

## **The Monuments of Florence, Real and Imagined, in the Early Renaissance: The Development of Single-Point Perspective in Painting\***

**Dr Hugh Hudson, The University of Melbourne**

Opposite the principal train station of Florence in the northwest quarter of the city stands the imposing church of Santa Maria Novella, distinguished by its slender belltower, long nave, elegant marble façade, and fine courtyards with cypress groves at either side. Inside are some of Italy's most dazzling late Medieval and Renaissance mural painting cycles: Domenico Ghirlandaio's *Stories of the Virgin and Saint John the Baptist* in the magnificent Tornabuoni Chapel behind the high altar, Nardo di Cione's *Purgatory, Hell, Paradise, and Last Judgment* in the Strozzi Chapel on the left of the transept, and Filippino Lippi's *Stories of Saints Philip and John the Evangelist* in the Filippo Strozzi Chapel on the right of the transept. In the lower nave of the church on the west wall is another chapel with exceptional decoration. Pilasters of white marble with rose marble Corinthian capitals support a rose marble entablature, framing the entrance to a tall, barrel vaulted chapel. In front of the pilasters, heavily robed figures kneel in prayer, while the Virgin and Saint John the Baptist stand inside the chapel on either side of the Trinity: God the Father supporting Christ on the cross, with the Holy Spirit flying between them. This is not a real chapel, of course, but Masaccio's celebrated mural painting of a fictive chapel, called the *Trinity*.

As many undergraduate students of art history learn, one of the most distinctive innovations of early Renaissance art in Florence is single-point perspective. Very little is securely known, however, about its rapid development in painting in the first decades of fifteenth century. What conditions in Florence, especially in and around the Santa Maria Novella quarter, during the second half of the 1420s led to the stunning semblance of reality in Masaccio's *Trinity*? That is to say, how did painters come into contact with the first developments in perspective, what kind of patrons did it appeal to, and how was it ultimately used? Rather than a conventional altarpiece depicting figures disposed in a shallow space within a gothic frame, or a mural painting of biblical scenes, Masaccio envisaged a virtual chapel with classical architecture, and figures receding into its depths in the nave of the gothic church.<sup>i</sup> Certainly, space was at a premium, where even the patronage rights to individual piers were fought over by wealthy families.<sup>ii</sup> In the early Renaissance the chapels in the nave were of different styles, depending on the taste and means of the patrons and the administration of the friars, at the time they were made.<sup>iii</sup> Amid competition from rival families, a fictive chapel was perhaps one way to enhance the appearance of a donor's patronage. But how was this novel solution conceived? Traditionally, the artist, architect, and engineer Filippo Brunelleschi is credited with the invention of single-point perspective and its application to the architectural features in the *Trinity*. Despite the volume of literature on Renaissance perspective little has been written about the artistic debates surrounding the validity of its introduction into painting, or the social climate that made it desirable in Florence in the 1420s, whether in regard to the painting of a fictive chapel or painting in general.<sup>iv</sup>

Standard accounts routinely attribute the invention of single-point perspective to Brunelleschi in the early decades of the fifteenth century, while Donatello is often said to have been the first to apply it to relief sculpture (albeit imprecisely), Masaccio the first to apply it to large-scale painting, and Alberti the first to put it down in writing. Standard accounts also often give the impression that despite minor differences of approach all those who worked with perspective were primarily interested in achieving a resolution of common technical issues, rather than coming to grips with the significance of perspective as an aspect of their specific artistic (or indeed literary) practices.<sup>v</sup> But does the historical and visual evidence sustain such a straightforward synopsis? This article will argue that it does not, and that even in the early Renaissance there are indications of varied views on the significance of single-point perspective and the identity of its key practitioners that should not be discounted.

Brunelleschi was indeed referred to as a 'perspectivist' in a brief reference in a letter written in 1413 by the poet Domenico da Prato to Alessandro di Michele Rondinelli ('*prospettivo, ingegnoso uomo Filippo di ser Brunellescho, ragguardevole di virtudi e di fama*'), a tantalizingly early but laconic and ambiguous source.<sup>vi</sup> The author did not mention any specific work by Brunelleschi; moreover, it is not clear that the term '*prospettivo*' here refers to an expert in the depiction of perspective, as it is now understood, rather than just a maker of 'views'. In modern Italian the word for perspective ('*prospettiva*') can allude in a general sense to any panorama, and in the early fifteenth century there is no reason to expect that the word (or any of its cognates) would already have had a particular technical definition, especially in the vocabulary of a poet. The sculptor and architect Filarete did credit Brunelleschi with the invention of the modern rules of perspective in a more technically specific context, in his treatise on architecture, written c. 1460–64,<sup>vii</sup> as did Antonio di Tuccio de' Manetti in his short collection of biographies of Renaissance Florence's most remarkable men, written c. 1494–97.<sup>viii</sup> Clearly, Brunelleschi's contribution to the development of perspective

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made an impression on his contemporaries and followers. However, there is no surviving written description of his actual technique,<sup>x</sup> or a perspective depiction definitely by Brunelleschi with which to reconstruct it.<sup>x</sup>

In his extended biography of Brunelleschi written around the 1480s, Manetti famously described two panels by Brunelleschi (now lost), showing perspectival depictions of a view of the Baptistery from the door of the Cathedral, and the Piazza della Signoria in Florence from the end of Via dei Calzaiuoli. Manetti explained how Brunelleschi guaranteed the verisimilitude of his depiction of the Baptistery. There was a tiny hole in the reverse of the panel through which the viewer looked to see a mirror held in place in front of the panel. Looking with one eye, the viewer observed a reflection of the painting of the Baptistery on the obverse of the panel through the hole, that is, from the point determined by Brunelleschi, the point at which the perspective construction gave a convincing impression. Manetti called Brunelleschi's approach to perspective scientific because it involved a rule 'setting down properly and rationally the reductions and enlargements of near and distant objects in correct proportion to the distance in which they are shown'.<sup>xi</sup> What that rule was Manetti did not say, probably because he did not know. Brunelleschi's preparatory design for the perspective would have been obscured when he coloured the images, as Manetti said he did. There is no reason to doubt that Brunelleschi's panels showed a relatively convincing depiction of two of Florence's most important monuments. However, whether the construction method underlying their depiction was as systematic as Manetti and others have believed is open to question.

Donatello's beautiful, classicising *Saint George and the Dragon* marble relief on the base of his statue of Saint George, made for the niche of the Armourers' Guild on the outside of Orsanmichele, along Via dei Calzaiuoli from the Baptistery (now in the Bargello Museum in Florence), is datable to the late teens of the fifteenth century. It has been described as among the earliest surviving instances of the application of the new perspective.<sup>xii</sup> However, linear perspective is confined to the facade of the small building behind the princess and the pavement within, visible through a doorway—minor features in which the perspective seems in fact to be rather irregular. Donatello's *Feast of Herod* bronze relief panel for the font of Siena's Cathedral Baptistery, made in the mid-1420s, shows a brilliantly complex, multi-layered depiction of space. Elements of single-point perspective have been found in the tiles on the floor and the architecture, but there is no overall convergence of the orthogonals (the edges on the sides of box shapes converging to a vanishing point).<sup>xiii</sup> Thus, the examples most commonly cited of Donatello's contribution to single-point perspective suggest, if anything, a relaxed approach rather than a systematic one.

Masaccio's *Trinity* (c. 1425–27) is probably the earliest surviving painting of the Florentine Renaissance to show a consistent set of converging orthogonals (at least in the barrel vault where the orthogonals are most clearly visible). Yet it is difficult to establish whether it also shows an entirely consistent system of proportionally diminishing spatial values (the forms shown receding into the distance diminishing in size in a proportional manner) because Masaccio did not show the floor of the chapel, which is depicted as though slightly above eye level. Thus, it is difficult to establish the rate of diminution within the depicted space. The ribs of the barrel vault give the strongest indication that there is a consistent system of diminution, although even this indication is ambiguous in parts.<sup>xiv</sup> It has been assumed that Brunelleschi must have inspired or designed the fictive architecture in this work,<sup>xv</sup> and that the appearance of mathematical precision is part of its religious meaning.<sup>xvi</sup> Certainly, the classical architecture is much more elaborate and close to Brunelleschi's style than in any other work of Masaccio, and the perspective is much more an important feature of the work than any other work of his, but their collaboration on this painting remains a hypothesis in the absence of any firm evidence.

