

RESEARCH REPORT

Science in the Art of the Italian Renaissance I: Ghiberti's *Gates of Paradise*—Linear Perspective and Space¹

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ABSTRACT. AS WITH THE WORKS OF A NUMBER OF ITALIAN RENAISSANCE ARTISTS, LORENZO GHIBERTI'S ART CONTAINED SCIENTIFIC ELEMENTS. IN HIS CASE BOTH HIS TRAINING AS A GOLDSMITH, WHICH INTRODUCED HIM TO CONCEPTS OF MINERALOGY, AND HIS KNOWLEDGE AND USE OF TECHNIQUES IN THE REALM OF THE SCIENCE OF OPTICS DEMONSTRATED A MELDING OF ART AND SCIENCE. GHIBERTI'S *Gates of Paradise* WAS AMONG THE FIRST WORKS OF THE PERIOD TO USE A TRUE SCIENTIFIC STUDY OF PERSPECTIVE AND SPACE. THE GREATNESS ASCRIBED TO THESE BRONZE DOORS FOR THE BAPTISTERY OF SAN GIOVANNI IN FLORENCE IS DUE NOT ONLY TO GHIBERTI'S ARTISTIC MERITS, BUT ALSO TO THE SCIENCE THAT WAS BEHIND THE DOORS' SENSE OF PERSPECTIVE AND SPACE.

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INTRODUCTION

Lorenzo Ghiberti's magnificent second set of doors for the Baptistery of San Giovanni in Florence is a high point in the art of the early Renaissance, even in all of western art. The magnificence of the ten narrative panels, numerous prophets, and the surrounding decoration of flora and fauna are still marveled at today. Called the *Gates of Paradise* by Michelangelo (Paolucci 1996), these doors are truly worthy of this function. Although this naming of the doors is somewhat dubious due to an alternate representation of the saying meaning "the central doors leading into sacred buildings" (Paolucci 1996), one could argue that if any manmade doorway could function in this heavenly task, it would certainly be Ghiberti's *East Doors*. In addition to all the beauty that can be found in the doors, the technical perfection to be found in the doors is also amazing. Among the great technical advances made in the *Gates of Paradise*, the use of a scheme of linear perspective stands foremost. The use of one point linear perspective comes from the perspective theory of Brunelleschi (Hartt 1994). With this new technique, Ghiberti could bring a new sense of space to his work that otherwise would have otherwise been impossible. Although other elements of the panels that contain this technique add to the sense of space, it is one point linear perspective that makes the space almost real, as if one viewing the panel could enter the work. The use of one point linear perspective and the contribution of that perspective to three of the panels on Ghiberti's *Gates of Paradise* help to make it one of the most beautiful and important monuments in the history of art.

DISCUSSION

The *Gates of Paradise* was Ghiberti's second set of doors for the Baptistery of the Cathedral in Florence. In representing the Old Testament, Ghiberti was completing a common program of the time, the *Salvation of Mankind* (Krautheimer 1971). The other two parts of this program

for the Baptistery of San Giovanni were the *New Testament* done by Ghiberti and *Life of John the Baptist* done by Andrea Pisano (Krautheimer 1971). The *Old Testament* doors were commissioned in 1425 by the Calimala guild in Florence and were originally to follow the quatrefoil design of the earlier two doors and follow the program of the humanist Leonardo Bruni (Clark 1980). Bruni's program was to include twenty-eight panels, twenty of which would be narrative panels from the Old Testament, eight that would be Old Testament prophets (Paolucci 1996). Instead Ghiberti condensed the scenes into ten large, square panels with multiple scenes of continuous narrative in the panels. The prophets were increased in number, supplemented by other Biblical figures and relegated to the door frames (Krautheimer 1971). Some of these figures stood in niches, while others were solely heads emerging from roundels. Furthermore, Adam and Eve and Noah and his wife took their place at the top and bottom of the frame (Krautheimer 1971). The ten panels contain a story of a certain Old Testament figure or figures in a number of scenes. These scenes include *Creation, Cain and Abel, Noah, Abraham, Isaac and Jacob, Joseph, Moses, Joshua, David* and *Solomon* (Krautheimer 1956). These panels are told with a number of scenes in each, in a clear manner and with logical arrangement. Ghiberti comments on his change of the program in his *Commentaries*. "I was given license to do it in such a manner as I believed would result most perfectly and be most ornate and most rich" (Paolucci 1996). The change in program was departure from the previous two doors and allowed more freedom for a space to be developed within the frame, without the need to conform to terms dictated by a quatrefoil frame. This development of space is most evident in three different panels—*Solomon, Isaac and Jacob*, and *Joseph*.

