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# The Scientific Narrative of Leonardo's *Last Supper*

AMANDA GRIEVE

ART 3130: Leonardo da Vinci, Fall 2017

**Nominated by: Dr. Caroline Hillard**

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**Amanda notes:**

I knew Leonardo was an incredible artist, but what became obvious after researching and learning more about the man himself, is that he was a great thinker and intellectual. I believe those aspects of his personality greatly influenced his art and, in large part, made his work revolutionary for his time.

**Dr. Hillard notes:**

This paper presents a clear and original thesis about Leonardo da Vinci's *Last Supper* that incorporates important scholarly research and Leonardo's own writings. The literature on Leonardo is extensive, yet the author has identified key studies and distilled their essential contributions with ease. Moreover, she has looked to Leonardo's writings on the art of painting to draw conclusions about his great mural.

### The Scientific Narrative of Leonardo's *Last Supper*

*The Last Supper* by Leonardo da Vinci has been an artistic sensation since its creation in the late fifteenth century (Fig I). It has been the focus of in-depth academic literature, artistic copies by many masters, and even popular fiction. It is arguably Leonardo's masterpiece and one of the West's best-known paintings, but due to faulty preparation for the mural's surface, only a ghost of Leonardo's paint remains (Barcilon 342). After the most recent restoration began in 1977, a greater version of Leonardo's genius has been revealed, if only in small remnants of his paint. *The Last Supper*, which was already known as a great composition and narrative, now reveals the modeling and sensitivity of Leonardo's hand, brought forth by Pinin Brambilla Barcilon, the lead restorer (vii). What becomes obvious on a scrupulous viewing of the restored work is that Leonardo da Vinci interwove a powerful telling of the gospel story along with a visual integration of his mastery of the liberal arts in *The Last Supper*.

Leonardo da Vinci first arrived in Milan from Florence circa 1482 (Kemp 16). He then came under the patronage of the regent Duke of Milan, Ludovico Sforza. Sforza had become regent for his nephew in 1476, but when his nephew died in 1494 he obtained the full dukedom. During this time Sforza initiated multiple projects to reinforce his rule, as he was the illegitimate son of his father, Francesco Sforza, previously a condottiere. Moreover, Ludovico's claim to the position was tenuous as the Sforzas had only been in possession of Milan since 1450 (Safra 680). In addition to commissioning from Leonardo a monumental equestrian statue to honor his father, Ludovico focused on restorations of the church and convent of Santa Maria delle Grazie (Kemp 34, 198). While there is no direct documentation or contract confirming either order, it is generally held that Ludovico, in conjunction with commissioning Bramante to update the church, also commissioned Leonardo to paint a Last Supper picture on the wall of the refectory (116).

*The Last Supper* was probably commissioned shortly after the Duke assumed his full power (Clark 144). It is known that Leonardo was working on *The Last Supper* during 1497 and was relatively close to completing it because Ludovico sent a letter to his secretary, Marchesino Stanga, "to urge Leonardo the Florentine to finish the work on the Refectory of the Grazie, which he has begun, in order to attend afterwards to the other wall of the Refectory..." (Kemp 17). Leonardo's painting must have been completed by

February 8, 1498, since, in that year, the mathematician Luca Pacioli, who worked with Leonardo in Milan, described the work as finished in the dedication of his treatise *De Divina Proportione*. (Clark 146, Young).

*The Last Supper* takes its iconography from the Bible story of Jesus and his twelve disciples celebrating the Passover meal. The four gospel books, Matthew, Mark, Luke, and John, tell the story of the disciples and Jesus gathering in an upper room where the scene takes place. During this time Jesus instituted the Eucharist, by sharing with his disciples bread and wine, which he said was his body and blood, and announced that one of the disciples would betray him.

*The Last Supper*, Jesus is seated in the middle of the table with six apostles to his right and six more to his left. They are all seated or standing on the same side of the table. The room is symmetrical, with four tapestries on each wall and three doors to the left and four slightly smaller matching shapes on the right. Jesus' head is framed by the largest of three windows symmetrically arranged on the back wall. The vanishing point falls to his right temple, where all converging orthogonal lines meet. The painting shows portions of both the floor and the coffered ceiling, and above the ceiling three lunettes depict the Sforza and Este coat of arms (Barcilon 405). The figures take up roughly half of the room's height, leaving a large portion of the boxy room showing, including the ceiling and side and back walls.

