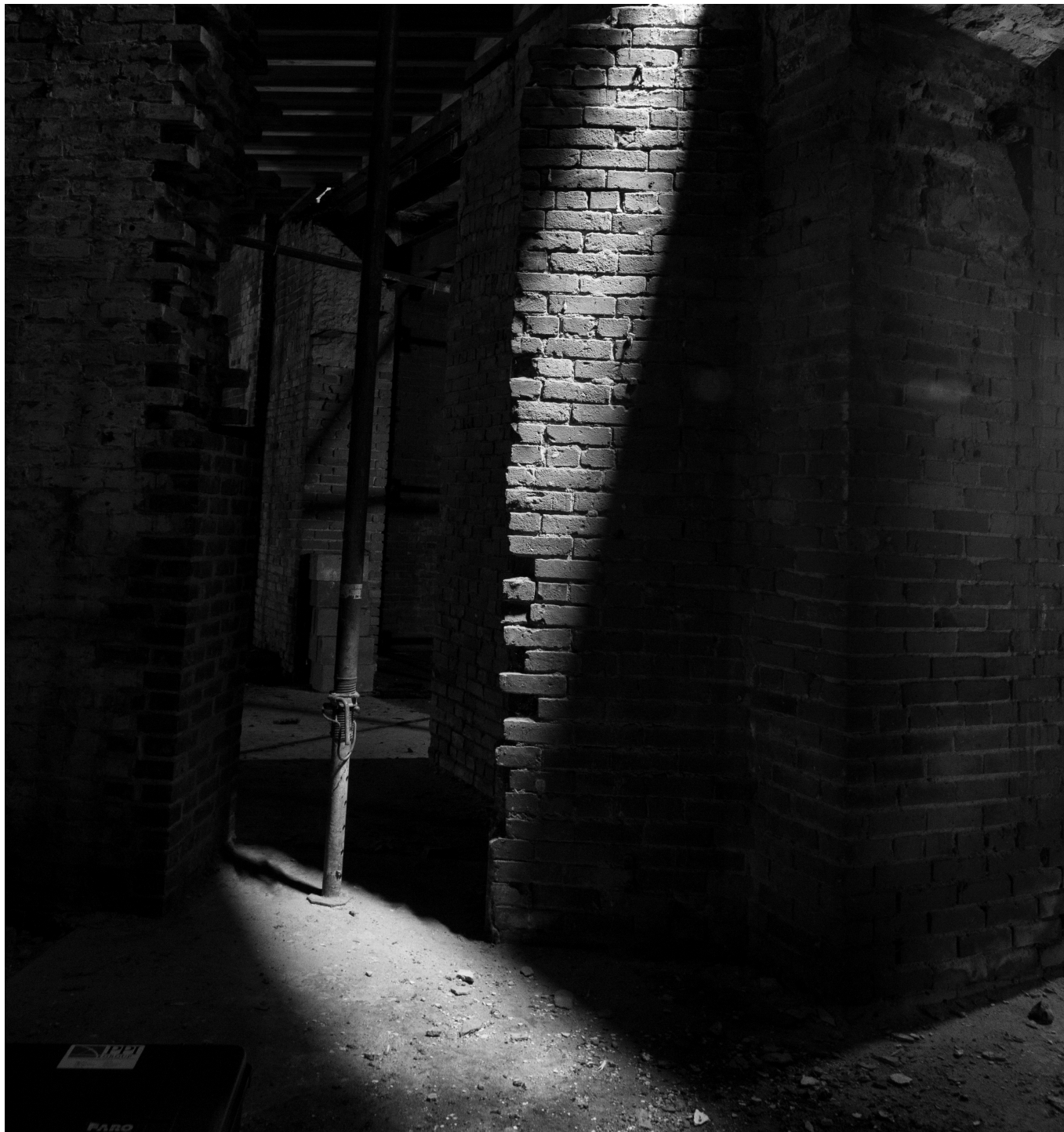
Utilized mainly by the engineering and construction industries, portable LiDAR (Light Detection And Range) scanning technology provides millimeter-accurate precision over hundreds of yards while also collecting 3-dimensional photographic color information. These scans produce a deep reading of actual spatial conditions, blending the texture and accuracy of photography with highly accurate planar data. Embedded in each scan are layers of information that provide a deeper understanding of the object or space being scanned—a physical history, an imprint revealed. The process of scanning, while having no physical effect on its surroundings distinctively changes our position in respect to it—we give heighten its status as a subject of inquiry.

By processing a sequence of scans, entire buildings, cities, terrains are represented. What begins as an exploration of a building soon becomes a reflection back on the city. What is a study of the built environment becomes autobiographical through our own interventions on the structures that surround us. The result is an

abstract conversation between the ideas of historicism, memory, and technological advancement that interplay with the multiple timelines defined in and inscribed on the architecture

This engagement with the tapestry of human endeavor on the built environment is not in itself new. Layers of human intervention, or “witness marks” on the architecture define an abstract timeline of the building’s use and inhabitation: The hole left from a wooden beam no longer present, graffiti on a wall, scars on a wood floor from a chair continually pulled back and replaced. These tell an incomplete, multilayered and momentary history of the building separate from the architectural drawings that underscored its construction. LiDAR scanning produces a forensic analysis of this momentary history that describes a timeline that is alternative to historical narratives.

This project explores the human interaction on the built environment through a forensic study of the present condition of the Metropole Building, a historic site in Seattle’s Pioneer Square. The spatial data of the existing conditions gathered through scanning becomes the foundation for a designed intervention. Gathering inspiration from artists such as Gordon Matta-Clark, Rachel Whiteread, and others this project explores both additive and subtractive processes to the existing space in the form of a continual conversation between the building’s history and inherent memory inscribed on the architecture.



# THEORETICAL FRAMEWORK

## I. PALIMPSEST AND THE WITNESS MARK

Buildings carry a living record of inhabitation, a timeline made visible. Within this record is a history only hinted at of the lives and memories that passed through the building. Even the cast-off elements of trash, detritus that fills an abandoned space tells a story of the inhabitants. They exist in a way, as an anti-history of a building. Agnostic to historical narrative, these fragments of lost moments each tell a partial story, memories that will remain incomplete but leave a mark on the architecture.

Human endeavor leaves its own traces on the built environment. Designers grasp for a deeper reading of existing space, a sort of “forensic analysis” of the use and inhabitation of space. A Witness Mark is an intentional or accidental mark or abrasion indicating assembly, use, etc. <sup>1</sup> These marks identify the uses and lives of the building, and are a tacit recognition of a building moving through time rather than attempting to freeze it in time. In his work, *The Ethics of Dust* Jorge Otero-Pailos questioned the notion of historicism:

***Is there not something suicidal, or at least amnesiac, in the impulse that dictates that an act of restoration should be so sly as to be invisible?***<sup>2</sup>

Rather than removing the effects of time, is there not a reason to expose them? Put them on display? These markings convey use, assembly and inhabitation. The scratches on a floor where a chair once lived, a struck line on two pipes that show assembly. These textures on the build environment, both intentional and incidental

are records between individuals and across spans of time. They are the simple recorded movements of how we live.

Perhaps the term “restoration” is incomplete in its description of the process of thoughtfully inhabiting historic buildings. It assumes there is a finite, specific point in time to retrieve and restore. Instead, I would make the case for using the term “intervention”: as the act of intervening on a space that requires the judgement to decide on what to alter, what to retain, and what to remove. This continual act of examining the propriety of historic elements within present culture is a process of reaffirming its value. Or, as Michel Serres suggests in his work on the founding of Rome, it is not the initial act of foundation that makes Rome unique, it is the consistent re-founding:

***Foundation is recurrent. It returns like a refrain. Rome does not cease to be founded; the act of origin or rooting continues indefinitely. To that Rome owes its long survival. But this remains hidden if we remain blind to variation.*** <sup>3</sup>

There is a symbiosis between history, memory and monument. The scan is a summation of a specific point in time but one that encompasses a rich, multi-layered palimpsest of markings, where the timeline of the building converges with the human experience. Markings appear that define what has come and gone. Moments are all but lost save for a piece of tape left on a wall, a chip in a stone, a deep scratch in the floorboards. Much of the way that we define historic buildings is through the lens of how they affect

1. Grant Barrett. “Witness Mark.” *A Way with Words*. August 9, 2007. Accessed March 2, 2017. [https://www.waywordradio.org/witness\\_mark/](https://www.waywordradio.org/witness_mark/).

2. Eva Ebersberger., et al. *Jorge Otero-Pailos : the Ethics of Dust*. Köln : New York, NY, Verlag Der Buchhandlung Walther KöNig ; Dist. by Art Publishers, 2009.

3. Michel Serres. *Rome : The Book of Foundations*. Stanford, Calif.: Stanford University Press, 1991. 263



*Fig. 4 - Exhibit At World's Exposition Chicago, Alphonse Bertillon 1898*

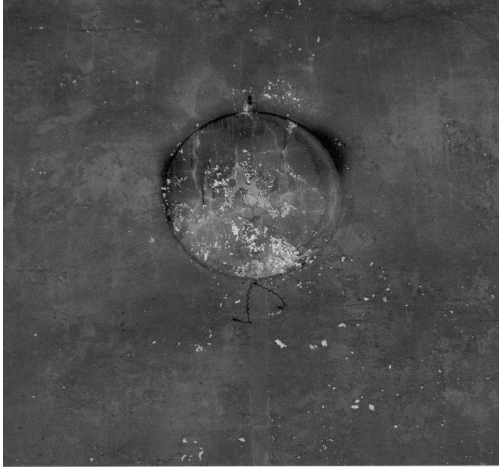


Fig. 5 - Absent Clock in Ex-Alumix Factory, *Raqs Media Collective* 2008

us—how a culture grows around a building, having an impact on generations of inhabitants.

This relationship does not work in a singular direction. In the same ways that an iconic building affects us, we affect it. We leave our own traces, much as a child carving her name into a tree, or footprints in the wet concrete that become part of the sidewalk. Beyond the planar outline of space, there is the texture and palimpsest of inhabitation. Each of these inscriptions on the building define a presence of absence: a fleeting memory that is all but forgotten save for its physical remnants.<sup>4</sup>

Jorge Otero-Pailos' work is inspired by the multiple timelines that

4. James A. Craig and Matt Ozga-Lawn. *Pamphlet Architecture 32 : Resilience*. New York, Princeton Architectural Press, 2012. 14-19.

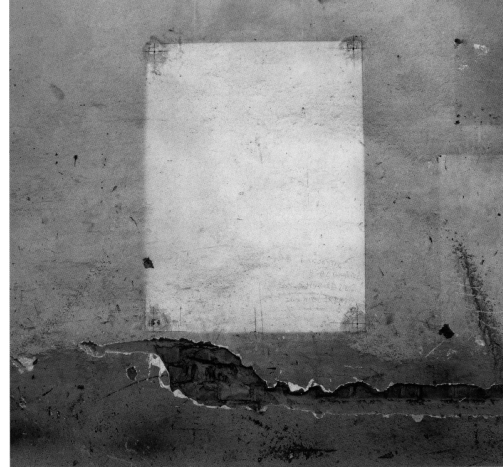


Fig. 6 - Missing Notice, *Raqs Media Collective* 2008

a building embodies. It is a living record of the span of its own inhabitation and simultaneously the current moment in time. Rather than promoting a singular view of history, his work asks us to define what point on the timeline we hold the building to. Should it be preserved as it looked upon its completion or show the years of use? Written on the surfaces of the space we inhabit is the palimpsest of our own making. It is autobiographical, but at the same time incidental (figs. 5 & 6). By removing these incidental elements, or rendering them impotent we erase a portion of our own collective memory. Rather than suggesting that all things are sacred, focus on these leftover marks elements frames both the object and ourselves within the historical narrative, and asks us to define what we hold as relevant, valuable and precious in the present moment.

## II. The AUTOGRAPHIC and the ALLOGRAPHIC: Digitization and the Multiplicity

It could be argued that the digitization of 3-dimensional space got its intellectual start almost five hundred years before in Rome with Leon Battista Alberti. Obsessed with absolute fidelity, Alberti developed one of the first systems for digitizing information. This was in pursuit of a way to assure no loss would occur in the reproduction of his work.

This interest began when Alberti was commissioned to draw an accurate map of Rome between the 1430s and 1440s. Without the invention of lithography, the only suitable method of replicating visual information accurately was with the use of scribes. Complex images and drawings lost fidelity through each inscription, soon becoming inaccurate and unusable.<sup>5</sup>

Alberti's solution to the problem of image fidelity was novel—instead of drawing a map to be copied and circulated, he produced the book *Descriptio Urbis Romae* that described the method of fabricating a tool of his own design and a coordinate system, followed by a lengthy set of digitized points. Thus, the map could be replicated exactly to the original dimensions. “The Albertian object is but the mechanical reification of an authorial script, and in Alberti's theory the material process of making, albeit carried out by human hands, is devoid of all human intentions”.<sup>6</sup> Soon he used this process not only to describe two-dimensional drawings, but devised a similar system for use with the replication of statues and other works. While the expectation was that the work could be perfectly replicated anywhere and by anyone, it also placed authorship solely in the hands of the digitizer. It doesn't

5. Mario Carpo. *The Alphabet and the Algorithm. Writing Architecture The Alphabet and the Algorithm*. Place of Publication Not Identified: MIT Press, 2011. 53.

6. Carpo. *The Alphabet and the Algorithm*. 78.

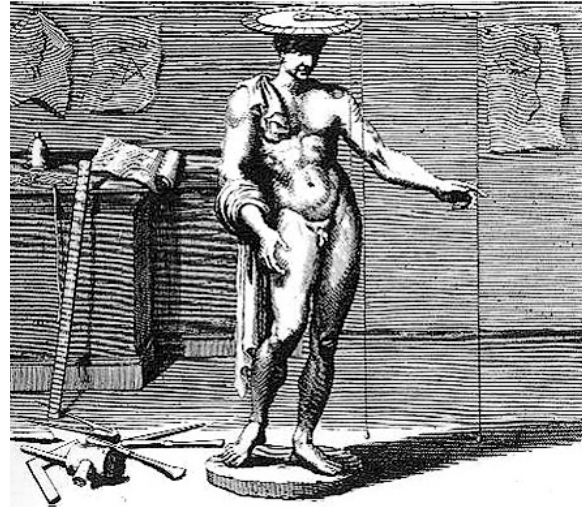


Fig.7 -From *De Statua*, Leon Battista Alberti 1462

matter who fabricates the map, the sculpture. Absolute control of authorship is ultimately maintained by defining the work in a digitized, unalterable format.

These principles of “perfect” replication and absolute authorial ownership were applied to architecture. Alberti believed in the need for complete control of the architect's intellectual work rather than allowing the builders to make their own interpretations of his intention, similar to the scribes whose interpretations of a written work altered the author's intention. While as a designer Alberti worked with physical models as well as drawings, once the work was finished, absolute control laid in absolute fidelity, and to this point he argued for the need for measured orthogonal drawings

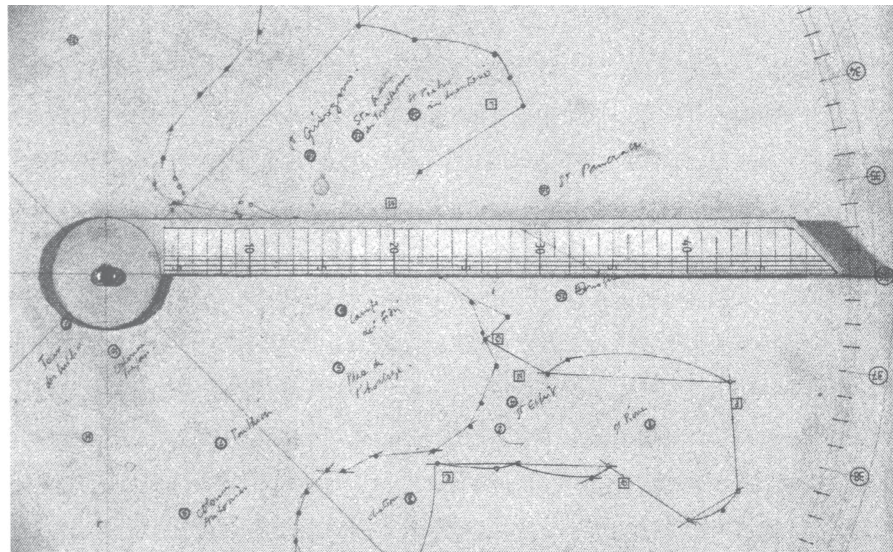
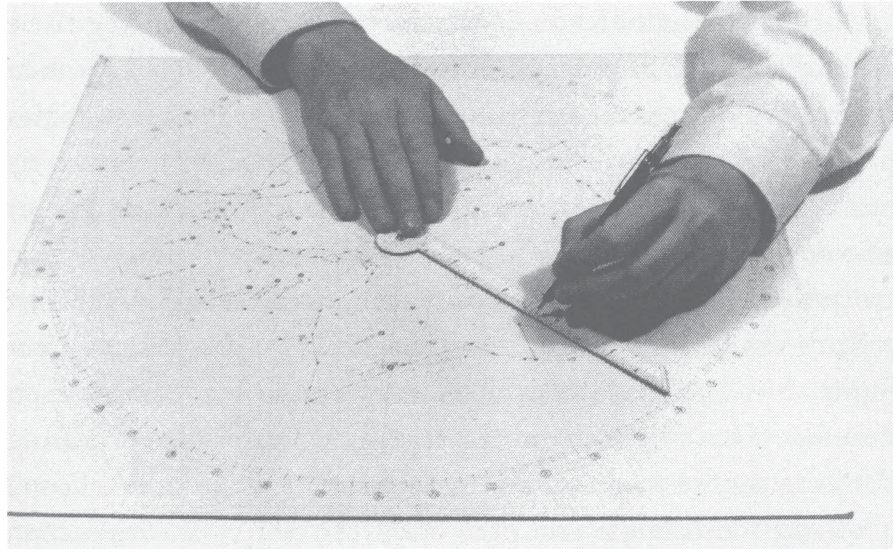


Fig. 8 - Descriptio Urbis Romae, Leon Battista Alberti 1430s-1440s Reproduced by Bruno Queysanne and Patrick Thépot

that could be replicated by the builder perfectly on-site. Plan, Section and elevation became ways of communicating information in a planar coordinate system with no loss of fidelity between designer and builder. Once disentangled from the act of building, the designer exercised total control over the intellectual work, and once finished it was relegated to the realm of the builder. “In Alberti’s theory, the design of a building is the original, and the building is its copy.”<sup>7</sup> To Alberti the design must be a singular, original creation brought to completion and remaining in non-physical space. The first copy is the replication of the designer’s intent made manifest in the physical world.

