

Mendicant Legacies: The Development of Space in 13th and 14th Century Italian Painting

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Introduction

The smallest paintings often have the largest impact. Filippo Brunelleschi, an Italian architect and sculptor, revolutionized the art world in a small panel painting of the exterior of Santo Giovanni di Firenze in the early 15th century. This panel, now lost to time, was the first to accurately employ single-point perspective and proved the possibility of a mathematically accurate representation of space. The mathematics of perspective had been discovered by the Romans but all but lost in medieval Europe until the Renaissance [Tyl00], where its formalization was composed by Alberti in his *Della Pictura* [Whi87].

The revolutionary mathematical and artistic discovery of single-point perspective forever changed the face of Italian art. However, this discovery was not without precedent. The art of the Trecento represents a stylistic migration from the ornate and decorative styles of the Byzantine period to the emotive and expressive realism of the Italian Renaissance. The artistic developments between, however, reflect the changes in the underlying culture surrounding the art as much as they echo a revolution in terms of general spatial handling.

The dominant artistic style which will be discussed in this paper is the advance of the Gothic artistic traditions, movements encouraging an increased expression of the reality of the human element in art and an engagement of the viewer in a painting: changing the meaning and purpose of art from iconic or decorative to a conscious engagement and communication between art and observer. This new engagement encouraged an exploration of space in painting pictorally, architecturally, and narratively. The ensuing experiments with space created a new emphasis on naturalism and the importance of space for communicative imagery, which may well have set the stage for Brunelleschi's advancements and the development of mathematically accurate perspective.

This paper explores the development of space in Italian painting from 1250 – 1400 with specific focus on the possible influence of the rise of the Franciscan and Dominican orders on the proliferation of the Gothic styles and the development of artistic consideration of pictorial and narrative space. The Mendicant encouragement of preaching and relation of the word and stories of the Bible to the masses encouraged a wide berth of patronage, most

of the public aspects of which focused on providing narratives to the generally illiterate masses. Thus, the role of art as a tool for general communication of pivotal stories likely spurred a stylistic revolution in the encouragement of pieces to engage the congregation and move them spiritually to the stories of God and legend. This stylistic shift created a new “vogue,” a newfound popularity of a relatable art focused on realism and the human element.

An important note to make, however, is that the speculation and support provided in this essay are purely speculative. As discussed by White [Whi87], we cannot hope to understand the motivations of the individual artists in their work. Thus, any assessment of these pieces and their consideration of space is, at best, observational hypothesis made by either the author of this essay or by published scholarship. The scope of this paper is limited to a discussion of Italian painting as it is inherently a two-dimensional medium requiring the artist to impart any sense of space into the imagery and is also among the most prolific surviving bodies of work available for analysis today.

The influence of the Franciscans and Dominicans as preaching orders and the resulting emphasis in the engagement of the viewer cannot fully be appreciated by limiting the discussion of space to the development of pictorial space. Instead, we consider the advancement of painting in its consideration pictorial, communicative, and narrative space across this period. It is the Mendicant emphasis on the engagement of the masses in religion that spurred the evolution of artistic styles of the period and influenced the rise of the French Gothic and an overall appreciation of images as a means of communicating the stories of the Bible and important ecclesiastical figures like St. Bonaventura to the people.

The next section provides some background into the rise of the Mendicant orders to anchor the ensuing discussion of artistic style and to ground the central hypothesis explored in this paper. The ensuing sections identify key works of the artistic development of this period and examine them for their treatment of space especially with regard to their use of space to engage the viewer in the piece.

Rise of the Mendicant Orders

The Catholic Church in the 11th and 12th century spent the majority of their time squabbling with the Holy Roman Empire and a series of Ghibiline leaders for power. Corruption ran rampant both at the Vatican and throughout the Church. The people became largely forgotten by ecclesiastic leaders as they battled for their own benefit and lost sight of the true purpose of the Church. Although a series of reformations brought the Church to the Golden Age of her power, the Pope sought the foundation of a series of early Mendicant orders as a liaison between the people and the Church in the late 12th century, allowing the papacy to focus on secular matters while the Mendicants cared for the congregation [Her07].

Francis of Assisi, the son of a wealthy cloth merchant, originally partook in the military campaigns sponsored by the church, but after an ailment ended his military career, took instead to following the life of Christ[Her07]. According to St. Bonaventura [Sal04], he was spoken to by the cross in the Church of St. Damian, and consequently renounced his earthly possessions and embraced monastic life, beginning by commissioning the repair of several local churches. Formerly recognized by the Catholic Church in 1221, the Franciscans emphasized that salvation was not a product of church or ceremony, but through the imitation of the virtues of Christ as taught by the Bible [Her07].

