# Resemblance of the Once Existing

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## Abstract

The study of buildings of the past, and the methods of architectural delineation that support it, did not first come to life with the introduction of virtual reconstructions. Powerful methods of depicting the original reality of still-existing buildings, or of imagining long-vanished ones, were invented by skilled artists, architects, and archaeologists in previous centuries. Most of the specific techniques of virtual reconstruction known today have already been formulated. This paper presents an analysis of the works of key figures in the history of architectural representation with the following issues in mind: 1) the extent to which each one has formed our present architectural perceptions and analytical approaches towards the built environment; 2) the still-relevant strength of their representational choices; and 3) the potential for adapting those strengths within digital architectural media today. The applicability of these approaches will be further explored with virtual reconstruction case studies at the Abbey of Pilis, Hungary.

## 1 Traditional Architectural Representation Techniques

Technical architectural representation methods, such as plans, sections, and elevations, are orthogonal projections of a building; two dimensional abstractions of a three dimensional object. Such depictions not only serve as plans for a future building, and therefore provide guidelines for its construction, but in the practice of architectural history and archaeology, the orthogonal rendering methods are the essential and fundamental tools for documenting, measuring, and representing a building. Here the descriptive drawings may come long after the building has been built, or in many cases after it has been compromised or destroyed. This two-dimensional documentation is the first step in understanding, analyzing, and, if necessary, reconstructing the missing parts and details of the historical building.

### 1.1 The Flattened Space – J. N. L. Durand

The French architect, engineer, and scholar, Jean-Nicolas-Louis Durand (1760-1834), was one of the most influential architectural theorists of the early 19th century (Fleming 1972:81). In one of his major works, *A Parallel of Architecture* (1800), he illustrates public buildings of different periods and countries arranged by type, according to his theory of modular proportions. As a catalog of building types, there are more than 100 plates carefully drawn in strict technical delineation (Durand 1905). The black-and-white line drawings each explore one building type, drawn to the same scale on each plate, and arranged in a symmetrical order when possible. Durand sometimes drew in different scales for sections, plans, and elevations. There are no perspective views or axonometric projections; the same orthogonal vocabulary guides the viewer throughout the entire series of drawings (Figure 1).

Although this method is too is abstract for a general audience, its significance lies in its simplicity. Architects, architectural historians, and archaeologists share Durand's objectivist language and intent. The drawings, by their directness, let their reader quickly understand the building's organization and composition, and its comparative morphological relationship to other buildings. The creation of a three dimensional model from such sources is therefore very simple. In Durand's clear-cut, linear drawings the same technique is applied to every part of the building and the uncertain details that Durand may have hypothetically added to the reconstructed ruins are not revealed.

### 1.2 The Disassembled Axonometric – Auguste Choisy

The axonometric view is used infrequently, today, in everyday architectural and archeological practice. Like orthographic renderings (plans, sections, and elevations), this representational technique is also a parallel projection created with the aid of descriptive geometry. Therefore, they also do not correspond with the way humans perceive the world because, unlike perspectives, dimensions do not shorten with distance. Although this technique has the illusion of three-dimensionality, it still retains its technical characteristics, such as consistent scale.

An engineer by training, Auguste Choisy (1841-1909), in his book *Histoire de l'architecture* (1899), explored important periods in the history of architecture, which he interpreted from prehistoric times to the present in terms of continuous technical development (Choisy 1976). Like Durand's work, his study is intended for educational purposes, particularly for architects. It includes descriptions of buildings in textual and graphical form, and maps, diagrams, and short summaries of historical events that had an impact on architecture. The main source of information is the text; the drawings serve mainly as illustrations. The book is divided geographically and chronologically into locations

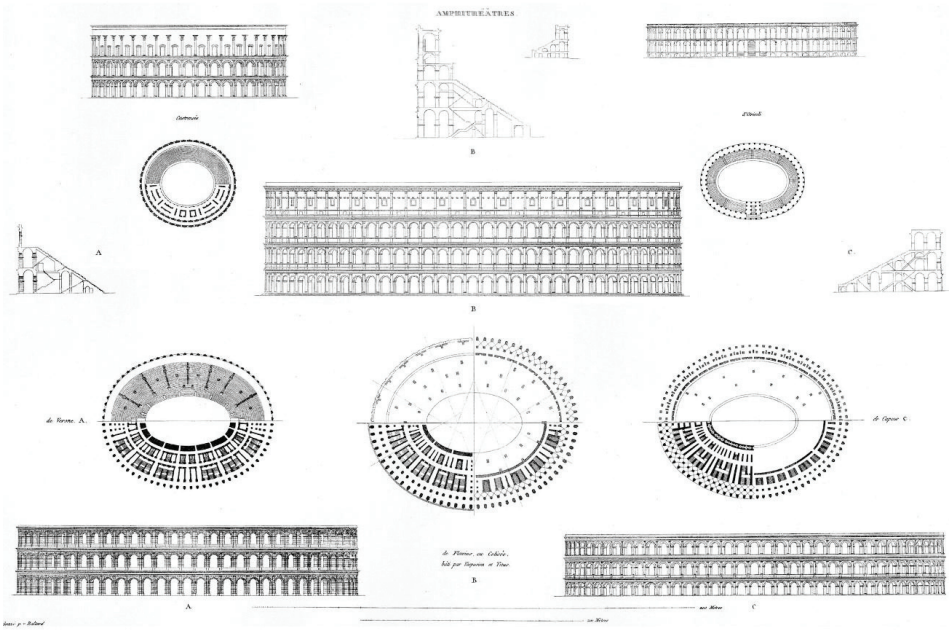



*Figure 1. Amphithéatres. One plate of the Parallel of Architecture.*

from ancient Greece to the architecture of the Far East.

Choisy extends the "conventional" methods of architectural representation (plans, sections, and elevations) by introducing axonometric views. His illustrations integrate the individual orthographic projections in one single image, attaining the illusion of a three dimensional appearance without losing the drawing's technical capacity. This method of superimposing discrete views draws attention to spatial relations within the building, and through its interpretation of all three dimensions eliminates the possibility that discrete plan, section, or elevation drawings would not match. For instance, in drawings of Greek temples, Choisy demonstrates their structure by combining plans with axonometric worm's-eye-views. He slices the building at varying heights at different rows of columns, creating a three dimensional section and showing different constructive layers of the edifice in a single drawing. By combining plans, elevations, and several different sections, the interior and hidden components of the building, such as roof trusses, are revealed, as well as the construction of the building. All of this synthesized dimensional information leads to a higher understanding of the building's form, mass, space, and structure (Figures 2 and 3).

Choisy also applies this method of cutaway axonometric views to the visualization of ancient building systems and components. For example, when discussing the Doric order, he depicts only a fragment of a typical colonnade, and removes certain pieces to show the general layout: for example, cutting away one part of the architrave or one of the columns in order to see the capital above it. Such drawings are accompanied by smaller explanatory illustrations of details: molding profiles and cross-sections that are not readable from the axonometric view. This "analytic ruin" technique demonstrates the relations of discrete pieces of the edifice to each other in three dimensions, and explains how the buildings are built in reality.

