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FRONT COVER
Edouard Vuillard, *La Terrasse at Vasouy, The Lunch* (NG 6373), 1901, reworked 1935 (detail).

TITLE PAGE
TOP LEFT: Adolphe Monticelli, *Subject Composition* (NG 5010), reverse, probably 1870–86 (detail).
TOP RIGHT: Pierre-Auguste Renoir, *The Umbrellas* (NG 3268), *c*.1881–6 (detail).
BOTTOM LEFT: Niccolò di Pietro Gerini, *Saint Peter: Left Tier Main Panel* from *Baptism Altarpiece* (NG 579.2), 1387 (detail).
BOTTOM RIGHT: Edouard Vuillard, *La Terrasse at Vasouy, The Lunch* (NG 6373), 1901, reworked 1935 (detail).

Niccolò di Pietro Gerini's *Baptism Altarpiece*: Technique, Conservation and Original Design

BRITTA NEW, HELEN HOWARD, RACHEL BILLINGE, HAYLEY TOMLINSON, DAVID PEGGIE AND DILLIAN GORDON

Introduction

In preparation for the *Devotion by Design* exhibition held at the National Gallery in summer 2011, the *Baptism of Christ* altarpiece attributed to Niccolò di Pietro Gerini (NG 579.1–5), which came originally from the Camaldolese monastery of Santa Maria degli Angeli in Florence, was received into the studio for conservation work in May 2009 (FIG. 1). This gave curators, conservators and scientists at the Gallery the opportunity for an in-depth study of the painting.

The altarpiece consists of a main tier of three panels, supported by a predella. These two tiers were reframed in the nineteenth century before the National Gallery acquired the altarpiece in 1857. The central panel shows Saint John the Baptist baptising Christ, who stands knee-deep in the River Jordan, watched by two angels, one of whom holds Christ's blue robe; above is God the Father despatching the Holy Spirit in the form of a white dove. An angel is in a roundel in the frame above. On the left panel is Saint Peter carrying the keys to heaven given to him by Christ, and on the right is Saint Paul, carrying a book and the sword with which he was beheaded. Each stands on a lampas silk textile decorated with phoenixes in flight and peacock heads and tails. In the predella are scenes from the life of Saint John the Baptist: left, the angel Gabriel appearing to Saint Zacharias, and the Birth of John the Baptist; right, the Beheading of John the Baptist, the Feast of Herod and Salome bringing the Baptist's head to Herodias. At the extreme ends of the predella are: left, Saint Benedict holding rods and a book; and right, Saint Romuald holding a hermit's tau staff.

The inscription socle is inscribed, left and right respectively: S.PETRUS.APL and SCS PAULUS. APLS (the S cropped by the non-original frame); in the centre is the fragmentary inscription which probably once read:

[A.D. MCC]C[L]XXXVII . DOM[I]N[VS]
PHILIPP[VS] NERONIS . FECIT . FIERI . HAN[C]/
[CAPP]E[LLAM PRO ANIMA] ANGELE .
M[ATRIS] SVE. ET SVORUM MORT[VORUM]

(In the year of Our Lord 1387 Don Philip Nerone had this chapel made for the soul of his mother Angela and of his deceased kinsmen).

The fragmentary central inscription transcribed above is not original, but has been painted on top of earlier *sgraffito* lettering (see pages 33 and 35). When and why this should have been necessary is not known, but it should be noted that the inscriptions on the altarpieces in Santa Maria degli Angeli were extremely important in reminding the monks to pray for the souls of the named patrons and their kinsmen.[1]

Patronage and provenance

The altarpiece of the *Baptism* comes from the Stoldi family chapel in Santa Maria degli Angeli. The chapel was built according to the testamentary wishes of Monna Agnola (Angela), whose son Philip was a monk at the monastery. In her will, drawn up on 13 August 1363, she left a house and some land. These were to be sold after the death of her stepson Federigho, in order to finance the building of a chapel within four years of his death; the chapel and its altar were to be dedicated to Saint John the Baptist.[2] Federigho died on 4 September 1383,[3] and the property was sold on 6 October 1383 for the sum of 500 gold florins. The chapel dedicated to San Giovanni Decollato (Saint John Beheaded) was built at the head of the new infirmary, and furnished with an altar, altarpiece, altar cloths, a chalice and everything pertaining to a chapel, at a cost of 500 gold florins; it was founded on 1 May 1386, and the first mass was said there on 23 September 1387.[4]

The *Baptism* came into the National Gallery from the Lombardi Baldi Collection in Florence in 1857.[5] In the Lombardi Baldi catalogue it was stated to be from the Badia del Sasso di Camaldoli in the Casentino,[6] which Martin Davies deduced to be the abbey of San Giovanni Decollato del Sasso near Arezzo.[7] The altarpiece no longer features in seventeenth-century *Sepoltuarii* for Santa Maria degli Angeli,[8] and a plausible hypothesis is