St. Dominic, however, came from a noble background and was raised in the light of Catholicism and scholarship in Spain. While accompanying the son of the King of Castille to Denmark, he encountered the Cathars, a Christian sect who ascribed to vows of poverty and celibacy and of an unshakable faith, actively persecuted by the Catholic Church. Inspired by their devotion and zeal, Dominic sought to counter the false preachings of heresy in Europe by building a new order, founded on the principles of truthful and zealous preaching and an intellectual rigor for absolute truth. The Dominicans were established by papal bull around 1216 as the Order of the Preachers [Her07].

Two primary similarities in the rise of these orders are of pivotal interest to the development of art at the time: their devotion to preaching and their desire to escape the

decorative indulgences of the Catholic Church. An emphasis on preaching suggests a heavy interest in conveying stories of faith and miracle to the generally illiterate masses. While a lively sermon could be understood by all, the captivation of a painting not only allowed the viewer to explore the stories at their own pace, but also to visually partake in the stories and truths of the faith. Further, the desire for simplicity echoed in the orders' vows of poverty suggests a desire to escape from the ornate Byzantine decorative style and return to an art that is simple yet engaging: something real enough to capture the attention of the viewer, but still aligned with the dedication to simplicity of the orders.

Mendicant patronage, in general, has had a significant impact on the development of artistic style, especially in the 13th and 14th centuries. While such patronage was often for icons for the comfort of the individual [Os90], the more visible commissions of the Mendicants were often intended to be shared with the community. An early example of Mendicant involvement in the rise of artistic style in Italy is the introduction of the French Gothic by the Cistercians [Fro90]. These developments suggest an introduction of the French Gothic architectural style in Italy as early as 1170 in the French Cistercian churches of Fossanova, Casamari and S. Martino. This points to two key facts: the French Gothic influence was, at the very least, known in the course of time discussed in this paper and the patronage of a mendicant order introduced its influence to Italy.

These facts are central to the hypothesis explored in this paper as they set a precedent for the interaction of artistic style and ecclesiastic purpose. A similar hypothesis of the interaction of art and order is presented by Spigaroli [Spi99]. He presents a series of architectural plans of mendicant churches as evidence of the impact of Mendicant scholarship on the development of architectural proportion in Gothic cathedrals of the 13th and 14th century. In his argument, he makes specific reference to the writings of Thomas Aquinas, St. Bonaventure, and Albertus Magnus, who is quoted as saying "The universal essence of beauty consists of the resplendence of form on the material parts in proportion." [Spi99] Mendicant interest in generating beautiful images and preserving harmony and realism in proportion is reflected in their heavy patronage in the 13th and 14th century. The rapid construction of Dominican and Franciscan churches in the late 13th century created

a good deal of opportunity for patronage, creating heavily public images undoubtedly having impact on popular artists and patrons and creating a new vogue of an interest in realism and communicative imagery: a hallmark of the Gothic style. These images were to supplement the preaching of the orders to the generally illiterate masses, building images that people could relate to and could engage the congregation in the teachings of the stories.

Their proven influences on artistic style and scholarly work in mathematics combined with their interest in preaching the lessons of their faith to the masses likely spurred the development of space. The consideration of space, communicatively, pictorially and narratively, could better engage the viewer in an image, requiring less suspension of belief on part of the viewer, even allowing them to mentally partake in a scene. A specific intellectual instance of the contributions of the Mendicant's to the development of perspective is found in Albertus Magnus' treatise on proportion [Whi87]. The ensuing discussion traces the development of pictorial and narrative space between 1250 and 1400, with a special emphasis on Mendicant involvement in either the commissions of specific works or the careers of the artists themselves. The simultaneous evolution of the Gothic is discussed in relation to the emotions and states of the human condition as experienced by the viewer as significant to the scope of this project, not necessarily in the full breadth of expression of the style, and is therefore interchangeably addressed in subject and name.

The Development of Space

Italian art before 1250 tended toward a decorative Byzantine style, like that of Berlingheri's *St. Francis Altarpiece* (Figure 1). This artistic style emphasized flat, stoic figures on a flat background, often of a gold or mosaic composition. However, towards the later half of the 13th century, a renewed interest in spatial development, with respect to both pictorial and narrative space in popular imagery. There is a renewed interest in the communication of figures across space as characters begin to interact with one another within paintings, creating a three-dimensional narration within visual space.