Even though these illustrations provide a sense of three-dimensionality, they are still too abstract and complex to be useful for a wide audience. Like axonometric views, these abstractions of form and space are far from recognizable. Choisy uses this projection method to maintain a distance between the viewer and the building, since it is not portrayed primarily as a piece of architecture in reality, but rather through the lens of a uniform representational technique. This analytical "distance" or removing the building from its multiple "contexts" allows him to examine the historical buildings with a more objective, or scientific, approach, considering only morphology, and not the way, for example, people might have used, inhabited, or interacted with them.

Choisy's work proposes an important question: can the same representational technique be applied to all pieces of architecture, whether a Greek stoa or a Japanese temple? Viewers, who can gain only a "second-hand" experience through his analytical drawings, can see only the morphological and structural differences, but not the different "contexts:" such as cultural, social, physical, topographical, etc. In some cases Choisy saw the limitations of his method: he rendered the previously mentioned Acropolis "walk-through" in perspective.

### 1.3 The "Analytic Ruin" – Eugène-Emmanuel Viollet-Le-Duc

Eugène Emmanuel Viollet-le-Duc (1814-1879) was a French architect and theorist, best known for his reconstructions and graphical analyses of medieval buildings. His view of architectural history was a fusion of romantic enthusiasm for and a rational architectural analysis of the Middle Ages. He considered the mid-thirteen-century Gothic style as the summit of architectural and artistic achievement, and the Renaissance as an age of decline (Kruft 1994:282). He was a central a figure in the Gothic Revival in France and helped to create a public discourse on "honesty" in architecture, which eventually transcended all revival styles to inform the emerging spirit of Modernism.

Viollet-le-Duc saw beyond the romantic, atmospheric fascination that drew his British contemporaries to Gothic architecture, to what he conceived of as its rational structural systems and their implications for modern building materials such as cast iron. He practiced as archaeologically precise a style of restoration as he could manage, but his own designs were also remarkably innovative. His approach to both medieval and modern architecture was severely rational, in keeping with his own unsentimental appreciation of

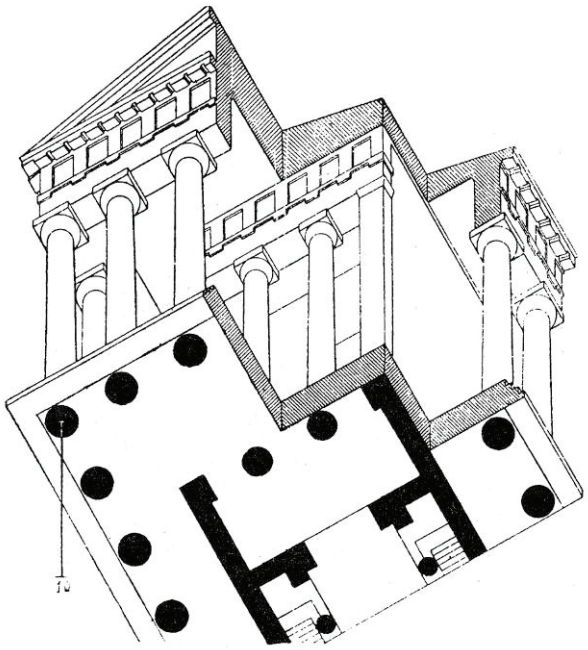


*Figure 2. The Temple of Olympia.*

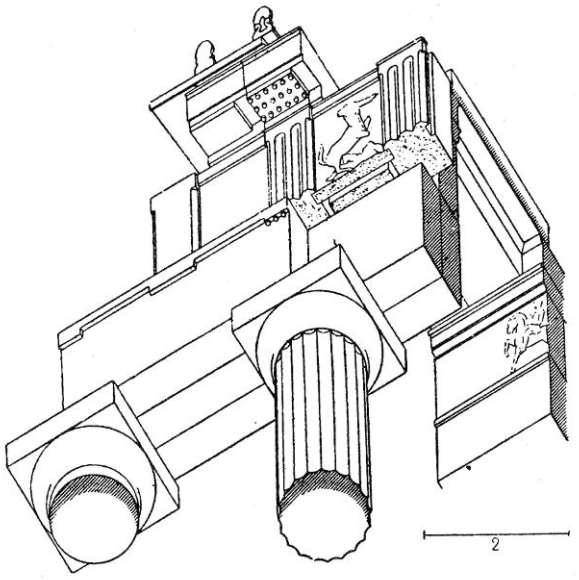


*Figure 3. The Doric order.*

the Gothic achievement.

One of the most influential parts of Viollet-le-Duc's architectural theory was applied to building restoration and hypothetical reconstruction. He deliberately aimed to put the building into an imaginary "ideal stage" where, in reality, it may never have existed. He stated: "To restore a building is not to repair or to rebuild it but to reestablish it in a state of entirety which might never have existed at any given moment." (Viollet-Le-Duc 1866:14). These reconstructions, however, were highly investigative and analytic, excluding the notion of uncertainty from the perspective of his audience.

Compared to other professors at the *Ècole des Beaux-Arts*, Viollet's drawings retain the technical approach, but place the buildings in perspective and with certain contextual or atmospheric qualities, such as light, shadow, and human occupation. Such representational characteristics are more appealing to human perception that the drier axonometric or orthogonal projections. Viollet-le-Duc also used the "analytic ruin" concept, where, similarly to Choisy, he disassembled building structures. But Viollet, unlike Choisy, rendered them in perspective: for example, when depicting an interior of a Roman building covered by a series of cross-vaults, he portrayed the first bay in high detail, as it might have looked, but the second bay is depicted in a structural form in a more technical fashion (Figures 6-8).

Viollet-le-Duc thus fused the analytic and "atmospheric" approaches in architectural representation. His main goal was to teach, and to illustrate his distinctive and innovative concepts of architectural history. Still, compared to those of Choisy, his works can also be considered artistic and yet purely analytic. Unlike the similar, dry style of technical delineation, he used shading, showed textures of different materials, and sometimes added colors. In contrast to

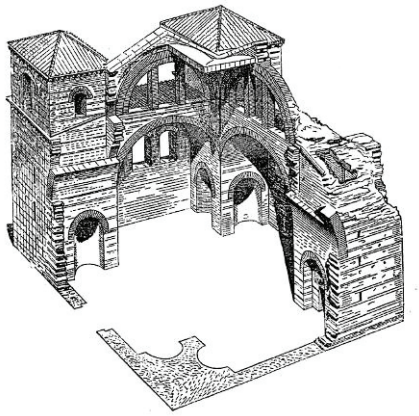


*Figure 4. Disassembled Roman building.*

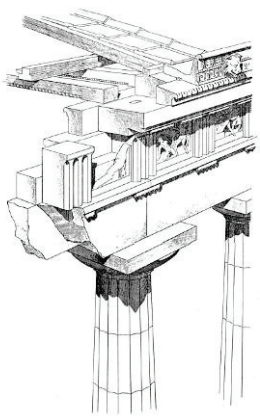


*Figure 5. The Doric order.*

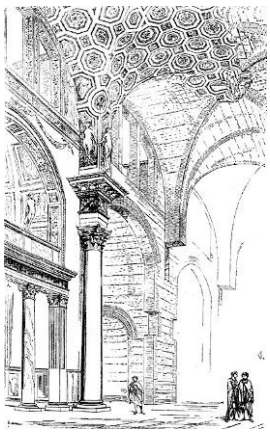


*Figure 6. Roman public building interior.*

axonometric rendering, where the scale of the drawing is easily readable, perspective rendering requires a different set of tools for explaining the size of the portrayed building, and for this purpose he included people and other contextual elements in his illustrations. Ironically, the principles of perspective rendering were invented in the Renaissance, a period that Viollet-le-Duc considered the beginning of the decline of architecture, and yet the Renaissance emphasis on a human-centered world and a human point of view informed his representational techniques.