The figures in the foreground are arranged into four groups of three. Each disciple has a different expression and pose than the others. Some are standing; most are sitting. They speak to one another, gesture, and tend to lead the eye back to the center where Jesus sits. The room appears relatively large when first viewed, but if a closer inspection is taken to the area between the table and the right and left walls, the room actually becomes quite tight to the figures, almost squeezing them into a space that is not large enough for them. Although it is difficult to know exactly what visual effect the original work would have offered due to the degraded state of the mural, looking at other studies and reproductions of the work by artists such as Andrea Solario and Giampietrino helps to fill in the gaps for large general details such as the probable flower-patterned tapestries shown in Giampietrino's version (Fig. II & III).

Viewed from the refectory, the work creates the illusion of an extension of the real room's space due to Leonardo's use of scientific

perspective. However, the vanishing point, being approximately four and a half meters from the floor, is too high to create a true trompe l'oeil for viewers standing on the ground (Steinberg 122). Before war damaged the refectory where the mural is located, windows on Jesus' right would have let light into the room, and the light source in *The Last Supper* also comes from the same direction (124). The copies by Solario and Giampietrino show how brightly lit the right side of the mural most likely was. A doorway was enlarged after the painting was completed and cut off a section of the middle bottom of the painting. Again, looking at the works of Solario and Giampietrino, amongst others, is helpful to gain an idea of the original lower portion of the work, including Jesus' feet.

There is a great deal of emphasis on Jesus in the work. Jesus, the only calm figure in the painting, gazes down towards his left hand. He is given additional stability because his form creates a triangle with his head and his two outstretched hands. His calm appears heightened when contrasted with the various animated emotions and reactions of the apostles. He is highlighted by the back window, and in addition to the converging perspective, the various poses, gestures, and gazes of the disciples lead the viewer's eye continuously back to him. He is both given more visual space than any other figure and is slightly larger (Steinberg 61). In addition, after the recent restoration by Barcilon, it was discovered that Jesus' blue drapery was painted by Leonardo with the thickest layer of lapis lazuli, a precious and expensive pigment used in the Renaissance (Barcilon 426).

The apostles have been identified by Steinberg as, from left to right, Bartholomew, James Minor, Andrew, Judas, Peter, John, Thomas, James Major, Philip, Matthew, Thaddeus, and Simon (11). Leonardo uses identifiers both from biblical and apocryphal stories to give visual reference to each figure. Bartholomew, who is said to have been skinned alive, has a knife pointed directly at him by Peter. There was also a separate legend that Bartholomew was crucified. In *Golden Legend*, a thirteenth century sourcebook for the lives of the saints, Jacobus de Voragine claims that, in order to unite both versions, Bartholomew was first crucified, taken down before his death, and flayed (Steinberg 106). In *The Last Supper* Bartholomew's feet are crossed even though he stands. Leonardo, a great observer of the natural world, would not have let an awkward way of standing enter his painting unless it told a greater story. Andrew, martyred by crucifixion, raises his hands in front of him in a gesture that could be reminiscent of his death. Judas, the apostle who betrayed Jesus for 30 pieces of silver, clutches a moneybag and

has knocked over a salt cellar, alluding to either a bad omen to come or the momentary discord of the apostles (Wasserman 70). In addition, Judas has an extended portion of neck showing, which may foreshadow his later suicide by hanging after Jesus was arrested (Steinberg 90). In the gospel book of John, Peter leans over to ask John to find out which disciple will betray Jesus. In addition, Peter holds a knife, which could foretell his cutting the ear off the official who comes to arrest Jesus (*The Holy Bible*, John 18.10). John, who traditionally is seated next to Jesus and often portrayed as a sleeping or fainting, almost feminine, figure, may be swooning. He clutches his hands together, foretelling his part to be played in witness to the Crucifixion (Steinberg 80). Thomas raises his finger, which foreshadows his unwillingness to believe Jesus has been raised from the dead until he touches the wounds with his own finger (88). Andrew, to the right of Jesus, was also martyred by crucifixion and has both his arms completely outstretched (99). There are many more identifiers that Steinberg presents, but for the sake of brevity the aforementioned examples give a sense of the narratives Leonardo painted.