Figure 1: Bonaventura Berlinghieri, *Saint Francis Altarpiece*, 1235

Some of the earliest surviving images showing this developing interest in space are located in Rome and were commissioned in the late 1270s during the reign of Pope Nicholas III, former protector of the Franciscan order [Whi56]. The first such example is in the imagery of the Sancta Sanctorum, a chapel initially reserved for the worship of the Pope. Above the altar, a fresco straddles an open window with an image of Pope Nicholas III presenting the Sancta Sanctorum to Christ enthroned. While the image does attempt to provide some depth of field in terms of the cube of the building and some dimensionality in the columnar forms of Saints Peter and Paul, what is truly notable about its handling of space is its consideration of the surrounding architectural space. Especially evident in the figure of Christ (Figure 2), the light of the window is emulated in the shading of the drapery of Christ, the artist emulating the natural highlight of the window across the throne and the folds of the drapery. In this integration of pictorial and physical space, the artist shows conscious consideration of the painting becoming more than an image: it is represented as part of the surrounding space, a space in which the viewer themselves is



Figure 2: *Enthroned Christ with Angels*, Sancta Sanctorum, Rome, 1277

physically present.

The integration of physical and pictorial space is continually used as a device through which to engage the user, whether to remind them of their ecclesiastical role (as in Taddeo Gaddi's *Last Supper*⁷) or to engage the viewer in the bold contrasts represented in a narrative (as in Giotto's work in the Arena Chapel). It is a mechanism which incorporates the viewer and their surroundings in the stories contained in the paintings, seen here in an image portraying a pope with notable involvement in the Franciscan Order.

A second commission during the reign of Pope Nicholas III was executed by Pietro Cavallini in Rome in a series of frescos detailing the life of St. Paul at S. Paolo. While these frescos have been lost, 17th century replicas show a significant stylistic variation in the images. This variation represents increasing experimentation with spatial composition: moving from shallow compositions to compositions of several different planes of depth. This variation is also often complementary with the surrounding architecture, furthering the integration of picture and space as seen in the Sancta Sanctorum. There is also significant experimentation with the presentation of architectural structures within the



Figure 3: Pietro Cavallini, *Last Judgment*, 1290

painting as well, often serving as a tool for enhancing the divide between different depth planes [Whi56].

These experiments in pictorial space carried over to Cavallini's later works, as witnessed in his work at S. Cecilia in Trastevere. In his *Last Judgment* (Figure 3), Cavallini creates a sense of dimension through the unspoken communication between characters. The saints seated in a row all divert their attention to the enthroned Christ beside them, seemingly aware of the spatial organization of this central character and seated in thrones turned toward him. A similar emotive gaze is echoed in the angels below in a Gothic exchange of emotion between the characters of the scene. This technique works to two ends: it manipulates pictorial space to create a sense of communication within the scene and draws the eye of the viewer to the central emphasis of the work. It is clear that Cavallini was still consciously exploring pictorial space in this work: the attempts at a perspective representation can be seen in the objects of the Eucharist beneath the figure of Christ [Whi93]. To what degree the experimentation with space in S. Paolo and S. Cecilia is a reflection of Cavallini's involvement with Franciscan-affiliated pope or a growing vogue due to the influences of the Classical art around him is impossible to determine. However, similar experimentation was occurring contemporary with Cavallini's later work in the commission of an expansive decorative project for the Franciscan project at S. Francesco at Assisi.

S. Francesco at Assisi serves as the mother church for the Franciscan order and the burial place of St. Francis. With its open, barn-like architecture, S. Francesco was conceived as a preaching church: a place of communal gathering and worship. As a result, the walls



Figure 4: *Life of Saint Francis: Renunciation of Worldly Goods*, San Francesco at Assisi, mid-1290s

of the Upper Church are richly frescoed with narrative series of the Old Testament, New Testament, and Bonaventura's *Life of St. Francis*. These images, which line the interior of the upper chapel, appear to be emphasized as a communicative art: richly narrated stories to supplement the teachings of the order and, consequently, an early example of the French Gothic influence in Italy [Whi93]. These images tend toward a heavy emphasis on realism in expression. They are intended to engage the viewer in their illustration and create a relatable narrative to illustrate the truths which guide the road to salvation. In doing so, they also encompass new experiments in spatial development, primarily in terms of engaging the viewer more fully in the drama of the depicted narratives.

As in Cavallini's work in S. Paolo, the representation of architecture plays a significant role in the development of pictorial space in Assisi. In the *Life of Francis* cycle, the St. Francis Master manipulates architectural representations as a mechanism to enhance the narrative space. In the *Renunciation of Worldly Goods* (Figure 4), some attempt at portraying the

architecture using an oblique perspective setting is attempted. However, it is in the spatial organization of the image that the significant spatial manipulation occurs. The buildings, like the two groups of people, are separated by a notable void: a foil marking the clear divide between the halves of the image. A strained tension is portrayed between the groups: a state of human emotion recalling Gothic emphases on the human condition. This technique shows that the artist was committed to expressing the full division of the two groups in the scene, manipulating space to express with unmistakable clarity the significance of the break between the groups, between the godliness of Francis and the secular sins of his father. This division creates a sense of tension in the viewer: a conflict between the secular life and the life of salvation as preached by the Franciscan order.