As the *Trinity* is such a compelling image and one that is apparently convincing in its depiction of forms in space, writers sometimes give in to the temptation of exaggerating its mathematical precision. In fact it applies perspective inconsistently, but then there is probably no Renaissance painting in which every line and shape conforms precisely to an overall perspective plan. Probably only a modern computer would be capable of such precision. In 1996, J.V. Field presented a thorough review of Renaissance approaches to perspective, including that of the *Trinity* after making new measurements of the paint surface, concluding: 'Like other artists of the fifteenth century, Masaccio and Donatello were interested in a form of truth that was essentially visual rather than mathematical, though mathematics might be used in attaining to it. That a picture that is so impressively visually correct as the *Trinity* can turn out to be mathematically faulty is a warning against confusing artist with mathematician.' According to Field, the abaci—the flat blocks surmounting the capitals on the columns—are not consistently measured; those at the front are too long to have been planned mathematically.<sup>xvii</sup>

Furthermore, as Joannides pointed out, the arch over the foremost columns should be foreshortened, since it is seen from below, whereas Masaccio depicted it face on as a series of semi-circles. A series of increasingly flat ellipses would have provided the correct appearance of a foreshortened arch only from a single viewpoint in the church (fairly close to the painting), from all other positions it would have looked distorted.<sup>xviii</sup> And so Masaccio compromised the single-point perspective of his work, probably in order to create a regular appearance from further away. An analogous phenomenon occurs in Uccello's *Equestrian Monument for Sir John Hawkwood* (1436) in Florence Cathedral, where the horse and rider are depicted as seen face on while the sarcophagus on which the horse stands and its base are depicted as seen from below, probably to avoid certain undesirable effects of showing the whole structure in consistent

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perspective: the horse's feet would have appeared cut off by the sarcophagus, Hawkwood's face would have been less clearly visible, and from a distance the horse and rider would have appeared distorted.<sup>xix</sup> The idea that Masaccio was the first to create a large-scale painting in something approaching single-point perspective also needs to be treated with caution, as is discussed below.

Alberti's treatise on painting *De Pictura* written in Latin in 1435 (and translated into the vernacular as *Della Pittura* in 1436) includes a shorthand method for producing an accurate view of a scene, which uses a 'veil' of squaring through which the artist looks and which they use as a reference for plotting the relationships between forms in the scene to be depicted. Alberti defended this method from critics who said it did not require artists to develop any real understanding of the depiction of objects in space. More complex was his second method, one that provides the two key features that this article takes to constitute the basis of single-point perspective (converging orthogonals and a proportionally diminishing scale of objects receding in space). Essentially, it required the artist to plot where the visual rays between points on the ground plan of the scene to be depicted (using for the example a grid of square paving) would cut the picture plane, using these intersections to locate the transversals in the composition (those straight lines parallel to the picture plane). The method exploits geometry rather than calculation to depict a pavement of squares in perspective, allowing the artist also to determine the appropriate heights of objects depicted on the pavement.

Though more rigorous than any earlier written perspective method, this is not to say that the method is itself highly sophisticated. Alberti frankly admitted at the outset of his text: 'Mathematicians measure the shapes and forms of things in the mind alone and divorced entirely from matter. We, on the other hand, who wish to talk of things that are visible, will express ourselves in cruder terms.'<sup>xx</sup> Indeed, a recent mathematical analysis of Alberti's perspective method has found it wanting, in terms of determining the precise relationship between horizontal, vertical, and orthogonal proportions.<sup>xxi</sup>

Modern art historians have often struggled to accommodate the claims by early writers that one of the protagonists in the development of perspective in early Renaissance Florence was Paolo Uccello (c. 1397–1475). Manetti singled out Uccello among the artists who followed Brunelleschi in the application of perspective,<sup>xxii</sup> and Giorgio Vasari alternatively credited Uccello and Masaccio with the leading role in the application of perspective to the field of painting.<sup>xxiii</sup> What has made it difficult for these claims to be accepted is Uccello's non-canonical uses of perspective. While a number of his paintings demonstrate a knowledge of standard single-point perspective (for example, the *Hunt in the Forest* in the Ashmolean Museum in Oxford), throughout his oeuvre numerous instances occur in which he ignored the standard approach, adopting varied and unusual uses (notably, the *Nativity* in the reserve collection of the Uffizi in Florence, in which the *sinopia*—the underlying preparatory drawing—depicts a standard perspectival grid, while in the painting on the *intonaca*—the final layer of plaster—there are two vanishing points at the lateral edges creating a strangely distorted appearance of space).<sup>xxiv</sup> Furthermore, even when Uccello used perspective in a more-or-less straightforward manner, he sometimes did so ironically, as in the *Battle* paintings in the National Gallery, London, and the Galleria degli Uffizi in Florence, in which he contrived to show the broken lances on the ground, and even the tufts of grass growing thereon, in a perspectival grid. How could a founder of canonical perspective have used it so inconsistently and anti-illusionistically?

Loath to ignore the early sources, some modern writers have attempted either to discredit them, or to make him the exception that proves the rule, as it were. Thus, Uccello has appeared in modern literature as a late follower of his peers whose influence on the development of perspective was actually inconsequential,<sup>xxv</sup> or an aberration, an eccentric personality, simultaneously obsessed with perspective and yet unable or unwilling to adhere seriously to its most important rules.<sup>xxvi</sup> However, historical evidence, discussed below, suggests Uccello was professionally and socially linked to the milieu in which the new approach to perspective found its earliest expression in painting. Specialist writers on Uccello have also suggested that he may have been providing a commentary on the work of Brunelleschi and Alberti (neither primarily a painter), by pointing out the artificial restrictions that single-point perspective creates.<sup>xxvii</sup> Uccello was by no means the only painter in the early decades of the fifteenth century to resist or ignore the strictures of single-point perspective.<sup>xxviii</sup> In three respects Uccello's approach belongs to a more complex reading of the significance of perspective in the late Medieval and early Renaissance period: in its recognition of the technical, expressive, and philosophical or theological limitations inherent in standard single-point perspective.

While single-point perspective created using the second method described by Alberti generates a consistent diminution of scale in forms as they recede into space in front of the viewer, this is at the expense of visual consistency across the picture plane. The further forms are laterally from the centre, the greater their distortion. This is a well-known phenomenon in specialist perspective studies,<sup>xxix</sup> but one to which the common viewer of artworks, accustomed to conventions of visual representation, would probably give little consideration under normal conditions. Piero della Francesca addressed the problem in the thirtieth proposition of the first book, and the twelfth proposition of the second book, of *De Prospectiva Pingendi* (*On Perspective for Painting*), referring to unnamed critics of perspective who doubted its rationality, but he did not accept that peripheral distortion invalidated the application of perspective to the visual arts. Leonardo da Vinci returned to the problem in Manuscript A of his *Discorsi*. Art historians agree that Leonardo understood the problem of lateral distortion, however, there is disagreement as to what approach or ap-

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proaches he may have pursued to overcome the problem.<sup>xxx</sup>

In other words, the Florentine single-point perspective method may not be an entirely mathematically precise method of depicting space in two dimensions, and is not an entirely consistent approximation of it, but is rather a system for creating a degree of illusion of regularly constructed space, one that privileges the diminution of forms away from the picture plane. The inherent difficulties in correlating the depiction of three dimensional objects in two dimensional space with the biological reality of vision were not so much resolved by Renaissance theorists as minimised through limiting the angle of vision (to avoid lateral distortion) and creating a pre-determined position for a viewer's eye (to allow the artist to create the most convincing impression of depth from a single view and to avoid the complexities of binocular vision).<sup>xxxi</sup> For practical reasons neither strategy would find general acceptance in painting: artists needed at times to depict wide angles of vision to create broad settings for their subjects and viewers usually move around in front of artworks—looking with both eyes! Furthermore, as explained in reference to Uccello's *Equestrian Monument*, other aspects of single-point perspective can at times be at odds with the desire for clearly legible forms in painting.

One aspect of Uccello's work that writers have not failed to praise is his imaginative and innovative imagery, replete with fantastically elaborate dragons, fierce thunderstorms, the pageantry of war, and the elegance of the Renaissance hunt. Might not his unconventional use of perspective be associated with his quest for novelty and the liberation of imagery from the monotony of canonical standards? A similar suggestion has been made to explain why most fourteenth-century artists, who were not that far from achieving single-point perspective, might have resisted it, and why even many fifteenth-century artists who evidently were capable of using the technique often chose not to.<sup>xxxii</sup> There is a well-known written source that also suggests such an interpretation. In the introduction to his handbook on painting, Cennino Cennini cited two reasons why painting can be considered a higher art: its basis in theory on the one hand, and its poetic licence on the other. For Cennini the painter is not constrained to follow theoretical considerations, indeed the occasional poetic disregard for theory is part of what distinguishes a painter from a lesser artisan.<sup>xxxiii</sup> Recently, it has been proposed that his handbook may have been written as a codification of late fourteenth-century artists' practices for the purpose of allowing the painters' guild to better oversee their members' professional activities.<sup>xxxiv</sup> Thus, his sentiment might well have expressed an orthodox point of view. Would the development of single-point perspective in the decades following the writing of his treatise negate such a view?

An indication that the rational application of geometry, on which single-point perspective is based, might not have convinced all commentators of its ability to provide a framework for representing the complexity of the world (and the universe) in the early Renaissance period is provided by the writings of the humanist Nicholas of Cusa, called Cusanus, particularly his most famous work, *De Docta Ignorantia (On Learned Ignorance)*, completed in February 1440. Although Cusanus affirmed that God created the world using arithmetic, geometry, music, and astronomy (the *quadrivium*—four of the liberal arts comprising the basic courses of a Medieval university) he used logical arguments to demonstrate the incompatibility of standard geometry and the concept of infinity, or put another way, the incommensurability of the human mind and divinity. In one instance he argued that an infinitely large circle would be equivalent to an infinitely long straight line whose circumference is everywhere and whose centre is nowhere.<sup>xxxv</sup> If this sounds paradoxical, that was evidently Cusanus' intention, to show that the finite logical tools available to the human mind are insufficient to understand God's infinite reality. Cusanus' demonstrations of the ambiguities of infinite geometry parallel to some extent Uccello's use of perspective, in as much as both highlight the limits of geometry, rather than its ability to represent a clearly comprehensible order.<sup>xxxvi</sup>

Some artists and humanists might have had differing views about single-point perspective as an orthodoxy, however, Florentine patrons may have had their own intentions in its use as well. The *Trinity's* verisimilitude is, of course, not restricted to the architectural setting. Two of the most riveting aspects of the work are the life-size figures of the presumed donors. They are unusually depicted without any kind of framework (fictive or real) around them. Instead, they kneel in front of the fictive architectural structure surrounding the sacred figures. Since most of the original edges of the painting have been destroyed, there could possibly have been a surrounding frame, but in any event, the directness of their depiction is innovative, posed between the viewer and the sacred figures, rather than among the sacred figures, as was more customary.

