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Siena, The Rise of Painting 1300-1350: The Beginnings of Naturalistic Lighting Techniques in Art as an Accompaniment to Shifting Perspective

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Abstract

The early 14th century saw major changes in the way paintings were executed; this included light for the first time being incorporated in a more naturalistic manner with it coming from a recognizable natural source, a principle that remains a central force in composition today and is now called 'motivated light'. The artists concerned, who plied their trade in central Italy, were led by Duccio and Giotto, the founders of the Sienese and Florentine Schools respectively. The author, a (retired) theatre lighting designer who has been inspired to explore the origins of creative lighting in art by a recent exhibition of early 14th century Sienese art in London, has formally analyzed three paintings produced by these artists and deconstructs their lighting by applying principles drawn from stage lighting procedures. This process is set within the context of the overall compositional changes in art that were happening at this time. Results show that this new use of light helped create pictorial images that were more recognizable as real-life situations while at the same time adding further value through incorporating symbolic or dramatic effects. While the changes the artists introduced didn't revolutionize art overnight, it took only 100 years for light to be used in a fully naturalistic manner, where within a strict adherence to the behaviour of natural light there was still scope for it to be manipulated for pragmatic, symbolic or theatrical impact. This new approach made a significant contribution to the creative and cultural journey towards the Renaissance.

Keywords

Lighting; Perspective; Medieval Art; Renaissance; Siena; Florence; Duccio; Simone Martini; Theatre.

1. Introduction

An exhibition titled *Siena, The Rise of Painting 1300-1350* ran at the Metropolitan Museum of Art, New York in autumn/winter 2024-5 and at The National Gallery, London in spring 2025. It drew universal praise for bringing together for the first time in many years a range of art works and artifacts that showed fundamental changes in the way art was being conceived and executed, with paintings beginning to display a language of narration that is still instantly recognisable today.

Michael Prodger in the *The New Statesman* recorded that "These were painters with a new conception of what art could do—and be. From narrative deftness and architectural detail to human emotion and spiritual gesture, the works were revelatory in the early 14th century."[i] The National Gallery billed the exhibition as a chance to "Step into Siena. It is the beginning of the 14th century in central Italy. A golden moment for art, a catalyst of change. Artists … are forging a new way of painting. They paint with a drama that no one has seen before. Faces show emotion. Bodies move in space. Stories flow across panels in colourful scenes."[ii] *The Guardian* newspaper's reviews of the London exhibition said it showed "… how Siena's art revolution brought heaven down to earth,"[iii] and that it was "A heart-stopping show about the moment western art came alive."[iv]

The exhibition reminded the art world that the birthplace of the Renaissance wasn't only in Florence, Siena's more illustrious northern neighbour, but that the Sienese artists of the time had an equally important part to play. Siena (roughly equidistant between Rome and Florence) and Florence were the two most important cities in a well-populated region and walkable in two days, being well connected by the main Roman road north from Rome which proceeded onwards to the northern Italian cities and Europe beyond. Although their relationship was coloured by historic feuding that had led to hostilities, around this period each had developed a more stable and forward-thinking government and thus much cross-fertilization of ideas and approaches happened within the region: the best known Sienese artist of the time, Duccio di Buoninsegna (c. 1255-1319) also worked in Florence and it is believed that he also may have travelled locally to Rome, Perugia, Assisi and Pisa, to Padua (near Venice), abroad to France and also to the eastern Mediterranean; while Florence's premier painter Giotto di Bordone (1267-1337) also worked in Rome, Assisi and Padua. The nearby town of Assisi is an example of an artistic melting-pot of the time: it hosted many painters from the region and thus is likely to have been an important creative hub.[v] While there is no evidence to show whether Duccio and Giotto ever met, their innovation and influence is such that they are considered the founding fine artists of the Renaissance period.

The exhibition focused on the work of four key artists: Duccio, Simone Martini (c. 1280-1344) and the brothers Pietro (c. 1280-1348) and Ambrogio Lorenzetti (c. 1290-1348), all active during Siena's 'golden era' 1290-1350, a period which abruptly and tragically ended when plague devastated the region. During this time Siena had developed as an important centre of artistic output in parallel with and that rivalled similar developments in Florence, where artists such as Giotto, Taddeo Gaddi (c. 1300-1366) and Maso Di Banco (active 1320-1350) made similar discoveries and applied similar techniques. Pietro Cavallini (c. 1250-1330), working first in Rome and then later in Naples, was another important figure as the pioneer of some of these new approaches and a teacher of Giotto.

Despite the magnificence and sophistication of the Siena exhibition and its accompanying textbook, it did not recognize the important developments in the use of light in art highlighted in this article, and thus a high-profile opportunity to give the deserved attention and attract due debate was missed. Because of the interest generated internationally by this exhibition and the fresh attention this has brought to the output of the Sienese artists, this article points a spotlight on some of their achievements in highlighting their new approaches to lighting. As stated, similar developments in painting light were also taking place at other centres in the region; together, these neighbouring artists would advance the language of light in fine art to one that underpins compositional techniques today.