Leonardo took much from the convention of previous Florentine refectories, but interpreted the common iconography in unprecedented ways. As compared to other Florentine refectory Last Supper paintings, Leonardo gave much time and thought to how he could arrange the disciples in a dramatic and visually stimulating composition. Depictions of the Last Supper by Andrea del Castagno, Domenico Ghirlandaio and Pietro Perugino show the same motif of the twelve disciples and Jesus sitting down on one side of a long table (Fig. IV, V, & VI). In each of the paintings, the figures for the most part sit upright, contained in their individual space, not overlapping each other. All three show Judas, the betrayer of Jesus, on the near side of the table, separating him from the eleven faithful followers. Leonardo chose to break tradition and kept Judas on the far side of the table, enabling Leonardo to create a more symmetrical composition with four distinct groups of disciples. He also chose a dramatic moment when the disciples are speaking and gesturing to one another, giving what was usually a static composition movement and interest. In addition to the unusual figural composition, Leonardo's choice of setting is also different from previous and contemporary paintings of the Last Supper. Leonardo chose a room that is relatively plain compared to those of the aforementioned artists. In contrast to Leonardo's painting, Castagno presents a relatively busy background filled with blocks of patterned stone. Ghirlandaio and Perugino incorporate intricate outdoor scenes where the viewer's eye can stray, almost forgetting

about the figures below. Leonardo, on the other hand, uses a dark back wall in addition to the perspectival composition to continuously lead the viewer's eye back to the figures in the foreground and centrally to Jesus.

Leonardo's choices for *The Last Supper* were anything but accidental. He put much time and thought into effectively communicating the inner workings of his figures in a visually dynamic way. Leonardo was concerned about the stories he would tell, going as far in his writings to describe how to begin drawing a narrative painting with loose strokes, which can be interpreted in a variety of ways (Kemp 171). This can be seen to a certain extent in one of his sketches for *The Last Supper* (Fig. VII). Here Leonardo has created what appears to be a quick sketch with loose lines and little details in the figures, leaving room for interpretation and adjustments. In another part of his notebooks he makes notation of what the disciples will be doing:

One who was drinking has left his glass in its position and turned his head towards the speaker. Another twists the fingers of his hands together and turns with a frown to his companion. Another with hands spread open showing the palm, shrugs his shoulders up to his ears, and makes a grimace of astonishment. Another speaks into his neighbor's ear and the listener turns to him to lend an ear, while he holds a knife in one hand and in the other the loaf half cut through by the knife; and in turning round another, who holds a knife, upsets with his hand a glass on the table (Victoria and Albert Museum).

While the exact notations do not show in his final work exactly as it is written, they do show his interest in the visual portrayal of narrative. Leonardo also wrote, "The figure is most praiseworthy, which, by its action, best expresses the passions of the soul" (Clark 152). It is clear after hearing directly from Leonardo that the narrative of not only the scene but also of each figure was of extreme importance to his preparations for painting.

In addition to his specific ideas about painting *The Last Supper*, in his *Paragone*, Leonardo vehemently argues that painting in general is a labor to be considered a work of the mind over the work of a hand. In the Renaissance, much as today, there was a general distinction between manual work, such as sculpting, painting, weaving, baking, and dyeing, and the liberal arts, defined in the Renaissance as the disciplines of philosophy, theology, rhetoric, geometry, astrology, music, and arithmetic. The manual disciplines generally belonged to the guild system and were comparable to today's blue-collar jobs. An education in the liberal arts would be the bases for professions that

would be akin to today's white-collar jobs. During the Renaissance, the liberal arts were referred to as sciences, and Leonardo was dissatisfied that painting was not considered to be on the same intellectual level as the liberal arts (Clark 127). If painting were to be elevated to a science, it would hold much more prestige for the painter and a more rigorous general education would be required.

To be specific, Leonardo argues in his *Paragone* that painting is like the science of philosophy because it describes all the individuality of nature and perceived nature, so if someone scorns painting, they scorn nature and thus the very invention of God (Farago 191,195). He also argues that painting is akin to the science of geometry and astronomy because it begins with line and perspective (177, 207). He claims painting is greater than other sciences that can be reproduced, such as books on a printing press, as no pupil can replicate another artist's work to an exact degree (189). He also attacks the science of poetry in particular. He states that painting is poetry seen and not heard and poetry is a painting that is heard and not seen (215). Leonardo argues that once the words are spoken, poetry dies, while the image of a painting remains. He asserts people would rather be without the sense of hearing than the sense of sight, therefore arguing sight is a higher sense to engage. Regarding the science of music, he argues that harmonic proportion is better when seen, such as in an angel's face, because again, it serves the eye, which is the higher sense (217). In these arguments Leonardo is not attempting to degrade the status of the aforementioned subjects, but to raise painting to an equal or even elevated position relative to these established liberal arts.

