You Can Touch This: Temporality Through Multisensory Architectural Representation

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Architects typically consider time to be a threat to buildings. This outlook stems from a lack of control over the effects of use, the elements, and changes in a building's physical and sociocultural context. As a result, standard modes of architectural representation lack the conventions and tools to address the dynamic effects of time, whether in the past or future. The limitation is particularly critical when dealing with a heritage site whose physical layers manifest its complex and layered histories. This paper proposes that the emerging technologies of Virtual Environments—endowed with not only visual but also tactile input—are well suited to enable the expression of buildings in flux. Taking advantage of this new medium's ability to enhance visual representation with dynamic and multisensory information, architects will be better able to convey, study, and synthesize the temporal scale in both the documentation and design of buildings.

INTRODUCTION

The philosopher Karsten Harries notes that architects build against the "terror of time."[1] Jeremy Till, as an architect himself, confirms time as the common enemy for those who want total control over their design, and observes architects to be compelled in two directions: those who deny time and those who aim for timelessness.[2] As a strategy, Till, in his writings, provokes architects to "deal with it." One way of dealing with time entails considering and representing the temporal scale during the design process. While typical modes of architectural representation yield "frozen" imagery—either by forcing a specific moment in history or by creating a veneer of "newness"—new media technologies offer possibilities for built work to appear on a continuum and to be understood in (the much dreaded) flux. Time no longer poses a threat for architectural production if the tools and methodologies for representing it are implemented. Going even further, the representation of historical artifacts, as projects that are no longer, can offer insights into projects that are yet to be. With that, the critical question arises: how do we draw time?

In response to this question, I focus on a particular building element, stone, which is typically considered timeless in material culture. Based on ideas dealing with the close relationship between drawing and making, and the archeological perspective on physical materials and time, I posit a mode of architectural representation that can span the extended history of an artifact. To understand the possibilities of representing stone along the temporal scale, I explore historical examples of drawings as analog experiments on their physical medium; with that, I propose how digital environments may be better equipped to deliver the tangible sense of time these precedents sought. As a specific case study of a building that demands a representation strategy blending the visual and tactile, I discuss a heritage site with a layered and complex history as truly understood through its materiality. Finally, I argue for the use of both visual and tactile perceptions to mediate change over time and propose a critical approach to new media technologies as a multisensory tool of representation for architects.

DRAWING DECAY, GROWTH, AND REGENERATION

In *Architecture Depends*, Jeremy Till critiques the modernist and persistent tendency of architecture's denial of its contingencies, whether social, cultural, or political.[3] Encouraged by the vision of such architectural theoreticians as Raynar Banham, Till identifies the issue to reside mostly within the architect's unwillingness to accept the mutability of their design over time, and less within the architecture's physical test against time. In an attempt to freeze the idea, architects disseminate perfectly crafted, calibrated, and curated images of their work.[4] How their buildings may change over time in their appearance, use, feel, and overall ethos is difficult for architects to grasp. As a result, Till argues that the dichotomy between the intent of the architect and the materiality of architecture grows to the extent of disassociation.

Two accounts of stone diminish the conceptual gap between the idea and its execution by relating the material to the traditions and understandings of making. The architectural historian Robin Evans recalls a specific historical practice of working with stone while the anthropologist Tim Ingold discusses an expansive history of the materiality of stone in built work. An introduction of Evan's ideas stipulates an introduction to masonry construction, but more specifically stereotomy. As a fabrication technique, stereotomy refers to the use of geometry in cutting and assembling complex three-dimensional configurations of stone. Evans, in the chapter entitled "Drawn Stone" from his seminal book the *Projective Cast*, discusses the history of stereotomy going back to

7th century France and its implementation of drawing templates, called *traits*, particularly in Renaissance architecture.[5] Traits are essential for precise documentation of the cuts and the assembly, but they also facilitate the off-site fabrication of components prior to construction. While Evans mentions the possibility that traits did not document a finality but instead helped solve formal problems and resulted in design revisions, his focus is primarily directed toward the act of translation and interpretation.

