

Across Time: New Forms of Representation for Architectural Heritage Sites

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Diagrams, even those that appear to be objective documents, constitute an act of design. Visual theorist and cultural critic Johanna Drucker argues that data does not allow for inherently neutral visual representation and that all graphic expression involves interpretation. The design of the representation conveys a specific message or at the very least orients the audience toward a specific reading. If the subject of study is an analysis of material change in architectural built work over time and the desired outcome is a multiplicity of readings, what form(s) can and should this representation take?

With the above question in mind, I would like to frame a discussion based on an overview of several examples of diagrams which represent the built environment and also incorporate time. Conceptually, they each refer to temporality, but, as still images, they are limited in their ability to represent it. In his drawing entitled *Field Plots*, the landscape architect James Corner specifically addresses the reading of physical marks on matter (namely the ground) as representations of farming techniques.¹ He cites the architect and historian Rob Evans' discussions in *Drawing and Making* to emphasize the intertwined relationship between the two. In one specific instance, as illustrated in Figure 1, literal drawing on soil constitutes a direct link to the production of crops in the American Midwest. Corner's drawing overlays topographic contours, a farming calendar and images of various crops. As an abstraction, it reinforces the connection between the various layers (its constituent parts), but it cannot fully describe the actual transformation from drawing to making, in this case the planting and cultivating of crops.

As a typology, life cycle analysis diagrams identify the important markers or phases throughout the design, execution and occupancy of buildings. The proposal shown in Figure 2 by Steve Watson of the University of Queensland for a small but important revision to the typical examples of life cycle diagrams addresses the notion that a building is in fact an "open system."² Bi-directional arrows indicate external factors that contribute to the transformation of a given building at each phase. While the diagram notes the existence of

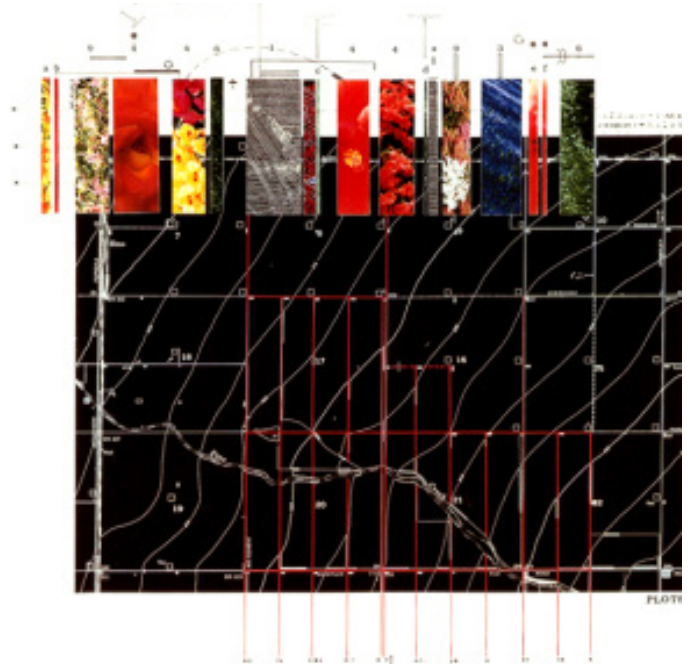


Figure 1: Field Plots drawing by James Corner

these connections between building and exterior factors, as a static drawing, it does not readily lend itself to a broader or deeper representation of the building's greater technological and cultural context.

The set of drawings in Figure 3 by the architects Jeremy Till and Sarah Wigglesworth marks the various points over the course of a dining experience from an initial moment of "perfect" order to a messy palimpsest of motion and use. The conceptual focus of the drawing, as highlighted by the title "Increasing Disorder in a Dining Table," is entropy. However, the triptych does not convey the full history of the dining table, namely the cyclical nature of its use, since it does not include documentation of the operations performed upon it beyond a single meal. Furthermore, the diagrams consist only of information regarding the dining table and the objects upon it; the diners themselves are only made legible through the markings representing their movements and actions. In a way, the omission of users suggests a—possibly deliberate—de-layering of cultural context.

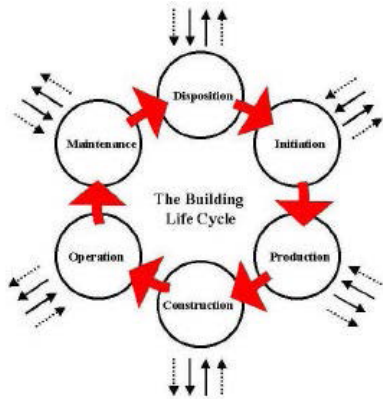


Figure 2: Diagrammatic representation fo the building life cycle by Steve Watson

Static drawings, even complex ones, are limited in their ability to display a breadth of data within a broader context.

