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Anachronistic or Visionary? Evaluating Giovanni di Paolo's use of Silver Leaf on a 15th-century Sienese Predella

Giovanni di Paolo's unusual use of silver is a material choice unexplored in terms of defining his aesthetic, as well as contextualizing him within the artistic Zeitgeist of his generation. A technical study of Giovanni di Paolo's Saint John the Evangelist, The Assumption of the Virgin, and Saint Ansanus, part of the Kress Collection at the El Paso Art Museum, revealed that this predella fragment once had a silvered frame and silver leaf ground, prompting a reevaluation of how the work should be displayed, and how its current condition with degraded and tarnished silver affects our reading of the work. Most of Giovanni di Paolo's works are now in a fragmentary state. This creates challenges when contextualizing how the predella fit into its original altar format, and whether it is feasible that the artist mixed metal leaves without a clear example as a comparison. A reconstruction hypothesis is reevaluated, stressing the importance of understanding the materiality of an object when reconstructing larger pictorial schematics.

Introduction

Giovanni di Paolo (circa 1402-1482) was a prominent Sienese artist, noted for his surreal compositions and imaginative spirituality. His works express a vivid opulence through his masterly use of pigments and geometric patterning, and he pursued a traditional style while many of his contemporaries had moved on to more realistic imagery. Thirty miles away, artists in neighboring Florence were becoming increasingly concerned with perspective and creating naturalistic illusion with two-dimensional painting. Giovanni di Paolo was not ignorant of the humanist influence taking hold there; having travelled to Florence in 1430, he brought back compositions from Florentine artists which he adapted to his needs¹. Yet he was less interested in imitating nature and continued to pursue an otherworldly aesthetic rooted in traditional techniques, drawing from imagery and formats from 14th-century traditions. As a result, he is often considered eccentric, idiosyncratic, and anachronistic. These labels have historically been based on his fantastical imagery and compositions rather than his choice of materials. However, a review of 15th-century Sienese painting reveals that Giovanni di Paolo was idiosyncratic in his continued use of silver leaf, particularly for backgrounds and framing. The use of silver is identified as a stylistic choice related to 14th-century Sienese practices.

Giovanni di Paolo's unusual choice of silver has been unexplored in terms of defining his aesthetic, as well as contextualizing him within the artistic Zeitgeist of his generation. The genesis of this project was the conservation

treatment and technical study of *Saint John the Evangelist, The Assumption of the Virgin, and Saint Ansanus*, (here forth referred to as the Kress panel) in the Samuel H. Kress Collection at the El Paso Museum of Art (fig. 1). Treatment and technical analysis revealed that this predella fragment once had a silvered frame and silver leaf ground. This discovery prompted a reevaluation of how the work should be displayed, how its current condition with degraded and tarnished silver affects our reading of the picture, and what the implications of a silver frame might mean for contextualizing the fragment as a compartment of a now dismantled original altarpiece.

Description of the Panel

This painting is on a single horizontal board and originally was part of a predella. Three scenes are depicted: two three-quarter length male saints face left with silver backgrounds, flanking a central scene of the Assumption of the Virgin. To the left is Saint John the Evangelist, who holds his hands in prayer with his head slightly bowed wearing green and pink robes. At the bottom left corner of the panel is a fragment of original grey paint which might have once formed a rock (to be discussed later in the article). On the right is Saint Ansanus, patron saint of Siena, holding the city's black and white standard in his proper right hand and a green palm in his left, wearing robes of pink and orange-red. Both saints have punched haloes, with punch mark vertical borders demarcating their section of the predella. The central scene depicts the Virgin rising from her sepulcher, supported by six red and gold seraphim. Her hands are in prayer as she gazes out directly at the viewer, floating above her marbled tomb. Her white robe is exquisitely decorated with *sgraffito* patterning to reveal gold leaf below. The painted background depicts a landscape of hills and a blue sky, with an otherworldly castle.

The paint layers are in good condition, with only a few discreet losses. The silver background is tarnished and abraded, and has lost its metallic luster with areas of dark red bole showing through. Another fragment of the predella, *Saint Bartholomew, The Entombment of the Virgin, and The Mourning Virgin* has been identified in the collection of the Fitzwilliam Museum, Cambridge, and was also examined for this project (fig. 2). Unfortunately the Fitzwilliam panel is in poorer condition, with most of the silver entirely removed, exposing the bole and gypsum ground. The mourning Virgin's once blue robe is heavily abraded. The paired saints on the two fragments turn in opposite directions, thus we can surmise that the Fitzwilliam panel was on the left end of the predella, and the Kress panel on the right. A central scene, presumably a *Man of Sorrows*, is lost.

Scholars have dated the fragments to Giovanni di Paolo's middle period, between 1445-1460². John Pope-Hennessy observes in his monograph that «the glory of Giovanni di Paolo's middle period remains his predella panels»³. With the Kress panel, he particularly notes the half-length saints, which he describes as «infused with a genuine and unmistakable devotion»⁴. The central *Assumption* scene is delicately executed, with a stoic composition demonstrating Giovanni di Paolo at his artistic maturity.

Treatment and Analysis of the Panel

The painting was brought to the Conservation Center at New York University for treatment as it had a discolored yellowed varnish, clumsy retouching, and a heavy mahogany cradle unsuitable for the painting's small size. The varnish and discolored overpaint were removed, including some disfiguring and muddy overpaint covering the silver ground. Once cleaned of overpaint, the silver was easy to identify despite the tarnish. In addition, a small grey paint fragment covered by overpaint in the bottom left corner was revealed. Losses to the bole were toned and small pieces of silver leaf were added to reestablish a sense of the uniform silver background that the panel once had. A new frame was constructed based on the profile of an original engaged Giovanni di Paolo⁵.