There are a number of factors that contribute to the development of space in these three panels. In all of the panels, a sense of depth is given by the use of gold over the relief. In fact, Ghiberti, being trained early in life as a goldsmith, was able to give the "feeling that the space is pervaded by a kind of golden atmosphere" (Hartt 1994). Furthermore, the differences in the height of the relief and

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the sizes of the figures add to the illusion of space. The figures in the foreground are so highly projected that they are almost round in character (Hartt 1994). In addition, as one can see by observation, the foreground figures are larger than those in the background. As one moves from the foreground to the background the figures diminish in size and in the height that they project. In fact, the figures that are farthest in the background seem barely to be raised from the surface of the reliefs (Hartt 1994). Although these conventions to provide the illusion of space are evident in all ten of the reliefs, not all of them have a fully developed sense of space. The large discrepancy one feels in the sense of space in most of the panels and the sense of space in *Isaac and Jacob*, *Solomon*, and *Joseph* comes from the use of one point perspective in these three panels. Since the degree to which a one point linear perspective succeeds in each work varies, it is useful to examine each separately.

Of the three panels that appear to employ a form of linear perspective, the *Solomon* panel is least consistent with the principles laid down by Brunelleschi. Unlike many of the other panels, this panel contains only one scene. The scene is the meeting of Solomon with the Queen of Sheba. This panel is the last in the program for the bronze doors and occupies the right bottommost position. The scene that Ghiberti takes up is from the book of *Kings* and shows the Queen of Sheba meeting with Solomon in front of the newly completed Temple of Jerusalem (Clark 1980). The meeting of Solomon, David's son and successor as king of Israel, with the Queen from the East bearing gold and spices, in some ways prefigures the gifts of the Magi to the infant Christ (Clark 1980). The composition has its focus at the steps of the temple with Solomon and the Queen of Sheba meeting and joining hands. Around them there are many onlookers, some even on horseback. In all there are almost one hundred figures in the panel "arranged like the chorus in a Greek tragedy, or for that matter, a Verdi opera" (Krautheimer 1971). Although the composition is clear in regards to its narrative, the work's perspective does not completely work. First of all, the perspectival lines formed by architectural structures, such as the side buildings, meet too high in the panel (Krautheimer 1956). Also, it seems that some of the lines they form would never all meet at one point. In addition, the jambs on the balustrade, although they are orthogonals, meet even lower than the other elements (Krautheimer 1956). Furthermore, the architecture acts as a mere backdrop to the action and is not integrated with the meeting of Solomon and the Queen of Sheba. Along with this fact, the figures seemed squeezed into their planes. This is especially true of the throng that occupies the level of Solomon and the Queen of Sheba (Krautheimer 1956). The overall effect of this squeezing is the flattening of the figures and a reduction of space. Another inconsistency that causes a reduction of a sense of space is the uniformity in the size of the figures. In fact, Solomon and the Queen in the middle ground are the same size as the foreground figures, while the background figures barely diminish in size

(Krautheimer 1956). This problem again diminishes the spatial reality of the scene. A final spatial problem of the *Solomon* panel relates to the unmarked paving stones on which they stand. Without having orthogonals on the pavement, there is no way to measure space on this part of the panel (Krautheimer 1956). Obviously the many departures from Brunelleschi's theory of perspective decrease the sense of space in the panel. However, it is unlikely that Ghiberti purposely disregarded this system. It is more likely that he reduced it to its essentials (Krautheimer 1956). However, Ghiberti shows a mastery of one point perspective in two other panels.