Continuing with proportion, during the Renaissance, order and proportion were of the utmost concern to theoreticians, artists, and architects like Leonardo. Many referenced classical authors, such as Vitruvius, a Roman architect, engineer and writer, who proposed that beauty was found in nature and found most abundantly in the perfect proportions of the human body (Kemp 66, Dwyer). Leonardo was inspired by the idea of perfect or divine proportions. He not only owned Vitruvius' *De Architectura* but also drew the perfect form described by Vitruvius in his *Vitruvian Man* (Fig. VIII). Another set of divine proportions Leonardo concerned himself with were the musical proportions set forth by Pythagoras (Kemp 67, 181). These proportions relate to musical intervals of the octave (2:1), the perfect fifth (3:2), and the perfect fourth (4:3). These ratios are 1:2, 2:3, and 3:4, and if they are expanded out, they become 3:4:6:12, which correspond to the

ratios of the perfect fourth (3:4), the perfect fifth (3:2 or 2:3 or 4:6) and the octave (2:1 or 1:2 or 6:12). As an observer of nature, “Leonardo formulates the numerical proportion 12:6:4:3 as an ordering principle he [not only] believed to have discovered in optical space” but also found in the previously noted musical ratios (Brachert 464).

If the space Leonardo created in *The Last Supper* is judged by the ordering principles of 12:6:4:3, it is found that when the picture plane is divided vertically in 12 equal parts, each square of the central coffered ceiling is one twelfth of the whole and the coffered area is 6:12. This same ratio is found in the height of the painting compared to its width. If the same 1:12 width is used to create modular squares, the painting’s height to width is also 6:12. Brachert also demonstrates in his article that the draperies on either side recede in the pattern of 12:6:4:3. The width of the back wall is one third (4:12) of the whole width. The bottom of the tablecloth to the ceiling also shares the ratio of 4:12. The width spanned by the rear three windows is 3:12 and the center back window is one module wide. Not only does the architecture share the rule of 12:6:4:3, but the figures fall into this category as well. Twelve apostles are broken up into two equal groups (12:6). Each group of six is broken up into two groups of three (6:3). Overall there are four groups of three figures (4:3). It is no wonder Leonardo added Judas to the far side of the table to be able to be consistent in his numerical groupings. However, as convincing as Brachert’s modular theory is, it does not extend to all portions of the painting. The ceiling is only one module high (1:6), which does not fit within the 12:6:4:3 ratio (Brachert 464-465).

Clark notes that unity and drama are the essential qualities that separate Leonardo’s Last Supper painting from his predecessors (149). Unity in his compositional groupings takes a difficult scene for any artist to make interesting and adds visual harmony and rhythm. The drama created from choosing a moment or moments where the disciples are all reacting in various ways lead us into each of their individual stories in an emotional way, which previous and contemporary artists’ portrayals lacked. The moment or, more accurately, moments painted exhibit the genius storyteller that Leonardo was. Many historians suggest the moment portrayed is when Jesus announced that one of his disciples would betray him, but the scene could also portray their astonishment at the first Eucharistic meal, the moment where they are arguing amongst themselves as to which of them is greater, or even evoke an image of all three interpretations (Steinberg 53). Jesus, however, remains peaceful--unfazed by his disciples’ reactions and emotions.

His hands gesture to the wine and bread, evoking the imagery of the Eucharistic meal. His right hand also reaches towards the dish where Judas is also reaching to--or recoiling from. This comes from the Bible story where Jesus, in answer to the questions of which disciple will betray him, says, "He that dippeth his hand with me in the dish, the same shall betray me" (*The Holy Bible*, Matthew 26.23). Not only are there three overarching stories that are plausibly being told, but each disciple's story, as previously discussed, is being told in his gesture, placement, and/or expression. All of these stories converge in a single painting to remind the pious viewer to remain faithful to Jesus: do not betray him, keep the Eucharistic meal, and be faithful even to death as a martyr, as nearly all of the disciples were.