This was an opportune moment to research Giovanni di Paolo's materials and techniques, and to consider his unusual choice of a silver ground. Technical analysis was undertaken, including stereo-microscopy, infrared reflectography, X-radiography, handheld X-ray fluorescence (XRF) spectroscopy, and cross section analysis, including SEM-EDS, Raman and FTIR-ATR. In addition, a replica was made using historically accurate materials and techniques to help understand how the predella may have originally looked (figg. 3-4).

Technical analysis revealed that in addition to the silver background, the top and bottom framing elements were also silvered. A cross section (fig. 5) taken from the top edge in the area of the sky clearly shows a bole preparation with silver leaf under the original ultramarine paint layer. Patches of silver leaf under the paint layers can be clearly seen in the infrared reflectogram along the top and bottom edges of the painting, and were confirmed as silver using XRF (fig. 5). The frame of the predella would have originally been engaged and treated as part of the panel during its fabrication. The framing elements would have been prepared with gesso at the same time as the picture plane, with the bole and metal leaf added prior to the painted elements⁶. This method is clearly laid out in Cennino Cennini's *Il Libro dell'Arte*, an invaluable source for understanding the

techniques of this period. Though written earlier, around 1400, Giovanni di Paolo's traditional technique barely strayed from Cennini's treatise⁷. In summation, the research established that the original framing elements of the predella would have originally been silver and not gold, raising questions regarding how the predella would have visually related to the rest of the altarpiece, and how the entirety would have looked as a whole.

In the cross section there is an original layer above the silver, which has seeped into the ground and fluoresces yellow in UV, indicating that it is organic. This is thought to be a protective coating, such as sandarac, employed to slow the oxidation of silver⁸. While in the studio, the concept of the frame being a *meccatura* or *mecca* frame was considered – a historic gilding technique where a tinted resin (usually sandarac) is applied onto a white metal surface to imitate gold, while also protecting the metal leaf from tarnishing. For the surface to be a true *mecca*, organic pigments such as dragon's blood and gamboge would have been added to the resin's formulation to tailor the tint to the artist's liking⁹. At the time of publication, organic analysis undertaken was inconclusive; yet future correct identification could clarify the composition of this layer and confirm whether the fluorescing layer is a degraded protective coating or an intentional tint aimed at toning the silver¹⁰. While often appreciated as an aesthetic in its own right, *mecca* gilding was most frequently employed as an economic imitation of gold, and the literature that examines this technique exclusively focuses on artworks utilizing *mecca* alone. Crucially, there are no studies recording both gold leaf and *mecca* silver in the same painting.

While we have been unable to establish conclusively the use of the *mecca* technique via organic analysis, we can consider the artist's style and his aesthetic choices. The bole under the silver is a dark red tone. Often a more orange bole was used as the underlayer of gold leaf, while the muted red under silver would accentuate the cooler tones of the white metal. Given the vibrancy of Giovanni di Paolo's works and his propensity for complimentary form and color, it is logical to conclude that the panel originally appeared silver with the organic layer acting purely as a protective coating, or was very minimally toned. This would have created a more dramatic transition compared to other gold elements on the altarpiece, which was demonstrated through the replica produced for this project. The untarnished silver has a brilliant effect and contrasts beautifully with the gold of the Virgin's *sgraffito* and the seraphim, making the gold details appear warmer and more strikingly vibrant.

In this period artistic practices were strictly managed by the statutes of the Painters' guilds, which stipulated that the materials listed in the contract were to be used, with fines administered for the use of inferior materials¹¹. This included replacing gold with inferior metal leaves, such as silver or *ora di metà* – a laminate of silver and gold leaf¹². The quality of an artwork reflected the economic, political, and social status of the city, church, or family for which it was produced, and the complex organization of the guilds system was a conscious supervision of artistic output, which was seen as a manifestation of the city's economic and cultural refinement¹³. As an artist who freely used gold in his other works, it is unlikely that Giovanni di Paolo would have undermined the statutes of his guild in the pursuit of the more cost-effective *mecca* aesthetic.

Giovanni di Paolo's Use of Silver

Pope-Hennessy notes that judging by known tax returns and his investments in real estate, Giovanni di Paolo was reasonably prosperous¹⁴. He used gold unsparingly in his other works, frequently placing it unnecessarily under large areas that were intended to be covered by paint¹⁵. The use of silver – the cheaper of the two metals – can be assumed to be an aesthetic choice, rather than an economical one. It was common knowledge that silver would tarnish; Cennini cautions his reader to use «as little silver as you can, because it does not last; and it turns black»¹⁶. Despite his knowledge of material properties, Giovanni di Paolo still consciously chose to create with it, and perhaps thought that the resin applied would suffice as protection.

Ultimately, this is a fragment of a sacred and devotional image, and the materials and techniques employed by late medieval artists were chosen to express the power of the divine. Pope-Hennessy notes that Giovanni di Paolo had a «vivid imagination inflamed by a deeply religious temperament» and considered his craftsmanship an act of service to God¹⁷. In fact, Giovanni di Paolo went as far as to tool into a halo on one of his altarpieces «Virgin, protect this man who painted you» (HIC QUI TE PINCIT PROTEGE VIRGO VIRUM)¹⁸ – demonstrating his faith in the Virgin, via the fabrication of these creative devotional works. He considered what he was fabricating, and how the materials employed would contribute to the altarpiece's embodiment of the divine.