A different experimentation with pictorial space occurs in the *Institution of the Crib at Greccio*. Like the *Renunciation*, space is by no means shown using proper perspective; however, the organization and selection of the depicted objects manipulate the visual space in such a manner as to try to integrate the viewer into the interior space of the image. According to White [Whi93], this image represents an innovative leap towards the development of interior space. While, true to the surrounding tradition, there is no sense of an interior, closing shell within the room, but instead, the St. Francis Master manipulates the composition of objects in the room as a mechanism for expressing internal space and inviting the viewer to partake in the observance of the events in the painting. We see the back of the crucifix and the steps to the pulpit behind the altar, among other objects suggestive of an interior space. Again, we see the development of visual space in a Mendicant commission for the sake of communicating to the congregation: by developing space, the image welcomes the viewer not only to see the image, but invites him to immerse himself in the story of the life of St. Francis.

Of the artists speculated to have worked in Assisi, Cimebae is one of the few actually documented as a participant in the illustrations of the narrative cycles. Most notably, his image of *St. Peter Healing the Lame* makes an explicit attempt at a perspective rendering of a cluster of buildings. However, Cimebae's most notable development of pictorial space in Assisi is not in the portrayal of the stories of the cycles, but instead in the painted

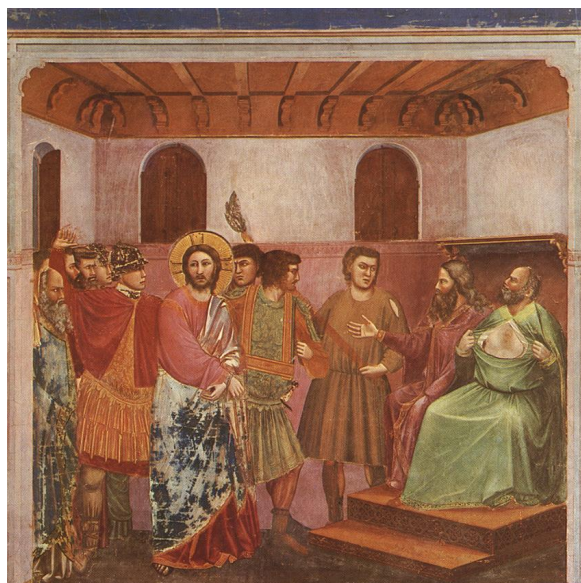


Figure 5: Giotto, *Jesus Before the Calf*, Arena Chapel, Padua, 1304. Courtesy of Wiki-Commons.

illusionary brackets linking the cycle together and binding it to the underlying architecture. While such a faux architecture had been seen in both the *Sancta Sanctorum* and the illusionary support columns of Cavallini's *Last Judgment*, the illusionary architectural decorations appear to bind the entire space of the frescoes into a single space, enveloping the viewer within [Whi87]. This illusionistic unification of space also plays to the role of poverty in the Mendicant vows: it is likely far more affordable to paint a faux decorative bracketing than pay for the labor and resources of true elaborate bracketing. The more real the perspective rendering, the more real the faux decor appears to the congregation below, allowing it to slip away as a beautiful decorative element uniting the scene instead of standing out as awkward attempt at faux decor.

Cimebae's consideration of the unity of architectural space likely influenced the work of his pupil, Giotto, in his configuration of the Arena Chapel. Among Giotto's earliest recorded works was composed in 1287 under Cimebae at Assisi. He had also spent time among the Dominicans at S. Maria Novella in Florence [Whi93]. However, it is in Padua at the Arena Chapel where Giotto displays an acute interest in spatial development, both as a tool of narrative structure and in the general development of pictorial space.

As discussed by Derbes and Sedona [DS08], the overall spatial structure of the narrative scenes and decorative virtues have a great significance to the artistic program of the Chapel. Placing contrasting narratives in complementary positions on central architectural installations, such as setting off images of the betrayal of Judas against those of the Marriage of the Virgin on the central arch, and keeping a nearly rhythmic symmetry between these contrasting images leverages the space of the program to emphasize the contrasts between good and evil. This contrast is unified throughout the chapel by the faux marble reliefs of the virtues and vices, juxtaposed across the facing walls, in a manner not unlike the decorative unity employed by Cimabue in Assisi. In this manipulation of pictorial and architectural space, the viewer is metaphorically trapped in the space between the figural representations of good and evil. The entrapment relates to the underlying commission of the Chapel for the benefit of the souls of the Scrovegni family: trapped in the son's search for salvation despite his father's sins of usury.