Kenneth Clark claims, "[*The Last Supper*] is one of the greatest manifestations of intellectual power in art" (151). Clark, while obviously biased towards Leonardo, perhaps even above other artists, still guides his readers to see Leonardo's intellect in *The Last Supper*. As has been discussed, Leonardo's interest in valuing painting as an intellectual activity akin and equal to other liberal arts dramatically influenced his creation of *The Last Supper*. If the elements that came from a liberal arts education had been left out, Leonardo would be half as effective as a storyteller. Without scientific perspective, the composition would lose the immediate, direct focus on Jesus. Though the mural does not portray a true trompe l'oeil when viewed from the ground, the perceived visual extension of the space would flatten. Without the divine musical proportion, the groupings would be broken up, Judas would remain on the opposite side of the table and the balance and harmony felt when first viewing the painting would be lost. Without the visual poetry in the emotional states of the figures, the apostles would remain upright and static. The painting would then become, if not completely mundane, at best, common.

What becomes clear after understanding Leonardo's theoretical views on narrative stories, as well as the figures and their inner working along with the artist's interest in divine proportions, is that he was a master storyteller. He chose a wide variety of points in the biblical story of the Last Supper and also included apocryphal stories of the apostles themselves. He integrated the liberal arts such as geometric scientific perspective, divine musical proportions, and visual poetry together with a narrative story. He unified each aspect into a single composition, which gives homage to Jesus, the divine, and incorporates the divine in his proportions and composition. As Clark states, "It is the most literary of all great pictures" (152).

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Figures



Fig. I.

Source: Leonardo da Vinci. Last Supper. 1495-1498.

[http://library.artstor.org/asset/SCALA\\_ARCHIVES\\_1039929028](http://library.artstor.org/asset/SCALA_ARCHIVES_1039929028)



Fig. II.

Source: Andrea Solario. *The Last Supper* copy after Leonardo's. c 1510

Steinberg, Leo. *Leonardo's Incessant Last Supper*. Zone Books. 2001.



Fig. III.

Source: Giampietrino. *The Last Supper* after Leonardo's. c. 1520

<http://www.racollection.org.uk/ixbin/indexplus?record=O1707>



Fig. IV.

Source: Andrea del Castagno. *The Last Supper*. 1447.

[http://library.artstor.org/asset/SCALA\\_ARCHIVES\\_1031314665](http://library.artstor.org/asset/SCALA_ARCHIVES_1031314665)



Fig. V.

Source: Ghirlandaio, Domenico, 1449-1494. Last Supper.

[http://library.artstor.org/asset/ARTSTOR\\_103\\_41822000636991](http://library.artstor.org/asset/ARTSTOR_103_41822000636991)



Fig. VI.

Source: Pietro Perugino. *Last Supper of Fuligno*. 1493–1496

[http://www.museumsinflorence.com/musei/fuligno\\_last\\_supper.html](http://www.museumsinflorence.com/musei/fuligno_last_supper.html)

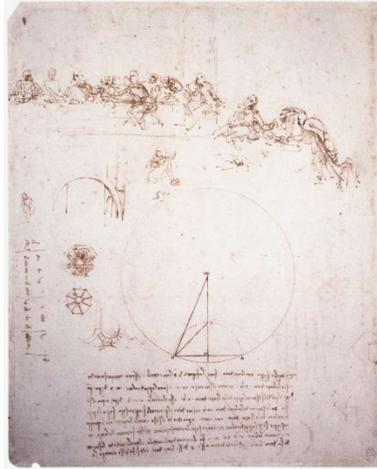


Fig. VII.

Source: Leonardo. Study for the Last Supper. Windsor Castle, Royal Collection (no. 12542) Steinberg, Leo. *Leonardo's Incessant Last Supper*. Zone Books. 2001.

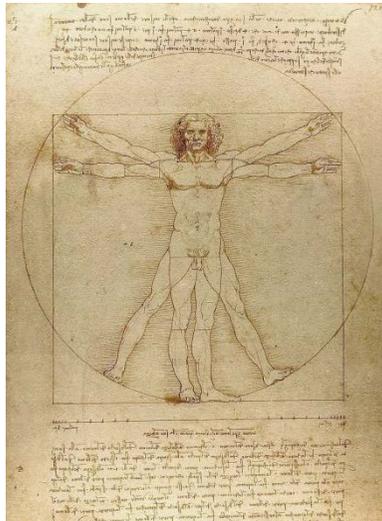


Fig. VIII.

Source: Leonardo da Vinci, Florentine, 1452-1519. Study of a man according to Vitruvius (Vitruvian Man). ca. 1485-1490.

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