Gold and its material significance has had considerably more scholarly attention than silver. Semantics around this period are based on the yellow metal; “to gild” references the technique, while this genre of medieval works are described as “gold ground paintings” Cennini devotes several chapters of his

text to the art of gilding, with only one mention of silver: recommending that children learn to practice their technique by laying silver «as it is less expensive»¹⁹. While the price of both metals fluctuated, the value of gold was higher as it was imported and dependent on the geopolitical climate, and was historically the more coveted metal²⁰. In contrast, there were active silver mines in Tuscany, making it a more consistently accessible product. The Colline Metallifere – the Metal Hills – southwest of Siena, was a vital region between the 9th and 13th centuries, with an active mining industry capitalizing on the abundance of lead, tin, copper and silver²¹.

The value of gold justified its use as a precious material to be used on devotional objects; it imparted a golden light in the church when illuminated by candles and windows. In his essay on the materiality of light, Christopher Lakey notes «The beholder is bathed in the reflective light of the gilding via the process of the replication of *lux*» – thus the gilded surfaces act as the materialization of otherworldly light, transmitting it and bathing the beholder in the divine²². When imagining this spectacle, the combination of silver to contrast the gold develops into a more complex vision. The silver acts as an aesthetic foil to the gold, complementing its natural warmth with a cooler tone, while also contributing as a mirror-like specular surface. As a master of color, Giovanni di Paolo was employing this anachronistic technique in a visionary way to enhance his craft of devotion, exploiting the contrasting tones of the two metals to create a pictorially enriched spectacle.

Silver is well known to oxidize over time, creating silver sulphide which forms a tarnish layer, and ultimately blackens the metal and heavily diminishes its reflective qualities. Silver is vulnerable to zealous over-cleaning aimed at removing the tarnish, which abrades the leaf and damages the layer structure²³. The darkened, mottled state becomes difficult for the viewer to read, and loses its initial bright specular surface. It is often challenging to tell from photographic reproductions if an area is degraded silver, while the object's tombstone information often excludes the mention of silver leaf or misattributes it as gold.

In our ignorance about an artwork's materiality, the prevalence of silver in early Italian works may be greater than currently realized. Research by Jennifer Sherman proved that an originally silvered early Trecento polyptych was later resurfaced with gold leaf²⁴. Though a few cases of this interventive treatment have been identified, it is unknown how many artworks this has happened to as it requires extensive examination and usually cross section analysis to determine. As gold does not tarnish or degrade, it is likely that an unknown number of originally silver backgrounds may have been gilded over. While it is more common to come across silver in works that have stayed *in situ* in Italy, few exported panels have retained their silver grounds. Whether this is a reflection of restoration practices remains to be seen.

Compellingly, when placed next to his immediate contemporaries, Giovanni di Paolo appears to be the only artist using silver in decorative framing or as a metal leaf background. While earlier artists in the 14th century frequently used it, in the 15th century he is largely alone in his employment of the white metal. Whilst undertaking this research, works by Giovanni di Paolo were reviewed and visited where possible, and categorized by whether they had silver details in the composition, a silver background, and/or a silver frame. Of the 60 works reviewed, 27 panels utilized silver in some form. These were identified through close looking at the object, without technical analysis. The results of positively identified silver use are tabled in this article. This list is by no means exhaustive, and it should be noted that most works are fragments, divorced from their original context or altarpieces. Silver is difficult to discern in online color images, and impossible to confirm in black and white images. Many photographic reproductions crop original framing elements and focus on the painted aspects of the scene, while original frames are often missing entirely.

There are several paintings by Giovanni di Paolo that employ gold as a background, but with a silver frame. Two fragments from the same altarpiece: a central panel *Madonna and Child* and a left panel of *Saint Catherine of Alexandria* (1457), in the Pinacoteca Comunale, Castiglion Fiorentino, have gold backgrounds with silver frames and a substantial area of silver leaf for the Virgin's bodice (fig. 7). The original setting for these fragments is unknown. Another example, *Christ Suffering and Christ Triumphant*, (1420-1430) in the Pinacoteca Nazionale, Siena, has a gold background with a silver frame and silver on the wings of the two seraphim (fig. 8). The original setting for this was the convent of San Niccolò al Carmine in Siena. The works date from different periods of Giovanni di Paolo's oeuvre, and in fact, it's apparent from the tabled results that Giovanni di Paolo utilized silver throughout his career, and it was not confined to a specific period. It is probable that more of his paintings had this combination of metal leaves, however his works are so often in a fragmentary state that few retain their original framing elements.

This style of framing gold paintings with silver is more commonly seen with artists of the 14th century, with comparative works existing by Duccio di Buonisegna (1255-1318), Ambrogio Lorenzetti (1290-1348) and Simone Martini (1284-1344). Several works by Martino di Bartolomeo (1389-1435), whose activity overlaps with Giovanni di Paolo's early career, utilized silver. Little is known of his training, but it has been suggested that he trained within the circle of Martino di Bartolomeo, among other artists. Giovanni di Paolo's more relevant contemporaries were also reviewed, and none were found to utilize silver beyond the occasional compositional details, such as on a figure's drapery or armor²⁵. This highlights Giovanni di Paolo's anachronism in his material choices, which extended to framing as well as his imagery.

Contextualizing the Altarpiece

Interestingly, there is no discussion in the published literature about Giovanni di Paolo's use of silver, and there are no published works on mixing metals within an altarpiece. In addition, there are no cases of Giovanni di Paolo using silver as the background of a large central panel, and only smaller works have been identified thus far.