Giotto's narrative work both in Padua also show considerable development in terms of pictorial perspective. A critical example of this is the image of *Jesus Before the Calf* 5, as discussed by Tyler [Ty100]. This image employs the convergent parallel lines technique, as evidenced in the steps of the throne and the lines formed by the ceiling rafters recede into space, converging near a single point. While not clear single point perspective, the technique is among the earliest evidences of a development of mathematical perspective in Italian painting.

As evidenced in the entanglement of the viewer in the use of contrasting paintings in narrative space, Giotto likely intended for the viewer to become fully engaged in the tensions and the stories of his works, in which the accurate application of depth would draw the viewer into the scene. As witness later, especially in his works for the Bardi Chapel in the Franciscan church of S. Croce, Giotto continued to work with expressive characters and experiment with spatial depth and foreshortening throughout his career. One notable such example is in the pain of the mourner in his *Death of Francis* in the Bardi Chapel. Despite the limitations of working in fresco, Giotto carefully foreshortens this face, likely as a mechanism to engage the viewer in the reality of the absolute grief



Figure 6: Duccio, *Entry into Jerusalem, The Maesta*, 1308-1311

conveyed in the face.

Duccio's art in the late 13th century was visually dominated by the Byzantine style, as seen in the flat, stoic forms and gold backdrop of the *Rucellai Madonna* of 1285, commissioned for the Dominican church at S. Maria Novella in Florence [Whi93]. Although the image drips with Byzantine figuration, the figuration of the throne and ceremonial cloth set the throne at an angle, almost intentionally forcing the throne into an oblique perspective. The evolution of the Madonna and Child in terms of spatial development can be traced through images such as the Servite commission of Marcovaldo's *Madonna del Bordone* [Os90]; however, Duccio's Madonna has clearly advanced beyond the subtle suggestive angularities and flowing draperies of Marcovaldo, turning both the figures and throne

backwards into space.

Duccio's grand altarpiece, the *Maesta* of 1308-1311, exhibits the careful handling of space used in the *Rucellai Madonna*, but on a far grander scale. The division of the physical space of the panel itself is notable: the front displaying the stories of the life of the Virgin, patron saint of Siena, to the congregation and the back showing the life of Christ to the clergy. Within these narratives, Duccio carefully orchestrates the visual composition of scenes, creating a sense of symmetry in the narrative space reminiscent of Giotto's Arena Chapel [Whi93]. However, it is the development of pictorial space in the individual elements of this work that truly characterize Duccio's experimentation with space.

In the *Road to Jerusalem* (Figure 6), Duccio conveys an unprecedented dedication to the representation of landscape. The city of Jerusalem recedes backwards, winding up a hill, growing increasingly diminutive in the distance, placed high above the viewpoint the viewer is exposed to from the bottom of the hill. The receding proportions of the figures and architecture provide a smooth viewpoint as the viewer visually progresses up the hill and into the city. The only comparable existing fresco pre-dating this composition is *The Expulsion of the Devils from Arezzo* in S. Francesco. However, in this work, the city is set on a hill by simply placing the walls along a curve and stacking structures in oblique perspective in a clustered, unnaturally linear space [Whi87]. The degree to which the Dominican writings of Albert Magnus on proportion impacted Duccio are uncertain at best, but it is in his control of proportion that Duccio is able to illustrate the rising city in a naturalistic way, inviting the viewer to visually enter the world he has created.

Taddeo Gaddi trained as a student under Giotto. His works tended to emulate Giotto's devotion to conveying emotion and the human figure; however, they also tended to include more ornate details of the setting in comparison to the barren voids characterizing the backdrop in many of Giotto's Arena Chapel frescoes. Gaddi's most notable use of pictorial space, however, is in the refectory at S. Croce in a commission arranged by a Third Order Franciscan nun. While a series of famous Franciscans and St. Dominic are displayed in the *Tree of Life* scenes, the more interesting image in terms of spatial development is found in the lower scene of the *Last Supper*. While the previous sections have discussed

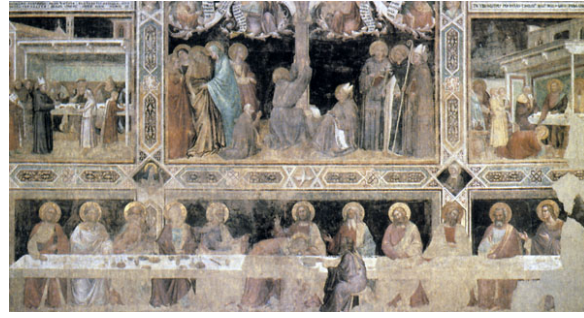


Figure 7: Taddeo Gaddi, *Last Supper, Arbor Vitae*, Refectory, Santa Croce, Florence, 1330-1340

the use of imagery to integrate the congregation into stories of faith, this image instead seeks to integrate the friars themselves into its story. The table softly angled in an oblique perspective, positioned outside of the decorative frame of the painting, as if projecting itself into the space instead of enfolding the viewer within. The viewing friar instead sits with Judas, at the table across from the figure of Christ. Placing the viewing friar next to Judas at the table serves to actively remind the friar of their existence in a world of sin. The table itself is visually removed from the confines of the framing space to actively engage the viewer. (Note: the reference for this discussion is the course lecture material)