### 1.4 Analytic Romanticism – Giovanni Battista Piranesi

Giovanni Battista Piranesi (1720-1778) was an Italian architectural theorist and artist trained as an engineer and architect who was best known for his numerous engravings of Roman antiquities. His dramatic views of Roman ruins and his imaginative reconstructions of ancient Rome inspired a new recognition of antiquity. As art historian Luigi Ficacci notes, it was in Piranesi's art "where the landscape composition coincides with archeological interest and the style of rendering becomes perfectly expressive of his intention and archeological demonstration" (Piranesi, 2000:19).

Piranesi's productive life-work includes etchings of ruins, depictions of structural details, and analyses of historical styles in architecture. His four-volume treatise, *Le Antichità Romane* (1756), contained an unprecedented wealth of technical and visual drawings about the architecture, engineering, and ornamentation of ancient Rome. This work included 250 plates of etchings and revolutionized the range of technical and archaeological illustrations (Piranesi 2000:9). The absence of color, which would be the most essential tool for an artist of his time, is compensated for by Piranesi's accuracy and completeness in the way he depicts the context of the ruins: he illustrates the sky and the clouds, light and shadow, and exhibits the ruins overgrown by vegetation (Piranesi 2000:19).

Piranesi's art and explorations in architectural history not only consisted of "atmospheric" depictions of ancient ruins, but he made several other contributions to the graphical representation of architecture. Although he preceded the analytically-minded professors at the *Ècole Des Beaux-Arts* discussed earlier, he created the concept of the "analytic ruin" by disassembling the structural components of the building at a very high level of detail and accuracy. Like Viollet-le-Duc, he rendered buildings and their parts in perspective and also portrayed their environment. His "assembly drawings" show how different structural and mechanical components or ornamental details were integrated or assembled into whole buildings. He also created an almost encyclopedic catalogue of details, again arranged in compositions, studying them separately but re-integrating them with the totality of the building. These drawings and all this complex information were consistently synthesized in beautiful evocative compositions, similar to the "analytiques" of a century later at the *Ècole Des Beaux-Arts* in Paris (Figures 7-9).

### 1.5 Depictions Of Ancient Egypt – David Roberts and Others

The British painter and traveler David Roberts (1796-1864), during the early 19th century, made long journeys in the Middle East and Egypt, which seemed to Europeans at that time a mysterious, strange, and sensuous land. As the first British artist to explore the Middle East and Egypt, Roberts presented his works in a series of views published between 1842-1849, entitled *The Holy Land, Syria, Idumea, Egypt and Nubia* (Mancoff 1999:10). The Romantic attitude towards the unexplored Orient can also be traced in paintings portraying Biblical scenes (Mancoff 1999:36). These works, like those of German artist Caspar David Friedrich, used buildings as one of the many elements, along with light, clouds, etc., that could help achieve a Romantic or "atmospheric" effect. On the other hand, Roberts treats a reconstructed ancient Egyptian city with greater detail and brings the reconstructed architectural forms into more focus. Similar to other Romantic artists, he concentrates more upon the context of the building rather than the buildings themselves, although the reconstruction of the historical forms is

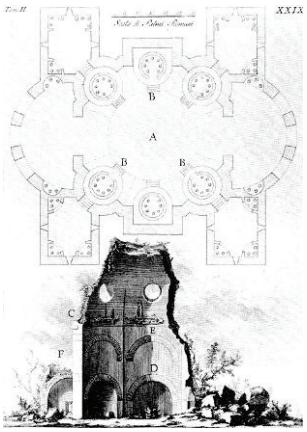


*Figure 7. Ruin and reconstructed plan.*

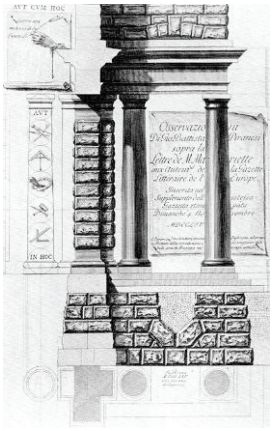


*Figure 8. Comparative drawing of plan, section, and elevation.*

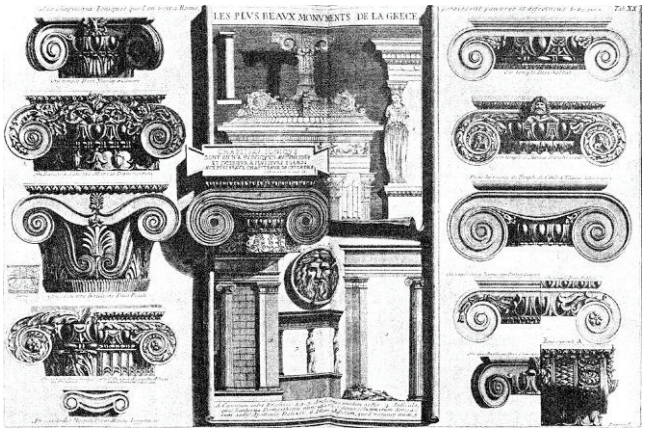



*Figure 9. Study of capitals.*

inevitable in order to portray them.

In most cases, the portrayal of the ruins plays an important part in the composition of the paintings. They are not merely one component among many, nor do they act as stage sets for the events occurring in front of them. If they are in the background, they provide context for the foreground, dwarfing the human scale, and they act as a metaphor for the past. Roberts may have added colors to them where the original paint had already weathered away, or he may have reconstructed them partially, but he played an important role in introducing the ancient architecture of Egypt to the Western world (Figures 10 and 11).

### 1.6 Evanescence of Existence – Caspar David Friedrich

According to art historian Wieland Schmied, the works of 19th century German Romantic painter, Caspar David Friedrich (1774-1840) are characterized by "exactitude and spirit, portraying fixed objects, giving them a special luminosity within the context of a composition." (Schmied 1995:7) His Romanticism manifested itself in depicting nature as an important component in his paintings, for example, sunsets, winter scenes, or vast landscapes with misty mountains. In many cases he included architectural ruins in his paintings, portrayed through the same lens as his vision of the seasons, colors, and sometimes dying nature. The ruinous buildings served as huge set-pieces in his art, underlying the idea of passing time, the evanescence of existence, and human life.