The preceding examples of attempts to represent the temporal dimension related to making and remaking expose the lack of a clear methodology, form, or medium that is well suited to address various and simultaneous scales of time and physicality. An exploration of other fields beyond architecture that deal with the social acts related to environment making, such as anthropology and archeology, yield several methods of analysis that trace the transformation of an artifact over time. One particularly useful method is the *chaîne opératoire*, or chain of operations. Typically, the *chaîne opératoire* method of diagrammatic analysis describes the material sourcing, tooling, functional use, disuse, and discarding of a given artifact along a continuum. Similar to Corner’s diagrams, the *chaîne opératoire* reveals the provenance of marks amalgamated upon an object as a result of human acts. While the object may exist for an extended period of time, perhaps over an archeological or even geological scale, its design highlights its intersection with human history. As a type of “life cycle” diagram, it represents the point of view of the object—akin to a building life cycle diagram—but it interweaves

external sources into its form, rather than signifying generic conditions with overly simplistic “bi-lateral arrows” or the like. The *chaîne opératoire* ultimately reveals the events associated with the making and re-making of an artifact along a continuum rather than bracketing such acts as “before” or “after.”

The cultural anthropologist Tim Ingold, in his book *Making*, further elaborates upon the idea of re-making and extends the view of the fabrication process to include the sourcing of the natural substance, its tooling, and its continued transformation throughout the life of the building.³ From his perspective, no built work is ever fixed in place or form. Unlike the traditional preoccupation with permanence in architecture, when considered as a material assembly in constant change, Ingold’s narrative involving buildings also includes “growth, decay, and regeneration.” As such, the building is never “finished” but perhaps only in a legal sense. Therefore, with Ingold’s broader framing of the idea of “building-in-the-making,” the function of representation expands to become a dynamic medium communicating an ad hoc and continuous process of change. I propose the *chaîne opératoire* as a methodology of studying and representing an architectural artifact throughout its extended history.

SPATIAL WRITING

The question I pose in this paper is how to design a type of diagram that portrays the extended history of an architectural artifact at multiple scales and that provides points of entry for further research. In other words, what is the right medium and form for describing the dynamic nature of such content? In another look across disciplines, this time toward the arena of interactive digital media tools, new opportunities for visual language are offered that have not yet been widely adopted in architectural representation.

In addition to the applied examples from digital media, the theory of digital space reinforces the direct connection with architectural thinking. The human mind, according to literary scholar Marie-Laure Ryan in *Narrating Space/Spatializing Narrative*, imagines space as either a container or a network of content.⁵ We navigate digital space similarly to the physical, and in both we can describe our movement along different directional axes. In fact, literary critic Susan Stanford Friedman reinforces this notion in her discussion of how narrative, along the “horizontal” plane, unfolds in a sequence of events or critical markers, while the “vertical” space allows the reader/viewer to delve deeper at any of these points of entry and make connections with embedded sub-narratives or cross references. The reader’s experience within this layered and interconnected conceptual space is an interactive process of navigation-- a fundamentally distinct feature in new digital media environments as identified by media theorist Janet Murray in her book *Inventing the Medium*.⁶

The visual theorist Johanna Drucker describes the emerging landscape of digital media environments facilitated by new software tools and platforms, and identifies a newly arising mode of creative production by scholars. These digital environments challenge predominant forms of linear text in the way they wholly integrate

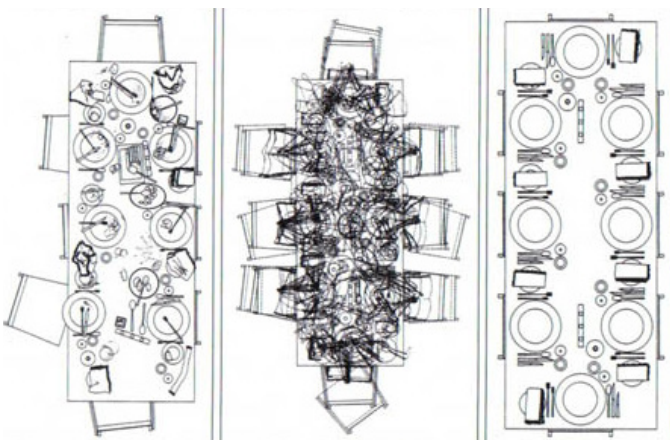


Figure 3: “Increasing Disorder in a Dining Table” drawing by Jeremy Till and Sarah Wigglesworth

non-textual, multimedia content and allow for interactivity. And unlike printed text, these technologies can facilitate diagrammatic, constellationary and associative writing, or in Drucker's words "spatial writing."⁷ I would like to now introduce one component of my own "spatial writing" project in progress, where I experiment with the representation of an architectural artifact's extended history, and the related chain of operations, using an interactive interface.