Scanning technology places a highly accurate simulacrum of the physical environment into the digital realm. Once untethered from the physical world, every outcome can be realized rather than any singular outcome. They exist in the same space simultaneously, like the entries for a competition for which there is only a single winner.

The work of Oliver Laric explores the very question of originality and authorship. Within the perceived object is the embodiment of all possible objects. The question of originality becomes inconsequential because the final object is itself inconsequential. Instead, the object is simply one example in a working and reworking of historical and mimetic narratives, without deference to one or the other. As noted in his work, *Versions 2012* (fig. 9):

*Are not the many versions different perspectives on a mutable fact? A long experimental game of chance played with omissions and emphases. With famous books the first time is actually the second, we begin them already knowing them. The prudent common phrase ‘rereading the classics’ is the result of an unwitting truth.*

7. Carpo. *The Alphabet and the Algorithm*. 26.

8. Oliver Laric. “*Versions 2012*”, video by artist. <http://olivertaric.com/versions2012.htm>

9. Jean Baudrillard. *Simulacra and Simulation*. Body, in Theory. Ann Arbor: University of Michigan Press, 1994. 2.

*Dialogue extends in both directions and the previous work is as altered by dialogue as the present one is. It differs with each season; every word has a history of usage to which it responds and anticipates a future response.*<sup>8</sup>

It is from the very displacement, the deviation of the object that it becomes invigorated with human interaction, and loses ties to any specific author. Out of the singularity comes a multiplicity of possibilities, with a solution selected given the propriety of a singular moment in time and context.

As Jean Baudrillard notes in *Simulacra and Simulation*, “The real is produced from miniaturized cells, matrices, and memory banks, models of control- and it can be reproduced an indefinite number of times from these”.<sup>9</sup> The physical world is produced through our collective experience. This does not preclude future appropriations and reappropriations. In fact, these appropriations are inherent in the object itself. Through the continual shift between object, idea, and intent, relevance is retained. What Walter Benjamin considered the “auratic” value of the original at a time when Mass Production reduced its importance is instead now contained within the reproducibility of the idea within a spectrum of shifting intent. Baudrillard seems to presume the existence of scanning technology in his perception of reality:

*Today abstraction is no longer that of the map, the double, the mirror, or the concept. Simulation is no longer that of a territory, a referential being, or a substance. It is the generation by models of a real without origin or reality: a hyperreal.*<sup>10</sup>

10. Baudrillard. *Simulacra and Simulation*. 1.



Fig 9 - Stills from Versions, *Oliver Laric* (2009-today)

### III. DIS-LOCATION: Shifting of Position in Art and Scan

Scanning has been used by engineers, historians and construction firms for a decade. However, it has only recently been used in art and architecture. Generally we are provided the processed mesh as a starting point. Lead Pencil Studio began working with laser scanning relatively early on, recognizing that the process of scanning elevates the mundane. What, to our day-to-day perception is a stairwell like any other in New York, becomes unique, autographic by the process of scanning (fig 12). The movement from the physical realm to the computational environment changes our perception of that space.

However, to suggest that the scan is more “honest” is perhaps to tell ourselves a falsehood. We curate our environment, as a photographer frames a picture. This is normal. It does not refute the scan, only enhances our understanding of it. With the scan comes an element inconceivable in photography: A separation between the scanner and the viewer. Whereas in photography they are the same, scanning detaches the two, creating a disembodied quality to our spatial understanding (fig 11).

This interest is not new. Shifting perspective, an attempt to make the two-dimensional spatial has been studied by artists such as Cezanne. In his *Still Life With Apples*, he attempts to give the viewer the sensation of seeing the scene three-dimensionally by using multiple perspectival points of view. He does this in contrast to the tradition of the still life as a classical projection with a single perspective.

David Hockney played with the notion of space in the two-dimensional image composed of many of his individual photographs collaged together (fig 10). They are documentarian, but at the same time abstractions that are highly curated.

What from one viewpoint seems to be a complete space reveals our own interpretation of that space when the photographer and the viewer take up different locations and become more actively engaged by mentally stitching them back together into a new collaged reality. (fig. 13-14).



Fig. 10- The Desk, David Hockney 1984



Fig. 11 - Falstone Shepherd's Show, ScanLAB Projects 2013

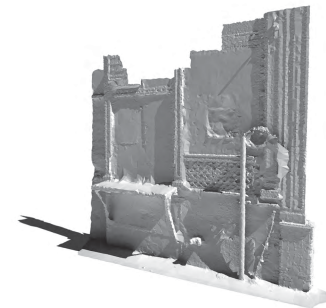
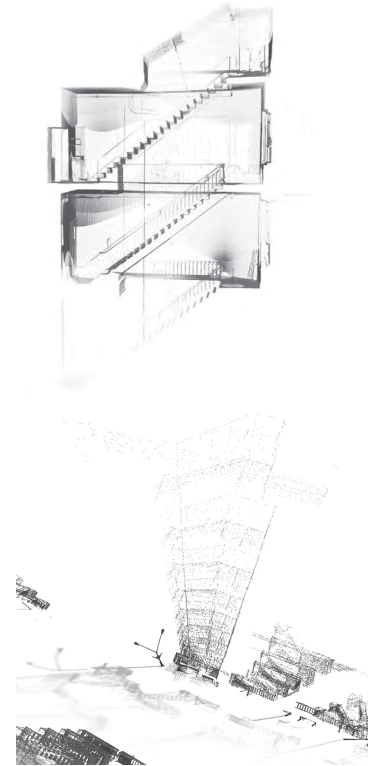


Fig. 12 - Looking At Nothing, Lead Pencil Studio 2010



Fig. 13 - View Of Single Scan Position



Fig. 14 - Shifted View of Same Scan

## IV. GORDON MATTA-CLARK: Discovery Through Deconstruction

The work of Gordon Matta-Clark strives to expose the hidden. Through a series of incisions into structures the interior spaces are rendered exterior. The makeup of construction is presented to the viewer, made important and exposed for what it is. We see behind the curtain. Anarchitecture is a post-mortem operation on the monuments that we make for ourselves and everyday living/working. At the same time, the precise removal of elements has the effect of disorientation, of making the irrational out of rational space and of presenting danger to that which is our safest place: the home.

At the same time, it places the ordinary on display, heightening its relevance. In the case of the Conical Intersect (figs. 15-17), Matta-Clark gives importance to the unimportant by exposing the interior of a traditional row house. Intervention, whether deliberate, accidental or incidental makes a mark on the architecture even before it is swallowed up by the impending construction of Le Centre Pompidou.

There is a separate experience in the different ways that Matta-Clark presented his work. Aside from the site of the intervention itself, his presentation takes form in three different scales and sectors: the deconstructed work out of context, the photo collage, and the documentary photograph. There are a multitude of other tools used: hand drawings, mixed media of drawing, film, model,

etc. Each process of documentation elicits a unique reaction. The physical condition of being in the installation directly engages the viewer—there is a sense of real fear, disorientation through the structural conditions being cut, removed and exposed. With the case of the Conical Intersect, the process of removal generates an abstract spatial volume that challenges the simplicity of walls, ceiling and floor. Each intersect with the effect of the viewer losing one's bearings. It is an abrupt change with no transitional element, just an immediate inversion of the order of structure and space.

The removal of objects from the installation and placement in a gallery reverses the experience. The gallery acts as a frame, a safe area to house an object wrenched from its place through violent incision. The mundane is ruggedly exposed, the inner workings of the planes that separate the volumes of daily life forensically presented, requiring us to take stock of the banal infrastructure that allows for our inhabitation. The object of the home is removed from its simple objectification, and instead is exposed in all its complexity.



Fig. 15 - Conical Intersect Photograph, *Gordon Matta-Clark*. 1975



Fig. 16 - Conical Intersect Collage, *Gordon Matta-Clark*. 1975

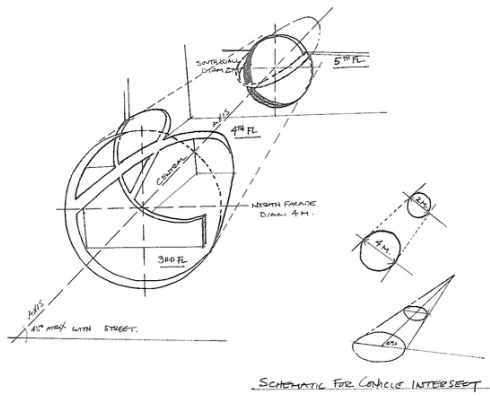


Fig. 17 - Conical Intersect Sketch, *Gordon Matta-Clark*. 1975

## V. RACHEL WHITEREAD: The Physicality of Space

Rachel Whiteread's *House* defines space through its negative. It displays what is absent by rendering space as a solid mass. What was space is now solid. What was solid is now void. We can only understand the original building by studying the remaining cast, and because this cast is rendered solid, our understanding of interior space must be viewed through the exterior. In this way, *House* bears its own witness. The outward projection of what was once private, intimate space back at the city is unsettling.

At the same time, it is a presentation of the diverging timelines of the cast and the mold. Similar to the scan and the scanned object, once cast, one is no longer connected to the other. Richard Shone touched on this in his writing on *House*:

*A cast of an object traps it in time, eventually displaying two histories—its own past and the past of the object it replicates.*<sup>11</sup>

What Shone does not mention is each then has its own future. The mold for *House*, the building itself, was removed a year before the installation. Later work of Whiteread's would cast rooms that still exist, either as the positive space of the original or as a negative in a gallery. They are now discrete objects in space.

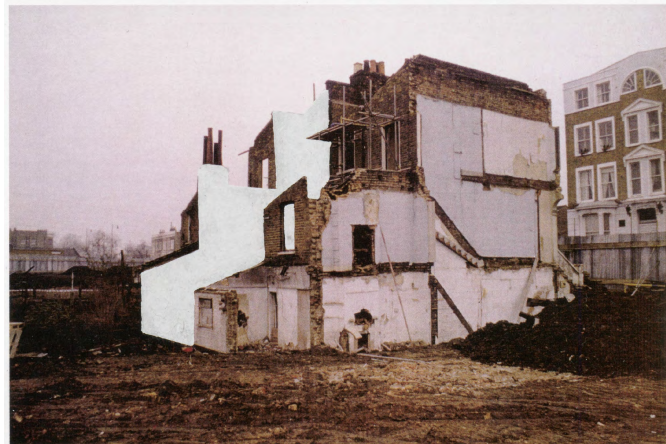
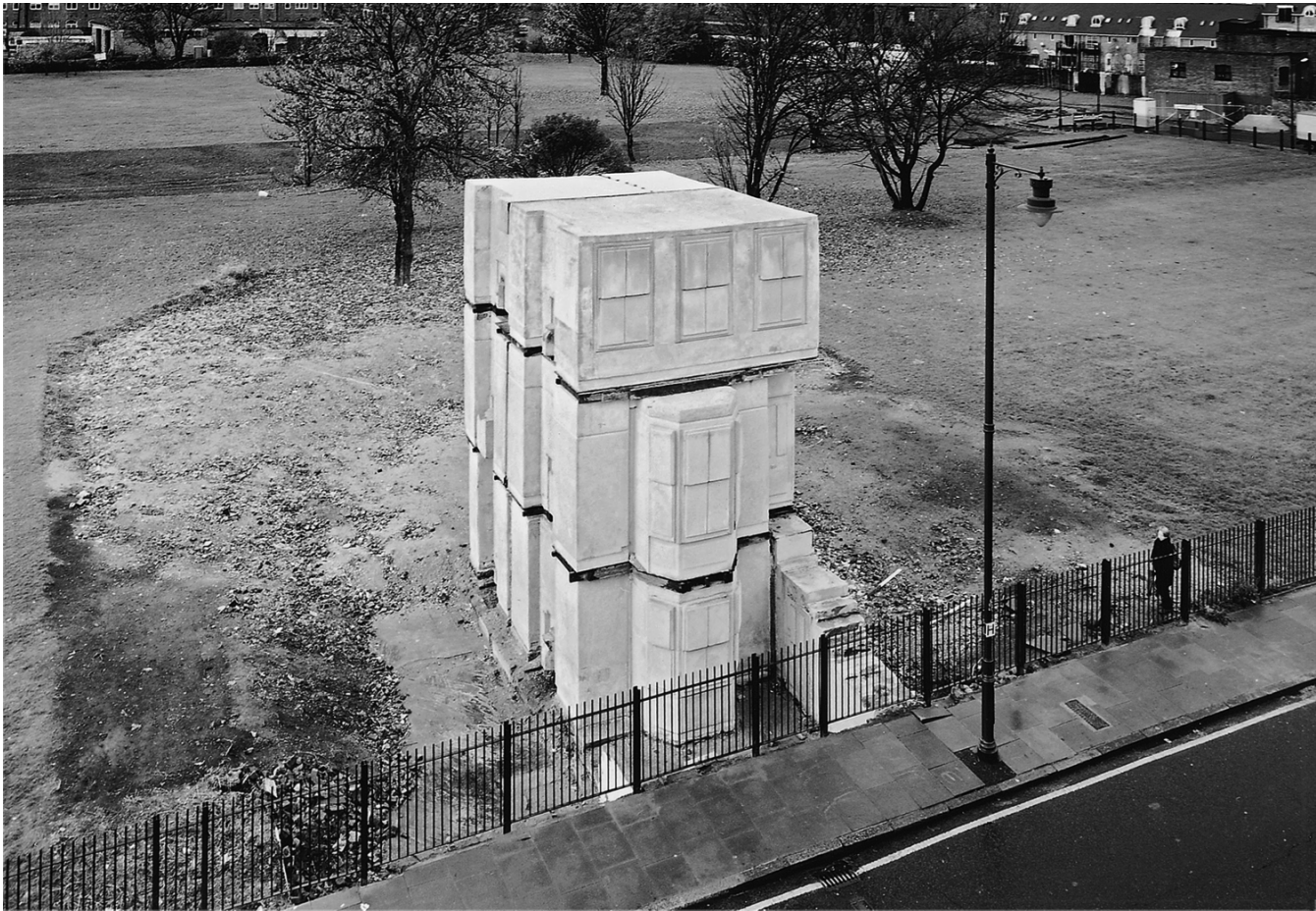