While their identity remains uncertain, documents provide a clue: a tomb slab near the painting was dedicated to Domenico Lenzi and his family, presumably when Domenico died in January 1427.<sup>xxxvii</sup> Little is known about Domenico as an individual, and the family as a whole has not been the subject of a sustained study as other families of their time have.<sup>xxxviii</sup> Scholars of the *Trinity* have drawn attention to the fact that a Benedetto di Domenico Lenzi became Prior at Santa Maria Novella c. 1426–28, and that a Lorenzo di Piero Lenzi (Domenico's cousin) was *Gonfaloniere di Giustizia* (effectively the mayor) in August and September 1425, as evidence for the extended family's possible influence over the commission.<sup>xxxix</sup> Further information about the social standing of the Lenzi and another family, the Carnesecchi, that commissioned paintings with conspicuous displays of perspective before and after the *Trinity* can help to explain the circumstances in which the taste for perspective in painting initially developed.

Disparate sources indicate that the Lenzi grew in prominence in the Santa Maria Novella quarter from the late

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fourteenth century, without ever joining the inner-circle of the most powerful families in Florence.<sup>xi</sup> They owned adjacent properties on the Piazza di Ognissanti on the north bank of the Arno, a little south of Santa Maria Novella. Being well outside the second city wall of Florence, this location did not represent the most desirable real estate in the city. Nevertheless, some time before 1470, two brothers and an uncle of the family—Lorenzo and Pietro di Anfrione and Francesco Lenzi—built an impressive palazzo on their properties, which currently serves as the French Consulate.<sup>xii</sup>

The fact that the palazzo was built by three members of the family says something about the importance of collective patronage in early Renaissance Florence. Even if Domenico is the patron represented in the *Trinity*, the commission would have been planned in partnership with the Dominican friars, and served as a collective monument for Domenico, his wife, and his descendents (the tomb slab was inscribed for him and his family ‘*Domenico di Lenzi et Suorem*’), and served more generally as a symbol of the success of the extended Lenzi family. An Anfrione di Lorenzo di Piero Lenzi is known to have held the important office of *Operaio* (building supervisor) at the Cathedral from June 1436.<sup>xiii</sup> Based on their patronymics (the string of names identifying the individual, their father, their grandfather and so on), it seems that Lorenzo, Anfrione, and, Lorenzo and Pietro represent three generations of a significant dynasty of power and patronage in Florence.<sup>xiiii</sup>

The most prominent member of the family was Lorenzo di Piero Lenzi, whose name appears frequently in sources in this period. In late 1412 and early 1413 a man of that name was a leader and representative of the Guelf party (*Parte Guelfa*), a semi-official association predominantly representing the interests of Florence’s conservative, oligarchic families, and was again in 1424–25.<sup>xliv</sup> In 1416 a Lorenzo di Piero Lenzi appears in a ledger of the Confraternity of Saint Peter Martyr, the company of laity and friars based in Santa Maria Novella, which exercised considerable influence over the administration of patronage at the convent and church.<sup>xlv</sup> In the same year a Lorenzo di Piero Lenzi appears in the records of the Magistrato dei Pupilli, a communal institution providing judges and notaries to administer the property of orphans.<sup>xlvi</sup> In 1434 a Lorenzo di Piero Lenzi sold Paolo Uccello a house in Via della Scala,<sup>xlvii</sup> perhaps the Lorenzo Lenzi who was among five supporters of the Medici threatened with exile by anti-Medici officials in that year.<sup>xlviii</sup> Granted, there may well have been more than one person with that name in Florence in the early fifteenth century, but the fact remains that the Lenzi family were conspicuous members of Florentine society at the time, particularly in the Santa Maria Novella quarter. That they buried their dead in the principal church of the quarter, as well as in Ognissanti, their local church, confirms their high social standing.<sup>xlix</sup> In addition, the Lenzi had a chapel dedicated to Saint Catherine in the church of the Spedale degli Innocenti.<sup>1</sup>

Paolo Uccello’s association with the Lenzi may not have been entirely casual. His wealthy and powerful relative from his mother’s family, Deo Beccuti, owned land in Castello, a number of kilometres northwest of Florence, an area favoured by the leading patrician families of the Santa Maria Novella quarter because of its proximity to the quarter, its location on the main road to Prato, and its elevated position on a foothill of Mount Morello, affording a view over the surrounding countryside and the city of Florence. The tax return of a Giovanni di Domenico Lenzi shows that in 1427 he owned land in Castello neighbouring that belonging to Deo Beccuti, as well as a house in Florence on the Piazza di Ognissanti, next to his kinsman Lorenzo di Piero Lenzi.<sup>ii</sup> Any knowledge Uccello might have gained through his relative about the landowners in the Santa Maria Novella quarter, such as the Lenzi, would have been helpful when he bought his house from one of them in 1434, but landowners were also important art patrons, so Uccello’s interest in the Lenzi family and other prominent landowning families in the quarter would have been a professional concern. As it happens, Anfrione di Lorenzo di Piero Lenzi was among the *operai* who oversaw the final stages of the commission for Uccello’s *Equestrian Monument for Sir John Hawkwood* in the Cathedral in 1436.<sup>iii</sup>

The idea of an indirect association of Uccello through his relative Deo Beccuti with prominent landowners and patrons in and around the Santa Maria Novella quarter is supported by the important case of the Carnesecchi Chapel in Santa Maria Maggiore, the modest church on Via de’ Cerretani, mid-way between Santa Maria Novella and the Cathedral. The sombre Medieval interior is now crowded with Baroque decoration, however, it previously contained a number of important Renaissance paintings by Uccello, Masolino, Masaccio, and Botticelli.<sup>liii</sup> The most distinguished early Renaissance survival in the church is Giovanni di Francesco’s small *Crucifixion*, painted on a blue background in an arch, high in the chapel on the left of the main altar. The decoration of the Carnesecchi Chapel, dedicated to Saint Catherine of Alexandria, was provided for in the will of Paolo di Berto di Grazino de’ Carnesecchi, who died on the 4th of February 1428.<sup>liiv</sup> He was a prominent citizen, holding numerous important government offices,<sup>liv</sup> and he was, like Lorenzo di Piero Lenzi, a leader of the Guelf party in the second and third decades of the century.<sup>lvi</sup>

A tax return of his sons Simone, Antonio, and Giovanni shows they were concerned with the financial maintenance of the chapel as directed in their father’s will (*‘La chapella di santa chatérina di santa maria maggiore de avere per testimente di nostro padre ogni ano due [...] di valuta’*),<sup>lvii</sup> and an entry in a ledger of Santa Maria Novella shows that his heirs also paid for commemorative ceremonies to be held in the principal church of the quarter (*‘Rede d[i] paolo d[i] berto carnesecchi dono dare ffiorin]j 5 lanno p[er] i fino/ i dieci annj p[er] uno rinovali [...] pietaza p[er] [...]ldecto paolo mori ad[i] 4 d[i] febraio 1427’*).<sup>lviii</sup> These services no doubt reflected the family’s desire to achieve recognition in the principal church of the quarter at this time, even if, unlike the Lenzi, they might not have been able to afford to commission a lasting monument there.

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The Carnesecchi altarpiece, although broken up after 1653, can be reconstructed from earlier descriptions and its surviving panels. The commission was granted jointly to Uccello, Masolino, and Masaccio, three of the leading avant-garde painters in early Renaissance Florence. Vasari recorded that Uccello painted an *Annunciation* and *Four Evangelists* in the vaulted summit (now lost). Following the demolition of the chapel, an *Annunciation* by Uccello (the same one?) was recorded in guidebooks as fixed to a column in the church until the early nineteenth century, after which there are no further notices of it.<sup>lix</sup> Vasari made remarkable claims for Uccello's contribution to the project, describing:

...an Annunciation in fresco, in which he made a building worthy of consideration, a new and difficult thing for those times, being the first that showed in a fine manner to artists and with grace and proportion, [it] showed how to make the lines escape [towards a vanishing point] and to show space on a plane, that is little and small, so much so that something that appears far seems large: and they who colour with good judgment of this, with grace adding the shadows in their place and the highlights, with colours, deceive the eye, such that the picture appears real and in relief. And not satisfied with doing this, he wanted also to show the great difficulty of some columns foreshortened by means of perspective, which bend round and break the corner of the vault, where there are the four Evangelists: a thing considered fine and difficult; and truly Paolo was ingenious and skillful in his profession.<sup>lx</sup>

Of the three scenes in the altarpiece described by Vasari, the panel depicting Saint Catherine is lost, the central panel showing the Virgin and Child has not been seen since it was stolen in the 1920s, although its appearance is known from photographs, and the *Saint Julian* is now housed in the Museo d'Arte Sacra in Florence. The two panels known to modern art historians are now attributed to Masolino, on stylistic grounds. Vasari also described three predella panels: a *Scene from the Life of Saint Catherine* and a *Nativity*, which are lost, and a *Scene from the Life of Saint Julian*, which has been identified with the small and badly damaged panel in the Museo Horne, Florence, on the basis of the analysis of its panel support.<sup>lxi</sup>

From Vasari's precise description it is known the Carnesecchi Chapel was located on the north wall of the church, beside a door providing access to the street leading to the Baptistery (Via de' Cerretani). The left aisle of the nave on the north side is not particularly wide, and so the chapel was probably not a space separated by walls from the rest of the church, but an altar with an altarpiece against the wall. However, the fact that the altarpiece was vaulted suggests it was of some depth, more solid than a flat panel. Vasari praised in particular Uccello's depiction of columns, illusionistically foreshortened within the curve of the vault at the top of the altarpiece. It seems that Uccello overcame the constraints imposed by the format of the altarpiece to create an impression of architecture in perspective.