*Figure 10. Grand Portico of the Temple of Philae.*

*Figure 11. Ruins are depicted in the background.*

In his painting, *Monastery Graveyard in the Snow* (1817-19), the ruin of a monastery is framed by two oak trees that echo dying nature during winter in their truncated, branchless forms. Only the entrance and the choir remain of the ruined church, which is represented as having greater height than it would have had in reality. The vertical linearity of the two oak trees reappears in the tracery of the Gothic windows, and also as a counterpoint to the background of the surrounding forest. Similar to the ruins, the cemetery in the foreground symbolizes the temporality of human life. The significance of the painting, besides its artistic value, is that the ruin of the monastery is based upon the still-intact Marienkirche in Stralsund, Germany (Hofmann 2000:66).. The artist thus imagined how it would look in the future in a ruinous form, even as he was in fact, in 1817 making designs for the altar of this church in detailed orthogonal drawings.

The significance of his paintings lies in their treatment of the ruins. Friedrich used the general concept of a ruin as a vehicle for portraying the Romantic melancholy about time passing. Among the many tools he employed, such as color, atmosphere, and nature, the built forms are treated as metaphors, and not merely as architectural objects. The portrayal of the buildings does not have to be as accurate as the drawings for the more analytical approach; they are represented in perspective, and are sometimes altered to give them a more melancholy look.

### 1.7 Summary

The list of historical representation techniques described in this section differs significantly in their treatment of the portrayed buildings and ruins. From the analytic approach to the more atmospheric treatments, the focus shifts from the building itself towards its context. The works of Durand and

*Figure 12. Caspar David Friedrich. Monastery Graveyard in the Snow, 1817-19.*

Choisy rarely portray the surroundings, but Friedrich's ruins become almost unified with it. The audience is also different: the drawings of Durand and Choisy were dedicated to academics and researchers, whereas the artistic paintings of Roberts were intended for a wide popular appeal.

The historical representation techniques discussed in this section are also applicable on computer models in the digital medium. In fact, similar to the process of architectural design, the various examples in this section showed how, from orthogonal drawings to perspective renderings, these representational techniques reflect the steps taken in the practice of computer reconstructions, namely: thinking and drawing in two dimensions (in plans, sections, and elevations); synthesizing these distinct renderings with the aid of the computer into a virtual object; constructing it further in axonometric views; and, finally, creating perspective renderings, sometimes with atmospheric qualities added.

Unlike today's digital world, these historical techniques had only one possible output medium, what we call today "still images:" pictures on a flat surface that do not move or interact with their viewer. What may be a simple and modest method of architectural representation today, when real-time interactive virtual realities provide almost first-hand experience with the buildings, these historical precedents are yet potentially valuable as examples of how to convey more types of architectural information besides simply a final rendering of the reconstruction. In this section, emphasis was laid not on the various medium types, such as still images, animations, or interactive virtual realities, but on the treatment of the model itself, with special attention to the somewhat neglected analytic qualities of Piranesi, Viollet-le-Duc, or Choisy.

From the works of the artists, architects, and scholars mentioned in this section, the most successful and applicable methods to computer reconstructions are potentially the ones that can synthesize both the analytic and "atmospheric" approaches. For example, Piranesi and Viollet-le-Duc created works that explained structure, construction,

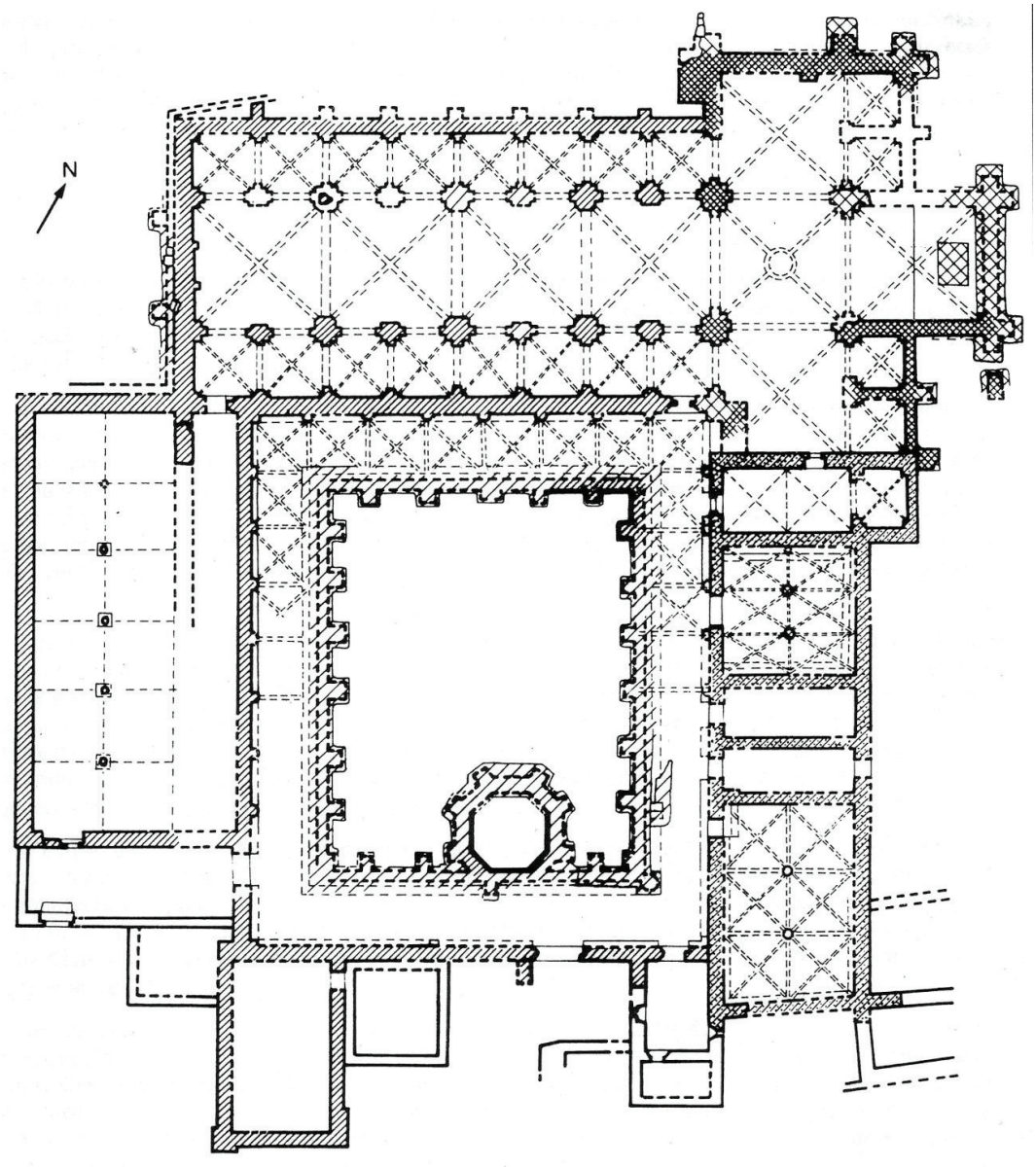



*Figure 13. The plan of the Abbey of Pilis.*

and morphology, and yet simultaneously appealed to the human perception of the world. They sought historical accuracy and yet were also very successful in making their works easily interpretable and understandable. In computer reconstructions it should be our goal to follow the path of such historical representation methods.