Fig. 18- House Study 3 & 4 (Grove Road), Rachel Whiteread 1992

11. Richard Shone. "A Cast In Time". Massey, Doreen, et al. *Rachel Whiteread House*. 1995. 52



*Fig. 19 - House, Rachel Whiteread 1993*

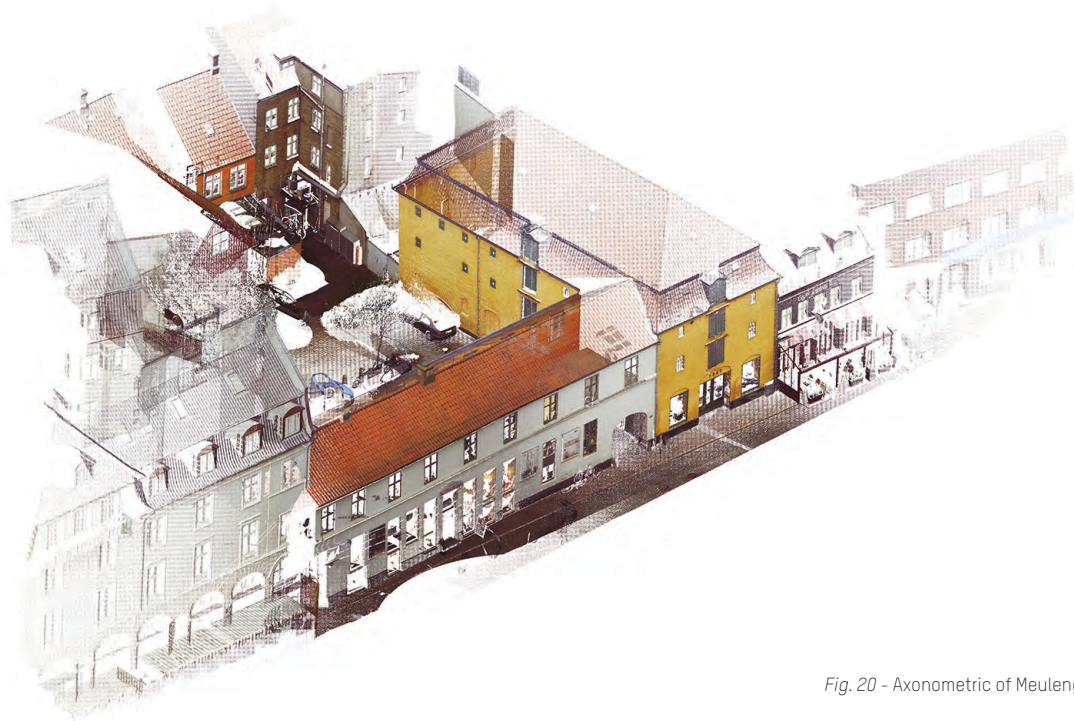


Fig. 20 - Axonometric of Meulengracht's Warehouse

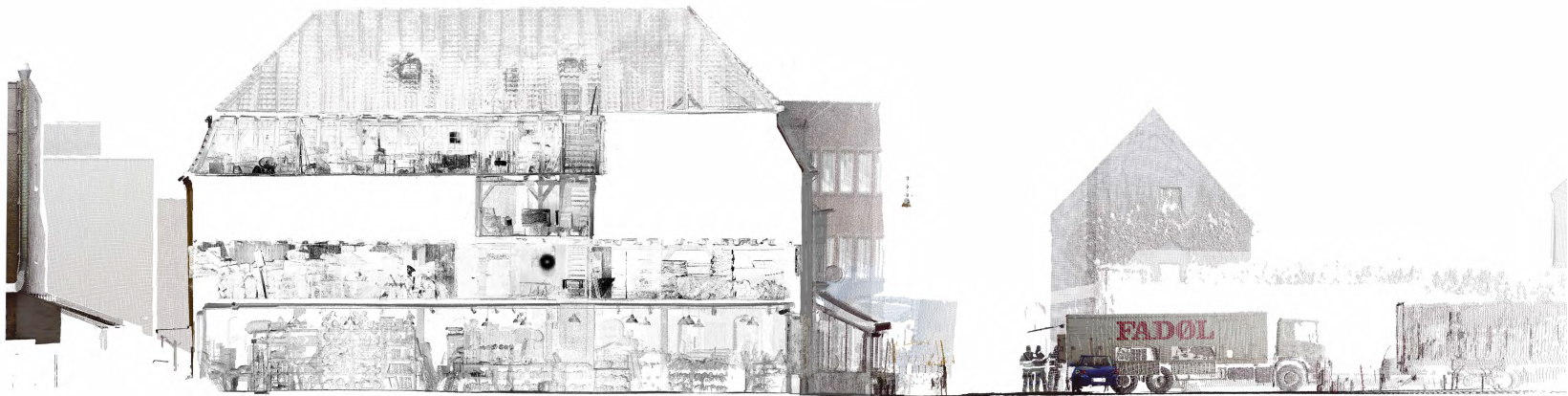


Fig. 21- Section of Meulengracht's Warehouse

## METHODOLOGY

The antecedent to this thesis was a studio project developed while studying in Aarhus, Denmark. The cohort scanned Meulengracht Warehouse, a two century old historic building in the center of the city. Over the years it had become an icon in Aarhus with its classic mustard yellow paint, deep openings and classic Danish roof line. It sat prominently on an old square in the heart of the Latin quarter, Pustervig Torv. The wood structure that made up its interior was hand hewn, each joint precisely chiseled to fit a matching hole.

The process of scanning captured highly accurate spatial data of the building in its current state. Structure that had sagged, shifted and settled over time was conveyed in the warehouse's digitized form. This simulacrum provided not only a set of hyper-accurate building information, but with it were incidental layers of inhabitation. Bolts of cloth sit on their shelves in the fabric store, foam mattresses pile up in the storage units above. A 25 year-old poster of a pin-up girl sits taped to the wall. A delivery man moving a keg of beer is caught in a moment of action (fig 21). Ghostly outlines of partial people show up as they moved through their daily lives unaware of the presence of the scanner.

Rather than pausing to consider this extraneous information, the spatial detritus, this data was culled out of the model and the normalized information was quickly translated to a concise 3d mesh. This was used to approximate the building's geometry in clean NURBS (non-uniform relational b-splines) surfaces that could be digitally modified and rendered. By doing so, the unique, erratic information of the point cloud was converted into a clean computational environment so that it fit within a normalized

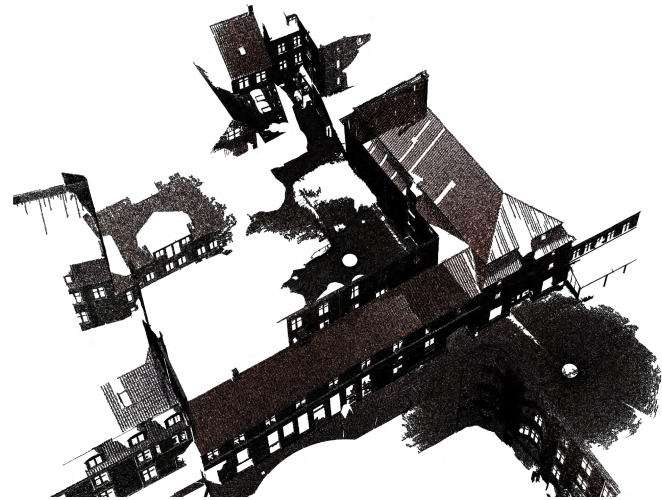


Fig. 22 - Resultant Mesh

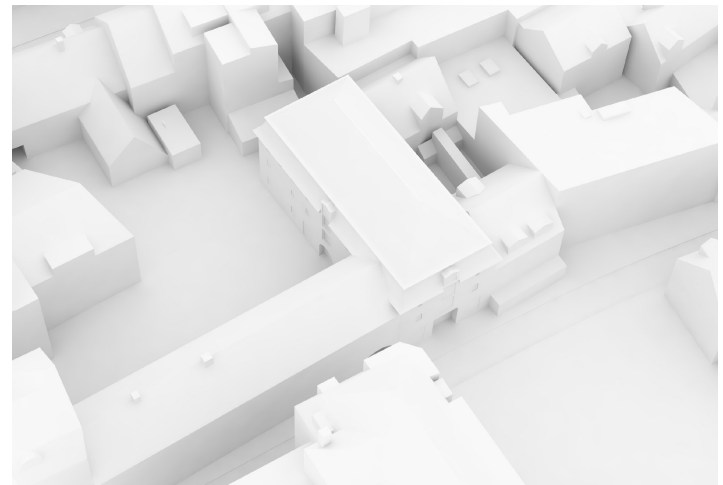


Fig. 23- Rendered NURBS Surfaces

design production stream and easily abstracted into cleanly abstract surfaces, plans, sections and elevations (figs. 22-23).

Rather than focusing on the predominant production system still based on Albertian abstraction, this thesis is an exploration of the path left behind. It seeks newer (and messier) ways of utilizing the rich and imperfect scan information in a new kind of design process. In pursuit of this process, the methodology explored uses a multitude of software tools, various representational systems including collage, hand drawing, physical modeling and 3d printing, and writing.

#### SCANNING TECHNOLOGY

LiDAR (Light Distance And Range) scanning works through the emission low energy pulses of light at high speeds. When the pulse makes contact with a surface, a portion of the pulse is directed back to the scanner. The time that it takes for the signal to return, and the intensity of the pulse on its return is translated into a cartesian point in space. The intensity value gives specific surface information such as reflectance, finish, etc.

For this project, a Faro X330 scanner (fig. 24) was employed. Highly accurate over its 330 meter working range, it also takes a high definition photosphere at the end of the scan. This

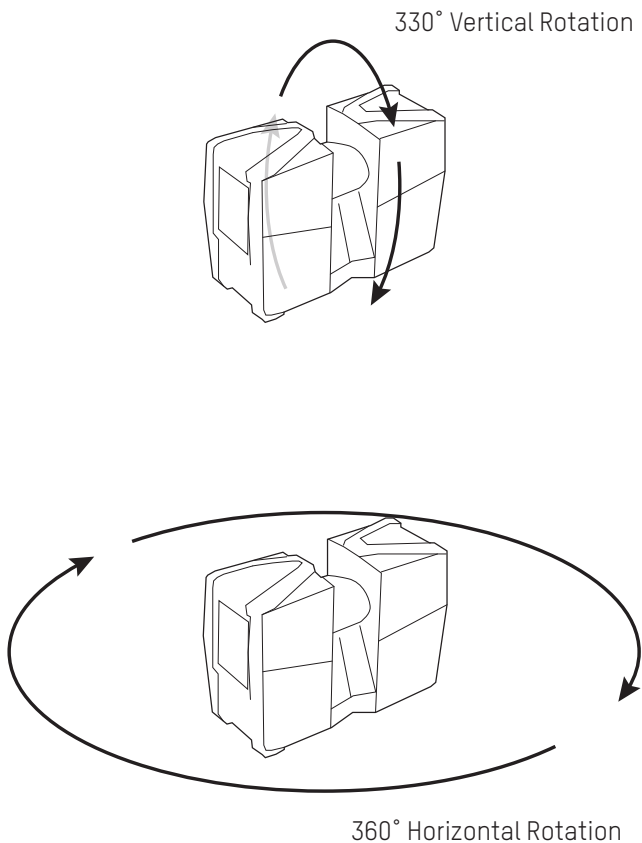
## LiDAR

Light Distance And Range Scanning



Faro X330

Fig. 24 - Faro Model x330



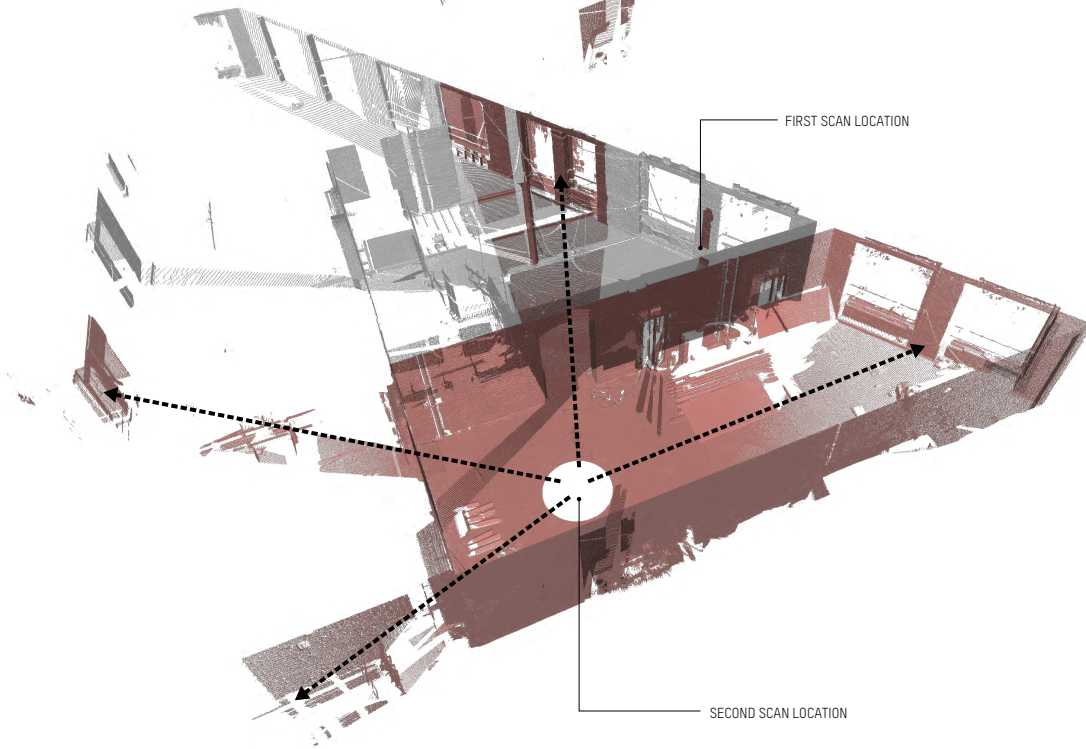
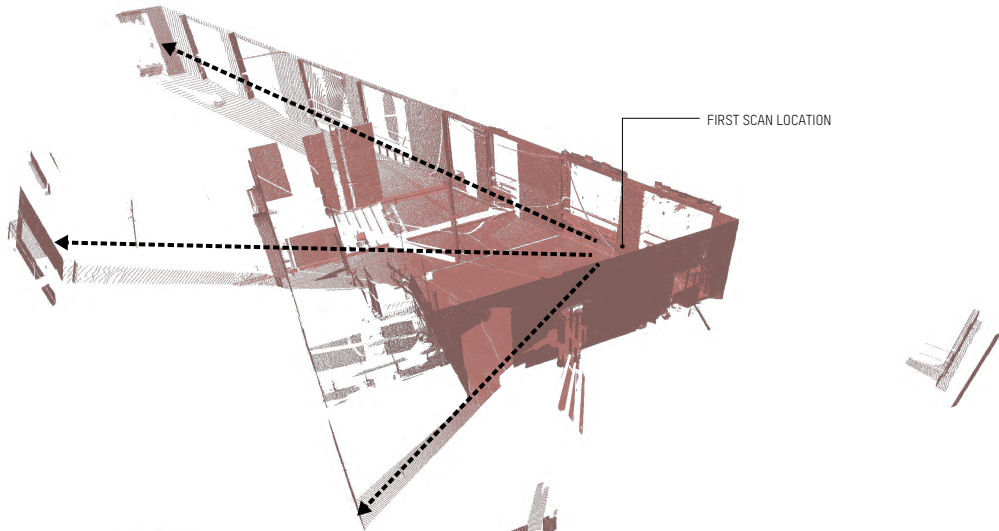
information is used to attach a color to the scanned points, giving 3-dimensional photographic detail to the digital environment. Each scan records around forty million points, taking on average 6 to 12 minutes depending on the settings. The Faro x330 has a built-in altimeter, inclinometer, compass and GPS device to assist in the geo-location of the scans.

As the scanner operates, the head rotates slowly around the horizontal axis as a mirror rotates at high speeds emitting and receiving millions of pulses of light. As would be expected, objects nearer to the scanner have a greater density of points, and dissipates with distance following the inverse square rule.

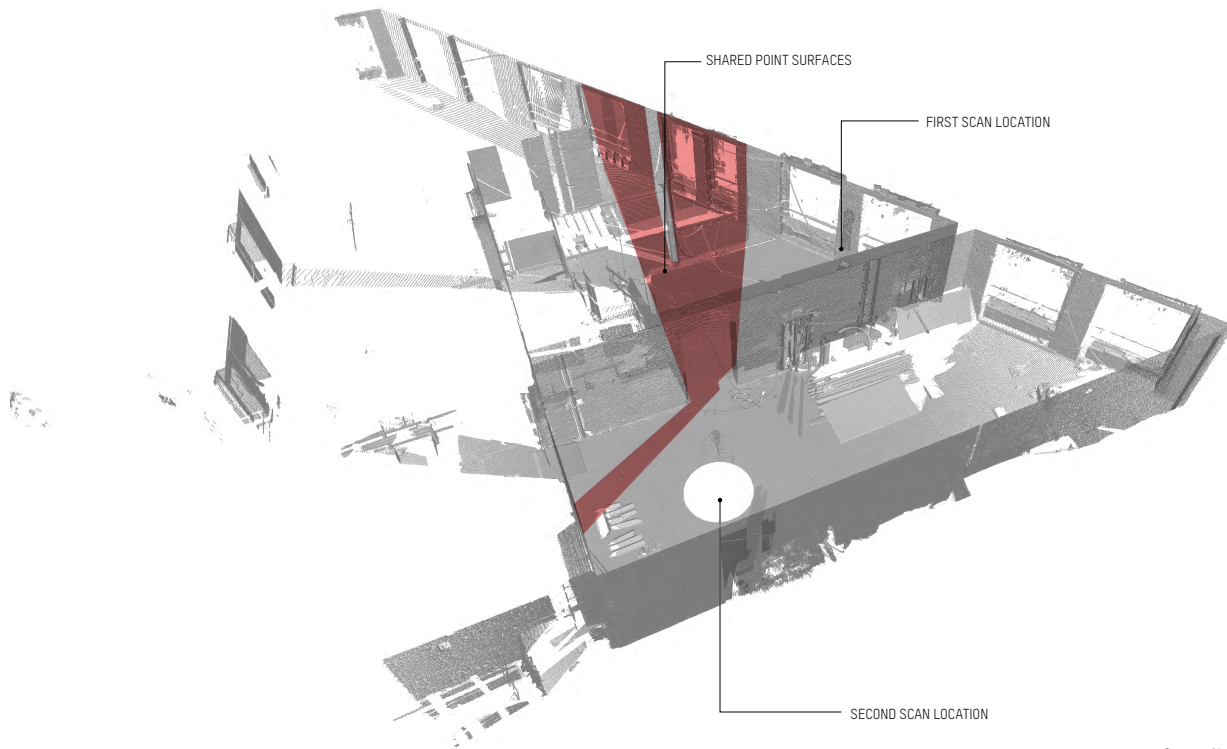
Operating conditions are a major factor in the performance of the scanner. It cannot operate in rain both because of machine limitations but also because the rain droplets themselves reflect light back, creating a ghostly “fog” of points hanging in the air. Because the scanner is essentially a portable computer, extreme temperatures also affect performance. HDR photography is less effective in low-light situations, high-contrast situations or other areas that would affect normal photography.