Paul Joannides argued that a notice of the chapel by Paolo Carnesecchi in January 1427 describing it as furnished (*'fornita'*) meant that the decoration had been completed by that time. The commission would most likely have been completed before the end of 1425, by which time Masolino was in Hungary and Uccello was in Venice. Joannides dated Masolino's contribution, and so presumably the whole commission, to around 1423 on stylistic evidence and the large workload Masolino had around 1424–25.<sup>lxii</sup> Thus the work most likely predates Masaccio's *Trinity* and may well have exerted some influence over it.

How Uccello, Masolino, and Masaccio came to collaborate on the commission is unknown. Anna Padoa Rizzo suggested that Uccello's involvement may have been facilitated by his mother's family.<sup>lxiii</sup> The del Beccuto and the Carnesecchi families each owned large properties adjacent to Piazza di Santa Maria Maggiore, indicating that they were among the leading citizens of the parish.<sup>lxiv</sup> The church would have been a focus for their religious and social activities. Like the Carnesecchi, the del Beccuto had patronage rights within the church, including a chapel dedicated to Saint Blaise. An eighteenth-century genealogy of the del Beccuto family in the Florentine State Archive shows that Deo Beccuti was in fact married to one Andreola di Zanobi Carnesecchi,<sup>lxv</sup> adding some documentary support to the hypothesis of a social connection between Uccello and his patron. Like the del Beccuto and Lenzi families, the Carnesecchi also owned land in Castello, another indication of their comparable social status.<sup>lxvi</sup>

The taste for avant-garde perspective in art seems to have run in the Carnesecchi family. It was probably Paolo di Berto's nephew, Bernardo di Cristofano Carnesecchi, who commissioned Domenico Veneziano's *Virgin and Child with God the Father, the Holy Spirit and Saints* in the early 1440s for a street tabernacle in front of one of his houses on the Canto de' Carnesecchi.<sup>lxvii</sup> The tabernacle was located at the point where the present day Via de' Banchi and Via de' Panzani meet, between Santa Maria Novella and Santa Maria Maggiore. The detached paintings from the central scene and two fragments of saints' heads from the sides of the tabernacle are all that survive, now housed in the National Gallery, London. The Virgin and Child are shown on an enormous throne depicted in steep perspective, composed of distinctively Uccellesque, simple, geometric forms, notably the spheres mounted directly on the top of the throne, reminiscent of the spheres decorating the tops of architectural features throughout Uccello's mural paintings of the *Stories of the Virgin and Saint Steven* in the Cathedral in Prato, painted c. 1435–36.<sup>lxviii</sup> Interestingly, like his uncle and Lorenzo di Piero Lenzi, Bernardo Carnesecchi was a member of the aristocratic Guelf party.<sup>lxix</sup> This might be an indication of the kind of patron who favoured artists that contributed to the early development of perspective, since as

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shall be discussed below, the Guelf party was itself a patron of Brunelleschi and Donatello.

While Vasari sometimes credited aspects of the development of perspective to Uccello and sometimes Masaccio, it would be impossible, and pointless in any case, to try to establish who made the greater contribution first. What is known is that if the Lenzi (or the Dominican friars) were looking for a painter for their 'chapel' in 1426 or 1427 Uccello would have been unavailable until at least 12 July 1427, when Deo Beccuti submitted his tax return on his behalf, because Uccello was away designing mosaics for San Marco in Venice.<sup>lxx</sup> Masolino is thought not to have returned to Florence before mid 1427.<sup>lxxi</sup> So, of the collaborators on the Carneseccchi altarpiece, Masaccio appears to have been the only one who was available. If Uccello pioneered a taste for perspectival art in and around the Santa Maria Novella quarter, on which other artists subsequently capitalised, where might his own interest in it have originated?

In the crucial early decades of the century it has been all but impossible to find substantial evidence of the context in which Uccello's perspective developed. The earliest surviving paintings that can be attributed with some certainty to Uccello are most probably from the late 1420s or early 1430s (the *Creation Stories* in the Chiostrino Verde of Santa Maria Novella, the del Beccuto *Virgin and Child* in the Museo di San Marco, Florence, the *Annunciation* in the Ashmolean Museum, Oxford, and the *Saint George and the Dragon* in the National Gallery of Victoria, Melbourne).<sup>lxxii</sup> There may, however be a clue in Eve Borsook's observation of the similarity between Brunelleschi's reported habit of using squared paper for accuracy when drawing the classical monuments in Rome, and Uccello's use of squared drawings to enlarge studies for mural paintings. The earliest surviving squared drawing is Uccello's *Study for the Equestrian Monument for Sir John Hawkwood*, housed in the Gabinetto Disegni e Stampe degli Uffizi, Florence,<sup>lxxiii</sup> although the preparatory squaring visible in the figure of the Virgin in Masaccio's *Trinity* shows that the technique had already been in use for some time. Where might painters such as Masaccio and Uccello have become familiar with this aspect of an architect's practice? In fact, the earliest work by Uccello referred to in a nearly contemporary document is a mosaic he created at San Marco in Venice in 1425.<sup>lxxiv</sup> While the documented figure of Saint Peter on the façade has been destroyed, another mosaic of a wheel interlaced with ribbons inside the atrium has been convincingly attributed to Uccello, and a beautiful, geometrically designed pavement in coloured stone of a stellated dodecahedron in perspective under the door of Saint Peter (the current main exit) has been plausibly attributed to him as well.<sup>lxxv</sup>

Thus, Uccello's art had an architectural aspect from early in his career. Unlike drawings and paintings, in which an artist can modify their design as they work, making pavements required a thoroughly pre-conceived plan and great precision in the cutting of the valuable stones. To avoid mistakes, the masons may well have made cartoons of the artist's designs, and these might have been enlarged from the artist's drawing using squared paper. Whether Uccello was involved in this kind of design in Florence before his trip to Venice is unknown, but he probably could not have got the commission without having some prior experience.

In the fifteenth century the most important examples of mosaics, polychrome stonework, and classical architectural features in Florence were in the Baptistery. Because of its cultural and religious importance it had always been adorned with expensive and elaborate ornaments. The significance of its fittings as a source of inspiration for Florentine artists and architects is well known. Diane F. Zervas has argued that the *all'antica* style pioneered by Brunelleschi and Donatello in the early decades of the fifteenth century, was championed by the Guelf party in its commissions to these artists for the tabernacle and statue of Saint Louis made for the outside of Orsanmichele and the new audience hall of its palazzo, because the antique references lent visual authority to the Party's claims to a venerable history in the Florentine Republic. In particular, Brunelleschi's borrowing of classical architectural elements from the Baptistery represented an appropriation of symbols of Florence's 'classical' past. The Chancellor Leonardo Bruni had argued that the Baptistery provided a distinguished classical lineage for Florence's modern Republic, having been built as a temple by Romans during their Republican era.<sup>lxxvi</sup> In fact, the Baptistery's origins cannot be established conclusively, but it may have originated in the seventh century and been rebuilt in the eleventh or twelfth.<sup>lxxvii</sup>

That Brunelleschi depicted the Baptistery in one of the two panels in which he is said to have pioneered perspective was probably no accident. His two ways of looking at the Baptistery are no doubt related: viewing it as a textbook of classical architectural features to be copied and translated into his own commissions, and viewing it as an exercise in perspective projection. The prestige of Rome's classical monuments justified Brunelleschi's trip there and the careful efforts he made to record them accurately using squared paper, and much the same might have been true of the Baptistery. Perhaps this is where the origins of single-point perspective should be looked for.<sup>lxxviii</sup> The projection of a grid onto the picture plane is conceivably a first step to the development of single-point perspective, in the laying of a regular, geometric matrix over the visual field. This finds its most direct corollary in Alberti's 'veil', described earlier. The artist then has to project the grid onto the ground plan as well, to consider the scene as though looking at it from the side as well as the front, and to realise that the two viewpoints together will provide the required proportions for a single-point perspective representation of the subject.