## 2 Reviving the Long Existing

In this section it will be demonstrated, with accompanying images, how techniques in the first section can be applied on a virtual reconstruction. As a case study, the cloister and the fountain of the Cistercian Abbey of Pilis in Hungary that was built in 1184 and was destroyed in the 16th century will be displayed in a range of representational techniques. In reality, a building in its physical form may turn into a ruin or be completely destroyed. During a reconstruction, the opposite happens: once existing architecture is revived and, in the virtual world, is remodeled. As it will be shown in this section, some analytic concepts will turn the models again into ruins in order to reveal their structure and massing arrangement. According to the "analytic ruin" idea, not only the once existing architectural forms were remodeled, but the effect of time is created, as well.

### 2.1 The Monastery

The ground plan of the monastery, with the exception of its southern side, corresponds to the typical Cistercian layout. All the buildings around the church and in the cloister reveal a unified building effort (Figure 13). The monastery cloister and the fountain-house were built in the early 13th century. The foundations and the ruins were excavated in 1913. A pipe carved in stone divided and lead the water to the yards of the abbey. Evidence suggests that the original pipes were later replaced in the 14th or the 15th century. With the aid of stone pipes the monks delivered water from the surrounding slopes. There was also a water-mill reconstructed next to the abbey, which delivered the waste water into the canals. The impressive scope and details confirm that the Abbey of Pilis was one of the biggest building complexes established in Central Europe during the glory days of the Cistercian order, also showing how a unified medieval Europe was emerging on the map.

### 2.2 The Fountain

Excavations have brought to light a dozen fragments of the 13th century fountain of the monastery. Most of them were found in the vicinity of the octagonal fountain house that opens out from the south wing of the cloister. These fragments helped in the almost complete reconstruction of the fountain, as seen in the digital model. The fountain was fed by waters from springs dammed up in the mountain-side west of the monastery. The water arrived in the cloister through a stone conduit running under the room of the converts. It rose to the level of the pinnacle through a lead pipe in the central axis of the fountain and trickled through four holes into the upper bowl, as one of the fragments testifies. Unmistakable traces of the lead pipe can be found in the discolored interiors of the pinnacle fragments. Excess water was drained from the lower basin through an underground pipe into the covered sewer running along the southern side of the buildings. This water system, just like other aspects of the monastic complex of Pilis, was strictly adjusted to the scheme of Cistercian architecture. The fountain rising in three tiers obtained its natural polychromy from the stones that were used. The color contrast between the polished red marble and the white stone was used as immanent decoration for architectural structures not only in Pilis but also in several other places in medieval Hungary. Thus, the fragments of the fountain not only confirm the rapid and high-quality reception of contemporaneous French architectural

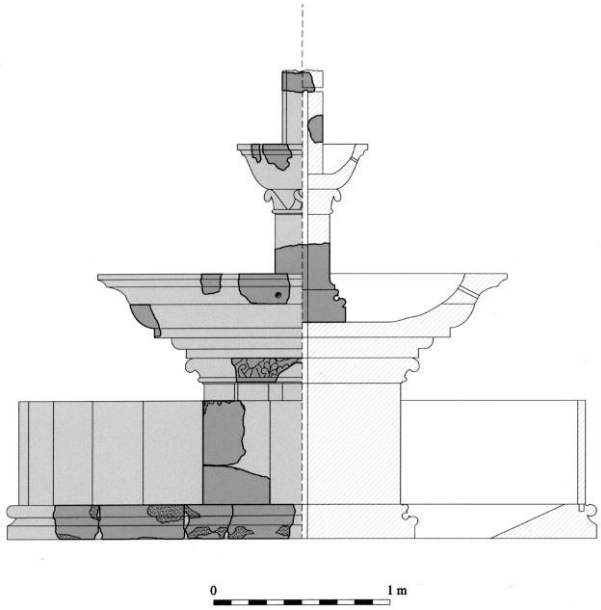



*Figure 14. Reconstruction of the fountain of Pilis.*

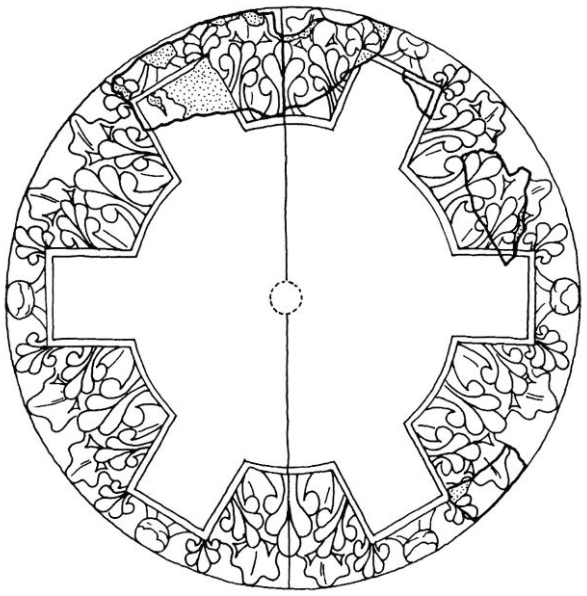


*Figure 15. Reconstruction of the capital of the pier.*

types but also provide valuable information as to the relationship between workshops as early Gothic art was spreading within Hungary (Figures 14 and 15).

The fountain symbolizes the goal of the Cistercian reform: to go back to the original sources. The Cistercian order rejected the ornaments and the luxury of Cluniac architecture and established a highly rationalist and technically developed modern building: the Cistercian monastery. The building, with its technical inventions and clearly-ordered arrangements, is the product of a complex worldview, simultaneously conservative yet somehow modern as well, that the Cistercian order represented in the middle ages.

### 2.3 Reconstruction

In architectural practice, buildings are portrayed by abstracting space in orthogonal projections: plans, sections, and elevations. The understating of an object begins with a reading of these drawings. Here, the Pilis fountain is portrayed in these projections, like in Durand's works, not as plans for a building being built in the future, but as portrayals of already existing architectural forms. These renderings bear explicit information about dimensions and shapes, but they are too abstract to appeal to a wide audience (Figures 16 and 17).