A much more consistent usage of a one point linear perspective occurs in the panel of *Joseph*. This panel contains a number of narrative scenes dealing with the life of Joseph. The story of Joseph deals with his being sold into slavery by his brothers, becoming a high official in the court of the Pharaoh, framing his brother for a misdeed, and finally reuniting with his family (Clark 1980). The upper right background scene deals with his being thrown into a well and being sold into slavery. The right foreground shows the loading of his brother's caravan with grain. The right front shows the finding of the silver cup with which Joseph framed his brothers. Finally, the left background shows Joseph revealing himself to his brothers (Clark 1980). As one can see, the overwhelming image in this panel is that of the large grain storehouse that covers a large portion of the panel. Unlike the Temple in the *Solomon* panel, this architectural setting is fully integrated into the scene. Figures can be found in and around the storehouse, as it seems to bend outward in three dimensions. Also unlike the *Solomon* panel, the *Joseph* panel contains orthogonals that meet at one vanishing point (Krautheimer 1956). Another difference lies in the figure size. There is a definite and continuous diminution of figure size as one moves from the foreground to the middle ground to the background. However, there is one clear break in the otherwise harmonious and complete use of one point perspective and space. The inconsistent area occurs in the portion of the narrative dealing with Joseph's revelation to his brothers. The platform on which the brothers stand sends orthogonals to the right and below the other vanishing point (Krautheimer 1956). Despite this one inconsistency, this panel displays a remarkable sense of realistic space. The figures diminish in size accurately, their relief height lessens, and the orthogonals meet almost at one point as one moves back in the panel. A space has been created into which it seems the viewer could walk.

Perhaps even more well developed in its use of linear perspective and space is the *Isaac* relief. This panel is a continuous narrative of many of the important scenes in the story of Isaac and his sons—Jacob and Esau. The topmost scene deals with Rebecca, the boys' mother, praying to Yahweh about the conflict in her womb. It is here that Rebecca learns that her older child will be subservient to her younger child. The left background scene shows Rebecca's confinement, the center showing a bargain between Jacob and Esau. The rest of the panel deals with how Jacob, the younger

child, got Isaac's blessing. The middle right scene shows Rebecca instructing Jacob how to trick his blind father by wearing sheepskin to feel like Esau. The far right background scene shows Esau going off to hunt. Meanwhile in the foreground, Jacob receives his father's blessing. Finally in the central foreground, the scene shows an apologetic Isaac and the cheated Esau (Clark 1980). All of these scenes are done in a very clear manner, with each delineated from the other. There is no crowding of figures and the composition is well balanced in total. The architecture helps to create this balance by dividing scenes. However, the architecture is also very important in creating a sense of space (Krautheimer 1956). Like the *Joseph* panel, the flagstones have clear orthogonals that meet at one vanishing point. In fact, the lines of the walls, pilasters, and flagstones all converge at one single point. This point appears to be in the middle of the central hall, right in the middle of the panel (Krautheimer 1956). There is even less of a deviation from a complete one point perspective than in the *Joseph* panel. Again the figures interact with the architecture and diminish in size and height of relief as one moves farther back in the narrative. For example, Rebecca and Yahweh are very small and almost flat. In contrast, the group of women in the foreground are large and almost round in appearance. Ghiberti's mastery of space and one point linear perspective is shown in its entirety in the *Isaac* panel.

CONCLUSION

After viewing the beauty of the *Gates of Paradise* and the expertise with which they were made, one could hardly disagree with Ghiberti's own words. "It is the most singular work that I have ever made, and it was finished with all art measure and skill" (Paolucci 1996). Clearly part of what makes the *Gates of Paradise* such a great work is the "convincing presentation of

space and reality" (Krautheimer 1956). This convincing, realistic representation of space was quite a technical innovation for its time and had profound effects on artists of later periods. The combination of the gilding, diminution of figure size and height of relief towards the back planes, and most importantly the creation of a true one point linear perspective all contribute to the sense of space. The three panels that combine these elements most completely are the *Solomon*, *Joseph*, and *Isaac*. The *Isaac* panel, especially, results from the near perfect use of all these elements. Vasari perhaps expressed best the importance that Ghiberti's *East Doors* play in the history of art: "The doors are undeniably perfect in every way and must rank as the finest masterpiece ever created, either in ancient or modern times" (Paolucci 1996). One would tend to agree with Vasari and with Michelangelo. Lorenzo Ghiberti's *East Doors* for the Baptistery in Florence are truly the *Gates of Paradise*.

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