2. New Approaches in Art in the late 13th and early 14th Centuries

The late 13th and early 14th centuries saw a shift in the style of art produced, with painters beginning to move away from a tradition of solely painting formal iconographic images of God, Christ, Mary, Saints and Angels in heavenly or abstract settings to also paint scenes from the New Testament, especially those featuring the life of Mary and Jesus. These scenes portrayed them in well-known Bible stories, in everyday settings and often surrounded by citizens; these scenes tended to be set in urban locations, mostly outdoors although some were interiors, and some scenes were set in rural or landscape settings as appropriate to the storyline. So, for the first time the paintings conveyed the staging of human life with people interacting in social groups in their everyday environments, albeit in a religious context. While there were no fully secular paintings at the time, capturing life through the context of a Bible story would be a

transition through the development of new artistic skills to create locations made realistic by geometric perspective and naturalistic lighting. With around 95% of the population illiterate, art had a critical role to play in teaching ordinary people the place of God in society and the stories from the Bible. Many artists often used a similar, almost standardized template when constructing these images, ensuring a degree of conformity would aid the viewer to instantly recognize the event and perhaps in addition the more subtle meanings conveyed through symbolism. The context of this iconographic understanding of art has been well documented by art historians such as German-Jewish Erwin Panofsky (1892-1968), whose writings provide a methodology to analyse the imagery within art and its associated contextual background. Lighting would play a perhaps less obvious role in this too, but importantly it supported the visualisation of composition that would help breed familiarity through consistent approaches that provided good visibility, purpose and order.[vi]

The early years of the 14th century had seen a significant shift in the way man understood the world, beginning to move away from a life culturally dominated by religion and its associated artifacts, imagery and stories, to one where their role in secular society had a growing importance, as reflected by an increased interest in the arts, humanities, sciences and governance. This fresh perspective on the world was recorded in the artwork of the day which provides valuable historical documentary evidence of this new cultural era. The way artists began to explore the role of light in art was to make an important contribution to this new direction, described by contemporary American art historian Joanne Carrubba thus: "As the explanations for the phenomena of the world became more rational and less religious, so too did the symbolic use of light shift to highlight that rationality as opposed to religious devotion. Along with that shift came the move towards new political systems, ideas of civil rights, and rationality within political systems, which meant that symbolic uses of light in art could also be co-opted for political means."[vii] Thus, a more enquiring, demanding and enlightening form of art was to emerge that would set society on a new course.

The lighting of paintings was to make an important contribution to this goal, as artists of the early 1300s were beginning to incorporate a more natural lighting effect into their paintings. This created a realistic feeling within the scenes, aided the narrative storytelling, enhanced three-dimensionality (which would have made visibility easier), and thus initiated processes that would go on to be forever embedded as fundamental techniques in fine art. Their work demonstrated that for the first time they had observed the actions of natural lighting and attempted to replicate these in paintings, as they moved from painting stylized godly images to painting stories from the Bible that resonated with man's life on earth.

2.1 The Beginnings of Perspective

As artists began to experiment with painted life-like scenes, so followed the need to adopt geometric perspective. Once compositions had recognizable urban or rural settings, so too did the way that we see these in real life—with objects diminishing in size towards a vanishing point—which needed to be captured in art for the settings to have a realistic feel. Initially the technique to achieve this accurately was not fully understood by artists; hence we see a range of successes in works of this time in achieving convincing perspective.

The authoritative work of Panofsky provides a deep dive into understanding the adoption of geometric perspective in early 14th century Italian art and how it would go on to be the sophisticated bedrock technique of Netherlandish art 100 years later, in its quest for 'a complete illusion of reality'.[viii] He grappled with how art could manage a contradiction, as he saw it, between the role of symbolism and slavish adherence to naturalism. Despite his breadth of enquiry into the development of perspective, its philosophical connotations and its influence and implications, even he struggled to articulate an understanding of the complementary role that the emergence of natural light played in the development of the artform at that time. While his writing showed an acute awareness of the role of light (especially in his writing about early Netherlandish paintings), he failed to make a link between the emergence of 'motivated' light (the dominant light in a composition whose source could be identified and located and that had aesthetic influence over the composition) and early experiments with geometric alignment that led to the revolution of three-dimensional perspective .

It fell to American art historian Millard Meiss (1904-1975) to recognize the development of lighting and perspective in tandem through the 14th century and into the 15th: "… basic innovations in pictorial composition were made early in the fourteenth century in both Siena and Florence. Duccio, Giotto, Simone Martini, and the Lorenzetti succeeded in creating the illusion of space and solidity and of a world seen through a frame from a… fixed position. If we compare their work with the paintings of the leading masters of the first half of the fifteenth century, the advances in the rendering of light impress us scarcely less than the consequences of the application of systematic focus perspective…

The objects of painting thus acquire a new dimension, and they approximate more closely the objects of the world, the portrayal of which was a major concern of the painters of the time. Light contributes, too, a new subtlety to the personalities that appear in painting… it extends and deepens consciousness. Mobile and intangible, light has always seemed the natural counterpart of the mind. In nature as in art, it stirs feelings and sustains moods."[ix] Simply put, Meiss essentially confirms that Renaissance advances in the rendering of light are on par with renewed perspective in terms of cultural-symbolic significance.