Pope-Hennessy notes that numerous problems arise from Giovanni di Paolo's paintings due to the disassembly of his altarpieces, and their subsequent fragmentary nature²⁶. Of his larger altarpieces, only one survives intact with its predella – *La Pala Staggia* (1475) in the Pinacoteca Nazionale, Siena. Many of his works were disassembled in the 18th and 19th centuries, with predellas often chopped into individual scenes and the original moldings disposed of, as is the case with the Kress panel. The material nature of the fragments is often overlooked due to poor condition, poor image reproductions, or mislabeled wall text.

As described above, this panel was cut from a longer predella. Both the top and bottom edges retain their original barbs; the height of the sight size is 18,5cm. The width of the central scene of the Assumption measures 21,5cm, while Saint John measures 14cm, and Saint Ansanus measures at 13,2cm. Based on the remaining fragment of the vertical right edge's punch-marks in Saint Ansanus's scene, the width of the two saints' sections are presumed to have measured approximately 15,5cm each, meaning approximately 2cm has been lost from each saints' silvered area. This cropping of the saints' sections is also present on the Fitzwilliam panel. Reconsidering these small additions is more in line with the appearance of the saints usually depicted in Giovanni di Paolo's predellas, which usually have more space around them. A mockup of what this may have looked like creates a more balanced composition (fig. 9).

Giovanni di Paolo frequently employed the motif of the Holy Passion trinity, composed of the Mourning Virgin, a Man of Sorrows, and John the Baptist in his predellas, almost always with a rocky backdrop behind Christ. One of the few remaining complete altarpieces, *La Pala di Staggia* (1475), although much later, is a good comparison (fig. 10). The Mourning Virgin is nearly identical, while the central Christ figure has a backdrop of grey painted rocks. The fragment of grey paint at the bottom edge of Saint John the Baptist's scene from the Kress panel is thought to be the left edge of a similar composition (fig. 11).

It has previously been suggested by Pope-Hennessy that this predella may have once formed part of the altarpiece of the *Coronation of the Virgin*, now part of the Lehman collection at the Metropolitan Museum of Art, with a *Man of Sorrows* presently unidentified²⁷. The *Coronation* is a major work in the artist's oeuvre, of sophisticated design and composition, and is hailed as one of Giovanni di Paolo's finest²⁸. It is, however, missing its original framing elements. While the *Man of Sorrows* sometimes posited has a rock backdrop and is stylistically of the same period, it has a gold ground which does not work with the continuous composition which would have included the flanking mourners.

This hypothesis has since been rejected; the dimensions in the literature were misunderstood, and the measurements of the *Man of Sorrows* do not match the compartments of the two predella panels associated with it. In his description of the panel, Pope-Hennessy incorrectly assumed that the predellas have been cut down vertically but not horizontally, but in fact the opposite is true: there is an original barb on the top and bottom edges of the Kress panel while the outer edges have been trimmed. But more compellingly, the silver of the flanking saints was not considered in Pope-Hennessy's mock up, and scholars referencing this proposal do not acknowledge the silver background or how it would have impacted the altarpiece overall. Thus, the predella is an example of the common occurrence of a misreading of the material knowledge presented through the object's physicality.

Since this particular *Man of Sorrows* was rejected, no panel has been identified as a suitable central element. Iconographically however, pairing the two predella panels with the *Coronation* is logical and corresponds in figure style, palette, and punchwork. There is continuum of compatible imagery: the Virgin's dress is strikingly similar; in the larger format her white robe with gilded elements and lined with olive green refers to the miniature; the marbling on the floor is continuous with the marbling on the tombs, and the Virgin is now surrounded by a swarm of golden angels, transformed from her simple seraphim in miniature. After redrafting the potential altarpiece scheme (fig. 11), the two predella fragments combine well with the *Coronation*. The missing central compartment of a *Man of Sorrows* would be 32cm wide, with a silver ground and rocky backdrop.

The *Coronation* has a gold ground, and no longer has its original framing elements. Is it possible that at least part of this major work had a silver frame? How do we contextualize a fragment in the wake of the destruction of comparative altarpiece formats? This problem plagues the study of Giovanni di Paolo, and numerous other artists, with scholarship hampered by the altarpieces' disassembled states²⁹. Frames historically have been undervalued, and in the

not-too-distant past were considered a disposable element of an artwork. As a result, we know comparatively little about them.

In terms of structure, we can surmise that the composition of the *Coronation* is contained within the panel's dimensions, and there are no indications that it has been cut down (bar the top of the arch, which is a non-original addition). It is unclear if the panel would have been supported by lateral panels with single or paired saints, as can be seen in the comparable *Coronation of the Virgin* in Saint Andrew in Siena, although this is unlikely, given that the dimensions of the known predella fragments fit the width of the central panel so well. Christiansen, Kanter and Strehlke suggest that the altarpiece was completed with pilasters, possibly adorned with small figures of standing saints and supported by bases adorned with coats of arms, more saints or donors³⁰. The positioning of Saint Bartholomew at the far left of the predella is a position of honor, and indicates that the altarpiece was made for a church dedicated to Saint Bartholomew (of which there are many in Tuscany). Pope-Hennessy proposes that the predella was set well forward of the central panel, as a void 30cm² in the panel near the base between the feet of the angels (now filled) may have hosted the sacred tabernacle, which would have rested on the edge of the predella³¹.

The edges of the central panel bear no evidence of remnants of silver, but due to its larger size it probably did not have an engaged frame incorporated in the same way as the predella's. Without comparisons, it is impossible to speculate how the frame of this grand scale altarpiece may have appeared, or how the combination of silver and gold leaf might have been employed. Was a mix of silver and gold used throughout? Several examples of a mix of metals can be seen on Ambrogio Lorenzetti's (1319-1348) framed works from the prior century. Or was the silver reserved for the more somber themed predella, which slotted into a larger structure of golden splendor? Again, there are no comparable examples. As tempting as it is to theorize, without further information the full visualization of the altarpiece must be left to our imagination, which can only aspire to be as rich as the inventiveness of Giovanni di Paolo's.