If single-point perspective originated in the context of Florence's centre, in the study of its most prestigious monuments by its most important architect who was working on commissions intended to enhance the city's monu-

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ments through references to its 'classical' past, its further development in painting seems to have taken place somewhat further away. In particular, in and around the Santa Maria Novella quarter, upwardly mobile families such as the Carnesecchi and the Lenzi were intent on advancing their interests towards the centres of power. As members of the Guelf party they would have been familiar with Brunelleschi's and Donatello's commissions for expensive architectural monuments and bronze sculpture for the Guelf party. Edgar Hertlein has presented a strong case for seeing the *Trinity* as containing allusions to Guelf imagery, not least in the formal similarity of its classical architecture with the tabernacle at Orsanmichele commissioned by the Guelf party from Donatello to house his gilded bronze statue of Saint Louis of Toulouse.<sup>lxxix</sup> Even if the Carnesecchi and the Lenzi were not quite rich enough to afford such expensive monuments for themselves,<sup>lxxx</sup> they were, nevertheless, sufficiently well off to commission painters such as Uccello and Masaccio to emulate these achievements using increasingly sophisticated and illusionistic techniques. Uccello and Masaccio were among the first painters to adapt the new perspective to large-scale paintings, and in doing so they quickly discovered its limitations.

It is telling that the Carnesecchi altarpiece was probably a substantial edifice,<sup>lxxxi</sup> and the *Trinity* is on a monumental scale. It seems that the potential for perspective to evoke grand architectural settings even in constrained physical, and perhaps financial, contexts was appreciated by early patrons. Like many patrician families in Florence, the Lenzi would have been keen to project an image of their wealth and antiquity, and in this context the choice of fictive classical architecture for the *Trinity* might be interpreted as a strategy aimed at this end, much as the Guelf party's taste for expensive classicising monuments bespoke its claim to an ancient and privileged position in the commune. In translating the theory of single-point perspective from its inherently limited scope to a monumental scale, artists such as Uccello and Masaccio were virtually obliged to compromise some of its principles, and in the case of Uccello, he seems to have made a virtue out of necessity by highlighting the artificial nature and theoretical limitations of perspective to such an extent that it can indeed be said to have become a part of his subject matter.

Dr. Hugh Hudson, Honorary Fellow, School of Culture and Communication, The University of Melbourne, 2006.

Thanks are due to Christopher Wood, Director of Australians Studying Abroad, for his help in formulating the topic, and to Associate Professor Richard Read for his valuable comments on this research.

<sup>i</sup> It may well be an indication of the location specific nature of the development of perspective in painting in the first three or four decades of the fifteenth century that there are few comparable developments in a major artistic centre such as Venice, as occurred in Florence in this period. On the influence of Tuscan art on Venetian art from the 1440s see: P. Humfrey, *The Altarpiece in Renaissance Venice*, New Haven and London, Yale University Press, 1993, pp. 164–174.

<sup>ii</sup> N. Ben-Aryeh Debby, 'Patrons, Artists, Preachers: The Pulpit of Santa Maria Novella (1443–1448)', *Arte Cristiana*, 90, 811, July–August, 2002, 261–272, p. 264. The Rucellai family antagonised the Minerbetti family in the 1440s with its project to construct a pulpit on a pier, beside Masaccio's *Trinity*, in the lower nave of Santa Maria Novella where the Minerbetti felt they held patronage rights. The dispute was resolved by a decree from the friars stating that the Rucellai pulpit would be allowed unless the Minerbetti provided an alternative at least as beautiful.

<sup>iii</sup> The chapels were redesigned in a more uniform style in 1565, during Giorgio Vasari's renovation of the interior, in accordance with the Counter-Reformation desire to focus the attention of the congregation on the main altar. Fortunately, Vasari covered Masaccio's painting, which he praised highly (G. Vasari, *Le vite de' più eccellenti pittori scultori e architettori italiani, nelle redazioni del 1550 e 1568*, testo, 6 vols, G. Mardersteig (ed.) (Florence, Sansoni Editore, 1966–1987), 3, pp. 126–127: the praise appears in the 1550 and 1568 editions of the book), with one of his own, thereby protecting it for posterity—presumably intentionally, given his praise for the work. The chapels in the nave were remodelled again in the 1860s in a neo-Gothic style. For a discussion of Vasari's work at Santa Maria Novella, see: M.B. Hall, *Renovation and Counter-Reformation: Vasari and Duke Cosimo in Sta Maria Novella and Sta Croce 1565–1577* (Oxford, The Clarendon Press, 1979).

<sup>iv</sup> The literature on perspective is enormous. A classic text is: E. Panofsky, *Perspective as Symbolic Form*, trans. C.S. Wood (New York, Zone Books, 1991—orig. German ed. *Vorträge der Bibliothek Warburg*, 1924–1925, Leipzig and Berlin, 1927, pp. 258–330); a frequently cited text is: J. White, *The Birth and Rebirth of Pictorial Space*, third ed. (London and Boston, Faber and Faber Ltd, 1987—orig. ed. London, 1957); a comprehensive survey of linear perspective techniques is in: M. Kemp's *The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat* (New Haven and London, Yale University Press, 1990); and a useful recent text is: J.V. Field, *The Invention of Infinity: Mathematics and Art in the Renaissance* (Oxford, New York, and Toronto, Oxford University Press, 1997).

<sup>v</sup> Such is the nature of B.A.R. Carter's account in his entry for perspective in *The Oxford Companion to Art* (H. Osborne (ed.) (Oxford, The Clarendon Press, 1970), 840–861, pp. 842–843 and 859–860). A related criticism of standard accounts of the development of perspective in early Renaissance Florence is the tendency to isolate the technique from the subject matter it was used to represent. Norris Kelly Smith's *Here I Stand: Perspective From Another Point of View* (New York, Columbia University Press, 1994) argued that perspective should be seen in relation to the specific iconography of the works in which it appears, although this



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approach tends to increase the subjectivity of the evidence for the interpretations proposed, since iconography is by and large more open to varying interpretations than technique.

<sup>vi</sup> P. Benigni (ed.), *Filippo Brunelleschi: l'Uomo e l'artista* (Florence, Ministero per i Beni Culturali e Ambientali Pubblicazioni degli Archivi di Stato (94), 1997—exh. cat., Archivio di Stato di Firenze, Florence, 1977), p. 97, citing A. Wesselofsky's appendix to the introduction to *Il paradiso degli Allberti* by Giovanni da Prato (Bologna, 1867, part 2, pp. 330–337).

<sup>vii</sup> A. Averlino, *Filarete's Treatise on Architecture: Being the Treatise by Antonio di Piero Averlino, Known as Filarete*, 2 vols, trans. J.R. Spencer (New Haven and London, Yale University Press, 1965), 1, pp. 304–305.

<sup>viii</sup> A. Manetti, 'Uomini Singolari in Firenze Dal MCCCC', in P. Murray (ed.), 'Art Historians and Art Critics—IV: XIV uomini singolari in Firenze', *The Burlington Magazine*, 99, 655, October 1957, 330–336, p. 336.

<sup>ix</sup> Vasari (*Le vite*, testo, 3, p. 142: appearing in the 1550 and 1568 editions) described Brunelleschi's perspective method, in very general terms, as based on the production of plans and elevations, but did not specify on what authority he said this. R. Krautheimer and T. Krautheimer Hess (*Lorenzo Ghiberti*, second edition, Princeton, Princeton University Press, 1970—orig. ed. Princeton, 1956), pp. 235–239) have tried to reconstruct Brunelleschi's method on the basis of Manetti's account of the two panels and Vasari's brief account.

<sup>x</sup> The metal relief book cover *Christ Healing the Man Possessed by a Demon* (Musée du Louvre, Paris) is sometimes attributed to Brunelleschi, following a suggestion by Roberto Longhi, (for example, F. Borsi and S. Borsi, *Paolo Uccello*, trans. E. Powell, (New York, Thames and Hudson, 1994—orig. Italian ed. Milan, 1992), p. 145), but this view is not generally held. Matteo Ceriana ('Fra Carnevale and the Practice of Architecture', in *From Filippo Lippi to Piero della Francesca: Fra Carnevale and the Making of a Renaissance Master*, K. Christiansen (ed.), exh. cat., Pinacoteca di Brera, Milan, and Metropolitan Museum of Art, New York, 2005, p. 120) attributed it to an anonymous Florentine goldsmith probably following a design by Alberti.

<sup>xi</sup> A. Manetti, *The Life of Brunelleschi by Antonio di Tuccio Manetti*, introduction, notes and critical text by H. Saalman, trans. C. Enggass (University Park and London, Pennsylvania University Press, 1970), pp. 42–47.

<sup>xii</sup> J. Beck, *Italian Renaissance Painting* (Köln, Könemann, 1999), caption to Fig. 70 on p. 94.

<sup>xiii</sup> For a discussion of the unresolved nature of Donatello's use of perspective in these works, see: Kemp, *The Science of Art*, pp. 15–16.

<sup>xiv</sup> For a useful overview of studies of the *Trinity's* perspective, see: Joannides, *Masaccio and Masolino: A Complete Catalogue* (London, Phaidon Press Limited, 1993), pp. 360–365.