The process of scanning requires thought and consideration of what is relevant, and the amount of data needed to be collected.

Fig. 25 - Faro Operation Diagrams



The power of this technology lies in multiple scans assembled to give a full projection of space. This can only be achieved if scans overlap each other so that they can be referenced. Each scan does not to “see” the other to be effective, however the greater number of shared points and surfaces the more accurate the assembly of scans.



*Opposite & Above Fig. 26 - Scanning Amalgam*

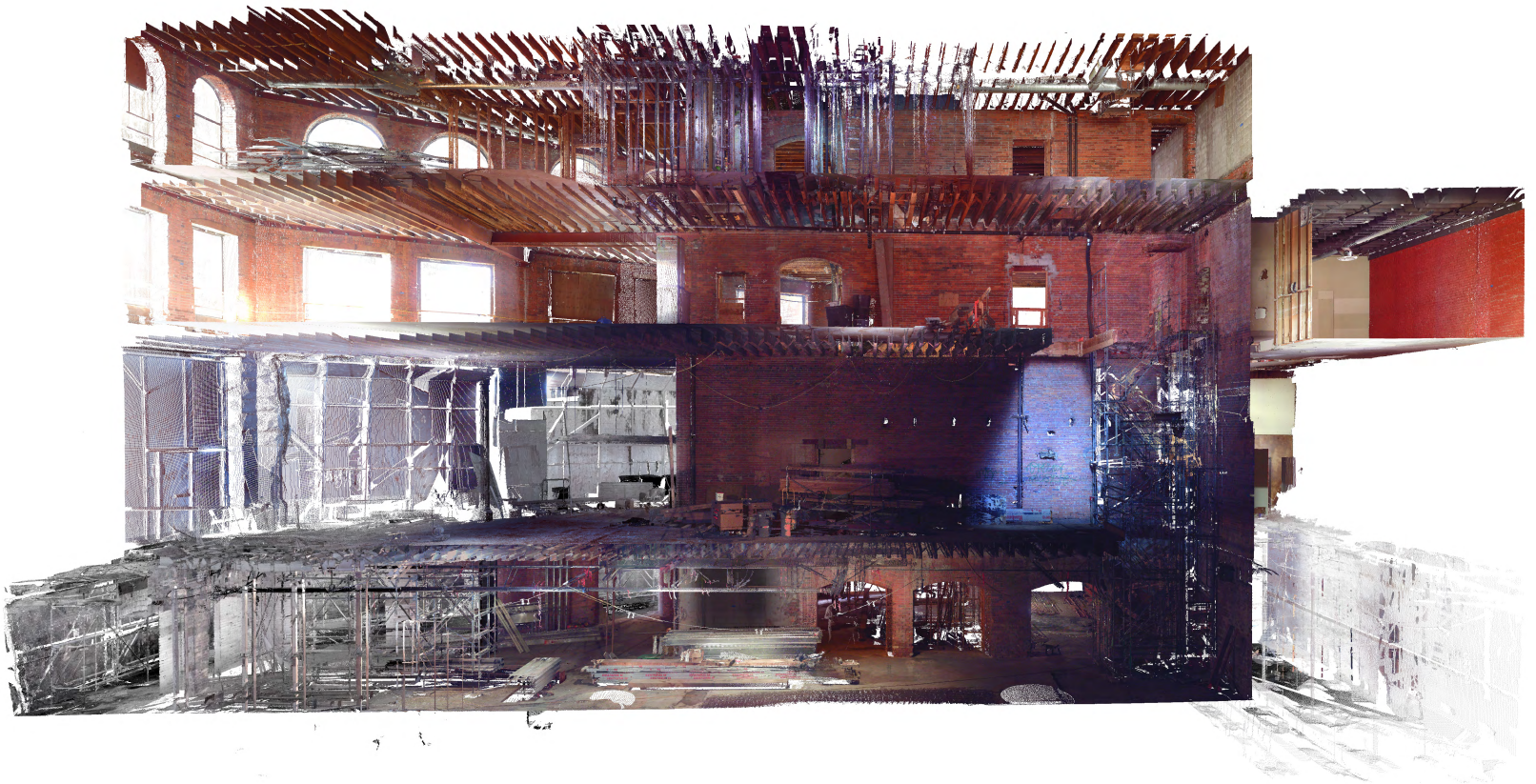


Fig. 27 - Scanning Amalgam

## INCISIVE LEARNING

The combination of multiple scans effectively becomes an amalgam of viewpoints and perspectives. From this comes a disembodied feeling, of seeing what can't be seen by a singular position (fig. 27). This collection of perspectives produces a narrative of the building that otherwise couldn't be seen without having a physical effect on the building. Gordon Matta-Clark's work, *Splitting*, made a physical incision through the building, exposing the connection between rooms, floors and walls. This perception shift between a single room and the building as a whole was represented in Matta-Clark's collage, *Splitting 32* (fig. 28), where a sequence of one-point perspectives combine to create a powerful section of the built environment. There is immediate surprise, wondering how the photograph was taken, then realization that it is instead a collage.

The process of scanning is itself a collage of multiple viewpoints and perspectives, presented as a whole in 3-dimensional space. Any location becomes a the site of an incision exposing spatial relationships that otherwise would be unknown.



Fig. 28 - *Splitting 32*, Gordon Matta-Clark 1974



Fig. 29 - Ghost, Rachel Whiteread 1990

## SPATIAL FIGURE GROUND

While the collection of scans into a single representation of space was being explored, a separate investigation began into the power of a single scan. What does a single scan effectively do? It is the culmination of everything that a person could see from a fixed position. From the point of view of the viewer, it is a complete space. Once removed from the point of view of the viewer, that space becomes an object in itself.

When this inversion occurs, what is generally considered usable space becomes solid, surfaces become the only connection to the

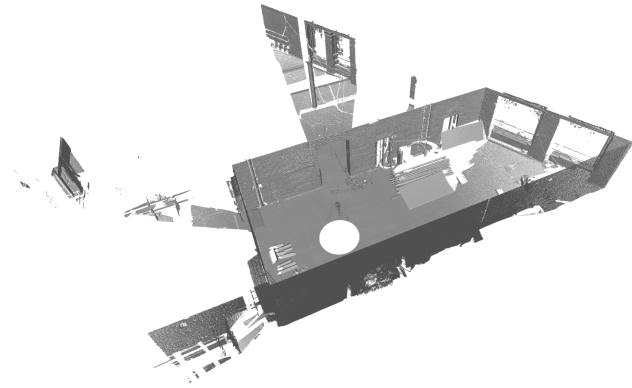


Fig. 30 - Representation of a Single Scan

interior. Rachel Whiteread has explored this inversion in many forms: *Ghost*, *House*, *The Holocaust Memorial*. In *Ghost* (fig. 29), the space is not only rendered solid, but also removed from its context.

A series of 3d prints served to explore both the perception of a singular perspective while at the same time understanding the inversion of solid and void (figs. 30-31). This process highlights the density of what is collected by the scan and the blatant absence of information. Taken together, the series of prints explores the opposing extremes that are inherent in the scan: hyper density and the complete absence of information.

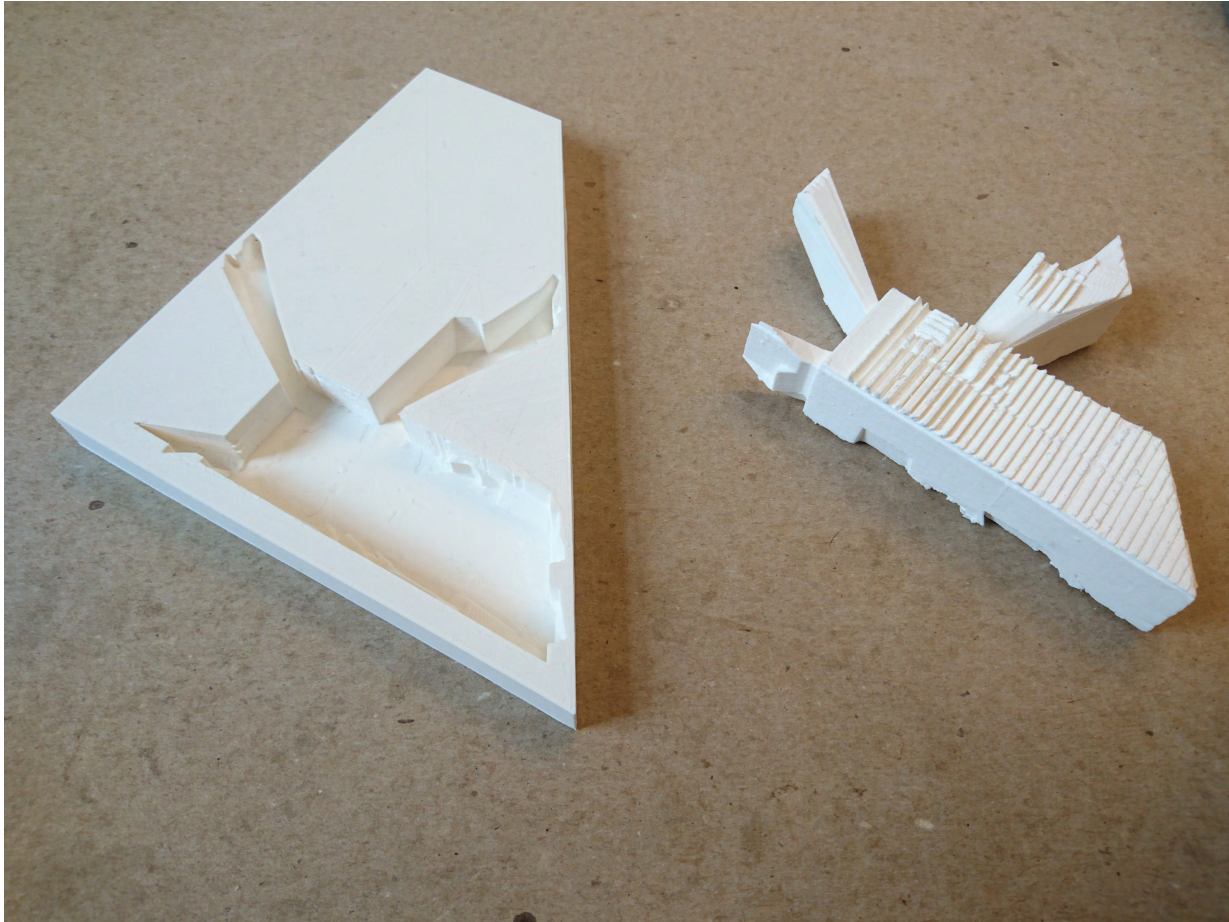


Fig. 31 - Single Scanned Space, as Solid and Void

## SURFACE MEMORY

While the result of scanned data is a cluster of points, the buildings we construct are inherently planar. The scan describes surface deviation to such a fine grain that what could be considered flat becomes unique and imperfect. The modular system of brick exposes elements of the human hand that placed it, every coursing, each module telling a distinct story. Jorge Otero-Pailos' installation not only captured the palimpsest of centuries pollution and detritus, when removed the latex contained the markings of where it came from. The traces of stones and cornice projected the architecture onto the latex mold. Removed from the context of the Doge's palace, it carried with it the memory of where it came from. Though the installation is hung far away from the site, it is still defined by where it came from, and cannot be disassociated with its origin. (fig. 32)

The process of digitizing space already removed the details of the built environment from its context, but in the oscillation between the digital and physical environment the artifacts created retain a direct link to their origin. The simple moment of a structural member missing from its original location is elevated by the process of removal from the computational environment and reassembly in the physical world (fig. 33).

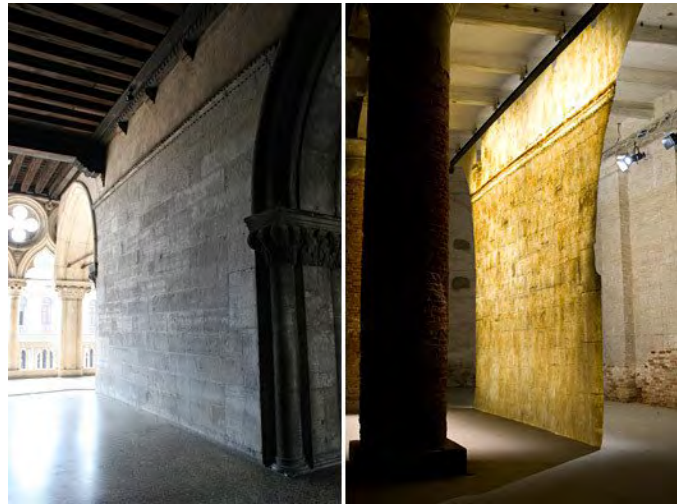


Fig. 32 - *The Ethics of Dust*, Jorge Otero-Pailos 2009



Fig. 33 - Witness Mark in Computational Environment



Fig. 34 - Resulting 3d Print



JAMES ST

METROPOLE BLDG

YESLER WAY

WASHINGTON ST

OCCIDENTAL ST

2ND AVE S

2ND AVE EXT S

## SITE INFORMATION

The Metropole building is located on a triangular site at the intersection of three streets in Seattle's Pioneer Square. Between Yesler Way, 2nd Ave Ext S and 2nd Ave S the building extends three stories with a subgrade basement. The basement has an under-sidewalk areaway that reaches out beyond the building envelope.

The selection of site was based on a number of criteria including:

- Having a historic context
- Being largely abandoned/overlooked
- Having connection to the city
- Being accessible within a reasonable timeline

After contacting University of Washington professor Kathryn Merlino, the Metropole building was suggested as a possible site. Matt Aalfs, a local architect and principle of BUILDING WORK, is currently designing a boutique hotel for the site and with his help I was able to get access to the building owner's representative David Bolin who arranged for me to scan the building in mid April 2017. After coordinating the rental of the scanning equipment I was able to scan the site from forty locations both in and around the building over two days.

1889 — Great Seattle Fire

1892 — **H.K. OWENS BUILDING** Constructed, designed by architect Elmer Fisher

1893 — **G.O. GUY PHARMACY** Opens for Business

1898 — First moving pictures shown in Seattle in theater in basement of **H.K. OWENS (NOW METROPOLE)** building to prospectors in Box House

1901 — John Considine Gets in an Altercation with Chief of Police Meredith, in ensuing fight Meredith is killed

1936 — **G.O. GUY PHARMACY** Closes



1970s

Ray McWade opens a gallery space

1990s

Basement is transformed into **THE SUPERHIGHWAY**, an all-ages club serving the rave community during the “teen dance ordinance” of the nineties.

2003

Hip hop club **SHONGO VILLAGE** opened, with notable acts playing here including **KANYE WEST**

2007

**FIRE FROM A CIGARETTE** butt results in major damage to the first floor of the metropole building, and closing it pending an insurance dispute.