2.2 Vision and the Challenge of Shadows

It is important to understand how 14th century artists would have understood the process of vision, as at the time there was a different understanding of the behaviour of light than we have today. Ancient Greeks, mathematicians Euclid (c. 300 BC) and Ptolemy (c. 200 AD), theorized that vision was enabled by light being emitted by the eyes (today called 'Extramissive'), while philosopher Aristotle (living at the same time as Euclid) speculated the opposite, that vision occurred by rays entering the eye (called 'Intramissive'). An Iranian Hasan Alhazen (965- c. 1040) advanced this theory in *De Aspectibus,* to say that light strikes an object which is then directed to our eyes. However, the highly dense and technical nature of Alhazen's work inspired efforts to make it more readable to a wider audience.[x] English scientist Roger Bacon (c. 1220-c. 1290), in his book *Perspective* (c. 1260) based on Alhazen's theories and Aristotelian philosophy, encouraged formal study of optical science, while Bacon's Franciscan colleague John Peckham (c. 1230-1292) rendered a more concise academic text on optical science, *Perspectiva communis*, which became one of the most widely used in universities of the time.[xi] The popular nature of Bacon and Peckham's texts ensured greater dissemination of intramissive vision theories.

However learned or sketchy their physiological knowledge, there is no reason to think that a professional artist at that time would not have instinctively understood the practicalities of these optical theories, being aware of the practical interaction between the eye, light source and a subject. For example, by virtue of their vocation, a Renaissance artist would have known that the eye takes time to adjust to a new intensity level when entering a dark room from a bright outdoors or vice versa, or that the light on a person walking from sunlight to shade would decrease in intensity and shadows would disappear, or that light takes on a different colour tone at different times of day. In the same way that an artist could manipulate paint colour, line and composition for effect, so too could this be achieved with painted light. A sophisticated ability to understand and interpret what we see, rather than a knowledge of how we see, is evidenced by artists of the time beginning concurrently to grapple with painting geometric perspective.

An interesting example of the challenge artists faced in adopting motivated light into their work was their relationship with shadows. Visible shadows come in to play in a painting once light comes from the side (as a front light casts shadows behind a subject and are thus hidden). All artists adopted a similar convention—that while shadow could be shown on faces and limbs, in folds of garments and on architectural features, a human (or Godly) body would not cast a shadow. Foreground especially would be kept clear of such visual 'clutter'. There is no recorded reason for this. One can speculate that shadows falling where figures are closely grouped together might have obscured a clear vision of peoples' faces; or that it was technically difficult to paint shadowing convincingly; or there was a symbolic challenge, in that a shadow was believed to hold some form of impurity or where evil might be found and thus was inappropriate to capture in religious art. In choosing to omit the shadows cast by figures, some works of art, especially those where feet are shown, can have an unreal feeling with bodies seemingly not anchored to the ground, instead appearing to be floating. Interestingly, omitting shadow is a technique employed today on stage when lighting dancers to help give them a sense of floating or jumping in space. Yet the convention of 'no body shadows' was universally accepted and would remain so in many subsequent religious artworks.

Thus, the new style of painting Bible stories showing people in their natural environment, realistically portrayed through perspective drawing and lit by natural light sources began to hold sway, heralding an era of fresh and exciting cultural enlightenment through man's engagement of religion through art. While there were slight differences in the style of paintings that would emerge from the Sienese and the Florentine Schools (as detailed comprehensively by Norman[xii] and Panofsky[xiii]), artists in both schools began to create the same type of narrative paintings informed by perspective and natural lighting, where the focus was on religious storytelling and man's place firmly within it.

3. A Methodology for Analyzing the Use of Light in Art

In order to analyse the use of a more natural light in art, I have looked to some of the principles of lighting composition that would be familiar to the stage lighting designer today to create a methodology. In lighting a proscenium stage picture with actors and scenery, many questions are raised that are similar and pertinent to the fine artist. Other than

the stage being a three-dimensional environment where action is continuously flowing as opposed to the two-dimensional form of a painting that is capturing a moment, the issues of applying light are very similar between the two disciplines with clear and obvious parallels.

To imagine a painting as an unlit stage setting, appropriate lighting could theoretically be conceived to realise the artist's lighting intent. A stage lighting designer builds a design luminaire-by-luminaire through the consideration of seven fundamental criteria set out below. Because of the architecture of the stage space, often many lighting instruments will be used in harmony to recreate a sunlight or moonlight effect, whereas for the painter there is only a single source as in nature: so the stage lighting rig might at first sight look highly complex but once analysed for function will bear close resemblance to the theoretical 'lighting rig' in the mind of the artist.

When creating a lighting composition, the lighting designer considers the following seven criteria:

1. **Direction of the source or "key" light.** For a daytime setting, the dominant light (the creation of sunlight) would need to show a consistent single source and come into the scene from a single direction. The effect of such a light striking the subject from different directions (in relation to the viewer) is very significant: in simple terms light from the front (the same side as the viewer) flattens form; light from the side exaggerates the three-dimensional nature of form; light from behind outlines form and helps to project a subject forward from their background (however, as it fails to light faces that look to the viewer it chiefly has an atmospheric role to play). The angle of a light's elevation is important too: light in mid-summer central Italy at noon has a vertical angle of around 75^0; a lower angle therefore might indicate a different time of day or season of the year.