FROM CHURCH OF STODIUS TO MOSQUE OF IMRAHOR AND BEYOND

The subject of study is the site of Studius Monastery in present-day Istanbul, Turkey. The monastery was a center of religious, cultural and intellectual life in the 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. 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 manifesting 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 information at hand regarding the site comprises heterogeneous content from many different sources, from many eras, in many forms, all with varying degrees of accuracy. Physical access or any type of sustained field research on site, which is currently under the auspices of the Turkish government body in charge of Museums and Foundations, is not permitted. Therefore, much of the information gathering must take place in physical archives such as the German Institute of Archeology in Istanbul and in online archives such as the Dumbarton Oaks Digital Collection. The scholarly literature regarding the site has primarily to do with its Byzantine phase, in addition to meticulous accounting records on the repairs conducted during the Ottoman rule in the 17th and 18th centuries, and some contemporary news reports related to the controversy around the impending reconstruction. Some of these sources are conflicting and others give partial information, amounting to a body of information of varying and questionable accuracy. As a result, a crucial component of the research involves data management that must account for fragmented information at multiple scales and with varying degrees of accuracy. The "material history" document is an initial approach to collecting and sorting the data in such a way that it can support the interpretive process of digital reconstruction, from textual to visual and spatial content. Essentially a matrix organizing all research findings chronologically as well as by source, location, specific details, and level of certainty on their accuracy, the documentation is the basis and first mode of representation of the research.

Given the types of content and the underlying objectives in employing spatial writing tools, the project uses the web-based, media-rich

platform *Scalar* to construct what may be described as a digital publication, titled "From Church of Stoudius to Mosque of Imrahor and Beyond: Architectural Heritage in Multimedia." *Scalar* is designed for scholars producing textual and multimedia content and offers an interactive and dynamic structure in which all pieces of content are interrelated. The project author has the dual responsibility of both designing the information architecture of the site, which creates a new context for the content, as well as generating the content itself. *Scalar's* design gives the writer the ability to define linear but not necessarily "flat" (in Friedman's sense of conceptual narrative space) sequences—namely "paths"—for the reader. Paths can be embedded within other paths, bypassed entirely or explored partially. For non-linear associations, the writer can identify "tags" that name categories or act as "tagging" elements. While the paths form the structure of the content, tags allow the reader to essentially "cut through" that structure and determine constellationary alternatives based on their focus of study. As a spatial writing tool, *Scalar* allows the visitor to the web platform to not only experience the project site as a reader/user, but in many ways as an agent of writing, or an "interactor."

The information design of the digital publication discussed in this paper has three primary paths, as seen in Figure 4, with the "Space" and "Time" paths conceived as a pair related to research and the "Project" path offering background information on the research process. Following the trajectory of "Space" one finds information on the physical site, and "Time" presents the reader with the history of the artifact. Although the distinction of temporal and spatial navigation creates a dichotomy and may give the appearance that the two paths diverge, *Scalar's* structure dynamically re-organizes itself by responding to visitors' prompts. Through tags that sort different aspects of the content and a set of visualization functions that reveals the meta-structure of the publication, the interactor can criss-cross or traverse up and down through the apparent stratification. In the space/site sphere, distinct paths allow the first-person navigation of the virtual environment facilitated by various media such as 360-degree photography, digitally reconstructed models, virtual and augmented reality platforms. Along the temporal/history path, the visitor can browse through or delve deeper into the existing literature on the site as well as the narrative on how the sources informed the digital reconstruction process. Regardless of the direction of their exploration through the content, the interactor can select certain tags to re-organize content according to their interest and shift their position within the space of the publication. The primary focus of this paper, the chaîne opératoire, is a piece of the history/time network, where a built-in interactive diagramming tool portrays the building's transformation through the point of view of the artifact.