2010

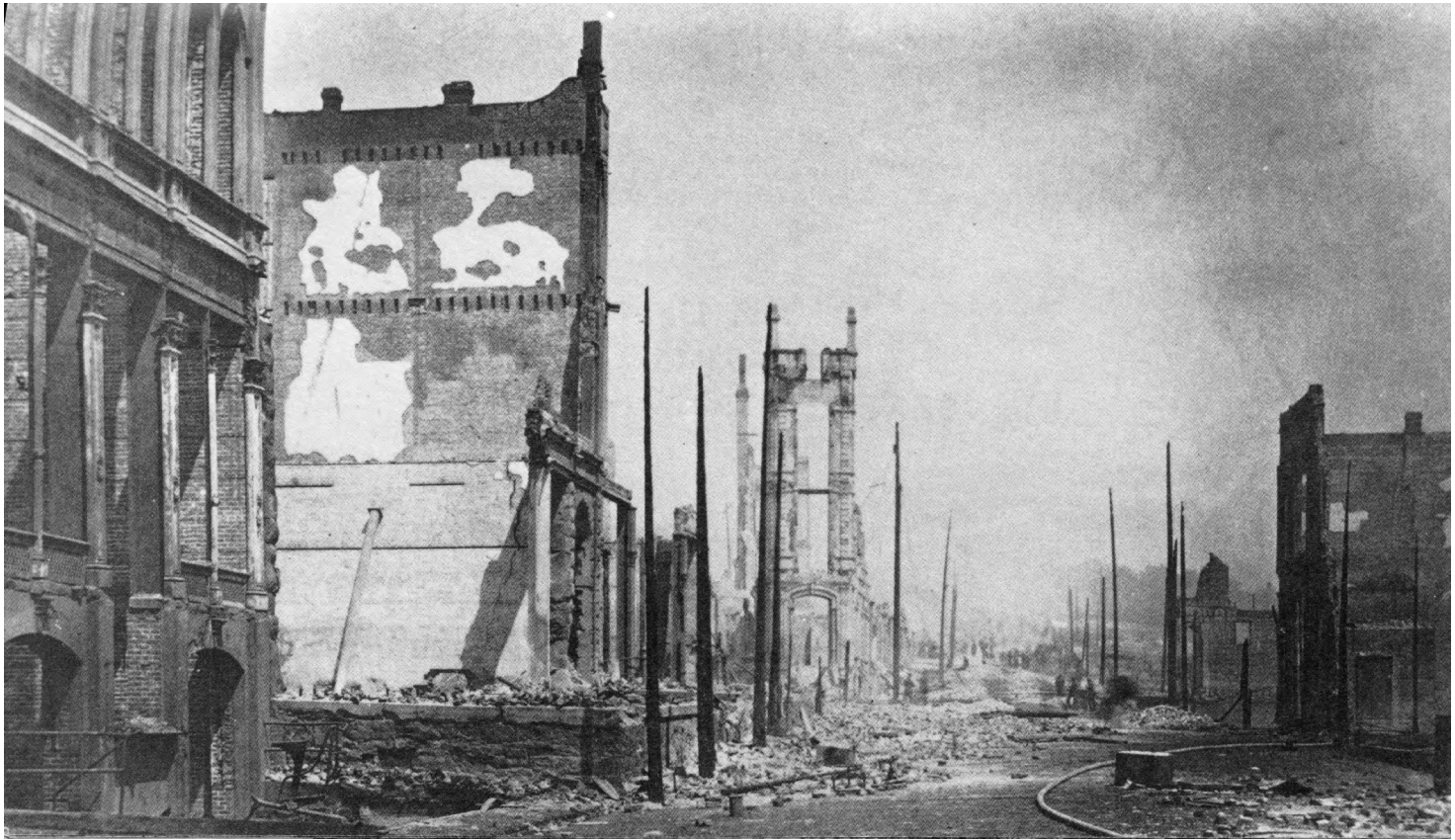
After building sits vacant for years, local artist **JEFF “WEIRDO” JACOBSON** begins a kickstarter campaign to fund mural **AN ODE TO DEDICATION**.

2017

Digitally scanned, preserving record of building’s status.



OPPOSITE: Fig.35 - Metropole Building, Alfred P. Bowen 1900  
Fig. 36 - Metropole Building, 2017



*Fig. 37 - Yester Way After the Great Seattle Fire, 1889*

Seattle in its early years was a In the 1850s, Doc Maynard was approached by a young man named Henry Yesler, who wished to found a mill in Puget Sound. Maynard, while skeptical of the individual, knew that with a mill came jobs and heightened port traffic from wood shipments traveling up and down the west coast. In turn, this would perhaps begin the population boom that the town needed. Weighing his options, he decided that it was best to give the individual the required property on the waterfront to start his mill. After a few mis-steps, the mill began operation in xxxx. Shipments of goods began to flow, and Seattle had an industrial facility. Trees were logged from First Hill and transported down Skid Road, named for the it being used as a skid for the downed trees. <sup>[12]</sup>

As time passed and the name Skid Road grew into a negative connotation, it was in turn renamed Mill Street and finally Yesler Way.

Nearly forty years later, Seattle was in the midst of a hot, dry summer. The population of the city was now around 31,000 and the railroad connected it to the rest of the country. On June 6th, 1889, a fire broke out in a cabinet shop in Pioneer Square. While the fire department was quickly dispatched, it spread from building to building. As it burned out of control, much of the surrounding area was caught in the blaze. By the end of the day, there was little remaining of the downtown core. <sup>[13]</sup> Headlines

12. Murray Morgan. *Skid Road : an Informal Portrait of Seattle*. 1st illustrated ed. with a new preface and concluding chapter by the author. ed., Seattle, University of Washington Press, 1982.

13. Morgan. *Skid Road*.

14. Morgan. *Skid Road*. 114.

15. Morgan. *Skid Road*. 115.

read “A SEA OF FIRE, SEATTLE IN ASHES. TOMB-LIKE RUINS NEATH A GREAT RED CLOUD.” <sup>[14]</sup> In the wake of this disaster was at the same time opportunity. Wood shacks and combustible construction was replaced by brick and mortar, stone and steel. In this boom of construction, the city swelled with masons. The population raised to 37,000 within half a year. <sup>[15]</sup> During this time, Henry Yesler secured the future site of the Metropole Building from H.K. Owens for a trapezoidal site to the south. <sup>[16]</sup> Yesler employed architect Emil DeNeuf to build the structure, and there is some evidence that Elmer Fisher was the design architect on the project. <sup>[17]</sup>

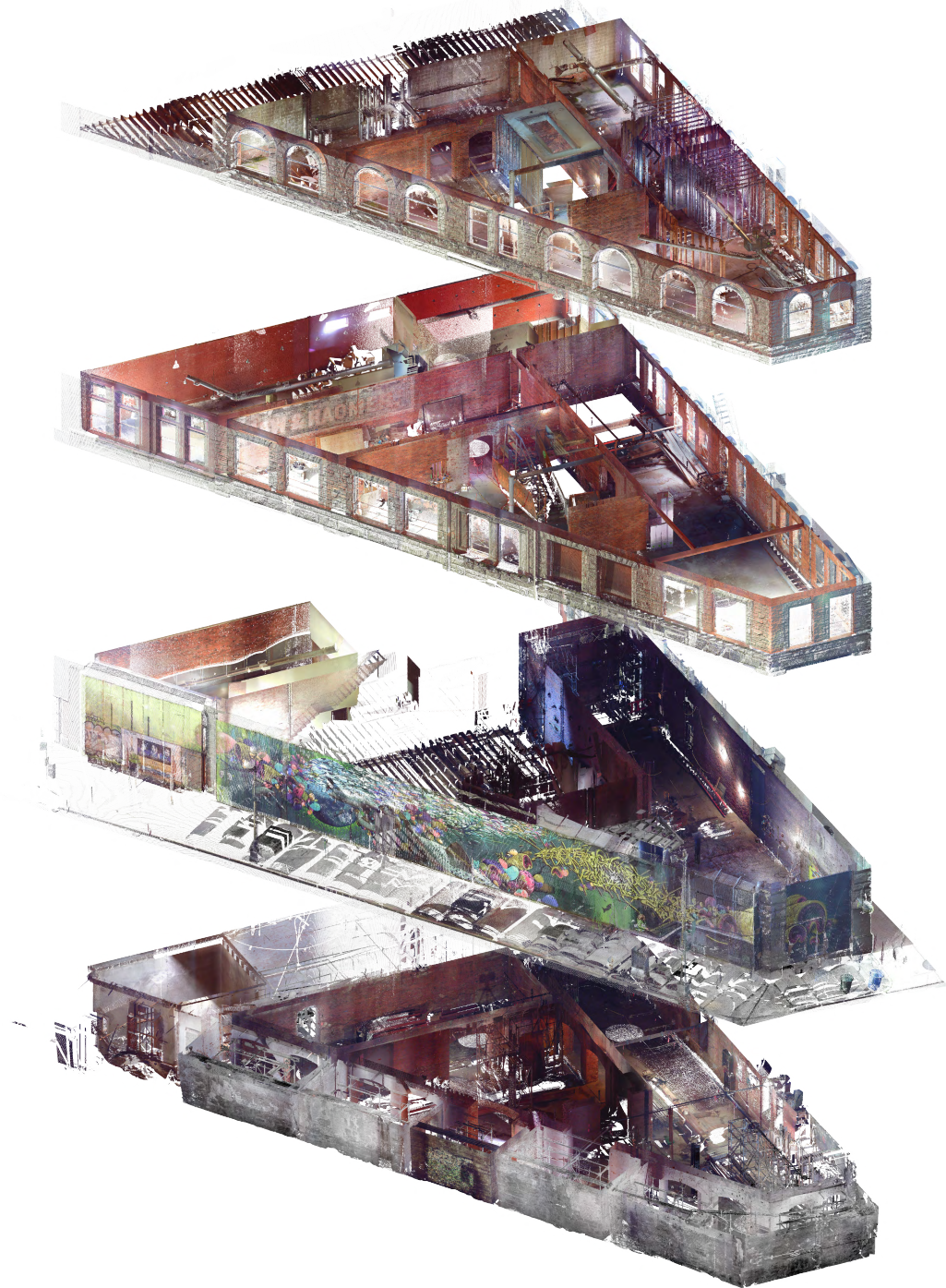
After its completion the G.O. Guy Pharmacy took over the triangular corner site on 2nd Ave Ext S. & Yesler Way in 1893. By this time, Yesler way was associated with a series of “Box Houses” where one could find liquor served by waitresses during low-brow variety acts. In this scene, The Metropole became the site of Seattle’s first movie theater in 1898 located in the basement below the pharmacy:

*Alaska-bound prospectors lined up at the door to buy ten-cent tickets. When everyone was seated, Lampman turned off the lights and hand-cranked a series of celluloid strips through the miracle projector. Half a century later, he recalled that each film lasted only a few seconds. “One might depict a man walking... another a horse trotting, or a few local scenes, gulls against the skyline, a steamer puffing to dock.” <sup>[18]</sup>*

16. Jeffrey Karl Ochsner], and Dennis Alan Andersen. *Distant Corner : Seattle Architects and the Legacy of H.H. Richardson*. Seattle, University of Washington Press, 2003. 367.

17. Ochsner and Andersen. *Distant Corner*. 309

18. Mildred Tanner Andrews, et al. *Pioneer Square : Seattle’s Oldest Neighborhood*. Seattle, Pioneer Square Community Association in Association with University of Washington Press, 2005. 144-145.



Seattle's most prominent box house owner, John Considine, was instrumental in raising the quality of performances in the theaters by hiring professional actresses such as "Little Egypt," an east coast dancer of well known reputation.<sup>[18]</sup> Later Considine was highly engaged in the opening of a series of movie theaters in Seattle and was involved in an antecedent version of the Vaudevillian acts that would come to prominence in the coming years. "Considine quickly saw the possibilities in a type of entertainment which drew all classes of people. He reasoned that with all the nickelodeons showing the same movies, the crowds would go to the one that offered the best live entertainment, just as segments of society willing to be found in saloons went to the box-houses that offered the best variety acts."<sup>[20]</sup>

Considine's success invited scrutiny by law enforcement in Seattle, which culminated in a well-known incident between he and police chief William Meredith on June 25th, 1901 inside the G.O. Guy Pharmacy. Shots were fired and in the end chief Meredith was killed. After a prolonged trial, John Considine was declared not guilty.<sup>[21]</sup>

By 1936 the G.O. Guy pharmacy closed in the Metropole building. Later, in the 1970s there is evidence that it was an art gallery and studio owned by Ray McWade.<sup>[22]</sup>

19. Morgan. Skid Road. 129.

20. Morgan. Skid Road. 148.

21. Morgan. Skid Road. 139-147.

22. L. E. Bragg Washington Myths and Legends : the True Stories behind History's Mysteries. Guilford, Connecticut, TwoDot, 2015. 33.

23. QDot (IAMQDOT). 1 Feb. 2017, Instagram.

By the 1990s, the basement of the Metropole which once housed films to prospectors became a haven for underage teens to dance late into the night in a drug and alcohol-free venue with world-renowned DJs in a relaxed atmosphere. [Seattle Weekly] By 2003, the basement had again changed hands and reopened as Shongo Village, a hip-hop club with two stages and a full bar. Various acts came through, most notably Kanye West in 2003 before he was a name. Playing to a crowd of a few dozen people, he would sell out the Tacoma Dome a little over a decade later.<sup>[23]</sup> <sup>[24]</sup>

The life of the Metropole changed on May 21st, 2007 when a lit cigarette caught fire in a trash bin on the mezzanine between the 1st and 2nd floors, quickly spreading into a larger fire. The building that was the product of the Great Seattle Fire changed in the same way that it began.<sup>[25]</sup>

After two years of laying abandoned, local artist Jeff "Weirdo" Jacobsen began a kickstarter campaign to paint a mural on the plywood structure covering the shattered windows. Completed in 2010, An Ode To Dedication still remains at the base of the Metropole.<sup>[26]</sup>

Future plans for the building include conversion to a 34-room boutique hotel complete with roof terrace and speakeasy bar in the basement where a box house one resided.

24. Chikodi Chima. "Chikodi Chima." PR Tips For Startups. N.p., 24 Aug. 2015. Web. 09 June 2017.

25. Hector Castro and Brad Wong. "Trash-bin fire inflicts more than \$1 million in damage to historic Pioneer Square building." Seattlepi.com. N.p., 21 May 2007. Web. 09 June 2017.

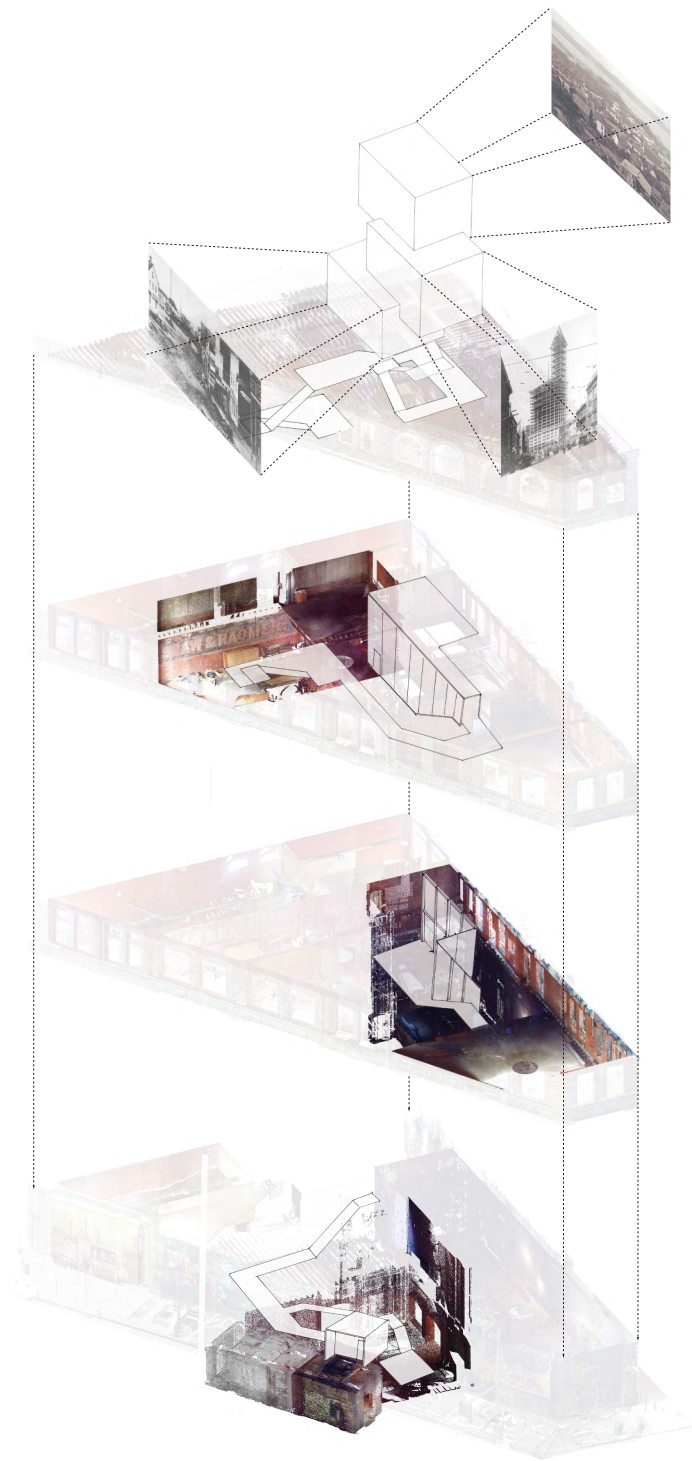
26. Jeff Jacobson. "Emerge: An Ode to Dedication" Kickstarter N.p., 23 Sept. 2010. Web. 09 June 2017. <https://www.kickstarter.com/projects/weirdoculture/emerge-an-ode-to-dedication-0/rewards>



DESIGN INTERVENTION

Fig. 39 - Section Perspective of Metropole Building Looking South





The written history of the Metropole building is small in comparison with its time as part of the city structure. While this historical timeline is relatively short, there is a rich layer of texture projected onto the building as a product of its use and inhabitation over its one hundred and twenty-five year life. These incomplete moments and partial memories that reside in the architecture present an alternative timeline

The purpose of this intervention is to re-integrate the building with the city it has been disconnected from during the decade that the Metropole has been abandoned. Through the process of inviting the public back into the building, it is the intent of this project to begin a conversation into the meaning of restoration, historicism, memory and inhabitation.

This took the form of an experiential timeline that weaves a path between four identified “witness marks.” These marks become specific frames from which to view the environment within the Metropole Building. However, while the four interventions are framed references, the path itself provides a shifting perspective to the viewer, developing their own interpretation of the spaces experienced.