   Today we call this source light the 'key light' (which is used to define its technical values) or 'motivated light' (its aesthetic role and technical values combined). To identify the position of the key light is the starting point when considering an analysis of a lighting composition within a naturalistic or realistic context.

2. **A key light will have an intensity, or brightness.** From the outset it became usual practice for the artist to adopt a level of brightness in a composition that is normally around 'mid-range'—reserving brighter tones for highlights and darker tones for shade. In the period of art that this article examines, this attribute is exploited but not greatly so, when considering the dramatic effect of extreme intensity differences that artists such as Caravaggio (1571-1610) deployed as his signature style.

3. **A key light will have a colour.** In the case of sunlight in central Italy this will be white with a slightly warm yellow tone at mid-day in the summer, with a cooler tone at dawn and warmer tone at dusk. The colour of light in other seasons will vary too; other geographical areas also have different colour tones—northern European light characteristically is much cooler in comparison to Mediterranean.

4. **A key light will create sharp shadows**. Such shadows will be seen on faces, limbs, the folds of garments, artifacts and architectural features, unless the light is diffused (such as by passing through cloud or a fine translucent curtain at a window) which results in the softening of the key light's shadows. As stated, this will have greater impact on a composition if the key light comes from the side as a shadow might spill onto another subject; also note that the steeper the angle of light, the shorter will be the shadow.

5. **A key light will create a reflected light.** Where light passes the subject then hits the floor, walls, other people etc. it may be reflected back onto the subject. This usually has a softening effect on a subject as it is usually will be a reflection from multiple surfaces. If a subject is close to, for example, a coloured wall, the reflected light will take on the colour characteristic of that wall.

6. **A key light may light the scene unevenly.** The key light might spread evenly over the whole composition but often it is broken into areas so that some areas (usually containing the subjects) are lit and areas of lesser importance remain dim. For example, this may be due to it passing through trees, between buildings, or through doors and windows before reaching the subject; or the beam may be artificially divided by the artist for symbolic or dramatic effect to aid storytelling by drawing attention to the subject matter through the use areas of light and shade. This technique is fundamentally important in using light to show depth in a picture, and is effectively deployed by both the stage lighting designer and the artist to guide to the viewer to the most important aspects of a composition, create depth and three-dimensionality, create compositional balance, and when coupled with a selective intensity boost can create a highlight for an additional symbolic or theatrical value.

7. **A background light complements key light**. The lighting of the background, such as the creation of a sky effect, needs to be considered. This will be independent of the quality of the key light but normally will be in

sympathy—so a bright clear sky will be mirrored by bright clear sunlight and a night time sky will help determine the angle and colouration of a moonlight effect.

It is important to note that these individual attributes do not operate in isolation but always in combination—every light source has to have a position, intensity, colour etc.; and it is the artist's observation and imagination in these attributes' deployment that brings creativity to bear on a composition resulting in the believability of the situation, enhancement of the narrative, and heightened engagement of the viewer.

These seven attributes individually and collectively serve as a tool for the technical analysis of a composition. They can also be deployed to create symbolic effect. As these are context specific, I will detail them in each case study.

4. The use of Light in Art pre-1300—Reflects Extramissive Understanding?

Of the four Sienese artists' work featured in the exhibition, Duccio and Martini demonstrated the greatest understanding of how natural light could be integrated into composition, albeit initially in a limited, rather experimental way. To understand how these shifts in lighting mirror an evolving understanding of narrative composition and perspective, lighting styles and techniques will be analyzed in six paintings: comparing three (figs. 1-3) from pre-1300 with three (figs. 4-6) from post 1300. Although there are relatively few Sienese paintings surviving from the 13th century in comparison to the explosion of creative artistry that followed, there is sufficient evidence from the region to show that light was utilized in differing (although standardized) ways, summarized in three examples:

4.1 Minimal Light Presence

Firstly, there would be little sense of the presence of light (in terms of it showing direction or creating contrasts) as it would be used to evenly and flatly illuminate the composition, providing little clue as to its source and offering no or minimal areas of shade or shadow that would help create a three-dimensional form. Typical of the style is *Virgin and Child Enthroned* by Margaritone from Arezzo and painted in 1263-4 (fig. 1). Here, light plays a very limited part in sculpting the composition:

Fig. 1: Margaritone D'Arezzi, *Virgin and Child Enthroned* (1263-4), Tempera on wood, 127 x 57 cm. National Gallery, London Margarito d'Arezzo | The Virgin and Child Enthroned, with Narrative Scenes | NG564 | National Gallery, London

4.2 Light was Clearly Directional

Secondly, light was more clearly applied in a directional manner. Its source was from the above-centre-front of the composition and at a steep vertical angle, lighting a face evenly on both sides in a rather flat, neutral, un-dynamic manner (so not revealing the form of the face), although showing shade under eyebrows and chin. Any accompanying setting was lit either in the same way, or as in D'Arezzi's *Virgin and Child Enthroned* (fig. 1). *The Madonna in Majesty* (*Maestà*) painted by Cimabue in Florence in 1285-86 shows this quality of light, with faces evenly lit with just a small amount of shadowing under the chin to provide modelling (fig. 2). Each detail of the painting is given the same quality of light, so dimension is achieved through lightness or darkness in the core colours. Overall, lighting helps make the painting slightly less two-dimensional than the previous example. Symbolically, the above-centre-front placement of the light source also emphasizes the divine quality of the light, appearing to emerge from the Virgin's halo—analogous

to a divine eye. The lighting arrangement here is very typical of the pre-1300 era and is a good example of the use of this lighting format.