The specific part of the digital publication discussed here is a built-in application in *Scalar*, developed by Northwestern University's KnightLab called "Timeline." So far used primarily in journalism, Timeline displays multimedia content along an interactive, temporal

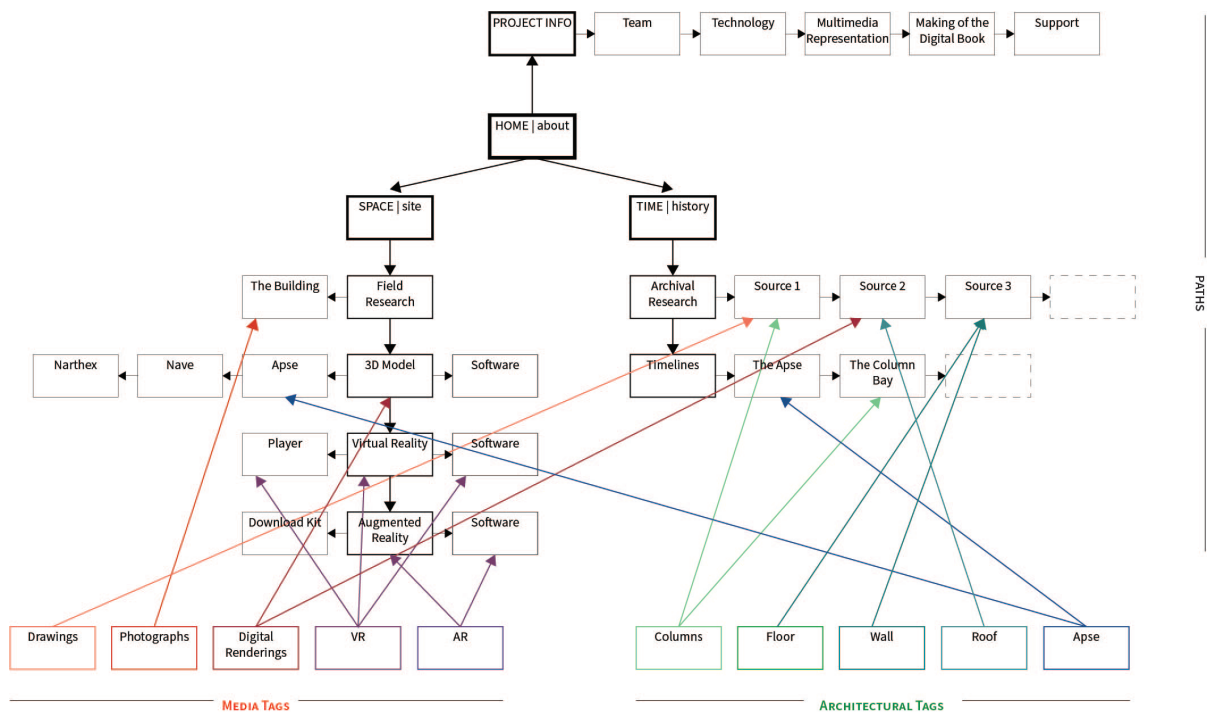


Figure 4: Information architecture diagram by author

navigation bar. Its design offers several advantages, one being that it is compatible with cloud database applications such as Google Sheets, allowing streamlined data entry and seamless multi-author input. “From Church of Stoudius to Mosque of Imrahor” project implements the Timeline function and integrates several customizations in keeping with the conceptual goals of the project. Looking at the structure of the Timeline interface, the temporal navigation bar operates along the “horizontal” axis, and its focus can be adjusted in terms of the span of time displayed. The entries embedded within the temporal bar can hold visual or textual content, hyperlinks within the digital publication or to external sources. A specific point in history can have multiple entries organized into different categories along the “vertical axis,” creating layers of contemporaneous information. This vertical layering, as described earlier by Friedman’s discussion of navigating the digital medium in different planes, offers opportunities for categorization but more importantly for creating interesting juxtapositions. Some iterations included organizing the content in terms of media type, building components, or ownership. Figure 5 shows the final iteration where each Timeline is designated for a discrete architectural element found in the basilica—such as columns, narthex, paving, apse—and where the vertical layers indicate different physical scales, from material to building component to the architectural scale.

The essential functionalities enhanced by some customization of the Timeline application provides the basis for designing a prototypical interface for an architectural chaîne opératoire. To illustrate how a new mode of representation emerges out of the adoption of the

chaîne opératoire methodology coupled with the implementation of the Timeline application, I want to focus on the “Columns Chaîne Opératoire” and discuss three distinct types of entries it exhibits. First one starts with the smallest scale, specifically the antique verde stone comprising the column shaft. The geographic location of the source is paired with an image of the particular type of stone and further contextualized by descriptions of how the stone, also known as green jasper, was commonly used in interior applications throughout the Byzantine Empire. Staying at the same historical point, in this example at the moment of the church’s construction in 463 AD, but moving to a larger scale of information, the viewer can find information on the building component, as well as a diagrammatic drawing of the Corinthian capital, entablature and Ionic columns found in the building colonnade. This entry also incorporates hyperlinks to both internal locations within the “digital book” for further reading about the existing literature that informed the digital reconstruction of the column, as well as to external archives that hold related content. The reader sees the architectural scale application of the antique verde columns with Corinthian capitals along the nave colonnade in the third layer of the Timeline. Having no visual records of what the building looked like in the 5th century, the reconstructed digital model relies on textual references as well as suppositions based on what we know from later eras. This interpretive process of the making of the model is explained through multimedia annotations offering the ability to “dig deeper” into the research behind each drawing or image.