Conclusion

While remaining within the established pictorial framework, Giovanni di Paolo utilized traditional techniques and materials to create fantastic visions of originality and richness. He was indebted to his predecessors of the prior century, and continued to skillfully exploit his materials, and create his own highly original artistic language and imagery. This paper's reevaluation of his use of silver aims

to shine light on an overlooked aspect of his aesthetic, which contributed to the decorative jewel-like physicality of his pieces. His honed sense of color can be extended from pigments to include metal leaf hues, which he employed to create otherworldly objects, removed from the spectator through the divine aura they convey³². Reestablishing the connection between the *Coronation of the Virgin* and the Kress and Fitzwilliam predella fragments has revised existing literature, engaged with the materiality of the object, and proposed a new conceptual lens for how the altarpiece can be imagined. With the untarnished silver predella and framing elements contrasting with the gold of the central panel, the altarpiece would have truly been a dazzling spectacle.

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- 1 K. Christiansen, L.B. Kanter, C.B. Strehlke, *Painting in Renaissance Siena 1420-1500*, exhibition catalogue (New York, Metropolitan Museum of Art 1988), New York, 1988, p. 11.
- 2 John Pope-Hennessy dates the panel to 1455-1460 (J. Pope-Hennessy, *Giovanni Di Paolo 1403-1483*, London, 1937, p. 75). Christiansen, Kanter, and Strehlke date it as post 1445 (Christiansen, Kanter, Strehlke, *Painting in Renaissance Siena 1420-1500*, cit., p. 203).
- 3 Pope-Hennessy, *Giovanni Di Paolo 1403-1483*, cit., p. 76.
- 4 *Ivi*, p. 76.
- 5 The new frame was constructed by Timothy Newbury. The profile was based on *The Exaltation of Saint Nicholas of Tolentino*, in the Robert Lehman Collection at the Metropolitan Museum of Art.
- 6 C. Cennini, *The Craftsman's Handbook: Il Libro dell'Arte*, tran. Jr.D.V. Thompson, New York-London, 1954, pp. 67-85.
- 7 E. Skaug, *Painters, Puncher, Gilders or Goldbeaters? – A Critical Survey Report of Discussions in Recent Literature about Early Italian Painting*, in «Zeitschrift für Kunstgeschichte», 71, 4, 2008, pp. 571-582, ref. p. 574, https://www.jstor.org/stable/pdf/40379384.pdf?refreqid=fastly-default%3A4b4abe5acaa1ccb7f9b934ad3c05ae8c&ab_segments=&initiator=&acceptTC=1 (last accessed 23 September 2024).
- 8 A. Chaban *et alii*, *Multi-analytical approach to the study of mecca gilding technique*, in «Microchemical Journal», 168, 2021, pp. 1-9, ref. p. 3.
- 9 *Ivi*, p. 1.

- 10 FTIR-ATR and Raman spectroscopy were undertaken by Dr Donatella Banti at the Courtauld Institute of Art in June 2024. Unfortunately, the results were inconclusive, probably due to the organic layer analyzed being too thin.
- 11 The guild of Siena (1355) stipulates that «Ordiniamo, che nullo de' l'arte de' dipentori ardisca over presuma di mettere ne' lavorii che facesse altro oro o ariento o colori che avesse promesso, sì come oro di metà, per oro fino, e stagno per ariento, azzurro de la Magna per azzurro ultramarino, ... e chi contrafacesse per le predette cose sia punito et condannato per ogni volta in x libr.» – «We order that no one of the craftsmen's art dares to presume to put in the works he makes other gold or silver or colors that he has promised, such as *ora di metà*, for fine gold, and tin for silver, azurite for ultramarine blue, ... and whoever counterfeits for the aforementioned things shall be punished and condemned each time in the books» (G. Milanese, *Documenti per la storia dell'arte senese*, Siena, 1854, p. 7, translation of the author).
- 12 Skaug, *Painters, Puncher, Gilders or Goldbeaters*, cit., p. 573.
- 13 I. Passeri, *Gold coins and gold leaf in early Italian paintings*, in *The Matter of Art: Materials, practices, cultural logics, c. 1250-1750*, edited by C. Anderson, A. Dunlop, P. Smith, Manchester, 2014, pp. 97-115, ref. p. 102.
- 14 J. Pope-Hennessy, *Giovanni Di Paolo*, in «The Metropolitan Museum of Art Bulletin», 46, 2, 1988, pp. 6-49, ref. p. 6.
- 15 Studies by both A. Don, 2019, (A. Don, *Craft and Devotion: A technical study and reconstruction of Giovanni di Paolo's Saint Bartholomew*. Unpublished Graduate Thesis, Hamilton Kerr Institute, Cambridge, 2019, advisor S. Bucklow) and E. Klein, E. Gordon, K. French, 1998 (E. Klein, E. Gordon, K. French, *Stylistic, technical and material developments in the paintings of Giovanni di Paolo*, in *IIC Painting Techniques: History, Materials and Studio Practice. Contributions to the Dublin Congress 7-11 September 1998*, conference proceedings, Dublin 1998, edited by A. Roy, P. Smith, London, 1998, pp. 82-88), have noted Giovanni di Paolo's tendency to extend the gold under areas of paint. This phenomenon is easy to identify as the adhesion between paint atop gold is fragile and there is a tendency for the paint to flake off, exposing the gold below within the painted composition.
- 16 Cennini, *The Craftsman's Handbook: Il Libro dell'Arte*, cit., p. 60.
- 17 Pope-Hennessy, *Giovanni Di Paolo 1403-1483*, cit., p. 148.
- 18 Christiansen, Kanter, Strehlke, *Painting in Renaissance Siena 1420-1500*, cit., p. 27.
- 19 Cennini, *The Craftsman's Handbook: Il Libro dell'Arte*, cit., p. 88.
- 20 Passeri notes that in 1252, gold to silver was valued at 8.5 to 1, but the ratio increased further in the 14th century. Passeri, *Gold coins and gold leaf*, cit., p. 101.
- 21 G. Bianchi, *The Silver Rush in Tuscany's Wild West*, in «Expedition Magazine» 53, 2, 2011, pp. 38-45, <https://www.penn.museum/sites/expedition/the-silver-rush-in-tuscany-wild-west/> (last accessed 14 June 2024).
- 22 C. Lakey, *The Materiality of Light in Medieval Italian Painting*, in «English Language Notes», 52, 3, 2015, pp. 119-136, ref. pp. 126-127.
- 23 J. Portell, *Altered Silver Gilding*, in *Gilded Wood: Conservation and History*, conference proceedings, Philadelphia 1988, edited by C. Hutchins, Connecticut, 1991, pp. 205-216, ref. p. 211.
- 24 J. Sherman, *A New Leaf: Recent Technical Discoveries in the Goodhart Ducciesque Master's Madonna and Child with Four Saints*, in «Studying and Conserving Paintings: Occasional Papers on the Samuel H. Kress Collection», London, 2006, pp. 64-76

