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Reconstructing or Inventing the Past:

A Computer Simulation of Unbuilt Architecture

by Andrzej Zarzycki

There is a certain mystery surrounding the *unbuilt* projects or unrealized ideas of famous architects. Often times there is the expectation of a deeper meaning and hidden genius present in unrealized buildings. Some critics go so far as to claim that the best and most interesting projects remain unrealized because of the progressiveness of the ideas associated with these types of buildings.

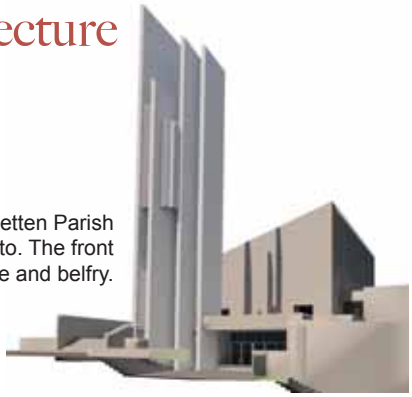

Figure 1: The unbuilt Altstetten Parish Church designed by Alvar Aalto. The front facade with the main entrance and belfry.

Whether we agree or not with this point of view, most would admit that there is an intellectual value to be derived from studying and (re)creating *unbuilt* buildings. Designers operate within an intellectual continuum that is evident through their work. This continuum is successively redefined and the designer's vision transcends with each consecutive project. In this sense, *unbuilt* projects are the *'missing links'* and serve as the *'stepping stones'* in an architect's creative development.

Studying *unbuilt* architecture allows one the ability to trace the origin of concepts and the architect's persistence of thought. In a broader context, unbuilt projects, as well as those that no longer exist, remain a part of our cultural heritage. Their presence continues to be felt through the impact they had on their contemporaries. Tracing back these threads of connections and influences is not only an exciting but also an informative exercise. It helps us better understand our design motivations as well as the present state of architecture.

Why Digital?

This is a valid question that needs to be addressed. There have always been attempts to resurrect past structures or immaterialized ideas. In the past, this was achieved through physical models or perspectival renditions. We are familiar with 19th century illuminations of ancient Egyptian structures or models of Rome that successfully conveyed architectural intents (their histories). So why with the emergence of digital technology do we see an increased interest in reconstructing past designs digitally? Why are we bringing past designs back to life, or perhaps, giving them a life that they never had?

The primary motivation for creating virtual models of *unbuilt* buildings with computer graphics tools is that the drawings and physical models for these building do not reveal the full meaning and potential of the crafting of form, light, and materials into powerful, resonant space.

Virtual models are the only medium which can deliver an experience compatible with real life observation, by inserting perceptual realism into three-dimensional representation. Specifically, digitally produced photorealistic representation leaves less opportunity for an observer's free interpretations and speculations. While this effect would not be desired in the conceptual stage of design, it is well appreciated as a precise communication method of carefully-formed designs. When employing photorealistic textures and light simulations, digital representation is also visually more explicit directing what types of associations can be inferred. As a result, digital images capture all the details of a scene typically with less visual holes or room for detached, distant associations. This, at least perceived, completeness of visual information when combined with the evocative and narrative character of digital representation, translates into a high authenticity of experience.

Digital representation allows for dynamic and innovative ways to visualize architectural environments. It embodies and extends the traditional use of the word "representation" into new visual conventions. Unlike physical models and similar to drawings, digital representation has the ability to symbolize and evoke a feeling about a space, not merely for capturing the photorealistic exactness of a perspectival view. In this sense, it relates to cinematic narratives. It can also convey the essence of an architect's intent or an overall spatial design framework. Consequently, digital representation has potentiality to go beyond a utilitarian need to visualize or describe a building. It presents unique opportunities for conveying mental impressions and intentions because of its ability to easily manipulate reality and tailor it to particular expectations.