Evans' emphasis on the function of drawing as an integral aspect of stone fabrication is reframed by the social anthropologist Tim Ingold in his book, *Making*. What Ingold adds to this discussion is a broader view of the overall process extended to include the natural substance, its tooling, and its continued transformation throughout the life of the building.[6] From his perspective, no built work is fixed in place or form. Unlike the traditional preoccupation with permanence in architecture, when considered as a material assembly in constant change, the narrative around a building also includes "growth, decay, and regeneration."[7] As such, the building is never "finished" but perhaps only in a legal sense. Ingold's proposition expands the function of drawing or other modes of representation past the fabrication phase and to include the extended history of a building. As far as he is concerned, the drawing template serving the traditional masonry construction was not merely a graphic projection of the mason's or the architect's mental image on paper, but a working tool of communication, a dynamic medium that facilitated the ad hoc and discontinuous process of making through iterations.

As far as the materiality of stone, the disciplines of archeology and architecture share a common area of study, albeit in vastly different scales of time. The way that archeology approaches the dimension of time and implements visual representation as a tool of scholarship can offer insights into architecture's challenges with time. When it comes to the physical properties of stone, durability is essential to the discipline of archeology. However, as Chantal Conneller argues in *An Archeology of Materials*, the study of human activity from a material culture perspective is not only concerned with the functional significance of surviving artifacts but rather encompasses the entire *chaîne opératoire*— the sequence of social acts around the production, use, and disposal of artifacts.[8] Conneller elaborates upon this proposition with a specific specimen of flint stone, where the marks found on the piece create a texture that holds visual interest but it is in fact residual from the act of removing fragments to use during various rites. Therefore, the texture represents something about the ritual of sourcing the substance from the earth, the act of manipulating it, and as well as the material's extended histories. In this sense, the *chaîne opératoire* methodology can also apply to an architectural artifact. The corollary with the piece of flint suggests a kind of architectural historiography that studies materiality as understood through the amalgamation of textures. But, the question of how architectural representation—of any media—captures the building's on-going transformation over time persists.

EXPERIMENTS WITH MEDIA

The answer to this question requires a closer look at the specific qualities of the medium of choice. In the 19th century, renderers used several types of paper and cloth as a backdrop, and what they added with ink or charcoal they removed with implements such as breadcrumbs and corncobs to manipulate the surface. In drawing examples from the early 20th century, the specific technique of "piquage," used primarily to layer textures in a localized way, is visible. On stonewalls, a non-uniform texture is achieved by multiple passes of tone over individual stones and by carefully preserving the sharp white background on one side of each stone block by pricking the paper. The incision on paper conjures the depth of the incision on stone. The ink wash flows like sunlight, but the sharp highlights on the stone help locate each piece in their specific position against the sun at a particular time of day, as well as in their specific positions relative to the neighboring components. Here we see the drawings manipulating and, furthermore, taking advantage of the tactility of their physical medium to construct a diurnal context for the stone. While each one may evoke only a specific point in time, together, they suggest the elasticity of the temporal scale as explored through drawing.

The architect H. H. Richardson, in his pursuit of the "Romanesque" style, also represents stone as a masonry assembly with particular texture; but instead of evoking the daily cycles of time, he overlays a sense of historic time. For example, in his drawings of the John J. Glessner house, in Chicago, Richardson employs texture as an affectation of weathered stone, so as to eliminate the temporal distance from Roman architecture and to situate his work in close proximity of the canonical precedents.[9] Needle stippling filled with lead powder creates a surface texture that is modulated per unit application. The resultant rustication on each unit is not merely a graphic exercise, but one that ties closely with the structural logic of each building. The legibility of the three-dimensional components is not once compromised in service of the "aged affect."
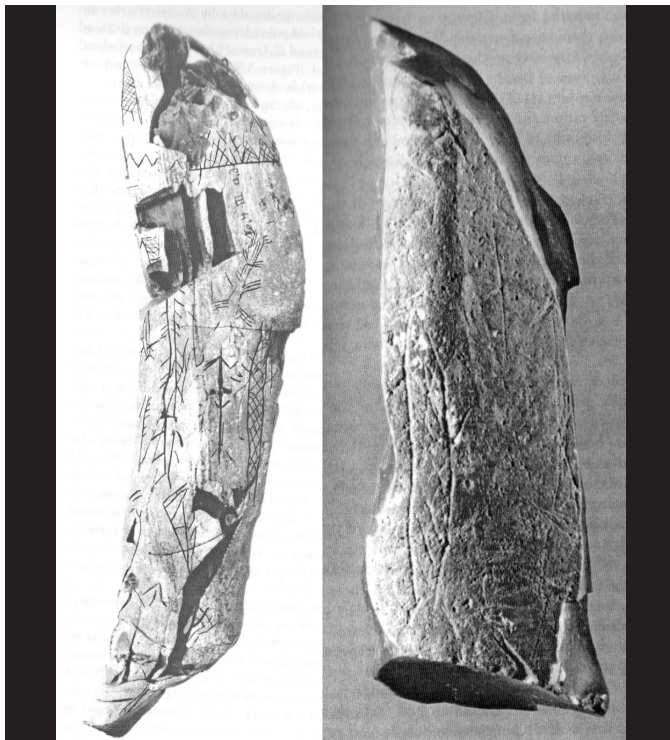