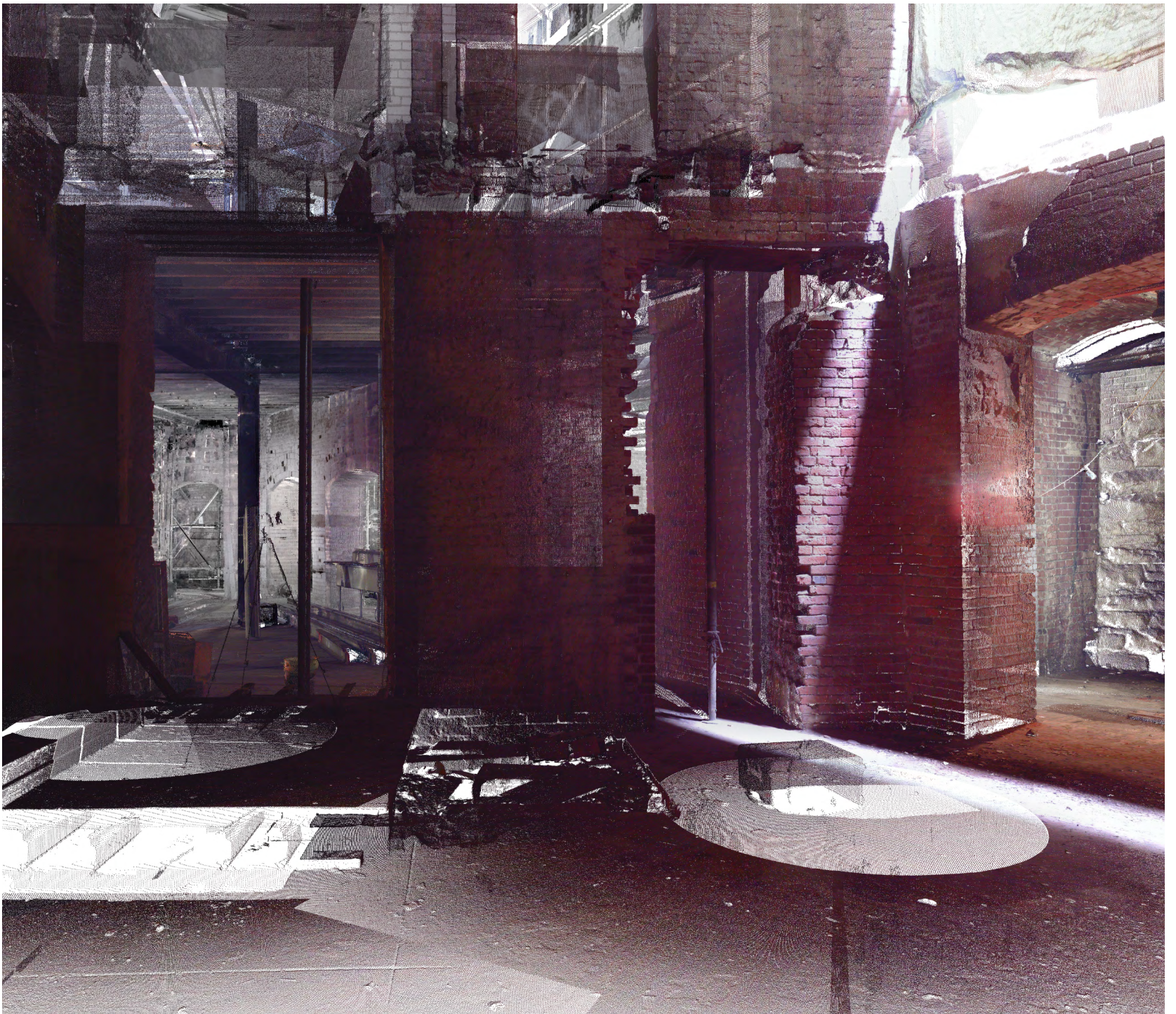
These four witness marks were identified by moments in the building’s history, elements that are visible only in their absence, moments forgotten and potentials that were never realized.

The first mark is the site of the fire. Stepping in from 2nd Ave S, one is saturated by the dense air, striking light and eerie silence. Here, the floor has been removed, exposing the basement to light for the first time since its construction.

The second mark moves from the over-saturated state of the first to a translucent volume with framed views of specific artifacts on the architecture: the holes where beams once inhabited when the site was a pharmacy, and where structure was removed during a partial repair of the building after the 2007 fire.

The third area is defined by an old painted sign on the raw brick, SHAW & RAOMER. The business, its history has been lost to time. Now it is what we make it: a tailor, a law office, a dentist. The story immediately becomes true as we strive to find its real use. Through the act of searching for history, we reaffirm its importance. Glazed panels stand between the viewer and the sign, its reflection placing the viewer within the scene, thus becoming part of the history of the building.

Some marks are defined by absence. The Metropole was structured to extend up eight stories. This unrealized height would have given the building a view of the harbor over its 6-story neighbor. The final mark is the addition of a tower that frames three historical views of Seattle: Skid Road, Smith Tower, and the old Harbor.



## COINCIDENCE

The fire began with a discarded lit cigarette, absent-mindedly tossed into a trash can. What began as growing smoke became open flame, and the fire was released from its can to spread across the wood floor. It hungrily consumed the soft tissue of the building, ignoring the thick brick walls. Beams cracked, then snapped. In some ways it is a fitting catalyst for the building, whose existence was put into motion by the great Seattle Fire of 1889. Skid Road was decimated in the blaze, only the husks of buildings left partially standing.

The air is thick from time, the traffic of 2nd Ave trails off. Stark light now cuts across the floor of the basement, glancing off brick, illuminating stone. The texture of a hundred and twenty years of history is exposed for the first time to the sun. It is a strange contrast, the reveal of something meant to stay hidden as if the moments kept inside this dark, cramped basement might escape leaving only a shell. Snippets of past lives play on the walls.

Men waiting to find their fortune from the Alaskan gold rush crowd into a room to witness the first moving images projected in Seattle. A fleeting clip of a horse running full sprint, a man dancing. A couple laughing as they stroll leisurely along a pond in the bright light of a spring day.

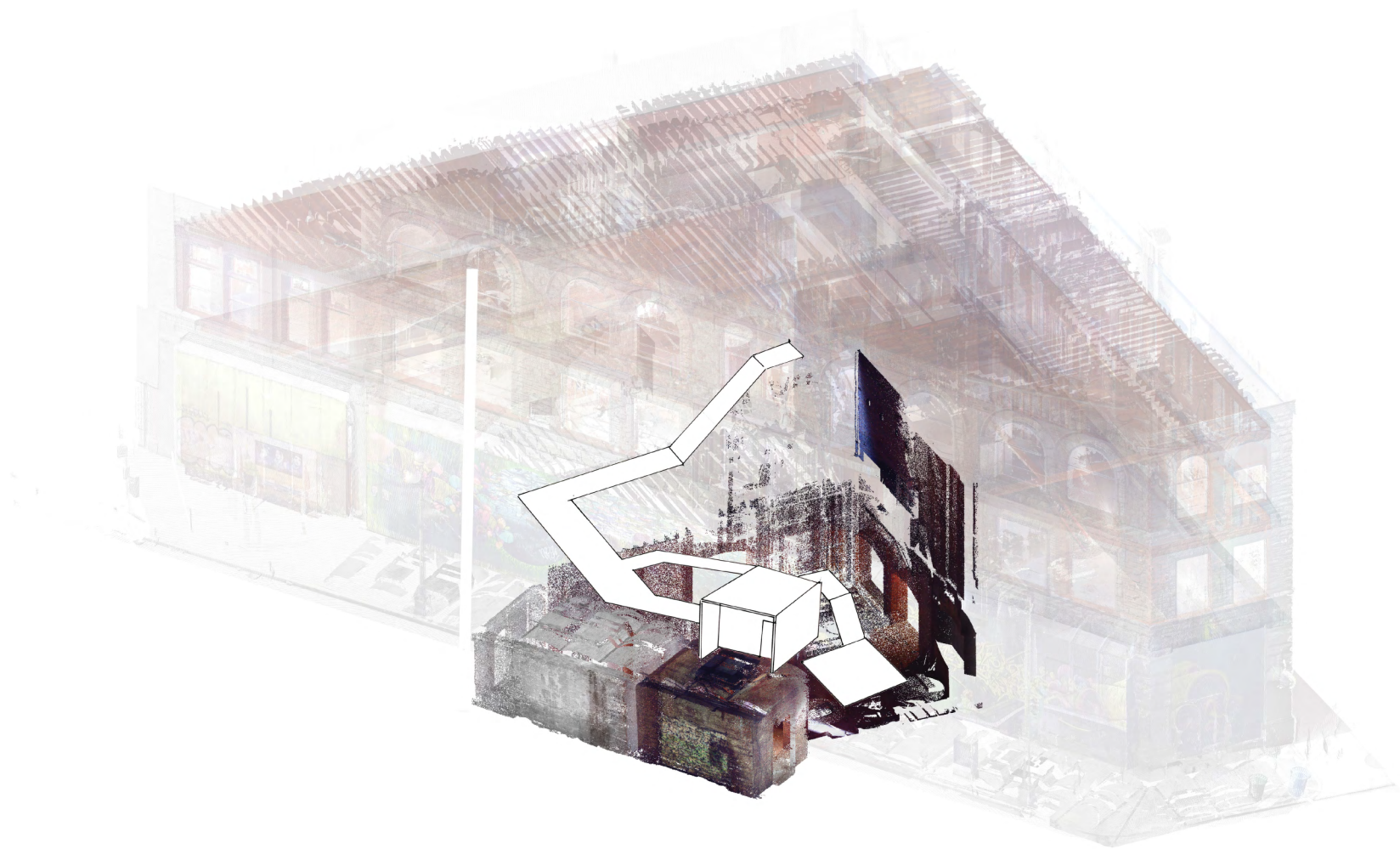
Teenagers sitting on the floor talking while techno plays loudly in the background, finding a temporary home in a city without a place for youth. A young rapper with big dreams and a bigger ego steps on stage for a room of thirty people, a decade later selling out venues of thirty thousand. These groups mingle together in the light of day, as if they occupy the same space at the same time.

Now open, it seems as though it could never again be hidden, separate from the street and the sky. It is almost impossible to view it any differently.

OPPOSITE: Fig. 42 - Basement View of Central Core Where Fire Started.



Fig. 43 - Fire Witness Mark



A building that has been uninhabited for a decade takes on a certain forgotten quality. Life moves on in the city—office workers hurriedly walk by on their way to lunch, tourists stare at Smith Tower or take a selfie in front of the mural. The Metropole is more monument than inhabitable space. There are no storefronts, no doors. It could be a solid mass. The first intervention into the site is a cut into a portion of the mural and installed in its place is a small aperture surrounded by translucent polycarbonate. There is an odd juxtaposition between the aging mural and this new addition that immediately reframes the experience of those walking by. Something feels different in the daily routine of passersby.

It is a stark transition, from a street full of the sounds of the city to a darkened volume of thick air and the now distant muffled sounds of the sidewalk. The basement, exposed below, has a platform suspended slightly above the floor. From it one can see the area that was affected by the fire. A mural of bright greens and yellows punctuated by black haphazardly covers a wall of the areaway just below the sidewalk. Similar to the earlier study of a single scan, the view from this platform framed to specific portals (fig. xx).

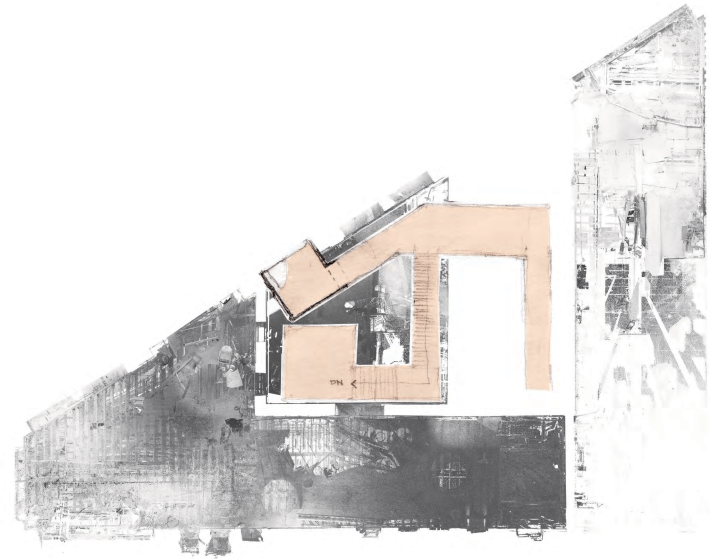
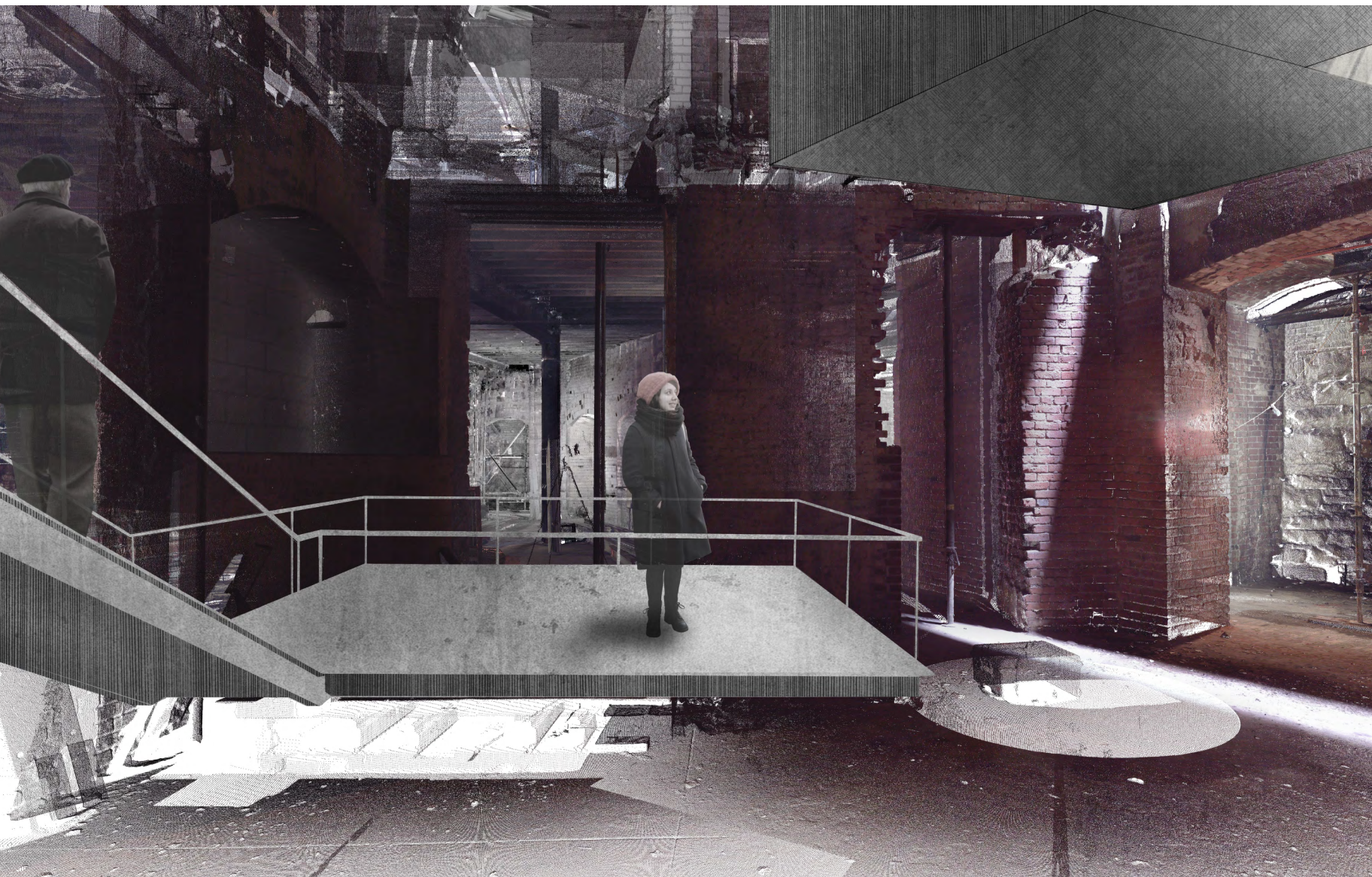
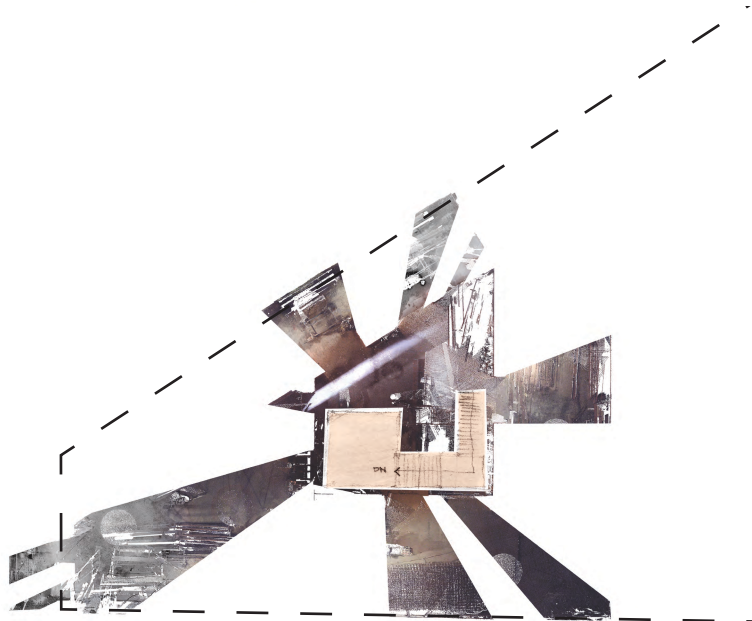
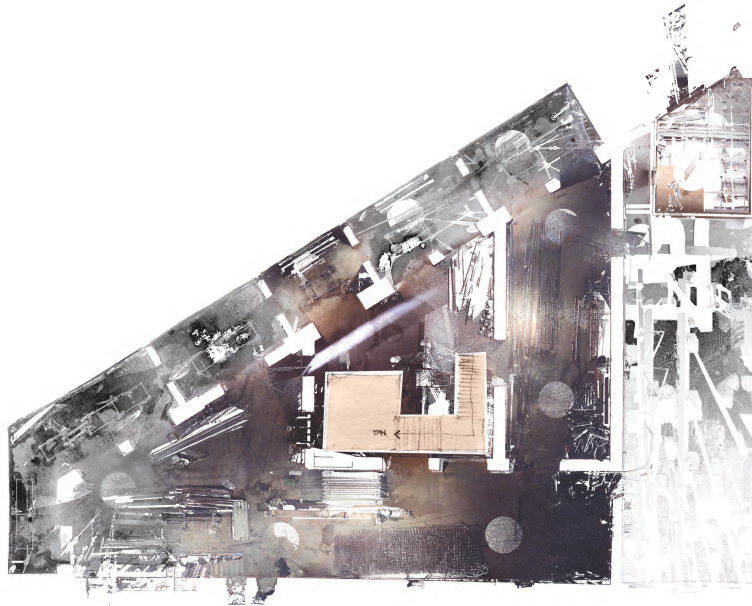