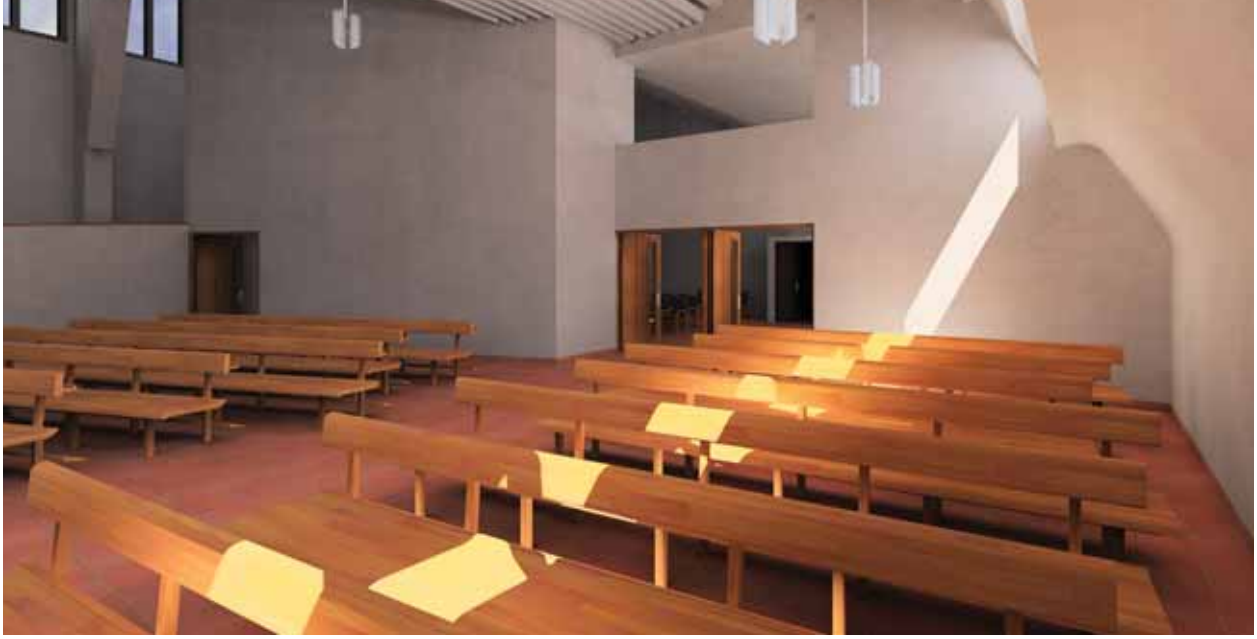

Figure 2: The interior space of the unbuilt Altstetten Church. A view from the altar toward the entrance.

Interestingly, even the view shown in the Figure 2, while highly photorealistic and consistent with an observer's mental picture, could not be achieved with standard photography. Its field of vision is wider than that of a camera or a human eye. The image (Figure 2) was achieved by a multiple offsetting of perspectives and splicing them into a single image. While this representational approach is not unique to digital media—it was used successfully in traditional media over centuries—it is well suited to the ways digital representation works.

Figures 3, 4 and 6 present the building in less usual ways. Figure 3 captures an impossible view that cannot be photographed or seen with human eyes in a single moment. However, it is a view consistent with the type of mental image one would form if experiencing this physical space from multiple perspectives and at different moments in time. In fact, it can be described as an accumulation of individual images-fragments that are being renegotiated by our mind into a coherent experiential impression. Figure 6 shows a spatial sequence of an individual building's components. It addresses the building's experiential continuity while acknowledging the intricacies of individual spaces.

The digital representation provides a unique combination of an evocative image (like a drawing) as well as the spatial and experiential character of a physical model.

This dual, dialectic-like, quality of digital media is further empowered by its dynamic aspects—an ability to account for time. An interactive (navigate-able) or animated three-dimensional digital model is closer in its representational quality to the act of interaction between a model and an architect, than to a physical model as a bare object. When interacting with a virtual model, we undergo a parallel experience similar to an architect designing a building (by interacting with multiple drawings or a model).

Figure 3: A sectional perspective with a semi-transparent partition wall; addressing spatial continuity and intricacies of individual rooms.

Figure 4: The main hall, view from the altar.