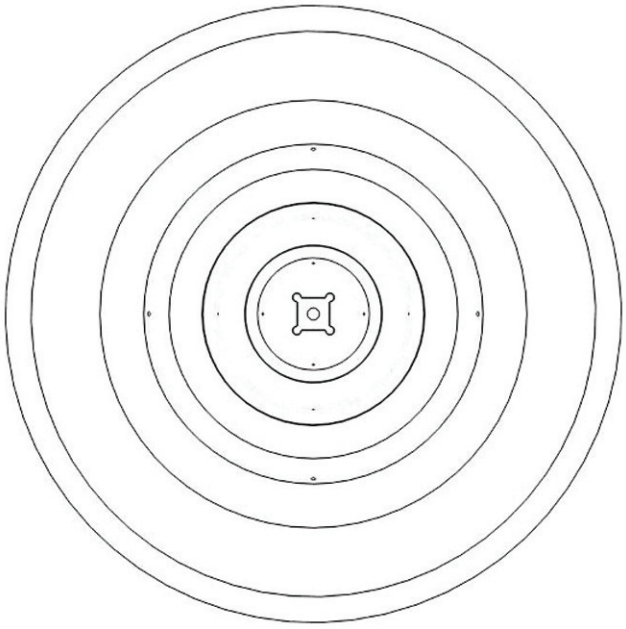


*Figure 16. Plan view of the fountain of Pilis.*

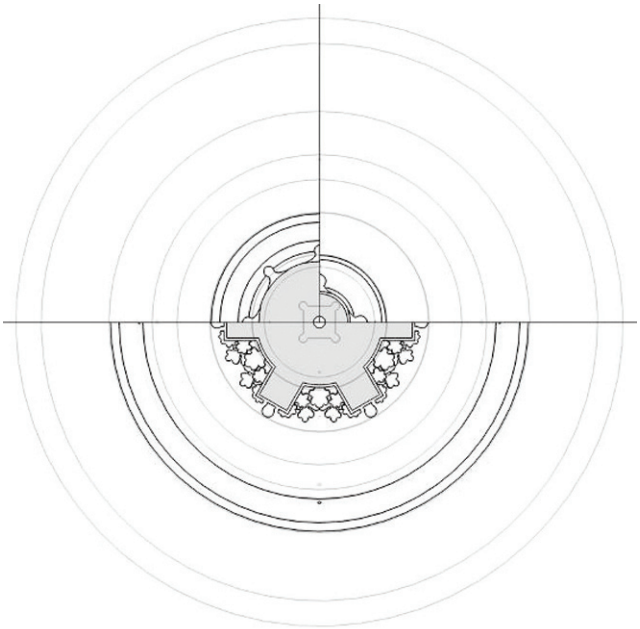


*Figure 18. Bottom view showing discrete layers of the edifice.*

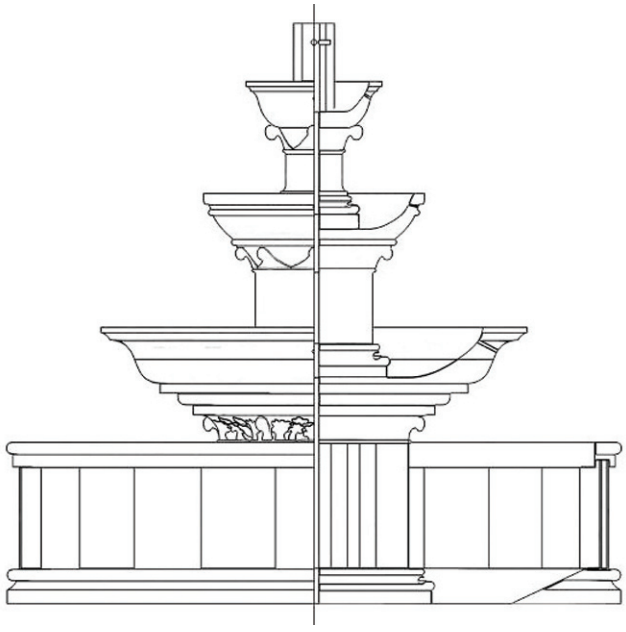


*Figure 17. Section and elevation.*

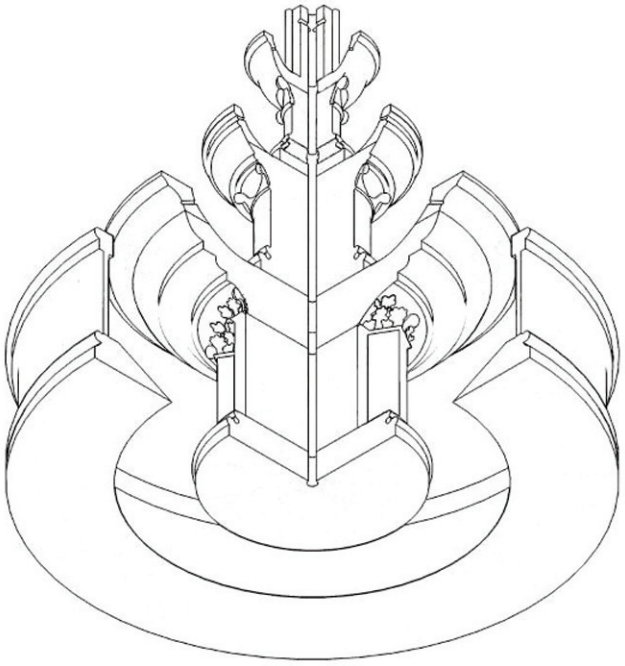


*Figure 19. Axonometric worm's-eye view and section of the fountain.*

Following the general architectural representation method of plans, sections, and elevations, a more complex understanding of the layered structure can be achieved with Durand's methods. The projections are still orthogonal, but discrete levels of the edifice are combined in a single drawing. This treatment of the fountain takes advantage of its symmetry, similar to the example of different amphitheatres from the *Parallel of Architecture* discussed in the first section (Figures 18 and 19).

Like the corresponding examples in the first section, axonometric worm's-eye views of the cloister and the fountain synthesize plan, section, and elevation. Compared to orthogonal drawings, these methods of depicting buildings emphasize spatiality without losing any of the dimensional relations. The shaded section and the axonometric view of the cloister both express three dimensions; yet only the latter retains the technical information of discrete plans, sections, and elevations (Figures 20 and 21).

Viollet-le-Duc used the "analytic ruin" idea to disassemble a reconstructed building and therefore to demonstrate the structural systems and relationships between interior and exterior. One bay of the cloister was turned into a ruin, alluding to the deteriorating effect of time. Even though put into perspective, these renderings take the architectural form out of its context. Though these renderings are excellent technical tools for creating formal studies, they are still too abstract for a general audience (Figures 22 and 23).

In archaeological practice and architectural history, piecing together the remaining physical evidence of the