- 25 The oeuvre of Giovanni di Paolo's closest Sieneese contemporaries were reviewed, including Sano di Pietro (1406-1481), Sassetta (1428-1480), Taddeo di Bartolo (1362-1422), the Osservanza Master (1430-1450), and Martino di Bartolomeo (1389-1435).
- 26 J. Pope-Hennessy, *Italian Paintings in the Robert Lehman Collection*, Princeton, 1987, p. 115.
- 27 Pope-Hennessy, *Giovanni Di Paolo*, cit., p. 45.
- 28 Pope-Hennessy, *Italian Paintings in the Robert Lehman Collection*, cit., p. 118-120.
- 29 Pope-Hennessy, *Italian Paintings in the Robert Lehman Collection*, cit., p. 115.
- 30 Christiansen, Kanter, Strehlke, *Painting in Renaissance Siena 1420-1500*, cit., p. 203.
- 31 Pope-Hennessy, *Italian Paintings in the Robert Lehman Collection*, cit., p. 120.
- 32 B. Cole, *Sieneese Painting: From its Origins to the Fifteenth Century*, New York, 1980, p. 207.

Appendix

Paintings Identified as utilizing silver, whether as a background, framing element, or composition detail

| Location | Title | Year/period | Church Origin | Background/ detailing/frame |
|---|--|-------------|---|---|
| Pienza, Cattedrale di Santa Maria Assunta | <i>Madonna and child and Saints Bernardino, Sabina, Francesco and Antonio Abate. Altarpiece of Saint Anthony</i> | 1462 | Pienza, Cattedrale di Santa Maria Assunta, Pienza | Frame: Silver bands of decorative floral ornamentation between figurative lunettes depicting mourning holy trinity |
| Castiglion Fiorentino, Pinacoteca Comunale | <i>Madonna and Child, Saint Catherine of Alexandria</i> - two fragments from the same altarpiece | 1457 | Unknown | Detail: Silver possibly on the Virgin's bodice. Frame: Silver framing elements with a gold ground behind two figures. |
| Asciano, Museo Palazzo Corboli | <i>Assumption of the Virgin</i> (Collaboration with Matteo di Giovanni - who did the two outer saints) | c. 1475 | Basilica di Santa Agata, Asciano | Detail: Silver detailing in the wings of the angels, and some of the drapery of two of the angels. No silver on outer panels by Matteo di Giovanni |
| Siena, Chiesa di San Andrea | <i>Coronation of the Virgin with Saints Andrew and Peter</i> | 1445 | Chiesa di San Andrea, Siena | Detail: Wings thought to be silver. |

| Location | Title | Year/period | Church Origin | Background/ detailing/frame |
|---|--|-------------------|--------------------------------|--|
| Siena, Pinacoteca Nazionale di Siena | <i>Christ Suffering and Christ Triumphant</i> | 1420-1430 | San Niccolò al Carmine, Siena | Frame: Silver frame with a gold background, detail: has silver on the wings of angels and throne. |
| | <i>La Pala di Staggia</i> | Late period, 1475 | Chiesa di San Silvestro, Siena | Detail: Silver armor of St. Michael, Frame: in the voids above the arches in the framing elements. |
| | <i>Saint Clare of Assisi Altarpiece: Madonna and Child Enthroned, with Saints Peter Damian, Thomas the Apostle, Clare and Ursula</i> | 1460 | Unknown | Detail: Saint Ursula's garment is predominantly silver |
| Chicago, The Art Institute of Chicago | <i>Ecco Agnus Dei</i> | 1455-1460 | Unknown | Background: The background sky appears to be silver with paint detailing over |
| | <i>Saint John the Baptist entering the wilderness</i> | 1455-1460 | Unknown | Background: The background sky appears to be silver with paint detailing over |
| New York, The Metropolitan Museum of Art | <i>Saint Ambrose</i> | 1465-1470 | Unknown | Detail: The robe is a silver brocade |