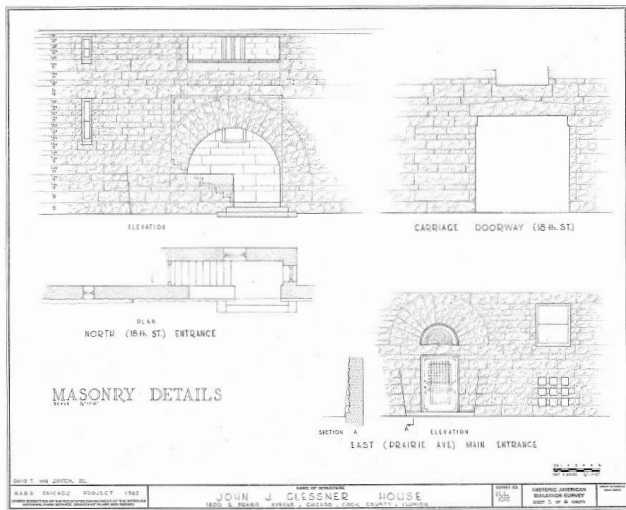Figure 1: Engraved flint specimens. Image by Anders Fischer.

Figure 2: Glessner House drawing sheet with masonry details. Library of Congress, Prints & Photographs Division, HABS ILL,16-CHIG,17-.

Among canonical figures whose drawings create a unique manipulation of the sense of time, we find Giovanni Battista Piranesi. The etchings of the 18th century Italian artist reconstructed ruins and recast well-known architectural artifacts in archeological scenes, in a scenario where the built environment is in return to a natural state, almost to a pre-historic moment. While the narrative of the image is one of re-growth and decay, the visual message connotes a singular moment in a very distant past. This reading of "ancient" owes much to content but perhaps even more to Piranesi's particular choice of medium, where the etchings, through the use of incisions and repeated build-up of ink, display a unique texture that contributes to the reading of "fuzziness" of the line and therefore of weathering and perhaps uncertainty. While Piranesi's work transposes the viewer in time, it does so by employing narrative devices and only peripherally deals with actual material history.

In contemporary, digital documentation of architecture, the distance from the physical medium in the making of the drawing often translates to a loss of touch with the physical properties of the represented artifact. It is common practice to employ abstract patterns that designate various types of stone, where the scale of building blocks may be adjusted to some level of accuracy and visual detail, but the finalized rendition is strictly a-material. The hatch pattern operates as a notational device rather than a signifier of physical properties, communicating the architect's specification of commodity as opposed to quality. (Interestingly, paralleling Alberti's preference of using only verbal language to discuss visual arts, architects also resort to exhaustive texts to achieve accuracy in product and material specifications.) This is partially due to that the graphic pattern, however specific in its geometry and dominating in its replicability, lacks medium specificity and therefore tactility. The resultant rendition connotes only a drawing void of medium, an idea without mass, and exists in no particular moment in history but perhaps to fulfill the picture of the "legal completion" Ingold refers to.