<sup>xv</sup> M.L. Cristiani Testi, 'La Trinità di Masaccio, Unità di Cosmo', *Critica d'Arte*, 50, 4, July–September 1985, 109–112, p. 109; R. Goffen, 'Introduction: Masaccio's *Trinity* and the Early Renaissance', in *Masaccio's Trinity*, R. Goffen (ed.) (Cambridge, Cambridge University Press, 1998), 1–32, p. 9.

<sup>xvi</sup> R. Goffen, 'Masaccio's *Trinity* and the Letter to Hebrews', revised edition, in *Masaccio's Trinity*, R. Goffen (ed.) (Cambridge, Cambridge University Press, 1998—orig. ed. *Memorie Domenicane*, 1980, pp. 489–504) 43–64, p. 53.

<sup>xvii</sup> Field, *Invention*, pp. 55–56, and 61.

<sup>xviii</sup> Joannides, *Masaccio and Masolino*, p. 365.

<sup>xix</sup> H. Hudson, 'The Politics of War: Paolo Uccello's *Equestrian Monument for Sir John Hawkwood* in the Cathedral of Florence', *Parergon*, 23, 2, 2006, 1–34, p. 18. This approach to perspective is not uncommon, it is also conspicuously present in two other painted monuments on the Cathedral's walls: those for Cardinal Corsini, painted in 1422 by an unknown artist, perhaps Giovanni dal Ponte, and Fra Luigi de' Marsili, painted in 1439 by Bicci di Lorenzo, in which the consoles are depicted as seen from below while the superstructures of the fictive tombs are depicted as seen face on.

<sup>xx</sup> L.B. Alberti, *On Painting and On Sculpture*, edited with translations, introduction and notes by C. Grayson (London, Phaidon, 1972): pp. 67–69 for the reference to the 'veil'; pp. 55–57 for the reference to the method for constructing perspective; p. 37 for the disclaimer about the mathematical accuracy of the methods he espouses.

<sup>xxi</sup> For a critique of the mathematical precision of Italian Renaissance perspective methods, see: S. Tsuji, 'Four Principles of Perspective: Looking at the *C Segments*', *Zeitschrift für Kunstgeschichte*, 59, 1996, pp. 63–77.

<sup>xxii</sup> Manetti, *Life of Brunelleschi*, pp. 44–45.

<sup>xxiii</sup> In the life of Uccello Vasari described the artist's *Annunciation* from the Carnesecchi altarpiece in Santa Maria Maggiore (now lost) as the first painting to demonstrate a proficiency in perspective and the depiction of relief (*Le vite*, testo, 3, p. 63: appearing in the 1568 edition only), while in the life of Masaccio Vasari stated that none before him had overcome the 'hardness, imperfection and difficulty' in painting up to that point to the extent that Masaccio had, including the depiction of figures in space and foreshortening, even if Uccello had begun to (p. 124: appearing in the 1568 edition only).

<sup>xxiv</sup> For the hypothesis of a symbolic significance of the unusual use of perspective in this work, see: H. Hudson, 'From Via della Scala to the Cathedral: Social Spaces and the Visual Arts in Paolo Uccello's Florence', this journal, forthcoming.

<sup>xxv</sup> R. Longhi, 'Fatti di Masolino e di Masaccio', *La Critica d'Arte*, 15–16, 3–4, July–December 1940, 145–191, pp. 179–180; R. Longhi, *The Art of Piero della Francesca*, with an introduction by K. Christiansen, translation and preface by D. Tabbat (Riverdale-On-Hudson, Stanley Moss—Sheep Meadow Book, 2002—orig. Italian eds Milan, 1927, Rome, 1942, and Florence, 1963), p. 93; and R. Longhi, 'Il "Maestro di Pratovecchio"', *Paragone*, 3, 35, November 1952, 10–37, note 8 on p. 32 and note 11 on pp. 32–33. Early in his career as an art historian Longhi championed Uccello as one of the leading proponents of Renaissance painting, but later changed his mind, arguing instead that while Uccello may have been a contemporary of the founders of per-

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spective, he did not accomplish his most important works in this vein until well after his peers. Longhi's reassessment of Uccello may have been influenced by Julius von Schlosser's unfavourable comparison of Uccello's inconsistencies, contradictions, and variety with Piero della Francesca's clarity and logic, in an essay published in 1933: '1'Xenia: Saggi sulla storia dello stile e del linguaggio nell'arte figurativa', trans. G.F. Ajroldi (Bari, Gius. Laterza & Figli, 1938—orig. German ed. Vienna and Leipzig, 1933), pp. 79–89.

<sup>xxvi</sup> Kemp (*The Science of Art*, pp. 24, and 37–40), despite acknowledging that Uccello was capable of applying Albertian perspective in a straightforward manner, supposed that in view of the artist's occasionally unusual uses of perspective, he had not quite resolved its inherent problems to the extent that Piero della Francesca later would. Beck (*Italian Renaissance Painting*, p. 91), expressed a different view, with similar negative connotations. Describing the *Miracle of the Host* he wrote: 'Perspective has become less obsessive and more empirical in the late paintings, although one still finds that here, as in earlier works, Uccello hovers precariously between high genius and eccentricity.'

<sup>xxvii</sup> For example, A. Parronchi ('Le fonti di Paolo Uccello: i "Perspettivi passati"', *Paragone*, 8, 89, May 1957, 3–32, pp. 14–15) interpreted the separate vanishing points in the *Nativity* as a critique of the monocular vision of Brunelleschian and Albertian orthodox single-point perspective. He related this approach specifically to the phenomenon observed by Alhazen in the third book of *De aspectibus*, and by Witellus in the third book of *Perspectiva*, that an object is only seen distinctly when it falls on the central axis between the viewer's eyes. Parronchi interpreted the opposing vanishing points in Uccello's *Nativity* as a demonstration of the difficulty of applying single-point perspective to binocular vision.

<sup>xxviii</sup> As was recognised in: Krautheimer and Krautheimer Hess, *Lorenzo Ghiberti*, pp. 240–244. K. Christiansen ('Some Observations on the Brancacci Chapel Frescoes After their Cleaning', *The Burlington Magazine*, 133, 1991, 5–20, note 59 on p. 17) even alluded to inconsistencies in the perspective of Masaccio's *Tribute Money* in the Brancacci Chapel.

<sup>xxix</sup> White, *The Birth*, pp. 207–215; T. Frangenberg, 'The Angle of Vision: Problems of Perspectival Representation in the Fifteenth and Sixteenth Centuries', *Renaissance Studies*, 6, 1, pp. 1–45; Field, *Invention*, pp. 93–97.

<sup>xxx</sup> White (*The Birth*, pp. 207–215) interpreted the testimony of Benvenuto Cellini concerning Leonardo's lost manuscript on perspective and Leonardo's surviving writings and diagrams on the subject to conclude that Leonardo had considered a method of depicting space in a curvilinear fashion, one that could have eliminated lateral distortion but which would have made flat objects appear round. C. Pedretti (*Leonardo da Vinci On Painting A Lost Book (Libro A) Reassembled from the Codex Vaticanus Urbinas 1270 and from the Codex Leicester* (Berkeley and Los Angeles, University of California Press, 1964), pp. 163–174) rejected White's interpretation, proposing that Leonardo's solution to the problem of lateral distortion in single-point perspective was simply to employ a narrow angle of vision.

<sup>xxxi</sup> These are the approaches that Frangenberg ('Angle of Vision', pp. 5–10) attributed to Piero della Francesca in the artist's attempt to validate the use of single-point perspective.

<sup>xxxii</sup> Trachtenberg (*Dominion of the Eye: Urbanism, Art, and Power in Early Modern Florence*, Cambridge, Cambridge University Press, 1997, pp. 174–175) suggested that it was not so much that fourteenth-century artists were incapable of refining their use of perspective to the point where the major orthogonals were aligned, but that they may have chosen not to take that step (and the other steps integral to single-point perspective) for aesthetic reasons.

<sup>xxxiii</sup> C. Cennini, *Il libro dell'arte, commentato e annotato da Franco Brunello con una introduzione di Licisco Magagnato* (Vicenza, Neri Pozza Editore, 1971) p. 4.

<sup>xxxiv</sup> R. Bellucci and C. Frosinini ('Working Together: Technique and Innovation (in Masolino's and Masaccio's Panel Paintings)', in *The Panel Paintings of Masolino and Masaccio: The Role of Technique*, C.B. Strehlke and C. Frosinini (eds) (Milan, 5 Continents, 2002), 29–61, p. 30) described Cennini's book as a conservative codification of artists' practices in Florence probably made for the painters' guild at a time when the guild was seeking to enforce its control of the art in Florence in the face of rapid changes in professional practices.

<sup>xxxv</sup> J. Hopkins, *Nicholas of Cusa On Learned Ignorance: A Translation and an Appraisal of De Docta Ignorantia* (Minneapolis, A.J. Benning Press, 1981), pp. 63–66. Cusanus problematises Panofsky's classic interpretation of the role of changing views of infinity in early Renaissance epistemology as underlying the expression of single-point perspective (*Perspective as Symbolic Form*, especially pp. 65–66). As one of the most prominent authors discussing infinity, and one who abandoned Aristotelian earth-centrism (pp. 114–116)—which Panofsky cited as a corollary of the new awareness of infinity—Cusanus might be expected to have taken a stance on the geometry of space sympathetic to single-point perspective theory as a rational world-view. On the contrary, Cusanus rushes ahead, as it were, to draw attention to the limits of the rational extension of infinite space, in so doing affirming a theological view of the universe. Cusanus' contacts with Florentine humanists are well documented: C. Vasoli, 'Niccolò Cusano e la cultura Umanistica Fiorentina', in *Nicolaus Cusanus zwischen Deutschland und Italien*, M. Thurner (ed.) (Berlin, Akademie Verlag GmbH, 2002—Beiträge eines Deutsch-Italienischen Symposiums, Villa Vigoni, Lovenjo, 28 March–1 April 2001), pp. 75–89.