Oftentimes, the connections between the artist and the Orders is unclear at best. However, later developments in the consideration of visual space are likely reflective of the influence of the rise of the popularity of the Mendicant - influenced styles of masters like Giotto and Duccio. The ensuing discussion addresses several significant advances in the development of visual space, pointing to either the continuation of the infatuation with realism and the Gothic notion of relating art to the human condition seen in these earlier works or direct Mendicant influence when available.

The stylistic tendencies of Ambrogio Lorenzetti tended toward deeply communicative figures with a classical Romanesque form, straddling the line between the French and International Gothic stylistically. However, the most notable feature of Lorenzetti's career is his immaculate development of pictorial perspective. His *Annunciation* of is the earliest known example of floor orthogonals towards a vanishing point [Doe64]. The visual evo-

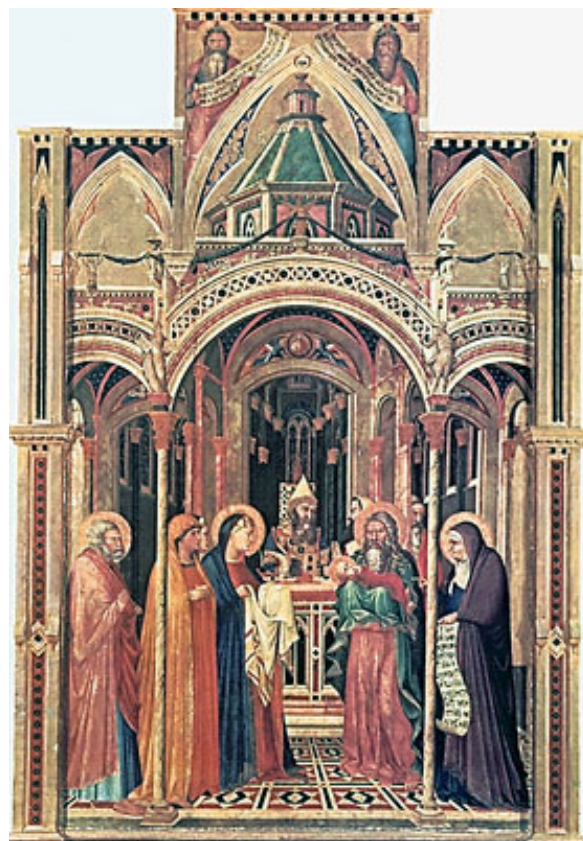


Figure 8: Ambrogio Lorenzetti, *Presentation in the Temple*, San Crescenzo, Siena, 1342

lution of his work covers a vast range of developments; however, for the sake of brevity, here I will limit the discussion of his works to his *Presentation in the Temple* of 1342, in which significant advancements in pictorial space are readily evident.

Lorenzetti's image of the *Annunciation* in 1334 is the first noted example of floor orthogonals converging to a single vanishing point [Doe64]. However, early evidence of his development of this vanishing point perspective can be found in the *Presentation in the Temple* (Figure 8). This altarpiece was commissioned to accompany Duccio's *Maesta* in the Sienese Cathedral, a work which, as has been discussed, has some evidences of Mendicant influence in its handling of space [PR05]. Here, we can see the floor patterns gently recede backward into space, albeit with a somewhat imperfect angularity in the floor. This sense of depth is continued more deeply in the recesses of the vaulted spaces behind the central altar, recalling, to some extent, the attention to the details of interior space witnessed in the *Institution of the Crib at Greccio* in Assisi. However, Lorenzetti's

approach leverages the smooth convergence of proportion seen in the *Road to Jerusalem* (Figure 6); the deep recesses of the interior not only draw smaller proportions in the arches, but also appear to swallow light into the depths of the building, finally settling on the darkened window immediately behind the head of the rabbi.