Fig. 2: Cimabue, *The Madonna in Majesty* (1285-6) Tempera on wood, gold background, 384 x 223 cm. Galleria degli Uffizi, Florence (Source: Virgin and Child Enthroned, and Prophets (Santa Trinita Maestà)

4.3 Lighting References Multiple Sources

Thirdly, light is angled rather crudely to highlight facial features and clothing but not in a realistic sense when the composition is seen as a whole, due to an illogical construct: this mode of lighting doesn't have any reference to a single source of natural lighting but to multiple sources as can be established by comparing the source of light on faces across the picture. Here, light mostly comes from outside the picture inwards from both sides, lighting figures' faces to the light's near side, with their faces (mostly) shaded when turned into the centre of the picture. Perhaps a justification for this approach was that having the inside of the face darkened was a symbolic device to show reverence; also, contrast between the onlookers and the principal characters was thus heightened and a greater focus was created on the subjects through highlight (by being set against areas of lower intensity). *The Nativity*, painted by local artist Guido da Siena in the 1270s, is an example: light comes from the left and right to illuminate the figures on the same side of the painting; whereas Mary and Jesus, as subjects, are lit from both sides and thus stand out (fig. 3).

There are further symbolic features too that show the connection of Mary and Jesus to God: divine rays come down from the heavens to the infant Jesus (this device was common, man believing that God communicated through celestial rays, and occurs regularly in art of this period). The angel to the right appears to be talking to baby Jesus and a Saint (bottom left) with Mary—in other works, these might have been shown through connecting rays of light, but here take on a more human-like mode—and thus the symbolism in the interactions which once would have been apparent through rays is now in a more sophisticated, implied and human-like form. There are inconsistencies in the lighting, such as on the top-right angel, where light is 'cheated' to aid visibility by having two clearly different sources, both unnatural and contrived. The painting also uses a layer of light and shade to emphasize depth: here, along with the shepherds, Mary and Jesus are set against a dark cave-like background, although the angels are set in a similar intensity to the golden sky, thus rendering the backdrop very two-dimensional:

Fig. 3: Guido da Siena, *The Nativity* (c. 1275) Tempera on wood, 36x 48 cm.
Musée du Louvre, Paris (Source: Nativity by GUIDO DA SIENA)

4.4 Summary

These three paintings show that while embryonic principles for the use of light in a composition had emerged, these were at best rather crude and the rules of natural light could be broken if it was expedient to do so, for example to provide light to a face or a feature that would have otherwise been obscured because of its angle or position. At the time, providing illumination to a face (and hands) to attract the viewer's attention was more important than obeying the behaviour of natural light. Since pictorial language was universal, so was the importance of clear, understandable messaging which was a vital function of religious art. Other than the special effect of Godly rays, light in these compositions complements their somber, formal symmetry by providing a neutral visual aesthetic which symbolically enhances a sense of reverence. It could be argued that the artists of this time interpreted light (in the lighting of faces) as if following the understandings of extramissive vision as set out by Euclid and Ptolemy.

It is interesting to note that in these examples, while faces are all lit in a simple manner, limbs, garments and any settings are lit in way that shows much more dimensionality (through creating highlights on creases, shade in the folds etc.). These elements could be painted more expressively as they are lower in the hierarchy of importance. Backgrounds universally were in gold, which would catch light and help bring a painting to the attention of the viewer.

These paintings also show the beginnings of scenes in perspective through sizing differentials between the subjects, rather than through formulaic, geometric diminishment.

These early principles were to be developed at a pace following the rise in popularity of painting from c. 1300 with a growing confidence that light used in a creative manner could be read as having symbolic benefit, such as by highlighting the subject. These developments were based on the observation and implementation of the behaviour of natural light which provided a consistent and universal model that could be rationalized and recreated across the *piste* and served as a model for creative adaptation that could show natural visibility alongside enhanced compositional meaning.

5. Intermissive Understandings of Light in 1300s Art: Three Case Studies

To illustrate the developments in the technique of using light in a more natural way through the output of the Sienese artists, I have chosen three works painted in a seven-year period at the start of the 14th century: two are by Duccio (which were both displayed in the Siena exhibition) and one is by Martini. These illustrate how the artists' use of light was gaining in observational sophistication shown in techniques that would become fundamental to overall compositional advancement.