DISTANT PLACES AND FUTURE TIMES

I began with Evans, who established the integral function of drawings to built masonry work, particularly in the Renaissance, and continued with Ingold, who situated the artifact and its design along a continuum of material transformation. Considering the relationship between drawing, design, and building, the architectural historian Mario Carpo, in *Writing Architecture: The Alphabet and Algorithm*, calls attention to a paradigm shift in media and its impact on authorship.[10] Leading up to the contemporary moment, he defines two previous eras: first, "the artisanal," where the builder maintained a direct connection with making through the use of drawings; second, "the intellectual," where the architect stood at a distance from the act of building, and drawings served as notational instruments of design intent. Carpo goes on to identify the current, digital era, and finds its lineage in the work of the ultimate Renaissance figure, Alberti. Through a series of astonishingly progressive experiments in the 15th century, Alberti represents the onset of algorithmic and therefore digital thinking. Carpo discusses the epistemic shift caused by digital architecture, where the replicability of bits of information and the algorithmic approach to design yield dynamic, variable, and multimodal documentation in which authorship is no longer a singular act. Any object, through digital reproduction, can be aggregated ad infinitum and "in distant places and at future times."[11]

As far as digital media, the technology that contains and connects vast expanses of physical and temporal space is Virtual Environments (VE)—some of its applications being Virtual Reality (VR), Mixed Reality (MR), and Augmented Reality (AR). These technologies facilitate various forms of virtuality by juxtaposing physical and digital space–MR; or extending the digital into the physical–AR; or containing the physical within the digital–VR. If earlier modes of representation stretched the boundaries of their physical medium to claim a multisensory and dynamic space of representation—a more-than-visual rendition of an artifact over time—they did this by triggering virtuality. Therefore, the suite of emerging Virtual Environment applications already exists within that representational space.

In fact, these qualities are not only ideas for but intrinsic to the new medium. The content itself is not necessarily fixed—external databases constantly update and feed into the internal space of the digital model. Building upon Carpo's thesis, not only authorship but also "viewership" is no longer a singular or static act in virtual reality environments. Multiple viewpoints and seamless transitions between "scenes" facilitate a dynamic engagement between the subject and the architectural space, negating the political bias of perspectival projection. Spatial perception is not mediated through a series of static images but synthesized through real-time rendition. Therefore, VE can represent how the physical environment changes as one moves through space and along the temporal axis, making possible a complete overhaul of the study of buildings embodying complex and layered histories.[12] The participant in VE can overcome the isolating brackets of historical periods and understand the building in a temporal continuum.

Currently, where the trends in architecture culture lack vision in terms of the breadth of possibilities within VE is the myopic search for photorealism. As a result, a lot of the investigation on the virtual in design

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Figure 3: View looking east toward the basilica apse. Photograph by Esra Kudde..

has accelerated in pursuit of enticing visualizations, leaving behind the sensory and narrative possibilities. When considering the design and function of virtual environments, the technology must be assessed as a multisensory platform, and the medium a unique one. Till's caution against the "extreme form of temporal coercion" exercised through frozen architectural renderings becomes a critical problem when representing buildings whose complex histories are legible through the physical layers of reconstruction.[13] The urge for accuracy in digital modeling yields pristine images of a specific age, where the artifact exists only the in the digital ether, out of the immediate context of its material history.

STUDIUS CHURCH, IMRAHOR MOSQUE, AND BEYOND

In order to illustrate the ways in which realistic visualizations fall short on capturing dynamic nature of an architectural artifact's history, I will introduce the site of Studius Monastery in present-day Istanbul, Turkey as a case study and argue for the need to represent stone's transformation at multiple scales of time and by more intelligent and nuanced material mapping. Situated near the Golden Gates of Constantinople, the monastery was not only a religious destination but also a center of cultural

and intellectual life in Byzantine Empire. The monastery church, originally erected in the 5th century, and converted to a mosque by the Ottomans in the late 15th century, was once a stone foundry and a horse stable, periodically a school and intermittently a refugee shelter. As a mosque the building belonged to a particular Islamic sect, and it was re-named after the Ottoman Sultan's equerry, as Imrahor, which literally means the Stablemaster. Within the span of 16 centuries, the basilica structure underwent multiple layers of reconstruction due to natural as well as human-caused events and currently stands as an amalgamation of these layers representing its complex history and multiple identities. The oldest surviving religious building in the city, the site has been effectively abandoned and exposed to the elements since the turn of the 20th century, but is slated for a controversial and imminent renovation to convert it back to an operational mosque.