Principle of Uncertainty

Whenever we try to restore ancient ruins, interpret a piece of art or translate a poem, we come across a dilemma: to what extent do we (re)create the original artifact through our own preconceived ideas. Many questions emerge:

- Just as a built project after its completion gains a new existence and meaning contextual to its users outside its architect's intent, does the digital recreation of *unbuilt* projects go outside or beyond the original architect's intent? (*Do we create meaning where there is none?*)

- Has an *unbuilt* project been carried out or has it begun again with a different designer's intentions?

- What are the rules for resurrecting *unbuilt* projects and presenting them with photorealistic images?

- To what extent does the present inform the past?

- To what extent are we unable to comprehend or understand the past, because it is always conditioned by the present moment or, in this case, interpretation of 2D plans?

I was aware of these dilemmas during my work on the visualization of the Alvar Aalto's Altstetten Church and set up a methodology for addressing them. The same methodology, albeit a simpler version, is used by students in my Computation Class at RISD as a way of formulating their perceptions into to execution of their digital visualizations.

Process & Methodology

A critical part of digital (re)creations is the decision process used during the modeling and rendering of *unbuilt* buildings from the architect's original drawings. The original drawings were essential in portraying interior spaces and tectonics. However, they did not address the details of the project nor did the hand drawings describe finishes (i.e. colors, materials and textures). These limitations were overcome through research and the extrapolation of details, materials and furnishings from other buildings built by Alvar Aalto.

A critical part of the success of this project was my methodology. I divided the project into phases. Each phase had its own distinct character and objective: the research phase involved gathering reference materials (e.g. obtaining large scale prints of original drawings from the Aalto's Foundation in Helsinki, Finland) and analysis of the design's final state; the design phase to resolve contradictions and missing elements through the process of extrapolation from built works and archival materials; the modeling phase where 3D digital models were constructed; the visualization phase where materials and lighting simulations were developed, and the presentation phase where various simulation techniques were evaluated to best communicate the experience and the essence of *unbuilt* space.

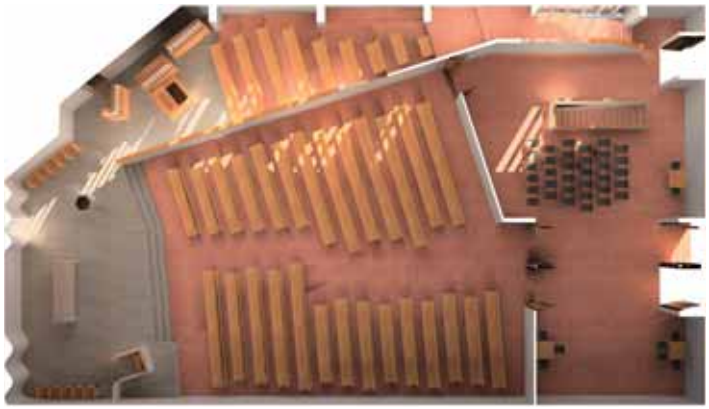

Figure 5: The unbuilt visualization of Alvar Aalto's Altstetten Church. Computer graphics by Andrzej Zarzycki.
Floor plan rendition with an alternate sunlight scenario.

Not a Single, but All Possible Designs

By going through the process of virtually constructing an *unbuilt* building, one not only gains insight into the designer's thought process, but also gains the ability to recognize all the other possible designs, which could have been realized. This exercise unfolds the pictures of possibilities. Since the reconstructed image is one of many possible, albeit likely the most probable interpretation of *unbuilt* space, the (re)creative process requires us to think about an idea of all possible spaces that can be interpreted from the same set of assumptions. *What ... if* is a constant question. The changing of materials, spatial elements or site orientation would alter the space giving us a new design with different sun exposure. Testing these possible designs against the most probable design would enable us to better judge the original ideas.

While these projects may seem to focus on achieving closure of unrealized designs by resolving and completing an architect's original intentions, more emphasis was placed on posing rather than answering questions. In this kind of investigation, by visualizing designs, we form a proposition about a possible design. While these propositions are important for our understanding of an architect's work, the questions are more important than the answers. This leads to a shift in an investigative process that treats past designs as the building blocks for various scenarios and re-creation of new life rather than a linear, domino effect like design steps.