Fig. xx - Plan, Level 1





OPPOSITE: Fig. 46 - Fire Witness Mark in Computational Environment  
Fig. 47 - Basement Plan & View Corridor from Platform

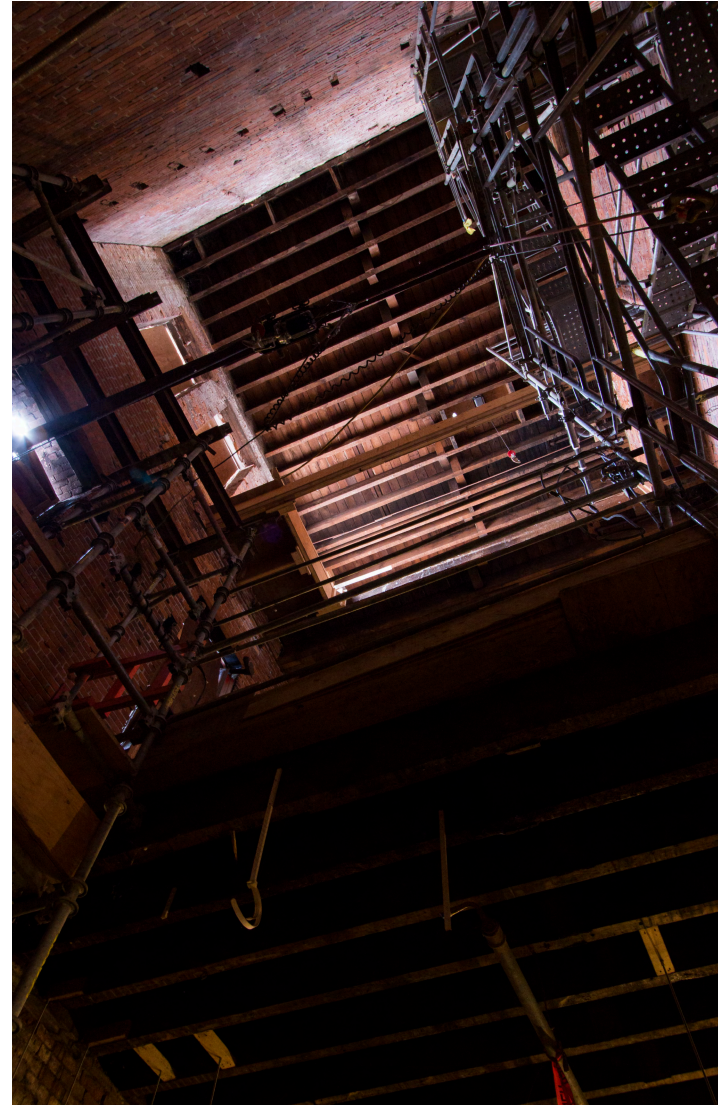


## CONSEQUENCE

There is a macabre irony in the fact that one of the only pharmacies in downtown Seattle became the site of a fatal brawl between Box House owner John Considine and former Chief of Police William Meredith in 1904. It was the culmination of animosity that went back years, and has become a part of Seattle lore. It began to mark the end of an era, Seattle as a wild western town on the edges of the world.

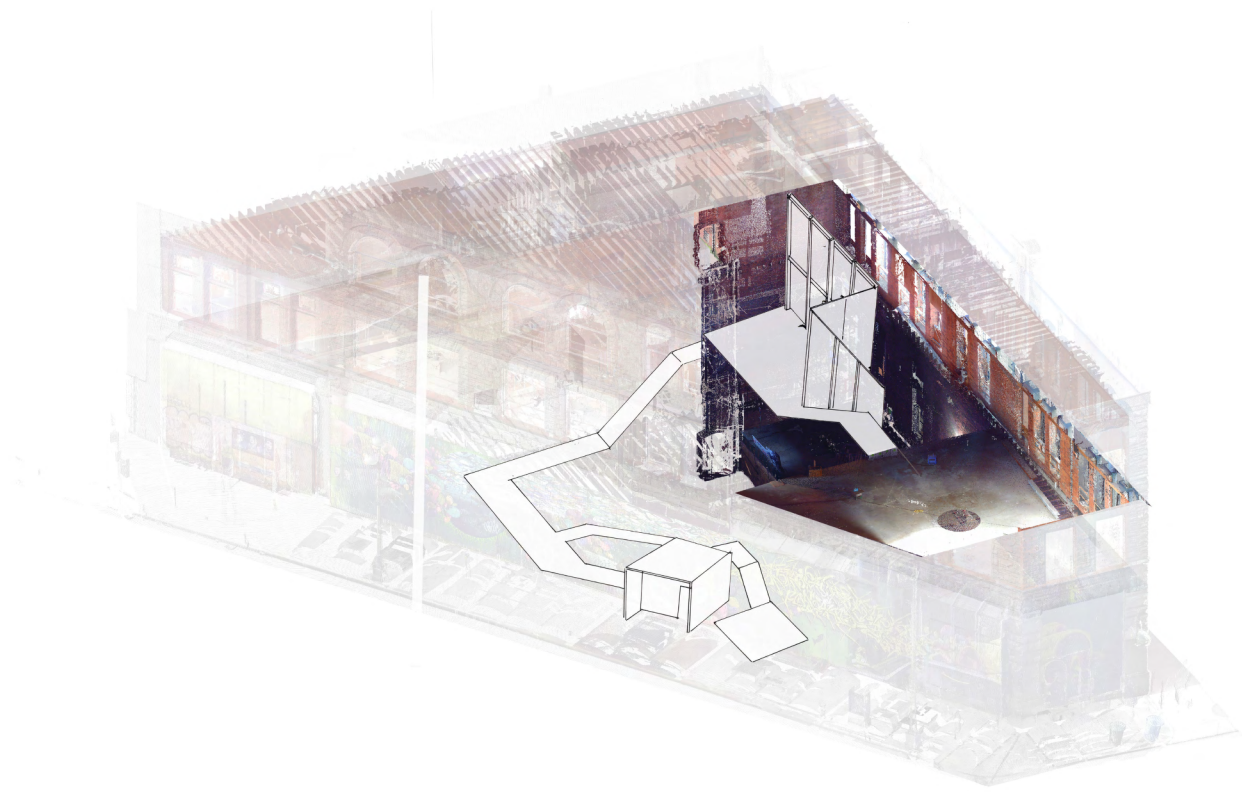
The only thing left of the pharmacy is actually something absent. A moment in time is hidden in a series of holes along the brick wall, where something used to be. Remnants of structure that held a floor was removed when the G.O. Guy pharmacy moved out, and a restaurant moved in. What was offices or storage became full of cooks and wait staff hurriedly communicating orders, receiving deliveries, the chef calling out tickets to his line.

There is a hole now where the kitchen once was, extending from the basement to the second floor. Scaffolding acts as the only access to the first floor, while also serving as a makeshift crane for construction material brought on-site to rebuild after the fire. In the interest of rebuilding, one needed first to remove elements of the original floor.



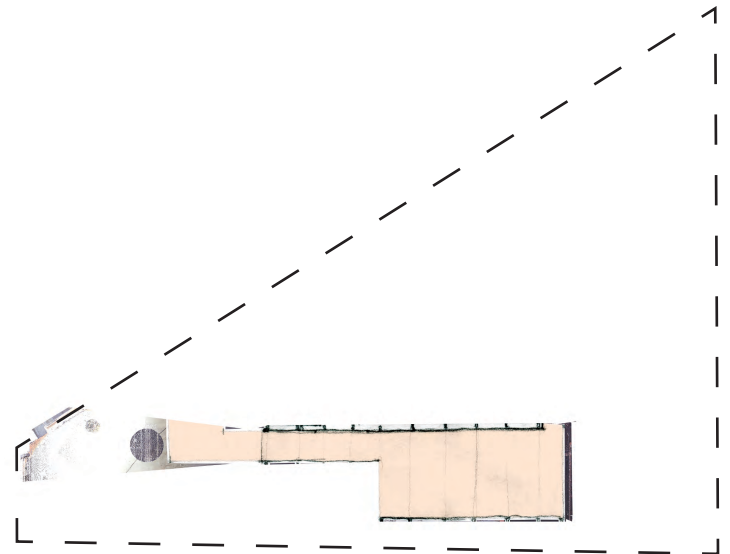
OPPOSITE: Fig. 48 - Fire Witness Mark in Computational Environment

Fig. 49 - Fire Witness Mark



Whereas the first position of the path is defined by saturation of time, material and history the second is desaturated, curated and framed. A translucent, dematerialized structure blends light streaming through the existing windows making the panels of polycarbonate glow, the structure a perceptible blur behind.

The floor is slightly below the original mezzanine, exposing the holes where the beams once stood. These indistinct and ordinary elements, along with the south wall where floors were stripped away to provide for a makeshift crane during the first reconstruction become central figures in the space.



OPPOSITE: Fig. 50 - Fire Witness Mark in Computational Environment

Fig. 51 - Fire Witness Mark

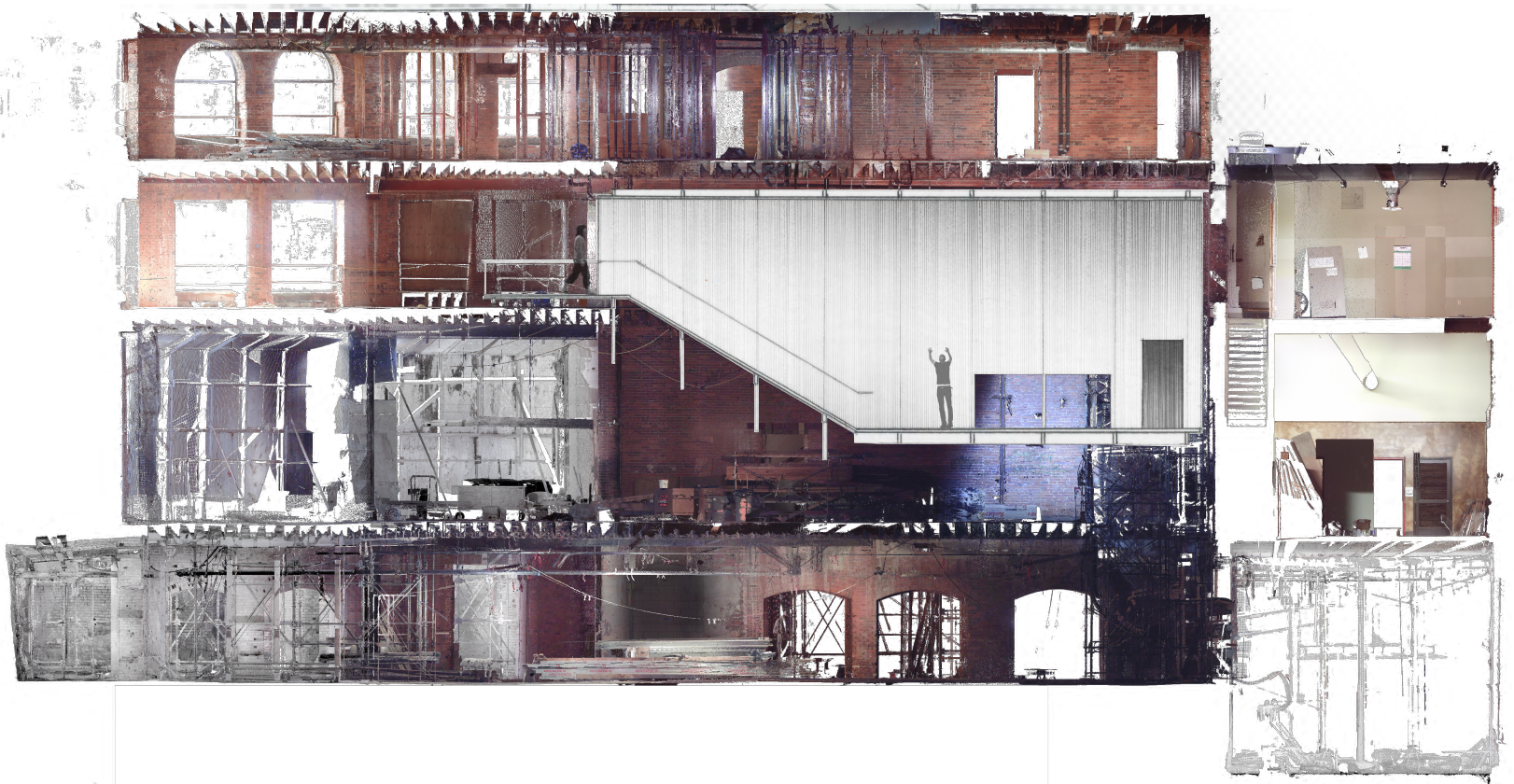


Fig. 52 - Section of added structure  
OPPOSITE: Fig. 53 - Perspective of intervention





## CONTINUITY

A sign represents a time that has been forgotten. The context of the faded words, SHAW & RAOMER have been lost to time. Now it is an artifact, an embellishment that almost seems staged. Law firm, Tailor, Dental office. The story becomes immediately true, the sign shifting to fit the narrative of this new reality. The stories of the sign begin to feel more real than its actually history. In this way, space is defined as much by our own impressions as by walls, floors and ceilings.

In this way we write ourselves into the history of our surroundings. Speculation becomes circumstance, the tenuous becomes concrete. By defining a narrative of the space, we immediately re-found its relevance. The point of history is not that it is in every way true, but that we still consider it relevant to discover it.



Fig. 55 - Tower Diagram

Some marks on the architecture are ambiguous. The sign that takes up the space of the room is undefined. A kitsch backdrop for a hip clothing store, a cocktail bar, an office. The image is borrowed to give credibility to whatever it is used to represent. We make ourselves part of historical references to place ourselves in our own time.

Reflective glazing stands between viewer and the wall, placing the viewer into the room as a participant, and onto the sign as an actor in the re-founding of their own historical narrative.