The true impact of the Plague on Italian art is a topic of heavy debate among scholars, but a notable change in the styles of the art of this period is undeniable [Os81]. Images such as Orcagna's *Strozzi Altarpiece* (Figure 9) in the Dominican church of S. Maria Novella, exemplify one set of hypotheses about Plague art in their return to the more linear decorative Byzantine style and emphasis on the metaphysical. Space is only united by the overlap of figures and realism is suspended for the sake of mysticism, as an adult Christ sits perched upon a throne of seraphim, floating above the ground plane [Whi93]. The figures show a return to a Giottesque emphasis on figural space, but little consideration for surrounding space or realism. It is almost as if death has become such an inevitability in life that interest in images is towards the supernatural: that art is providing a way for the the viewer to escape from the tangible world to the metaphysical space not tied down in the realities of architecture or landscape. There is also far less communication between the characters in the scene, as developed in Cavallini's *Last Judgment* (Figure 3), and instead several of the figures of the scene instead gaze outwards, as if to directly engage the viewer from their ethereal space. This invitational space may likely be a function of the Dominicans again seeking to engage the viewers in their art, but this time for the sake of hope more than lesson: conveying an image of Christ as a Holy Savior, capable of rising beyond this world and inviting the children of his faith to join him.

As the Italian world recovered from the horrors of the Plague, returning to the spatial developments of the masters before the Plague. A brief exploration of this renewal is here traced through key works of two distinct artists, commissioned for Mendicant houses: Tomaso da Modena at the Dominican San Nicolo and Altichiero at San Antonio.

Tomaso da Modena's frescoes in the Dominican Chapter House of San Nicolo serve a similar function to Gaddi's *Last Supper* (Figure 7): they remind the friars within of the virtues of the famous Dominicans frescoed around them. The use of depth in these



Figure 9: Andrea Orcagna, *Christ in Glory with Saints* (Strozzi Altarpiece, Santa Maria Novella, Florence, 1354-1357)



Figure 10: Tomaso da Modena, *St. Albert the Great*, Chapter House, San Nicolo, Treviso, 1351-1352



Figure 11: Altichiero, *Crucifixion*, Chapel of Bonifacio Lupi, S. Antonio, Padua, 1373-1379

portraits, as exemplified by *St. Albert the Great* (Figure 10), make the subjects appear as if they are coming forward from their studies to address the viewer. The emphasis of architectural structure in conveying this engagement between painting and viewer is again seen in the oblique perspective used to set the desks back in space. However, it is the active posturing and gaze of figures like St. Albert that directly confront the viewer, similar to the forward gaze characterized in the *Strozzi Altarpiece* [Gib89].

Twenty years later in Padua, Altichiero's *Crucifixion* (Figure 11) exemplifies the development of pictorial space with its careful foreshortening and dedication to proportion in portrayal of depth of landscape, in what White refers to as "the first major development of the principles of Giotto's fundamental realism" in Italy after the Plague ([Whi93], p. 575). The piece serves as the unifying axial alignment of the narrative cycles of the Chapel of Bonifacio Lupi in the Paduan church of S. Antonio, a basilica dedicated to the Franciscan St Anthony. The scene is shown using careful foreshortening, especially on the haunches of the horses in the foreground, merging the viewpoint conveyed in the image with that of the viewer himself. The landscape of the cities recede into the background with a decided continuity of proportion as first exemplified in Duccio (Figure 6). However, in a style like that of Cavallini's *Last Judgment* (Figure 3), the characters in the foreground all turn their backs to the viewer and instead are intently focused on the image of Christ crucified above [Whi93]. This integration of perspective viewpoint and character manipulation

within the narrative space actively integrate viewer into the piece: they are able to not only see the painting, but to experience it and engross themselves in a key scene from the life of Christ. The further possibility of the inclusion of portraits of local personalities in the image creates a greater sense of familiarity for the viewer, further binding his world to that of the painting (note: reference is the course lectures).

Other Factors – Influences from Abroad

Another possible significant influence on the development of space in painting between 1250 and 1400 is the globalization of the Italian economy, especially with regard to trade in the Middle East. As discussed by Mack [Mac02], trade with the Middle East was prolific, as evidenced by the rich Arabic textiles appearing in panel painting of the time, such as the ceremonial cloth over the throne in Duccio’s *Rucellai Madonna*. This trade pipeline, in addition to bringing new goods and resources to Italy, also opened an intellectual pipeline between the two communities.

Alhazen, an Islamic mathematician, developed a full treatise on optics, which was translated into Latin around 1200. However, this document was initially treated as “natural philosophy” in the West, an unlikely category of study for artists of the time, who were often considered on the level of craftsmen. There is a nearly undeniable link between an interest in perspective in the Western world and optical discoveries in the East. The word perspective itself finds its root in the word *perspectiva*, Arabic for *optics*. [BS11]

While Alhazen’s direct impact on Proto-Renaissance art is widely debated, it did introduce a new way of thinking among scholars in the West: it brought about the debate as to whether “sensory perception could be the source of any genuine knowledge ” ([BS11], p. 129). The central point of debate within this topic was Alhazen’s distinction between the actual form and perceived form of objects in space. Interestingly enough, however, it was a Franciscan friar, Roger Bacon, who, around 1257, began to champion this optical distinction of form. Further Franciscan scholars would later follow in his footsteps to develop more advanced theories of optics.