5.1 Duccio *Healing of the Blind Man* (1308-11):

While faces in Duccio's *Healing of the Blind Man* are lit in a rather uninteresting, flat, mid-toned light from above-centre-front, garments have a sense of light coming from the front-left with an intensity similar to the highlights on the buildings (fig. 4). The figures typically cast no shadows giving them an unreal, ungrounded feeling. The man alone to the right appears lit in a darker tone. Is he shunning the power of Christ, as his gesture suggests? The casting of the

light towards the man facing Jesus seems to reinforce the idea of the divine as a source of symbolic light, and light in this instance as a metaphor for sight. Euclidian ideas of light as originating from the eye are suggested in the composition, perhaps, as the man shunning Christ also looks upwards, away from the group—the individual perspective against the common one. Such a dilemma subtly mirrors the radical shift of Renaissance perspective, since Peckham's theories in *Perspectiva communis*—the intermissive idea of the eyes receiving light, rather than creating it—became increasingly recognized as a new foundational truth. The old idea, exemplified by the man turning away from the light, alludes to old ways of seeing. The focal light—Christ's sunlike halo, at the centre of the painting and symbolizing a new way—is available to enter all.[xiv]

Interest lies in the buildings behind, which are lit in a much brighter light than the rather muted, even-colour tone of the people, who are lit as if in shadow from a building. Around this time, we see locations being incorporated into compositions that have a greater sense of realism, providing a setting or context for a scene from a story which is now rooted in daily life. Here, intense, clear (intramissive) light from the left models the complex array of architectural shapes with highlight, shade and shadow. This contrast between light and shade on the buildings also heightens depth and aids perspective, which makes them stand out against the golden background and lends a degree of realism to the composition. Essentially, the stylistic perspective of three-dimensional art has begun to emerge through the deliberate application of light and shade to architecture.

Fig. 4: Duccio, *Healing of the Blind Man* (1307) Tempera on wood, 45 x 47 cm.
National Gallery, London. (Source: https://www.nationalgallery.org.uk/paintings/duccio-the-healing-of-the-man-born-blind)

The lighting of these buildings shows observational attention to how sunlight interacts with architectural forms. While the buildings are painted in a rather cartoonish form, this simplicity provides a clear platform to illustrate their basic shaping through light and shade. The floor is progressively graded by light, from a bright foreground receding to dark; this helps place distance between the people and the setting. This is one of the first examples of a considered lighting of structure and space that brings form and depth to a composition, aiding a sense of perspective that is only partially supported by accurate geometric perspective alignment, and the first use of a grading of light intensity to indicate space.

5.2. Duccio, *The Annunciation* (1308-11):

Duccio's *The Annunciation*, painted after *Healing of the Blind Man,* shows a development in the use of light from the previous painting, where directional light only sculpted the buildings (fig. 5). Here, we see the subjects and their foreground area also lit in directional light. Lighting from the left half-illuminates the Angel Gabriel's face, robes, the urn of flowers, Mary's prayer book, as well as all the left-facing architectural features. The side of the angel's face that looks at Mary is lit in a lower intensity with a slight colouration, suggesting light reflected back from the building and coloured by its hue. Mary is lit in subdued lighting befitting being in an interior, although it is possible that the picture shows the moment just before the Annunciation takes place as suggested by the dimmer tones on Mary's face: the angel is poised but Mary is yet to receive 'the light';[xv] she also receives Godly rays from an orb above, symbolically showing Gabriel that she is the chosen one. Shadowing is limited to the shape of the buildings and the dark recess behind Mary

and the slight toning of the wall above her. Even the golden background catches ripples of light, highlighting an uneven texture that contrasts with the plain flat walls, and intensity is graded to be brighter nearer the source light. There are inconsistencies in the lighting that show the rules of natural lighting are not fully observed: for example, the angel's left foot is lit by a light from the right, far too brightly for it to be reflected light.

Fig. 5: Duccio, *The Annunciation* (1308-11) Tempera on wood, 45 x 46 cm.
National Gallery, London. (Source: https://www.nationalgallery.org.uk/paintings/duccio-the-annunciation)

Duccio's *The Annunciation* is one of the first examples in Western art of consistent motivated light, used to craft figures and environments throughout the composition. Furthermore, this consistent, directional light is shown to be reflected by a hard surface as a secondary source of light. This realism is enhanced by symbolic use of light on Mary, showing the artist's fine understanding and control of compositional lighting to assist storytelling.

These two examples of Duccio's work come from his complex multi-compositional altarpiece, *Maestà*. Many of the individual panels of the *Maestà* are painted in a similar style to the *Healing of the Blind Man* (fig. 4). The painting of light in *The Annunciation* is unique for both its naturalistic and symbolic qualities.

5.3 Simone Martini, *Maestà* (1315):

In *Maestà*, Martini shows many innovations through his adoption and manipulation of natural lighting conditions (fig. 6). This painting shows light from the front left illuminating Mary, her child and those closest onlookers, with other onlookers in a rather flat and slightly muted tone. Mary is projected forward by being placed against a dark throne which is shaded. The bright faces of Mother and Child stand out against their golden backing. Further shape is given to the composition by the swagged canopy that has pockets of light and shade to help show its form. This is all set against a richly lit blue background (where its tone rises from a lighter to a darker shade) that gives great depth and intimacy to the scene.