Finally, the very process of creating virtual worlds and imagery provokes new and interesting questions, which may be utilized to guide young designers' future efforts. This connection between the study of architectural history and testing design possibilities is a promising example of synthesis between academic research and teaching.

Where to Go From Here?

As educators and designers we tend to focus on creating forms and spaces. In result, we emphasize the creative aspect of tools, often ignoring the experiential and emotional connections that are formed as a result of interfacing with virtual environments. In the case of *unbuilt* projects, this latter component is critical, since the purpose of digitally resurrecting *unbuilt* designs is to increase public awareness and to bring them into general consumption. As such, presentation of work and an ability to connect to it is critical. In this particular case, due to the printed medium, the images are presented as still-life pictures. If you were to view a video of an *unbuilt* project, your experiential aspect would increase due to the nature of moving pictures. An ability to navigate the space, not unlike a video game, is the next level to develop and would address the experiential differences between physical and digital models.

The navigability of digital models and environments is a critical element of the successful design interaction between the designer and the design. While there is space for improvement in these areas, there is also a constant progress as well. An example going in this direction is a MRI (*Multi Reality Interface*) approach, where the user or a designer would interact with a computer through physical objects. Another example is a 3D mouse-input device such as a SpaceNavigator, a device with higher levels of navigational freedom than a typical computer mouse. **form•Z** is one software that supports these devices, thereby increasing productivity. However, in the context of this article, the use of 3D mouse devices is critical from the navigational perspective. With their use, users can gain a real and intimate access to virtual space. This increased access translates quickly into democratization of virtual environments.

References:

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Alvar Aalto, Richard Weston, Phaidon Press, 1995.

Note: *The two student examples discussed following this article were developed during routine digital courses in the Interior Architecture Department at RISD. The quality of these examples speaks about a great fit between the new generation of students embracing technology and software with advanced capabilities, which promotes visual thinking and creativity. In essays below, students discuss their hands-on experience with* ***form•Z****. The Relativity visualization by Sophia Chan was recognized with an Honorable Mention award by* AutoDesSys *in 2007.*

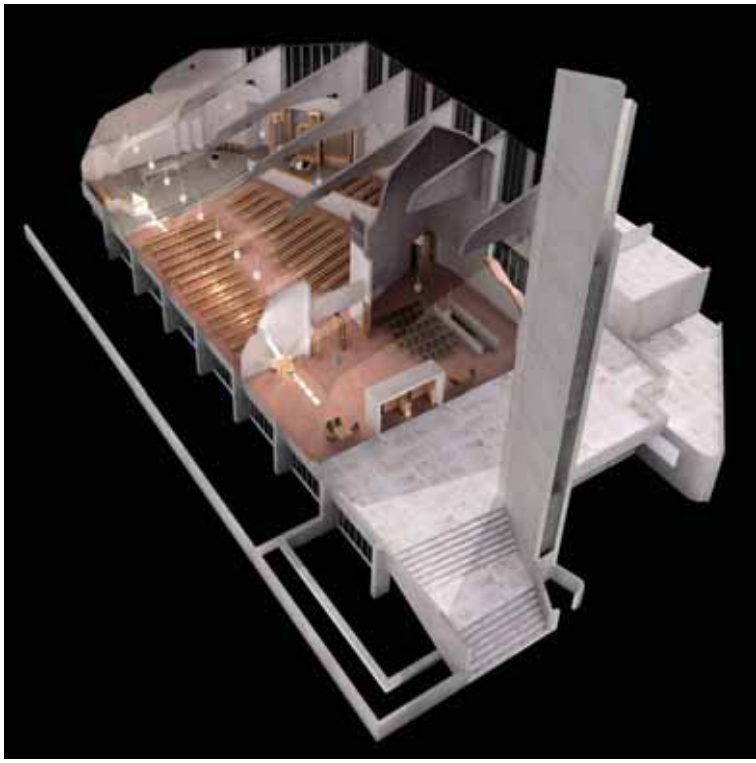

Figure 6: (Left) The overall perspective illustrating a progression sequence.

Figure 7: (Above) View toward the altar.

For a biographical summary of Andrzej Zarzycki please see page 67.