CONCLUSION

Architectural representation that depicts change, primarily in the context of buildings with complex histories and multiple layers of making,

FROM CHURCH OF STODIUS TO MOSQUE OF IMRAHOR AND BEYOND: ARCHITECTURAL HER...

MATERIAL

BUILDING COMPONENT

ARCHITECTURAL APPLICATION

DECRY

463

Verde Antique

Verde antique is used for marble especially in interior decoration and occasionally as outdoor cladding, although the masses are frequently formed from local stone. Verde antique is a natural material used on the Stoudios Church here in Greece.

Verde antique was sourced in Larissa, Thessaly, in Greece.

Big fire of Covid

Big fire of Covid

1882

Major Destruction due to Fire

Open designed as "Holy" by the architect, the building roof has gone through multiple fires and collapses, ultimately collapsing in 1882. Ottoman repairs and revisions on the wood frame led by a team of Turkish architects, the site was later renovated in the 1940s.

FROM CHURCH OF STODIUS TO MOSQUE OF IMRAHOR AND BEYOND: ARCHITECTURAL HER...

MATERIAL

BUILDING COMPONENT

ARCHITECTURAL APPLICATION

DECRY

1876

Mosque of Imrahor

The waterfront by Antonios Maniatis, currently known as the **Mosque of Imrahor**, is one of the most important masterpieces of Constantinople. It was built by the architect **Imrahor** in the 18th century. The building was not a mosque, but an Ottoman mosque (Imrahor Camii). The building is extremely valuable. In 1990, the drawing **Maniatis and Imrahor**.

Big fire of Covid

Big fire of Covid

1882

Column Motifs Eroded

The column motifs in the building were all Corinthian and the erudite incorporated intricate natural figures such as animals and plants. The motifs were eroded by the fire in 1882, the one occurring in 1882 in particular, which marked the surface erasure of the mosaic to a point of anachronism. The Chalki fire also eroded the building, which was never renovated and ultimately abandoned after this fire.

Figure 5: Screenshots of the “Columns Chaîne Opératoire” by author

must exhibit dynamic qualities. A reading conventional modes of architectural diagramming cannot readily deliver, incorporating the temporal dimension into diagramming sets forth a fundamental design problem: what form(s) should the representation of architecture take such that its material transformation is conveyed in a continuum? In response, this paper focuses on a specific architectural heritage site with an extended history of 16 centuries, and proposes a pairing of a unique type of methodology of analysis borrowed from the humanities—the *chaîne opératoire*— and emerging tools of interactive visualization. The emerging form of representation encompasses the architectural artifact's original making layered with various phases of re-making and embeds the representation within the scholarly research that informed it. The result is not a static imagery of the building but one that reveals its own making. Interweaving text and visual content in dynamically associated ways, the author of such an architectural representation project engages in a practice of "spatial writing," situating the reader as an interactor within a digital space, where one does not merely receive information but can actively engage in the crafting of the inquiry.

ENDNOTES

1. James M. Corner, and Alex S. MacLean. *Taking Measures Across the American Landscape*. (New Haven: Yale University Press, 2000), 113.
2. Steve Watson. *The Building Life Cycle: A Conceptual Aid for Environmental Design*. PhD Thesis. (University of Queensland, 2016.)
3. Tim Ingold, *Making: Anthropology, Archeology, Art and Architecture* (London; New York: Routledge, 2013), 54-57.
4. Ingold, *Making*, 48.
5. Marie-Laure Ryan, Kenneth E. Foote, and Ma'oz 'Azaryahu, *Narrating Space/ Spatializing Narrative: Where Narrative Theory and Geography Meet* (Columbus: The Ohio State University Press, 2016), 18.
6. Janet H. Murray, *Inventing the Medium: Principles of Interaction Design as a Cultural Practice*. (Cambridge, MA: MIT Press, 2012.)
7. Johanna Drucker, *Graphesis: Visual Forms of Knowledge Production*. (Cambridge, MA: Harvard University Press, 2014.)