The blue background in *Maestà* is highly enigmatic and pivotal to interpreting the painting: does the blue represent a heavenly location, or does it represent the sky as seen from Earth? Is the scene set in daytime or a moonlit nighttime? Undoubtedly, Martini's *Maestà* is highly theatrical and impressive, not only for its beautiful hues but also for its ability to evoke a sense of foreground and background through lighting, composition, and gradation—a unique achievement of its time.

Fig. 6: Simone Martini, *Maestà (Virgin with Child Enthroned between Saints and Angels),* 1315, Fresco, 763 x 970 cm. Palazzo Pubblico, Siena. (Maestà (Madonna with Angels and Saints) by SIMONE MARTINI)

This painting is highly significant in the history of art as it illustrates six lighting 'firsts' in a single composition:

(1) This is one of the earliest paintings to display a 'spotlighting' technique in a multi-figure composition where a principal character is highlighted within a scene and thus 'lifted' and given prominence through light intensity.

(2) It is a development of the 'outside-in' technique illustrated in Fig. 3 where the sides of the faces looking into the centre of the composition are now lit. With the centre subject boosted in intensity and set against a dark throne and golden backing, a brightness differential is maintained which helps keep the viewer's primary focus on Mary and Child.

(3) It incorporates multiple layers of depth achieved by the overlay of lit subjects (Mary and Child) against dark (her throne) which are placed against a partially lit canopy and the lit and graded blue background. This creates a depth of field to the composition through lighting devices alone, which complement the architectural features in contributing to enhanced perspective.

(4) Sensitive and well-observed lighting of selected areas of the swagged cloth helps to show its curved form.

(5) The choice of a deep blue background. If this is a nocturnal setting, then it is an early example of when nighttime is alluded to. This new technique of indicating times of day or weather conditions through the lighting and/or backdrop would soon become commonplace and begin to displace gold as a background in narrative paintings – another example of lighting used to create a more naturalistic setting for compositions. It is interesting to note that Martini utilized a blue background in many of his later compositions, eventually painting his first sunset in *Entombment* (1326-1334).

(6) The crisp silvery colour of the light suggests moonlight which is probably the first example of its use. The colour is distinctly different from the colour of daytime light normally used in paintings of the time.

5.4. These Three Works in Context

It is important to note that the examples I have chosen to analyze express styles of lighting that deviated from the norm for these artists: Duccio, for example, invariably painted using light coming from the above-centre-front. Paintings such as *Virgin and Child* (painted 1290-1300) and *Triptych with the Crucifixion and Other Scenes* (painted 1302-1308) typify his style, as do most of the panels in his *Maestà* (1308-1311). Martini always used this same technique to light his principal characters too, though he adopted a blue background in many of his subsequent works. However, where they incorporated motivated light suggests that they may have aligned their understanding of vision to that of Alhazan, showing them to be at the forefront of the Renaissance movement by embracing intramissive vision and thus were in tune with progressive scientific thinking.

In these three examples we see a new type of iconographic image for the first time in art. This must have had a profound and challenging impact on the ordinary worshiper: to see in pictorial form the stories that had previously only been

passed down aurally, and seeing Christ and his mother Mary set in everyday situations for the first time must have both enlightened and mystified. Lighting played an important role in making these images believable. Whereas previously it had served as little more than an illuminant, now the lighting reflected and enabled daily life, allowing the viewer to believe they too inhabited a world that was now set out before them.

These three paintings may be considered as pioneering examples of experimental intramissive thinking as they didn't immediately predicate a wholesale shift towards implementing a greater awareness of natural lighting in paintings going forward. However, the techniques used to produce natural lighting in these works must have raised interest amongst the art community since the use of light beams to create a rudimentary three-dimensionality and drive visibility of form soon became common practice in narrative composition.

6. Summary of Findings

These three paintings from the early 1300s clearly evidence some of the beginnings in the shifts in thinking, setting art firmly on a journey to a revolutionary new way of engaging with the world and show an emergence of some of the fundamental principles of crafting the shape and meaning of a composition through the use of light.

The following points consolidate these three works against the seven attributes of light (stated in Section 3) that the artist could control when making a composition:

1. **A consistent, primary source of light.** This was apparent in both Duccio works, which appeared to be set in exterior locations. In contrast, Martini's *Maestà* seems to be set indoors, symbolically appropriate for its associations with mothering and family life. The scene's diffuse lighting, appearing evocative of moonlight, was stylized by not having a single primary source.
2. **Assigned intensity.** Without going to the extremes of intensity difference, all three paintings play with this attribute to help convey the storyline through highlight and shade. Innovative fades occur, from light to dark, in all three works, and Martini's clearly shows the use of highlight to help create focus on the subject.
3. **Assigned colour.** Manipulation of this attribute is less developed in these early works, although Duccio's *The Annunciation* shows colouration in a reflected light tone and he also deepens the colour of light on Mary's face, and in *Healing of a Blind Man* on his principal characters. Both Duccio paintings have a colouration of light appropriate for their daytime locations, whereas Martini adopts the colour of moonlight.
4. **Shadowing effect.** Shadowing in garments and architecture is well developed in all three paintings, although shadowing caused by bodies and artifacts is absent.
5. **Reflected light**. Most clearly seen in how the light falls on the angel's face in Duccio's *The Annunciation*.
6. **Even or broken light beams.** While broken, uneven light beams feature in all three exemplars, this is most evident in the Martini's *Maestà*.
7. **The lighting of the background.** Martini uses this device magnificently as a dominating motif to create a highly spiritual aura, as well as an evident sense of foreground-background, in his *Maestà* composition. In *The Annunciation*, Duccio grades to background light intensity to help point to the key light source.