| Location | Title | Year/period | Church Origin | Background/ detailing/frame |
|---|---|-------------|--|---|
| | <i>Coronation of the Virgin</i> | c. 1455 | Unknown | Detail: Silver on the Angels' wings, brocaded silver cloth over the throne |
| | <i>The Annunciation to Zacharias, (verso)</i> <i>The Angel of the Annunciation</i> | 1455-1460 | Unknown | Detail: Silver on the Angel's wings on the reverse of the panel. Background: silver may be under the sky paint (unconfirmed) |
| | <i>Madonna and Child with Saints</i> | 1454 | From an unknown chapel in a church belonging to the Augustinian order, possibly in Cortona | Detail: Silver on the bodice of the female saint on the left |
| | <i>The Exultation of Saint Nicholas of Tolentino</i> | c. 1450 | Unknown: more likely a personal devotional object | Detail: Thought to have silver on the cloak of the Father and his banner |
| | <i>Madonna and Child with Two Angels and a Donor</i> | c. 1445 | Unknown | Detail: Silver sleeves on the angels |
| Madrid, Thyssen-Bornemisza National Museum | <i>The Virgin of Humility</i> | 1440 | Unknown: more likely a personal devotional object | Frame: Gold ground, with silver border on edge of original engaged frame. |
| Paris, The Louvre | <i>The Nativity</i> | Unknown | Unknown | Detail: Silver garments for the angels |

| Location | Title | Year/period | Church Origin | Background/ detailing/frame |
|---|---|--------------|---|---|
| Berlin, Staatliche Museen zu Berlin | <i>Saint Jerome appears to Saint Augustine</i> | c. 1465 | Unknown | Detail: Silver roof |
| Kress Collection, El Paso Museum of Art | <i>Saint John the Evangelist, The Assumption of the Virgin, and Saint Ansanus</i> | c. 1455-1460 | Unknown | Background: Silver background of the saints. Frame: Confirmed silver frame (now lost) |
| Cambridge, The Fitzwilliam Museum | <i>The Entombment of the Virgin; (left) St Bartholomew; (right) The Mourning Virgin</i> | c. 1450-1460 | Unknown (most likely a church or chapel dedicated to St Batholomew) | Background: Silver background of the saints, heavily damaged and almost entirely abraded away. Frame: Confirmed silver frame (now lost) |
| London, The National Gallery | <i>Saints Fabian and Sebastian</i> | c. 1475 | Unknown | Detail: Silver on the garment of Saint Fabian |
| Oxford, The Ashmolean Museum | <i>Madonna and Child</i> | Unknown | Unknown: more likely a personal devotional object | Detail: Silver on Madonna's garment |
| Philadelphia, The Philadelphia Museum of Art | <i>A Deacon Saint</i> | Early 1430s | Unknown | Detail: Silver garment |
| | <i>Saint Lawrence</i> | Early 1430s | Unknown | Detail: Silver garment |

| Location | Title | Year/period | Church Origin | Background/ detailing/frame |
|---|---|--------------|---------------|---|
| | <i>Christ on the Way to Calvary</i> | Early period | Unknown | Background: Potentially a silver sky, with blue pigment stumbled of the top. (unconfirmed) |
| Washington D.C., The National Gallery of Art | <i>The Adoration of the Magi</i> | 1450s | Unknown | Detail: Silver on the robes of the three magi |
| | <i>The Annunciation and Expulsion from Paradise</i> | c. 1435 | Unknown | Detail: Silver on the very worn on the wings of the angels |



Fig. 1: Giovanni di Paolo, *Saint John the Evangelist, The Assumption of the Virgin, and Saint Ansanus*, 1455-1470, tempera, gold and silver leaf on panel, 20,0cm x 49,6cm. Samuel H. Kress Collection, El Paso Museum of Art, El Paso. Photo of the Author.



Fig. 2: Giovanni di Paolo, *Saint Bartholomew, The Entombment of the Virgin, and The Mourning Virgin*, 1455-1470, tempera and silver leaf on panel, 18,4cm x 46,7cm. Fitzwilliam Museum, Cambridge. Photo: The Fitzwilliam Museum, Cambridge.



Fig. 3: Replica created using historically accurate materials, following the recipes and methods set out by Cennino Cennini. Photo of the Author.

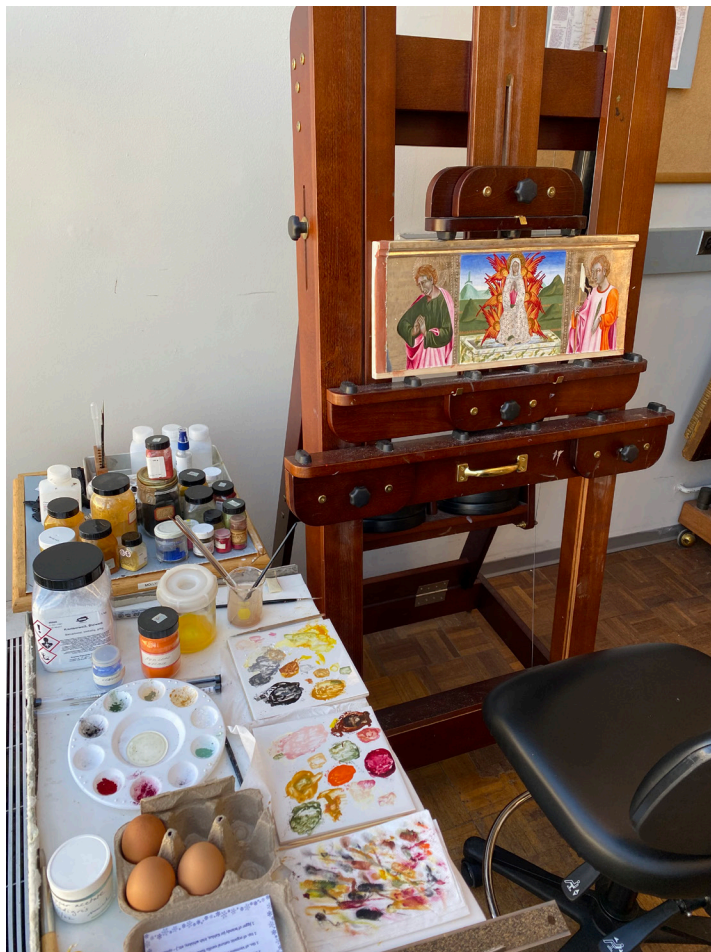


Fig. 4: Making the replica in the studio. Photo of the Author.