*Figure 20. Section of a bay of the cloister.*

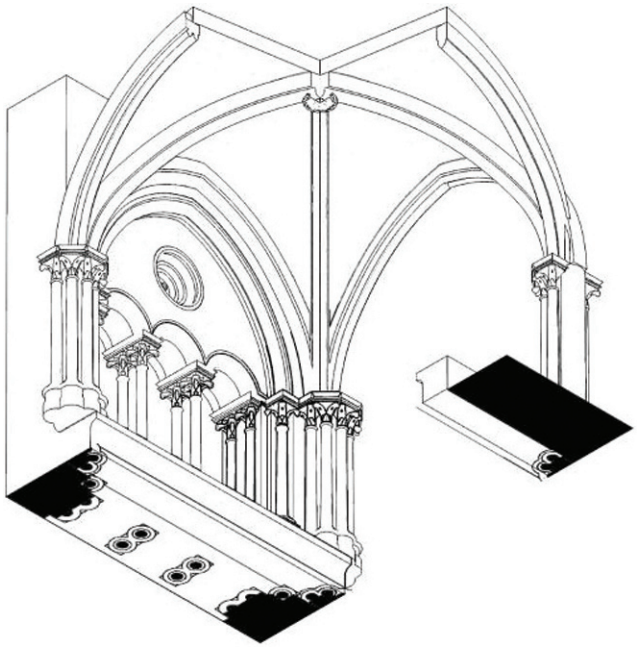


*Figure 21. Axonometric rendering of the bay, synthesizing plan, and section.*

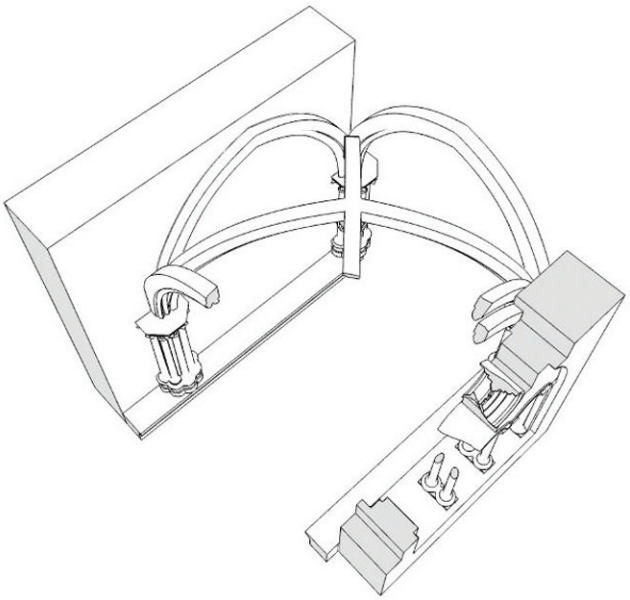
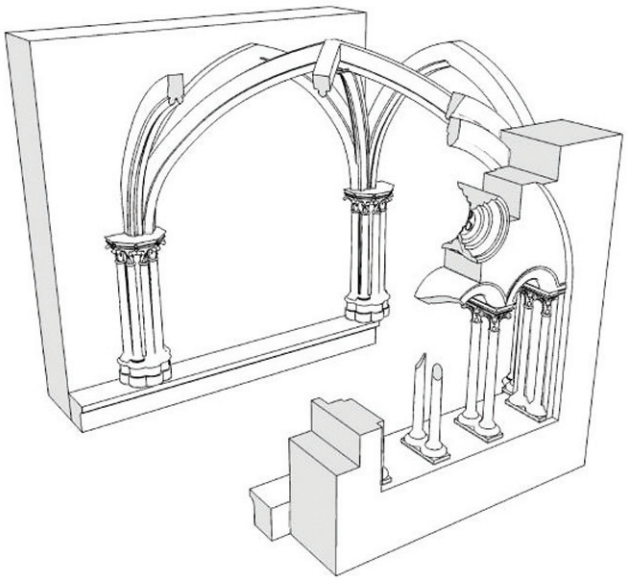


*Figure 22. One bay of the cloister turned into an "analytic ruin."*



*Figures 23. One bay of the cloister turned into an "analytic ruin."*

once existing building is crucial during the reconstruction process, but can be difficult to visualize. It can be verified later by placing the still existing pieces into the completed digital model. Fragments of the fountain of Pilis Abbey made from a complete, rendered computer model can be highlighted like “digital ruins,” and positioned within the complete reconstruction depicted only in hidden wireframe (Figures 24-26).

Colors, shading, and contextual elements, such as water in the fountain, bring the model to life. Excluding the

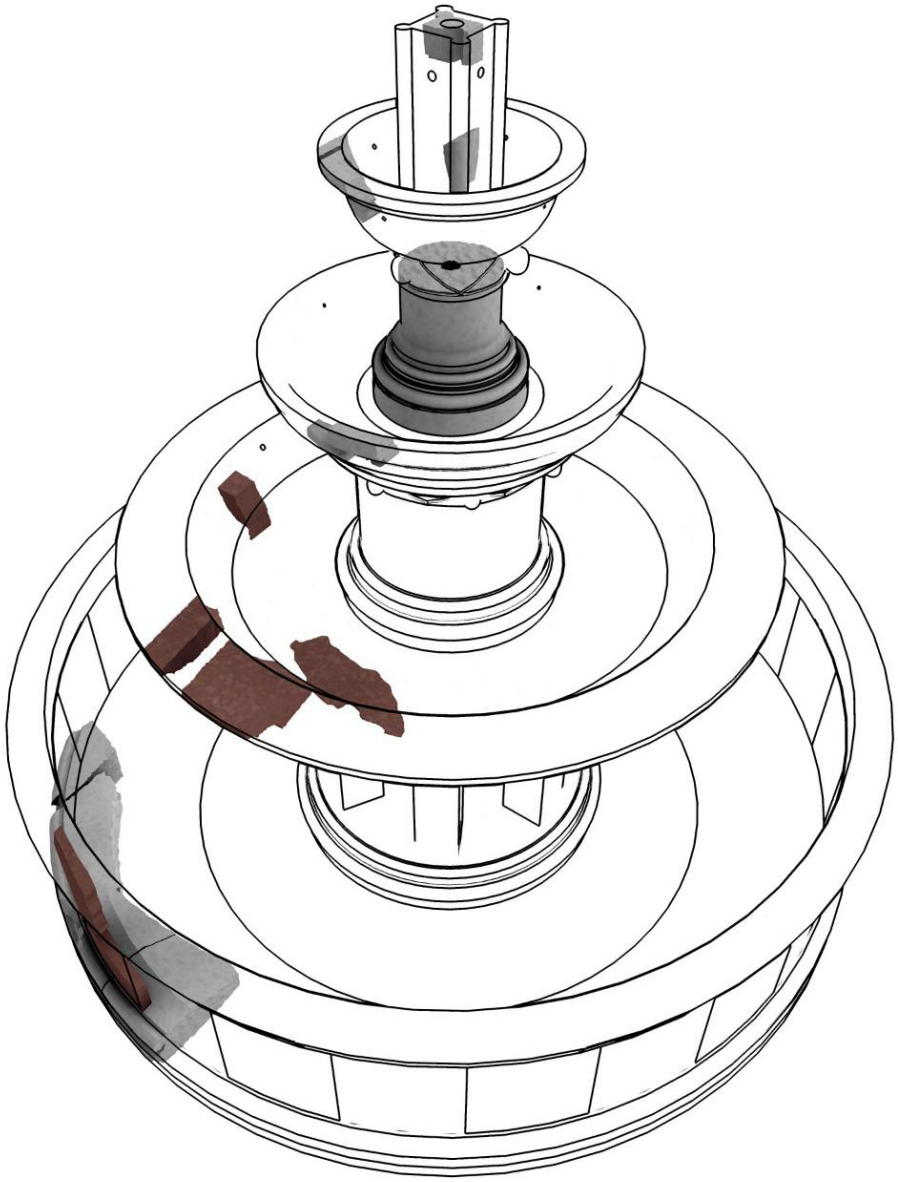
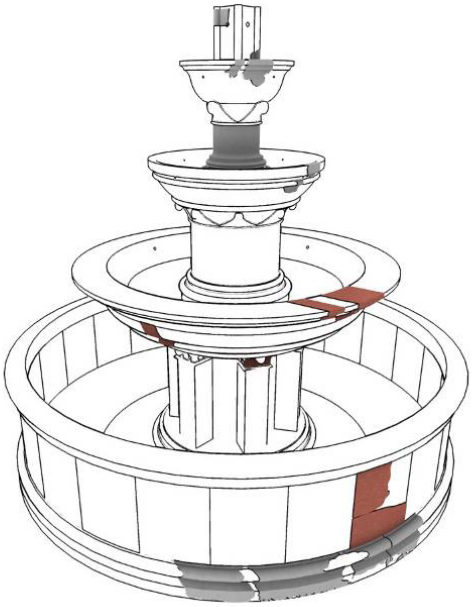