<sup>xxxvi</sup> For E. Sindona ('Prospettiva e crisi nell'Umanesimo', in *La prospettiva rinascimentale: Codificazioni e transgressioni*, M.D. Emiliani (ed.) (Florence, Centro Di, 1980—papers of the conference of the same name, Castello Sforzesco, Civiche Raccolte d'Arte di Milano, 11–15 October 1977), pp. 95–124) Uccello's *Uffizi Nativity* and a number of works by his contemporaries in which space is depicted in a way that suggests its continuation beyond the picture plane or that otherwise resist the tendency of single-point perspective to represent a self-contained, rational space, are symptomatic of a crisis in Neoplatonist humanist culture for which single-point perspective is emblematic of man's assumption of God's powers of creation expressed primarily through

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numbers.

<sup>xxxvii</sup> For a detailed review of the work's critical history including the question of its patronage see: R. Pacciani, 'Ipotesi di omologie fra impianto fruitivo e struttura spaziale di alcune opere del primo Rinascimento Fiorentino: Il rilievo della base del "S. Giorgio" di Donatello, la "Trinità" di Masaccio, l'"Annunciazione" del Convento di S. Marco del Beato Angelico', in *La prospettiva rinascimentale: Codificazioni e transgressioni*, M.D. Emiliani (ed.) (Florence, Centro Di, 1980—papers of the conference of the same name, Castello Sforzesco, Civiche Raccolte d'Arte di Milano, 11–15 October 1977), 73–93, pp. 78–87. Pacciani did not accept Lenzi patronage, but neither did he not explain whom the donor figures might represent. Joannides (*Masaccio and Masolino*, pp. 356–357) concluded that a private donor was most likely involved, even if the evidence for the patronage is ambiguous. He described Domenico Lenzi as a possibility, although he thought the impetus for the commission probably came from the Dominicans at Santa Maria Novella. R. Goffen ('Introduction', pp. 12–13) suggested that Domenico Lenzi is the likely patron.

<sup>xxxviii</sup> For example: F.W. Kent, *Household and Lineage in Renaissance Florence: The Family Life of the Capponi, Ginori, and Rucellai* (Princeton, Princeton University Press, 1977); and P. Hurtubise, *Une famille-témoin les Salviati* (Città del Vaticano, Biblioteca Apostolica Vaticana, 1985). Probably the most extensive discussion of the Lenzi family is found in: E. Hertlein, *Masaccios Trinität: Kunst, Geschichte und Politik der Frührenaissance in Florenz* (Florence, Leo S. Olschki Editore, 1979), pp. 108–118.

<sup>xxxix</sup> Joannides, *Masaccio and Masolino*, p. 357. During Lorenzo di Piero Lenzi's office the feast of Corpus Christi was instituted in Florence, one that was important to the Dominicans. The idea that Lorenzo di Piero Lenzi might have been the patron of the *Trinity*, and was shown in the painting wearing his robes as *Gonfaloniere*, suggested by some authors, has been rejected by others since the robes seem too modest to depict those of such a high office. In any event, he died in 1442, long after the *Trinity* was painted, and was buried in the church of Ognissanti, not Santa Maria Novella.

<sup>xl</sup> G. Brucker (*The Civic World of Early Renaissance Florence* (Princeton, Princeton University Press, 1977), p. 256) lists the Lenzi with a number of 'parvenu' families that reached political prominence after the establishment of the oligarchic regime in 1382.

<sup>xli</sup> L. Ginori Lisci, *The Palazzi of Florence: Their History and Art*, 2 vols, trans. J. Grillo (Florence, Giunti Barbèra, 1985—orig. Italian ed., Florence, 1972), 1, pp. 289–292.

<sup>xlii</sup> Archivio di Stato di Firenze, Arte della Lana, 39, *Codice membranaceo contenente un registro per le diverse magistrature dell'arte*, 1 April 1388–31 December 1612, fol. 42r. Hertlein (*Masaccios Trinität*, p. 109) has also noted that a member of the Lenzi family had been involved in the administration of the building of Florence Cathedral in the mid-fourteenth century.

<sup>xliii</sup> That they are indeed directly related is supported by the Lenzi family tree in Hertlein, *Masaccios Trinität*, Fig. 58, which shows these names in three successive generations.

<sup>xliv</sup> D.F. Zervas, *The Parte Guelfa, Brunelleschi and Donatello* (Locust Valley, J.J. Augustin, 1987), pp. 266, 281, and 299.

<sup>xlv</sup> Archivio di Stato di Firenze, Corporazioni Religiose Soppresse dal Governo Francese, 102, 296, Compagnia di San Pier Martyr, *Entrate e Uscite, 1413–1419*, fol. 32r. For a discussion of the confraternity's influence over patronage at Santa Maria Novella, see: H. Hudson, *Paolo Uccello: The Life and Work of an Italian Renaissance Artist*, PhD dissertation, The University of Melbourne, 2006, pp. 78–83. The subject was also addressed in this author's paper 'Paolo Uccello and the Confraternity of Saint Peter Martyr: Themes of Reciprocal Obligation in Life and Art' at the conference *Sociability and its Discontents: Civil Society, Social Capital, and their Alternatives in European and Australian Society*, 19–21 August 2005, The University of Sydney, convened by Dr Nicholas Eckstein, publication planned.

<sup>xlvi</sup> Archivio di Stato di Firenze, Magistrato dei Pupilli, 26, *Libro di deliberazione 1416*, fols 89r and 178r.

<sup>xlvii</sup> Archivio di Stato di Firenze, Catasto, 625, microfilm reel 1527, fol. 224r.

<sup>xlviii</sup> D. Kent, *The Rise of the Medici Faction in Florence 1426–1434* (Oxford, Oxford University Press, 1978), note 9 on p. 188 and p. 320.

<sup>xlix</sup> Ginori Lisci, *Palazzi*, 1, caption to Fig. 235 on p. 29.

<sup>l</sup> On this chapel, see: J. Burke, *Changing Patrons: Social Identity and the Visual Arts in Renaissance Florence* (University Park, Pennsylvania University Press, 2004), pp. 119–133.

<sup>li</sup> For the location of Domenico's property: Archivio di Stato di Firenze, Catasto, 77, microfilm reel 139, fol. 312v. For the location of Lorenzo's property: Ginori Lisci, *Palazzi* 1, pp. 290–291.

<sup>lii</sup> On this work, see: H. Hudson, 'The Politics of War', pp. 1–34 (p. 33 for Anfrione di Lorenzo di Piero Lenzi's term as *operaio*).

<sup>liii</sup> For the church, see: W. Paatz and E. Paatz, *Die Kirchen von Florenz: Ein Kunstgeschichtliches Handbuch*, 6 vols (Frankfurt am Main, Vittorio Klostermann, 1952–1955), 3, pp. 615–654.

<sup>liv</sup> A. Parronchi ('"Una Nunziatina di Paolo Uccello" Ricostruzione della Cappella Carnesecchi', in *Studi su la dolce prospettiva*, [A. Parronchi (ed.)] (Milan, Aldo Martello Editore, 1964—orig. ed. *Studi Urbinati*, 36, 1, 1962), p. 182) gave the date of Paolo Carnesecchi's death as 6 February 1427 without specifying his exact source, although he referred to archival material from Santa Maria Maggiore, mentioning the Carnesecchi chapel, which dated from the seventeenth century.

<sup>lv</sup> Paolo Carnesecchi held the offices of *Buonuomo*, *Gonfaloniere di Compagnia*, *Priore*, and *Gonfaloniere di Giustizia*. D. Herlihy, R.B. Litchfield, A. Molho and R. Barducci (eds), *Florentine Renaissance Resources, Online Tratte of Office Holders, 1282–1532, Machine Readable Data File*, (Florentine Renaissance resources/STG, Brown University, Providence, R.I., 2002), search by 'Carnesecchi', sighted 14 April 2005.

<sup>lvi</sup> Zervas, *Parte Guelfa*, p. 262 (October–November 1404), p. 264 (February–March 1409), p. 266 (April–May 1412), p. 270 (No-

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vember 1413), p. 282 (August–September 1425), and p. 295 (1404–1425).

<sup>lvii</sup> Archivio di Stato di Firenze, Catasto, 79, fol. 85r.

<sup>lviii</sup> Archivio di Stato di Firenze, Corporazioni Religiose Soppresse dal Governo Francese, 102—Appendice, 67, fol. 43r. The date 4 February 1427 equates with 4 February 1428 in the modern calendar, since the Florentine calendar of the fifteenth century began on 25 March, the Feast of the Annunciation.