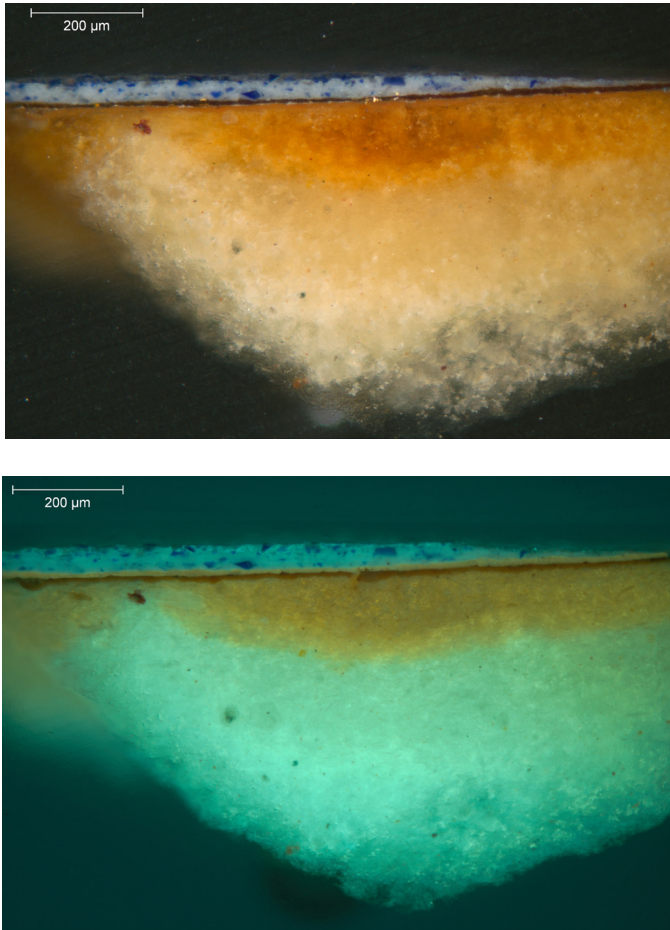


Fig. 5: Cross section in normal (a) and UV (b) illumination taken from the edge, showing the silver from the frame under the original paint layer. In UV illumination, a fluorescing yellow layer is clearly visible above the silver, and appears to have seeped through into the ground layer. Photo of the Author.



Fig. 6: Infrared Reflectogram captured with the Opus Apollo Camera, false color composite image created by overlapping three images captured with different filters, showing the 1250 μm , 1250-1510 μm , and over 1510 μm range. The false color composite allows the pieces of silver under the paint layers to be more clearly identified, and appear as dark patches along the top edge under the sky, and along the bottom edge under the saint's robes. Photo of the Author.



Fig. 7: Giovanni di Paolo, *Madonna and Child, St. Catherine of Alexandria*, circa 1457, tempera, gold and silver leaf on panel. Pinacoteca Comunale, Castiglion Fiorentino. Original Church unknown. Photo of the Author.



Fig. 8: Giovanni di Paolo, *Christ Suffering and Christ Triumphant*, 1420-1430, tempera, gold and silver leaf on panel. Pinacoteca Nazionale di Siena, originally from the Convent of San Niccolò al Carmine in Siena. Photo of the Author.



Fig. 9: The proposed reconstruction of the predella, including the Fitzwilliam and Kress panels. An unrelated *Man of Sorrows* by Giovanni di Paolo has been placed in the center – the original panel is lost. Additional grey areas have been added to account for calculations of lost areas in the predella. There would have been additional punchwork flanking each saint, and the entire predella is thought to have been a continuous frieze, with no dividing elements, framed by a continuous silvered frame. Reconstruction by the Author.



Fig. 10: Giovanni di Paolo, *La Pala di Staggia*, detail of the predella, circa 1475, tempera, gold and silver leaf on panel. Pinacoteca Nazionale di Siena, originally from the church of Saint Silvester near Staggia Senese, in Siena. Photo of the Author.



Fig. 11: A detail of the reconstructed Holy Passion Trinity, featuring the Mourning Virgin from the Fitzwilliam Panel, Saint John the Evangelist from the Kress Panel, and an unrelated *Man of Sorrows* as a place holder for what is now lost. The small fragment of grey paint at the bottom left corner of the Saint John section is thought to have been part of the rock composition of the central Christ figure. Reconstruction by the Author.



Fig. 12: The proposed reconstruction of the altarpiece to scale, including *The Coronation of the Virgin*, c. 1455, tempera and silver leaf on panel, 179,4cm x 131,4cm. The Robert Lehman Collection, Metropolitan Museum of Art, New York. Photo: The Metropolitan Museum of Art. Image source: Art Resource, NY. The altarpiece is here reconstructed to include the predella, comprised of the Kress (figure 1) and Fitzwilliam (figure 2) panels. Reconstruction by the Author.