The history of the building in terms of its material transformation is complicated. Among several scholars who studied the conversion from Church of Studius to Mosque of Imrahor, the historian Alexander van Millingen offers us some of the more comprehensive documentation of the small and large-scale modifications to its architecture.[14] While these diagrams are critical to our understanding of the building in its early 20th century state, they operate under the narrative of "two hands," Byzantine and Turkish, creating a dichotomous approach to the

historiography of the architectural artifact and imposing forceful but abstract breaks in our understanding of the continuous material change the building went through. As an alternative, one initial strategy has been to shift the focus from ownership to materiality and compare the misalignments and overlaps seen on the wall surface with the modular standards of the typical Byzantine banded masonry construction of the era. The results illustrate an instance of "growth and decay" that Ingold projected.

Another aspect of generating tactile mapping is an analysis of the chemical composition of the masonry wall components. An analysis by Zeynep Oguz clearly portrays the range of physical properties the building as a whole manifests.[15] More specifically, the study shows that the sample range appears to be wider than what the margin of error inherent to the production process of mortar would yield, suggesting that the building was continuously re-constructed using brick, stone, and mortar produced at different points in time. Another scale of texture emerges when documenting the marble inlay paving, the *opus sectile*. Added later in the 1200s in an effort to restore the building's glorious architectural details after the destruction caused by the siege of 1204, the collection of marble types help locate their various sources and place the fabrication of the groundscape.[16] Both of these aspects of the building reinforce the fact that there is not a uniform pattern to the texture, and therefore, a finer-scale documentation of modules with textural fidelity to depict the overall result is essential.

However complete, the rendering of the Studius church by the *Byzantium 1200* project exhibits the inadequacies and risks of photorealistic visualization.[17] The model is based on our knowledge of the basilica in its 12th century condition, but the effort to be accurate introduces the risk of an inauthentic and static appearance. However realistic of an image it may appear, it in fact eliminates access to the "real" heritage of the building and in its stead imposes a misplaced reading of "newness" without a tangible temporal context.
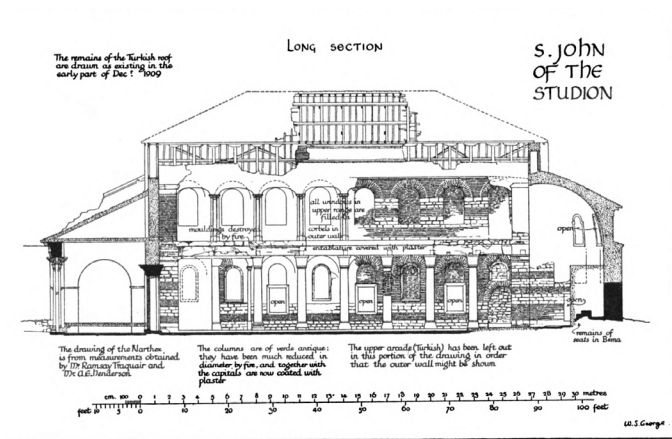
DIRT ON VR

Figure 4: Longitudinal section of Studius Church, documenting the changes made during the "Byzantine" and the "Turkish" times. Drawing by Alexander Van Millingen.

Figure 5 Rendering of exterior view of the basilica apse. Image by Byzantium 1200.

Even sophisticated virtual environments that achieve a reading of "age" through highly refined textures, nuanced interaction of forms and light, and the delicacy of atmospheric qualities, lack a level of credibility. Perhaps the reason is not for lack of refinement but the contrary. Under the heading "Here and Now," Till references the artist Laurie Anderson who expresses her mistrust in virtual reality environments until "they learn how to put in dirt."[17] This comment is not only an explicit critique of the blinders on the charge toward photorealism and its version of irreality, but also an implicit prompt to pursue dirt (or the un-designed layers of architectural skin) as a device to situate the viewer within reach of the artifact. The underlying provocation is that tactile input is a more reliable verification than visual.

What gets lost (or misleading) in photorealistic rendering is in fact possible to recapture through strategic incorporation of tactility in digital models. Current methods of digitization, in particular of architectural heritage sites, illustrate technical achievements that bring within reach a dynamic representation of temporality through a nuanced rendition of materiality. One approach is through various processes of translation from two-dimensional to three-dimensional data, such as photogrammetry and range-scanning. These tools of documentation construct models that have high fidelity in terms of the assembly—both the quantitative information of the structure, as well as a nuanced level of texture mapping, that is, the qualitative aspects of the artifact. Furthermore, with segmented modeling, assembly is represented in terms of a group of modules that have unique surface rendering that can be adjusted based on multiple variables and to greater degrees, generating tactile qualities informed by mass as opposed to an ever-expanding graphic pattern.

