Danteum & Escher: Two (Un)Realized Visions

by Sophia Chan

Danteum: *The Digital Construction of Heaven through Glass and Light*

Danteum is one of the most famous architectural projects never constructed. In 1938, architects Giuseppe Terragni and Pietro Lingero designed the building as a structural interpretation of Dante's Divine Comedy. Proposed during Mussolini's rule in Italy, however, the project was not seen as being supportive of Mussolini's political ambitions and never came to fruition.

Terragni and Lingero used Dante's work and the mathematical rule of the golden rectangle ratio to design Danteum. The architects also used symmetry and specific materials to construct different structural representations of each of the stages in the Divine Comedy. While one room would be a library that would house a collection of Dante's works, other rooms would draw inspiration from Dante's literary themes of "Paradiso" (heaven), "Inferno" (hell), or "Purgatorio" (purgatory). The architects' concept and design transformed Dante's two-dimensional Divine Comedy into a three-dimensional structure full of illusions.

For example, "Paradiso" would be a room located on the uppermost level of the structure and would consist of 38 glass columns arranged symmetrically around a central point (Figures 1,2). The nine central glass columns would represent the nine spheres of heaven as described in Dante's poem. The positioning of the columns would force the viewer to circle the room and to look upward to the sky, which symbolizes paradise.

After studying the architectural plans and sections, I modeled and demonstrated the essence of the space of "Paradiso" by using digital modeling tools. Several factors contributed to my decision, such as the structure's emphasis on materials and light. The key architectural elements of the space would be the configuration of the glass columns. After careful study of the glass columns and its specific glass properties, the discovery of how the reflections and refractions of the glass would create numerous distorted views of the space were made (Figure 3). The glass would make the group of nine columns and peripheral columns all appear to be in infinite repetition, thereby symbolizing Dante's concept of heaven and never-ending life.

The open grid work in the ceiling would also exhibit a repetitive ribbon effect due to the glass' cylindrical shape. The transparency of the glass columns would skew the perception of the room to generate an illusion of infinite space. This illusion could only be achieved using rendering programs that could create a representation of the properties of glass instead of a traditional, physical modeling of the space. Information about the materials could be found from the architects' original descriptions of the project, but details of the specific properties of the stone floors or other textures were not clear. The opacity of the glass and the amount of refraction were also factored into

Figure 1: The colonnade; the Paradiso Space, Danteum.

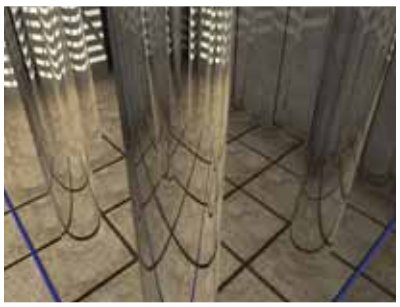

Figure 2: The colonnade; the Paradiso Space, Danteum.

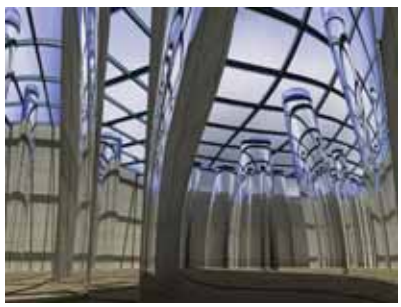

Figure 3: Distortion in a glass column; the Paradiso Space, Danteum.

Figure 4: An artificial light study for the Relativity space.

Figure 5: A 3D interpretation of M. C. Escher's "Relativity."

the considerations about the design, as this was an unbuilt project. The final decisions thus included a series of images of the space.

Using digital tools, I also created different views that represented each of the daytime and nighttime lighting scenarios for the structure. Depending on the time of day, the amount of light in the room would vary and yield a room that changes both contrast and luminosity. The closely paneled walls would allow only a sliver of light to pass from the exterior to interior space and would thus enhance the light and shadows of the space itself. The combination of the glass columns and variable light supply would also cause the lower half of the room to be more enclosed than the upper skyline. Various degrees of distortion would emerge, such as a mirage of endless glass columns reflected in the space's walls. In comparison, the square apertures in the ceiling and open-ended sky would jointly create an illusion of freedom as one ascends to heaven.

Terragni and Lingero's decision to use glass columns in the structure and to include a variable light supply in the room would have consequently transformed a two-dimensional piece of literature into a three-dimensional structure of heaven, or "Paradiso." The three-dimensional structure could only have been possible using digital tools that could interpret the architects' original intent through different materials and lighting scenarios.

2D to 3D Relativity by Escher

"2D to 3D Relativity by Escher" posed a design challenge of extrapolating a two-dimensional drawing into a three-dimensional construct. Since the original two-dimensional floor plan was created on a skewed perspective, there were no basic floor plans that could facilitate the creation of six spatial sections in three-dimensional space. Numerous estimated measurements would thus be needed to create the details of this project. **form•Z**'s functions and capabilities were ideally suited for accomplishing such an endeavor.

In two dimensions, **form•Z** allowed the architect to draw continuous lines and curves without any breaks to create closed shapes that could be transformed into three dimensions. The options of retaining or deleting objects in an operation were also useful in both two and three-dimensions. Given its ability to retain an original two-dimensional drawing throughout the design process, **form•Z** easily facilitated the conversion from two to three dimensions.

In three dimensions, the program's lofting tools were essential to constructing circular objects from various directions with different gravities—indeed, the circular stair railings were illustrated using this exact program function. **form•Z**'s catalogue menus were also more useful than other drafting programs in allowing Boolean operations and additional commands for constructing three-dimensional objects to be performed in different layers and thus preserved. Finally, **form•Z**'s rendering capabilities offered a final check on both the faces and the solid objects in the interior space of the structure.

By transforming a two-dimensional drawing into a three-dimensional space with three different gravities, **form•Z** not only simplified the design process, but also enabled this architect to study interior spatial relationships with precision and in detail (Figures 4,5).

Sophia Chan is a second year graduate student in Rhode Island School of Design's Interior Architecture department. She has recently received an honorable mention in **form•Z**'s Joint Study Program on her work "2D to 3D Relativity by Escher." Prior to graduate school, she earned her B.F.A. from Parsons School of Design in 1999 and has worked in the fashion industry in New York for more than eight years. She has been published in Women's Wear Daily and more recently served as the design director for Perry Ellis dresses and separates. She seeks to use her experiences in design to broaden and develop her knowledge of interior architecture. She perceives interior architecture as a study of the relationship between people and their surroundings. Sophia intends to become an interior architect in New York after she obtains her M.I.A. in 2009.