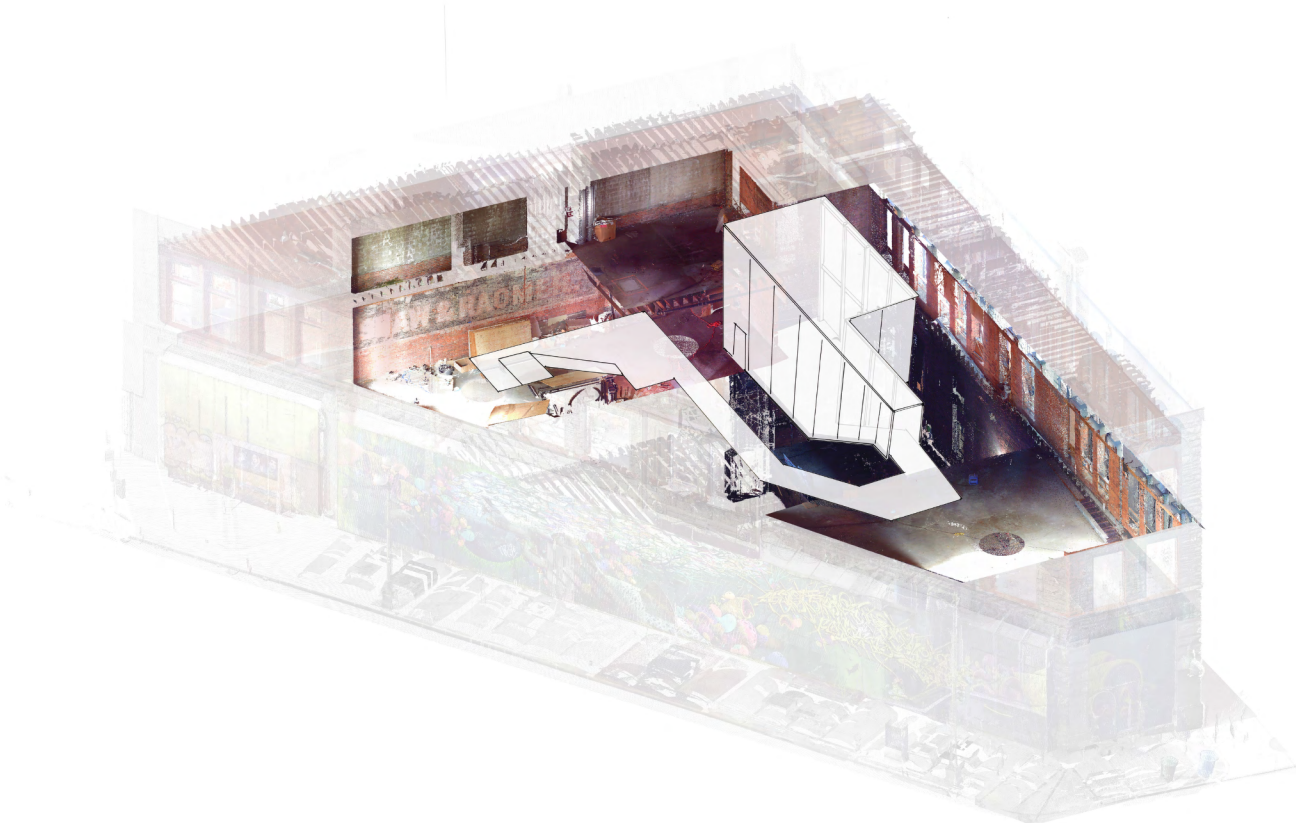


Fig. 56 - Fire Witness Mark



Fig. 57 - Perspective of Reflection in Sign.



## CULMINATION

Time flows in a single direction, but history does not. A timeline is an unfinished document, and is inaccurate as soon as it is completed. Things are discovered, moments are forgotten. Our knowledge of our surroundings shifts under our feet. The walls of this building make up its own timeline, more descriptive than any book, capturing moments over its 125 year existence that are but an outline now.

After the fire in 2007, the only stair in the building was destroyed. Each floor in a way became separate reality, unbeknownst to the other. Shops come and go, while above offices and businesses move in and out without knowledge of one another. The only element that connected them was the central stair that pierced each floor and projected the street upward to communicate each reality to the other.

When conceived, the architect of the Metropole designed it to be eight stories tall. The walls are oversized to carry the load of this phantom building hovering above the actuality. The heart of the building, this structural core, was expected to serve a greater purpose.

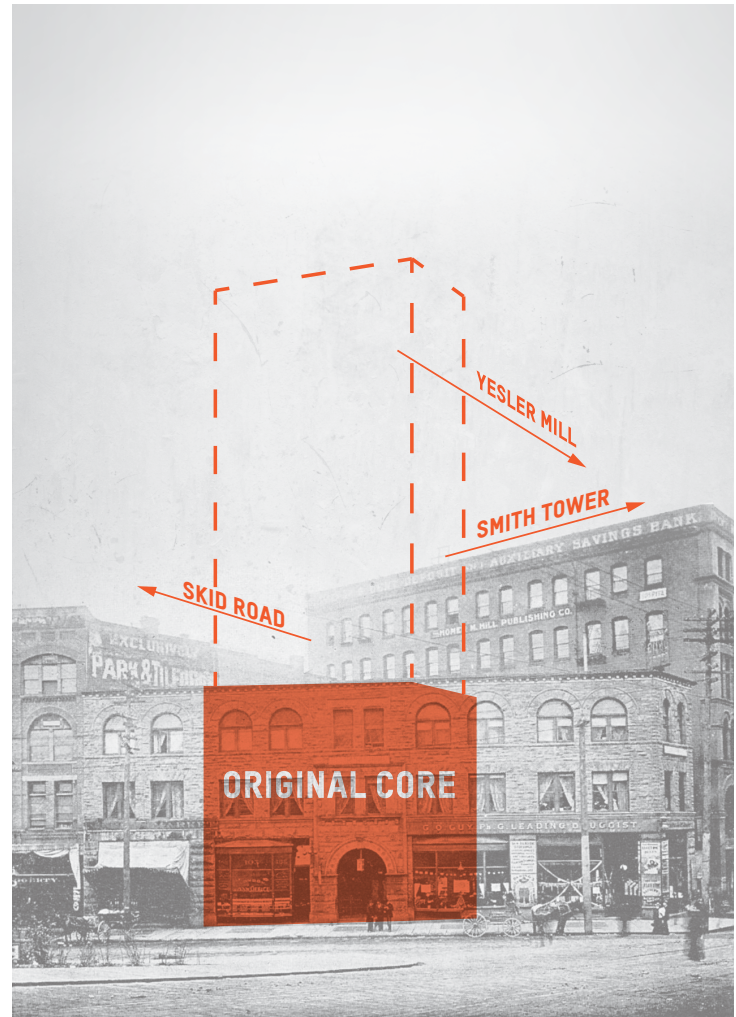
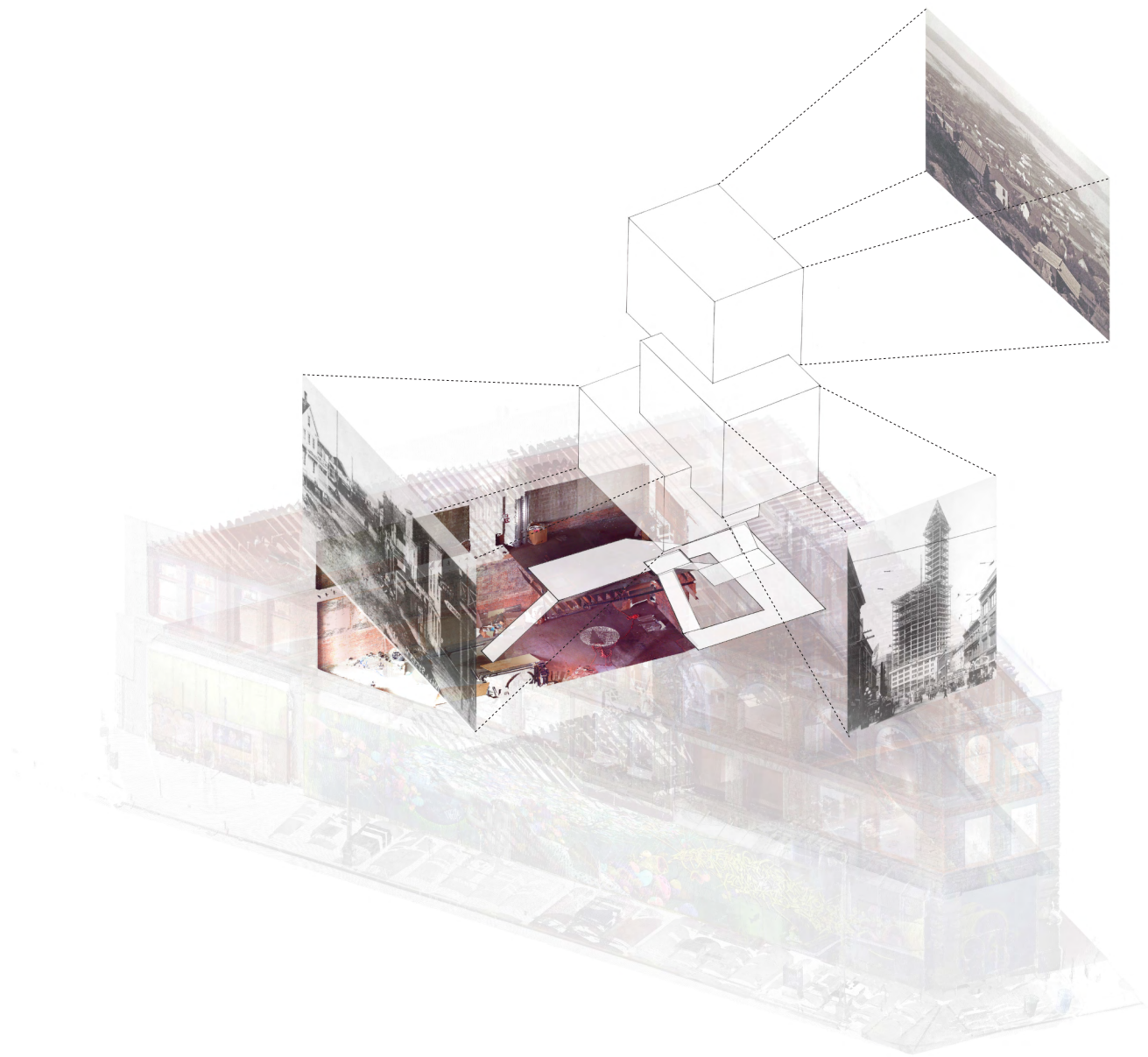


Fig. 59 - Tower Diagram

OPPOSITE: Fig. 58 - Scan of Existing Core



The final witness mark is defined by an aspiration that never came to pass. The building, structured to hold loads for up to five more stories, never realized its potential. What began as a journey through history and memory on the site of an abandoned building culminates in a new addition to the cityscape. The addition of a tower to the existing core elevates the perspective of the viewer. The city becomes the site of witness marks and historical overlay. Each volume corresponds to a historic site: Skid Road in 1868, Smith Tower in 1913, Seattle Harbor after the Great Fire in 1889.

From the street, only shadowy outlines of the boxed spaces behind walls of translucent polycarbonate material are perceptible. Only the punched openings directed toward historic views translate through the facade.

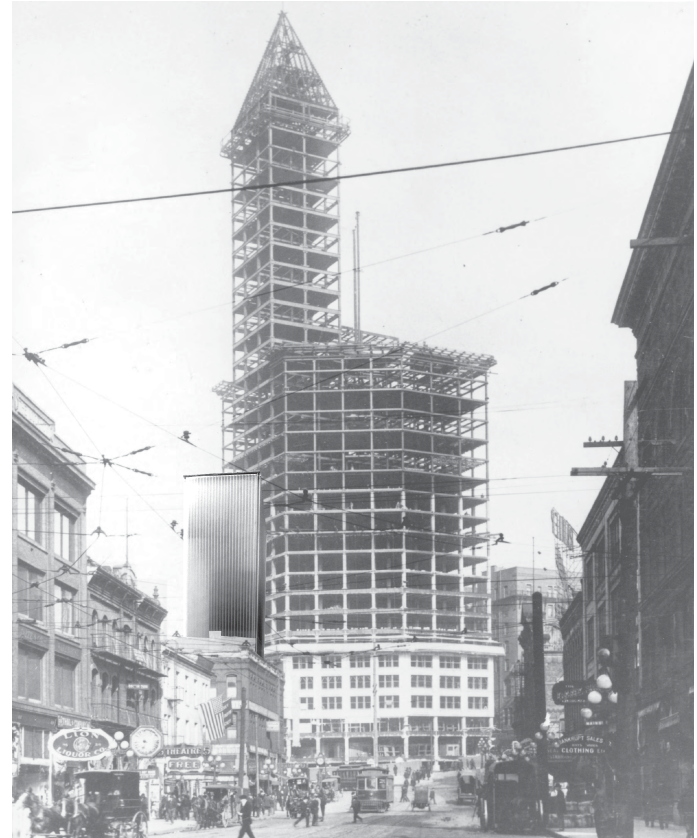
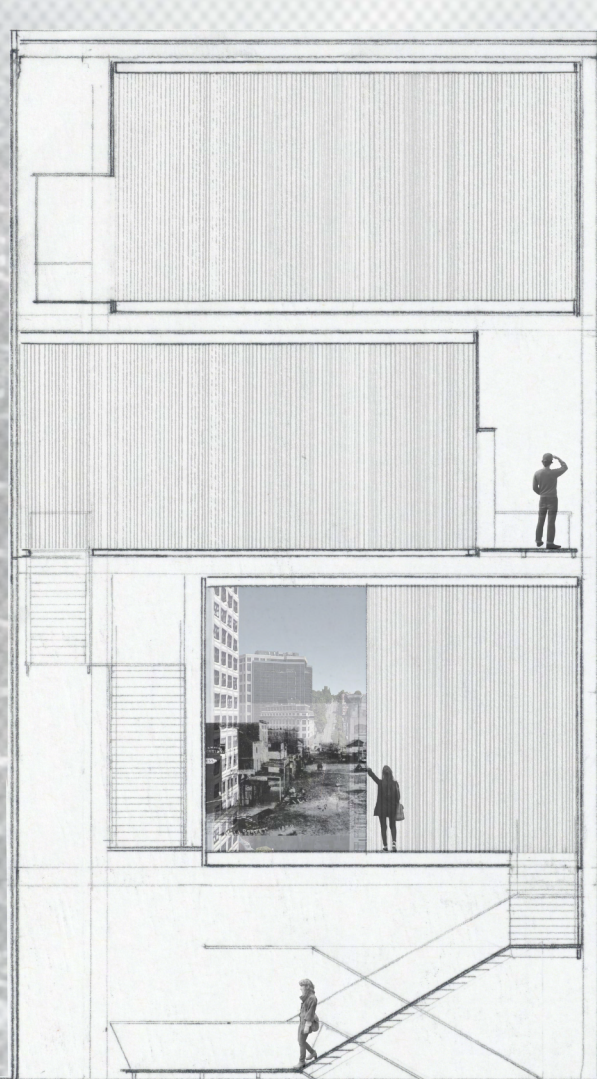


Fig. 61 - Metropole Tower Against The Backdrop of Smith Tower

Fig. 62 - Section of Tower Intervention  
OPPOSITE Fig. 63 -Perspective Looking toward Waterfront





Spatial technologies such as LiDAR scanning are still in their infancy, yet they are quickly becoming part of our daily lives. Self-driving cars use LiDAR to “see” the city.<sup>[27]</sup> Vancouver, BC has a living 3-dimensional model of the city derived from a mixture of aerial and terrestrial LiDAR imaging.<sup>[28]</sup> The purpose of this thesis is to pause and take stock of erratic and unconventional data that is also present in the scans because they are present in the physical world.

The process of scanning, though physically benign, elevates and abstracts what is scanned. This happens either through our changes in perception to that into which we put forward the energy to capture, or through the blind spots in the information gathered. This simulacrum of the physical world provides a hyper-saturated data set that we as designers can leverage with greater ability if we engage it more creatively. The technology will become more ubiquitous as time passes, but before it is fully normalized it should be utilized by artists, architects and designers to push the boundaries of architectural representation and design.

The spatial result of 3d scanning allows us to work within a truly autographic environment rather than solely in the abstracted computational environments such as Rhino, Revit, and others that we currently employ. Opportunities are bound to present themselves in the interplay between these systems.

Technological advancement will always be a forward-facing endeavor, and scanning technologies are no different. What is truly surprising about this technology is its ability to disorient us in a world that we perceive to understand. The collage of the city and the building become housed in a singular image. This disassociation of viewer and recorder opens up the possibility to see our physical environment in new ways and from new vantage points.

Because of limited access to the scanning equipment this thesis does not engage another important armature of this technology that has not been tested here: temporality. As it is used today, scanning is employed to record a static environment and digitize it in order to develop a 3-dimensional model of the highest fidelity. This is currently done through a collection of scans that are collaged together to form a singular model from multiple positions.

If one were to invert this logic, and the scanning position stays static and the environment is dynamic, there is the opportunity to collage multiple scans of the same position, but with changing conditions—One could build an object, scan it, destroy it, build another object, scan it, destroy it and so on. The outcome would become an overlay of a multiplicity of potentialities in a single space. Once an object is scanned, the simulacrum is no longer

27. John R. Quain “What Self-Driving Cars See.” *New York Times*. May 25th, 2017. Accessed on June 8th, 2017. [https://www.nytimes.com/2017/05/25/automobiles/wheels/lidar-self-driving-cars.html?\\_r=0](https://www.nytimes.com/2017/05/25/automobiles/wheels/lidar-self-driving-cars.html?_r=0).

28. GeoSim. Corporate Website. Accessed on June 8th, 2017. [www.geosim.com/technology/](http://www.geosim.com/technology/).

## CONCLUSION

associated with the physical object but now generates its own timeline. By overlaying multiple potentialities on each other, there is a single digital representation of multiple outcomes.

The *witness marks* identified in this thesis could have been discovered and documented using traditional methods. However, what the scan provides is a series of intersections among the measured line drawings and the detailed records of inhabitation of the photograph. These become three-dimensional archives of space that convey a greater degree of information about the built environment than could be captured through traditional means.

There is true potential in this technology because it is intensely autobiographical. We live in a city of our own making, and within the scans of our environment it is abundantly clear that the effects we have on the spaces that we inhabit leave rich and deep traces. The ability to design within this framework is a fascinating proposition, and one that is only in its infancy. Past, present and future are linked within the computational environment of the scan, and become a reflection of ourselves that this thesis looks to explore.

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