In parallel with the advancements on incorporating more robust texture mapping onto digital models, accessing tactile perception within immersive virtual environments have come into the foreground. This is supported by scientific studies that show the combination of visual, auditory, and tactile information constructs a much more immersive experience for the user than a higher level of visual fidelity alone could

deliver.[19] The computer science behind this possibility is haptics, a term that is already familiar to architects but needs re-contextualizing. As Mark Paterson discusses in his essay "More-than visual approaches to architecture," haptic perception in virtual reality goes beyond the isolated feeling of touch.[20] As a system it helps living beings understand their bodies relative to their environment and other masses within this environment. Paterson reminds us that the "distancing effect of the edge of the pictorial space" that Walter Benjamin bemoans is relative to his pursuit of an access to the imaginary space. Within VE, "the edge," that spatial-temporal distance between the holder and the work, collapses. In *The Sense of Touch: Haptics, Affects and Technologies*, Paterson elaborates on the term "presence," as this perceived sense of spatial proximity in the context of human-computer interface. In a perceptual sense, presence emerges out of the technological phenomenon of touching something that exists elsewhere through visual and haptic collocation.[21] What this implies for architectural representation is that the subject can occupy a building such as the Studius church at various incarnations of its architectural existence, but also touch and feel the dirt on its stonewalls.

CONCLUSION

Architectural representation can cover the execution of the building, but it can go beyond to uncover the extended history of the making and remaking of the artifact. A series of experiments with the representation of stone reveals the way in which authors consider the temporal dimension of the material and experiment with the physical and conceptual "edges" of their medium. What these examples also suggest is how, through strategic manipulations, the tactile perception can begin to inform a continuous reading of temporality. New media technologies, such as Virtual Environments, are equipped to unite visual and haptic perception seamlessly to create dynamic renditions of architecture in time. These powerful tools offer vast opportunities not fully explored in critical and conceptually rigorous ways by architects. Instead of pursuing more realism in visual terms, architects must consider Virtual Environments along the genealogy of media explorations and as opportunities to facilitate temporality through multisensory readings. This is particularly evident when dealing with buildings with complex histories that have had numerous iterations and continue to change. Virtual Environments are powerful to the extent that they can provide access to this continuum. Otherwise, they are packaged as super tools of visual processing–as embellished scenes–without a real grasp of their own, unique medium.

ENDNOTES

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2. Jeremy Till, *Architecture Depends* (Cambridge, Mass. : MIT Press, 2009), 79.

3. Till, *Architecture Depends*, 18.

4. Till, *Architecture Depends*, 79.

5. Robin Evans, *The Projective Cast: Architecture and Its Three Geometries* (Cambridge, Mass. : MIT Press, 1995), 189.

6. Tim Ingold, *Making: Anthropology, Archeology, Art and Architecture* (London; New York : Routledge, 2013), 54-57.

7. Ingold, *Making*, 48.

8. Chantal Conneller, *An Archeology of Materials: Substantial Transformation in Early Prehistoric Europe* (New York : Routledge, 2011), 82.

9. John J. Glessner House, 1800 South Prairie Avenue, Chicago, Cook County, IL, HABS ILL,16-CHIG,17- (sheet 5 of 6), Historic American Buildings Survey,Library of Congress, http://www.loc.gov/pictures/item/il0118/

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16. Esra Kudde, "Istanbul Imrahor Ilyas Bey Camii-Studios Bazilikasi Orta Bizans Dönemi Opus Sectile Döşemesinin Belgelenmesi ve Korunmasi Için Öneriler," Restorasyon Konservasyon Çalışmaları Dergisi, vol. 17 (2014) : 36-61.

17. "Monastery of Saint John of Stoudios," Byzantium 1200 Project, accessed October 2, 2016, http://www.byzantium1200.com/studion.html.

18. Till, *Architecture Depends*, 87.

19. Mark Paterson, "More-than Visual Approaches to Architecture. Vision, touch, technique," Social & Cultural Geography, Vol. 12 No. 3 (May 2011) : 270.

20. Paterson, "More-than Visual Approaches to Architecture," 265.

21. Mark Paterson, *The Senses of Touch: Haptics, Affects and Technologies* (New York : Berg, 2007) 137.