However, the optical theories proved to bring about a new demand of art for the masses: by not simply explaining theological lessons, but actively representing these lessons in a manner that the congregation could perceive with their own eyes, mimicking their impressions of the world and creating more recognizable images [BS11]. It is in this theory that a bridge between the globalization factor of the development of pictorial space and the Mendicant factor can be found: the development of realism in images brought on by advancements in pictorial space created images which better engage the viewer. It was through Mendicant championing of these discoveries in the West that the science of optics was likely brought to artistic craft.

Future Work

As mentioned in the introduction, it is impossible to fully understand the intentions of the artist. The arguments presented as to the manipulations of space are based on observations, both personal and published, of the works discussed. However, recent technological developments allow scholars to better attempt to quantify the use of pictorial space in painting.

Computer graphics has leveraged perspective viewing in order to generate realistic projections of three-dimensional scenes onto the two-dimensional surface of monitors and other traditional output devices. Carlbom and Paciorek [CP78] discuss in detail the influence of Renaissance perspective to the development of projection methods in computer graphics. Such technological methods can also be applied in reverse: by understanding the mathematics of pictorial space, computers can generate three-dimensional approximations from two-dimensional paintings.

One such approach for generating three-dimensional studies of paintings was developed by Horry et al. [HAA97]. By defining the approximate vanishing point and respective foreground and background planes, the system uses a series of reverse perspective transformations to approximate the three-dimensional geometry of the scene. The resulting objects are then abstracted from the image, warped to remove distortions caused by fore-

shortening, and replaced at their approximate locations in the scene. The viewer can then actively navigate through the three-dimensional space represented by the painting.

This technique is useful for the study of the development of pictorial space in visual images. It is innovative in its ability to generate approximations of three-dimensional space using only a single image and a flexible approximation of the vanishing point, making it one of the few such modeling systems appropriate for paintings. Additionally, by generating three-dimensional approximations of these scenes, an historian could view a pictorially accurate reproduction of the geometries employed by the artist and compare these against mathematically accurate reproductions of the same objects. The resulting comparison would facilitate exploration into the progressive development of artistic styles toward fully accurate perspective projections by quantifying where the artist's projection and the mathematical projection disagree.

However, architecting such a system represents both a mathematical and engineering challenge: the system relies on a series of inputs which are difficult to automate, but tedious to construct, such as full masks of foreground objects and approximate models of the space occluded by these foreground objects. While methods exist for automating such inputs, they are often complicated and unreliable. The paper requires the user to manually input such elements; however, to develop a useful research aide of these sorts of tools, some automation of these intermediate forms is a practical requirement.

A more artistically-motivate exploration of the use of perspective could also be accomplished through a three-dimensional modeling of a scene, as seen in [PA]. In these studies, artists are able to reproduce the elements of a painting by approximating the geometries of the figures within the paintings and "gluing" the images of the figures from the paintings onto the digital geometries. The viewer could then actively navigate through this three-dimensional reproduction of the scene to understand the dynamics of space in the original painting.

Such a model could then also be projected into two-dimensions using mathematical perspective transformations and again compared against the original painting done by the

artist to understand differences in the artist's handling of space. However, such methods require heavy involvement by the user and often advanced modeling experience, making them impractical for rapid exploration for large series of images. Advancements in image processing methods, however, may soon make either technique a viable method for exploring and analyzing perspective in images.

Conclusion

While the exact nature of the development of space between 1250 and 1400 in Italy is impossible to determine, its contribution to the revelations of perspective are invaluable. The above discussion outlines the possible influence of the Mendicant devotion to preaching and human engagement as one mechanism for the development of space both pictorially and narratively. The vessel of the Gothic artistic style likely helped to bring this new engagement and interest in creating images relatable to the human condition into vogue. By engaging the viewer in the stories told by the paintings discussed above, the Mendicant works echo the emphasis of the orders on opening the congregation to the acceptance of the spirit and truths of Christ as the path to salvation.

Though technological tools would enable a better quantitative understanding of how pictorial space evolved across this timespan, a continual emphasis on the engagement of the viewer in the depths and interactions of imagery points to significant role of communication in the development of these images. The prospect of the influence on economic factors to the evolution of perspective, though cursorily parallel in idea, in fact further tie the Mendicant orders to the development of spatial perspective and the integration of optics and realism in art. While definite attribution of the spatial developments of this period to the rise of the Mendicant patronage may be unattainable, the thread of their influence provides a clear path along which to trace the evolution of the pictorial development of space leading up to the High Renaissance.

Note: The images in this paper are courtesy of the University of Wisconsin - Madison Department of Art History unless otherwise noted.

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