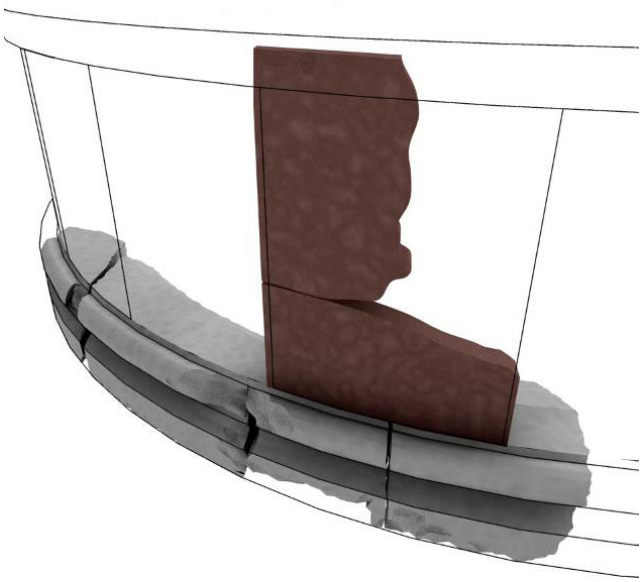
*Figure 24. Superimposing fragments with complete model.*

context, the accompanying images represent a compromise between the analytic and atmospheric approaches. The colors correspond with the archaeological findings. This rendering makes the edifice accessible and interpretable to a mixed audience: to archaeologists, architectural historians, and the general public, alike. The model aims at accuracy, but photo-realism may obscure the possible questions of uncertainty about the reconstructed forms (Figures 27-31).



*Figures 25. Fragments in hidden wireframe model.*

*Figures 27. Photo-realistic rendering of the fountain removed from its context.*



*Figures 26. Fragments in hidden wireframe model.*

*Figures 28. Photo-realistic rendering of the fountain removed from its context.*

*Figure 29. Interior of the cloister from the human vantage-point.*

*Figures 30 and 31. Perspective, "atmospheric" rendering of the fountain and its context.*

## 3 Conclusion

The first section of this paper demonstrated that even though many techniques are known and are used in computer representations in architecture today, most of them were invented and exploited for centuries by skilled architects, artist, and art historians. These still-works represent a diverse selection of ideas in architectural representation: analytical technical drawings of plan, section, and elevation; investigative perspective renderings of structures; and landscapes with distant and imagined buildings filled with emotional and atmospheric appeal. However far they may be from each other in their approaches to the problems of visualization, these techniques share one thing in common: all depict the non-existing and seek to rebuild the lost architecture of the distant past.

The goals of today's computer reconstructions have not changed. It is therefore important to take into account these historical methods that have already been improving over centuries, and have a well-established role in architectural education, art, and even entertainment. The analytic approaches mentioned in the first section can serve the need of emphasizing the technical aspects of the building, while also highlighting the interpretive nature of digital reconstructions. For example, the explanatory illustrations of Choisy shed light on spatial and planar correlations; the disassembled buildings in the drawings and etchings of Piranesi and Viollet-le-Duc portray structural systems that would otherwise be hidden. The "atmospheric" treatment, on the other hand, of Roberts and others draws attention to the architectural context and appeals more to human perception, but can exaggerate the emotional aspects. From analytic to atmospheric, the sequence of exploration of these techniques reflects the process of reconstruction itself: from plans and sections to three-dimensional models placed within contextual environments.

With the synthesis of traditional representational techniques, the analysis of contemporary digital reconstruction projects, and with the historical overview of the site, this paper attempted to shed light on emerging questions in computer reconstructions. It utilized ideas of scholars in architectural education to reflect more upon the educational, analytical, and interpretive capacities of digital models. These concepts were transformed into the virtual world to create images of the Cistercian Abbey of Pilis that show more than a finalized, mostly photo-realistic rendering. The images of Pilis demonstrate that the infinite possibilities in the digital world may be utilized to create three-dimensional visualizations of abstract analytic thinking, exploratory perspective drawings, and atmospheric renderings all at the same time. All these techniques in combination provide a rich, multi-dimensional, visual and intellectual experience that goes beyond merely the resemblance of the long existing.

## Illustrations

1. Amphithéatres. Durand, Jean-Nicolas-Louis. 1905 [1800]. *A Parallel of Architecture.* New York: W. Helburn.

2. Axonometric view of the Temple of Olympia. Choisy, Auguste. 1976 [1899]. *Histoire de l'architecture*. Ivry: Serg, p 367.

3. Axonometric view of the Doric order. Choisy, Auguste. 1976 [1899]. *Histoire de l'architecture*. Ivry: Serg, p 239.

4. Roman building. Viollet-Le-Duc, Eugène-Emmanuel. 1965 [Paris, 1863]. *Entretiens sur l'architecture*. Ridgewood, New Jersey, Gregg Press, p 108.

5. The Doric order. Viollet-Le-Duc, Eugène-Emmanuel. 1875. *Discourses on architecture*. Boston, J.R. Osgood and Company.

6. Roman public building interior. Viollet-Le-Duc, Eugène-Emmanuel. 1875. *Discourses on architecture*. Boston, J.R. Osgood and Company.

7. Giovanni Battista Piranesi. [1756]. *Le Antichità Romane*.

8. Giovanni Battista Piranesi. [1756]. *Le Antichità Romane*.

9. Giovanni Battista Piranesi. [1756]. *Le Antichità Romane*.

10. David Roberts. [London: F. G. Moon, 1846-1849]. Grand Portico of the Temple of Philae – Nubia. From Egypt and Nubia.

11. David Roberts. [London: F. G. Moon, 1846-1849]. General View of the Ruins of Luxor from the Nile from Egypt and Nubia.

12. Caspar David Friedrich. 1817-19. *Monastery Graveyard in the Snow*.

13. Gerevich, László. [1982]. "Les fouilles de l'abbaye hongroise de Pilis." *Mélanges à la mémoire du père Anselme Dimier. Architecture cistercienne* 5.

14. Takács, Imre. [1992]. "Egy 13. századi kút töredékei a pilisi ciszterci monostorból." (Hung. Fragments of a 13th century Fountain from the Cistercian Monastery of Pilis). *Művészettörténeti értesítő.* 41, 1-19. p 11.

15. Takács, Imre. [1992]. "Egy 13. századi kút töredékei a pilisi ciszterci monostorból." (Hung. Fragments of a 13th century Fountain from the Cistercian Monastery of Pilis). *Művészettörténeti értesítő.* 41, 1-19. p 19.

16-31. Author

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