<sup>lix</sup> Parronchi, ‘Una Nunziatina’, pp. 182–192. The *Annunciation*, described by Vasari as a fresco, may actually have been painted on panel and saved during the demolition of the chapel, or perhaps this is an early instance of the relocation of a mural painting. It is also possible that writers after the demolition of the chapel mistook an *Annunciation* in the church by another artist for Uccello’s version, or indeed, that another version by Uccello was in the church. Parronchi identified the *Annunciation* with the painting from the Goldmann Collection in the National Gallery of Art, Washington, usually attributed to Masolino. While Uccello’s *Original Sin* scene in the Chiostro Verde shows that his style was sometimes very close to Masolino’s, there is no feature of the Goldmann *Annunciation* that is distinctly Uccellesque and Parronchi’s suggestion has not been widely accepted.

<sup>lx</sup> Vasari, *Le vite*, testo, 3, pp. 63–64: appearing only in the 1568 ed.

<sup>lxi</sup> Joannides, *Masaccio and Masolino*, p. 351; R. Bellucci and C. Frosinini, ‘The Carnesecchi Altarpiece’, in *The Panel Paintings of Masolino and Masaccio: The Role of Technique*, C.B. Strehlke and C. Frosinini (eds) (Milan, 5 Continents, 2002), pp. 81–86; R. Bellucci, C. Frosinini, and M. Pani, ‘Technical Catalogue’, in *The Panel Paintings of Masolino and Masaccio: The Role of Technique*, C.B. Strehlke and C. Frosinini (eds) (Milan, 5 Continents, 2002), p. 154.

<sup>lxii</sup> Joannides, *Masaccio and Masolino*, p. 350. Perhaps the year of the document referred to by Joannides might actually mean 1428 since the references to Paolo di Berto Carnesecchi from Santa Maria Maggiore’s archives have been said to date to the seventeenth century (at which time dates in the old calendar were not automatically corrected). Parronchi (‘Una Nunziatina’, p. 182) gave the date of Paolo Carnesecchi’s death as 6 February 1427, not 4 February 1428, without specifying his precise source, but apparently on the basis of an uncorrected (as well, perhaps, as an inaccurately recorded) date.

<sup>lxiii</sup> A. Padoa Rizzo, *Paolo Uccello: Catalogo completo dei dipinti* (Florence, Cantini, 1991), p. 8.

<sup>lxiv</sup> R.F.E. Weissman, *Ritual Brotherhood in Renaissance Florence* (New York, Academic Press, 1982), p. 9.

<sup>lxv</sup> The reference to Deo Beccuti’s wife is in: Archivio di Stato di Firenze, Deputazione Sopra la Nobilità e Cittadinanza, 15, section 21, part 1, unfoliated. The *Tratte* (Herlihy, Burr Litchfield, Molho, and Barducci (eds), 2002, on-line source, search by ‘Carnesecchi’) record three members of the Carnesecchi family with the name Zanobi: Zanobi di Berto, Zanobi di Simone, and Zanobi di Francesco. Further evidence of contact between Deo Beccuti and the Carnesecchi family is the debt of four florins recorded owing by Deo Beccuti to ‘bertto carnesechi’ in Deo’s 1433 tax return, at: Archivio di Stato di Firenze, Catasto, 498, microfilm reel 1234, fol. 188r.

<sup>lxvi</sup> G. Carocci, *I dintorni di Firenze* 2 vols (Florence, Galletti e Cocci Tipografi Editori, 1906), 1, p. 278. The Carnesecchi owned the Casa Ridolfi (formerly ‘Fossi’) at l’Olmo a Castello. G. Lensi Orlandi, *Le ville di Firenze: Di qua d’Arno*, 3rd ed. (Florence, Vallecchi Editore, 1978—orig. ed. Florence, 1954), pp. 22 and 26. The Villas Il Pozzino and Corsi, in and near Castello respectively, were also owned by the Carnesecchi in the early fifteenth century.

<sup>lxvii</sup> D. Gordon, *National Gallery Catalogues: The Fifteenth Century Italian Paintings*, 1, London, 2003, p. 64, citing unpublished research by Brenda Preyer. The tabernacle was dated by Gordon to c. 1440–1444.

<sup>lxviii</sup> On Uccello’s mural paintings at Prato, see: A Padoa Rizzo, *La Cappella dell’Assunta nel duomo di Prato* (Prato, Claudio Martini Editore, 1997).

<sup>lxix</sup> Zervas, *Parte Guelfa*, p. 312. Bernardo Carnesecchi was Secretary of the Guelf party in 1443.

<sup>lxx</sup> Archivio di Stato di Firenze, Catasto, 55, fols 707r–707v, dated 12 July 1427.

<sup>lxxi</sup> Joannides, *Masaccio and Masolino*, pp. 32–33.

<sup>lxxii</sup> For arguments concerning the dating of these works, see: Hudson, 2006, *Paolo Uccello*, pp. 94–106 and 191–197.

<sup>lxxiii</sup> E. Borsook, *The Mural Painters of Tuscany: From Cimabue to Andrea del Sarto*, 2nd ed. revised and enlarged (Oxford, The Clarendon Press, 1980—orig. ed. London, 1960), p. 77.

<sup>lxxiv</sup> Archivio dell’Opera del Duomo di Firenze, Delib. 1425–1436, fol. 156v, in G. Poggi, *Il Duomo di Firenze: Documenti sulla decorazione della chiesa e del campanile tratti dall’archivio dell’Opera*, 2 vols, M. Haines (ed.), Florence, 1988 (orig. ed. Berlin, 1909), 1, p. 147, doc. 773. On 23 March 1432 the *Opera* of the Cathedral in Florence wrote to Piero Beccanugi, the Florentine Orator in Venice, seeking information concerning Uccello’s work in that city. The letter described Uccello as a master mosaicist and mentioned a figure of Saint Peter he made in 1425 on the façade of San Marco in Venice, which has not survived.

<sup>lxxv</sup> M. Salmi, ‘Per Paolo Uccello’, in *Studies in Late Medieval and Renaissance Painting in Honor of Millard Meiss*, 2 vols, I. Lavin and J. Plummer (eds) (New York, New York University Press, 1977), 1, p. 373; Hudson, *Paolo Uccello*, pp. 84–85, and 236–238.

<sup>lxxvi</sup> Zervas, *Parte Guelfa*, especially pp. 119, and 152–153.

<sup>lxxvii</sup> F. Toker, ‘A Baptistery Below the Baptistery of Florence’, *The Art Bulletin*, 58, 1976, pp. 157–167.

<sup>lxxviii</sup> A number of authors have suggested that Brunelleschi’s work on perspective developed from his architectural interests, including: G.C. Argan, ‘The Architecture of Brunelleschi and the Origins of Perspective Theory in the Fifteenth Century’, *Journal of the Warburg and Courtauld Institutes*, 9, 1946, 96–121, especially p. 104; and Krautheimer and Krautheimer Hess, *Lorenzo Ghiberti*, pp. 234–240. Trachtenberg (*Dominion of the Eye*, pp. 52–54) argued that Brunelleschi’s choice of monuments to depict

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and the viewpoints from which he depicted them was influenced by thirteenth-century approaches to urban planning and the way it determined ideal viewpoints for the city's most important monuments. Smith (*Here I Stand*, pp. 1–19) called into question the idea that the panels were demonstrations of perspective, stating that they: '...involved neither a constructed grid-iron pavement nor a focal vanishing point...' (p. 5). Although, he did not explain why the view of the Piazza della Signoria could not have shown these features, as is commonly assumed. Smith argued instead that the panels pre-date Brunelleschi's interest in architecture, and that the subjects were chosen as emblems of Brunelleschi's regard for the importance of church and state in public life.

<sup>lxxix</sup> Hertlein (*Masaccio's Trinität*, pp. 193–222 and Figs 17–18) argued that the *Trinity* can be interpreted as symbolic of Guelf allegiances, since the Guelf party was allied to the papacy, for whom the Trinity was a fundamentally important theological concept. The most potent symbol of the papacy—the triple crown tiara—illustrates the central importance of the Trinity in papal iconography. Furthermore, Hertlein noted that Santa Maria Novella was a centre for the Guelfs in Florence, and the Lenzi family coat of arms bears three *fleurs-de-lys*, a symbol in Florence of Guelf allegiance to the French royal house of Anjou.

<sup>lxxx</sup> No record of the cost of the *Trinity* has survived, although other evidence indicates that a mural painting of its size could be relatively cheap to commission. Rab Hatfield (*The Wealth of Michelangelo* (Rome, Edizioni di Storia e Letteratura, 2003—orig. ed. Rome, 2002) has provided a useful summary of the prices of artworks in fifteenth century Tuscany, which indicates that even well known artists could provide large-scale paintings inexpensively, while works in bronze might be more expensive. Uccello's *Equestrian Monument for Sir John Hawkwood* in Florence Cathedral cost only 64 *lire* (Poggi, *Il Duomo di Firenze*, 2, p. 125, doc. 2060).

<sup>lxxxii</sup> Masolino's *Saint Julian* panel from the Carnesecchi altarpiece measures 114 x 54 cm. By multiplying its width by three (to include the missing two panels), and adding Masaccio's predella and Uccello's *Annunciation and Four Evangelists* to its height, as well as allowing for the dimensions of the lost original frame, the altarpiece must have been of substantial size, though by no means approaching that of the *Trinity*.