It is clear from these examples that these lighting techniques could both be applied in a literal, naturalistic manner but they could also be given symbolic value, i.e. manipulated for the sake of achieving greater visual impact and understanding, as seen through the use of:

1. **'Spotlighting' (*Maestà*).** Like principal actors on the stage, only key individuals have the privilege of the brightest direct lighting.
2. **Intentional Contrast.** The overlay of lit components against darkened areas (and vice versa) in all three works to heighten the subject's impact and create dimensionality.
3. **The use of Godly rays (*The Annunciation*).** Lighting illuminates the scene from the outside-left, falling mostly on Archangel Gabriel, emphasizing his status as divine messenger. However, ray-like elements seem to beam from a convex object from above, down towards Mary, communicating the idea of a divine sign.
4. **The differentiation between lit faces to create hierarchy.** At this point in *The Annunciation*, Mary has yet to be "enlightened" by the knowledge of her destiny, so she remains dimly lit; however, Gabriel, as the source of knowledge, is also the scene's symbolic source of light. Gabriel's gesture suggests intent on transmitting that light to Mary, so perhaps the scene captures the moment just before its full unfolding.
5. **Symbolic darkening.** The darkening of a figure who rejects Christ (*Healing of a Blind Man*), alluding to metaphorical blindness or outdated modes of perception (eye as light source vs. receiver of light), as first noted by Alhazen.

Thus, these three examples are indicative of the movement in art at the time, where light actively contributed to the new narrative style both in terms of helping to create a realistic, recognizable scenario coupled with the artists' ability to manipulate the circumstances to add symbol, clarify meaning, and celebrate theatricality.

7. Endpiece

The lighting highlighted by these three post-1300 examples illustrate principles that would underpin the development of the canon of western art composition and can still be seen today as fundamental attributes in all forms of pictorial media—photography, film and television, theatrical performance and architecture—indeed wherever lighting has a creative role to play to enhance a subject's meaning, in addition to providing raw, functional illumination.

About the exhibition, Jonathan Jones said that "You walk into a dark space where gold-mounted paintings are picked out by intense lighting, and are suddenly plunged into a world of inner feeling."[xvi] Of course, the medieval viewer is unlikely to have seen these paintings in such conditions unless there happened by chance to be a shaft of sunlight entering a church and striking or reflecting on to the painting: it is as likely the painting would have only been seen by the strategic placing of a candle (a rather inadequate illuminant). Yet it is the light inherent in the paintings that modern exhibition lighting, rather than the darkened vaults of a medieval church, can amplify and exploit, to help us understand and interpret through our modern lens how important these early steps were in incorporating light into art, and how they too underpinned the birth of the Renaissance in a quietly under-recognized yet vibrant way.

Without this pioneering work in crafting figures and their environment through a sense of natural light, art would have remained rooted in two dimensions. The introduction of what went on to be called 'motivated light' and its compositional implications was as important to the development of fine art as was the mastery of perspective drawing. While many subsequent artists who magnificently placed light at the centre of their art have gained due recognition for doing so, their successes were built upon the work of artists from central Italy in the early 14th century who first tentatively laid out the potential for meaningful lighting in art.

Hopefully, this article raises the profile of 'the art of light in art' and the tool I have developed proves useful when analyzing a composition. To boost our awareness of the role of lighting, we should all reflect further on the juxtaposition of how we *instinctively* see and how these pioneer artists *helped us* to see through implementing their observation of daily life combined with their imagination. Their efforts would commence a journey towards achieving naturalism with light as evidenced by the life-like work of artists such as Dutch artist Jan van Eyck (c. 1395-1441), whose paintings a mere 100 years later showed the finest mastery and manipulation of the properties of natural light.

Author Biography:

Having initially qualified as a music teacher, the author by chance fell into backstage theatre work, going on to specialize in lighting and sound. As a professional lighting designer, he worked in theatres throughout the UK. He also developed a specialism in designing lighting for retail environments, working for many of London's most prestigious department stores. He taught stage lighting in London drama schools and was invited to create and run a groundbreaking BA (Hons) Lighting Design programme, as it was then the first in Europe. He completed his PhD at the University of Manchester in 2005, researching the origins of stage lighting design in the UK.
He has had two books on stage lighting published and two extended papers on local history. He is currently working on a new book which comprehensively charts the rise of creative lighting in art, and from which this paper is an edited extract.

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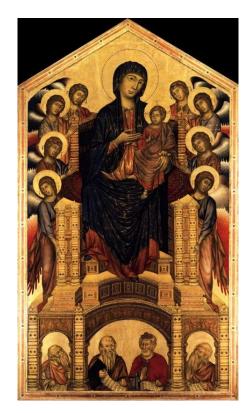

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