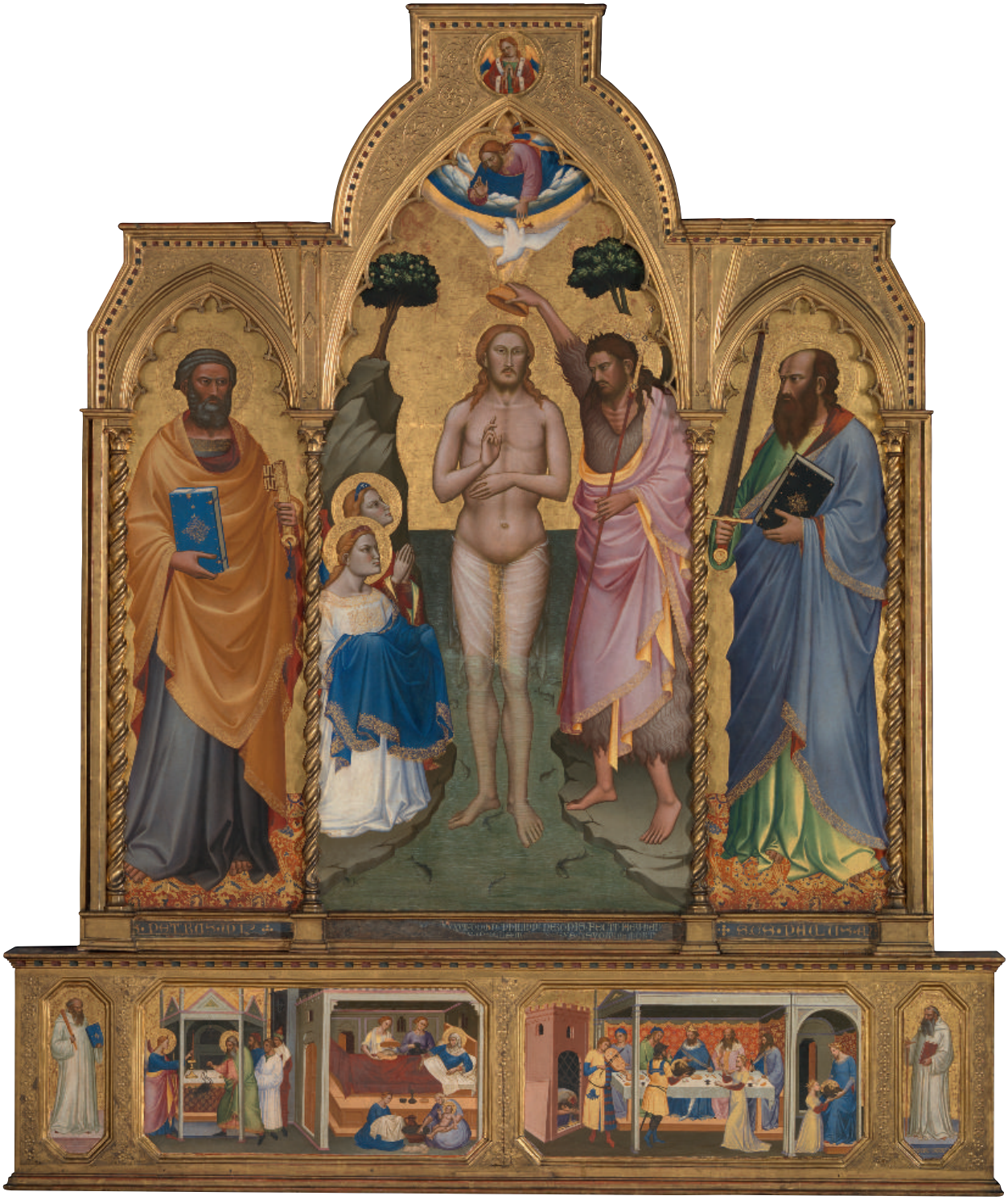


FIG. 1 Niccolò di Pietro Gerini, *The Baptism of Christ*, *Saint Peter* and *Saint Paul.* Predella: S*cenes from the Life of Saint John the Baptist*: left, *The Annunciation to Zacharias* and *The Birth of John the Baptist*; right, *The Beheading of John the Baptist*, *The Feast of Herod* and *Salome bringing the Baptist's Head to Herodias*. At the extreme ends of the predella: left, *Saint Benedict*, and right, *Saint Romuald* (NG 579.1–NG 579.5), 1387 (formerly inscribed 1387). Egg tempera on wood, main tier 189.5 x 171.0 cm, predella 48.2 x 196.2 cm. After cleaning and restoration.

that it had already been removed from the monastery at an unknown date, possibly before 1580.[9] A *terminus post quem* for the move would be 1414 when San Giovanni Decollato was united with Santa Maria degli Angeli.[10]

The artist

The *Baptism* is universally accepted as having been painted by the Florentine painter Niccolò di Pietro Gerini, who is documented from 1368, and died probably in 1415, certainly by 1427.[11] No discrete signed paintings by him survive, since he generally worked in collaboration with other painters, including Jacopo di Cione and Agnolo Gaddi; and together with Spinello Aretino and Lorenzo di Niccolò he completed an altarpiece in 1401 for Santa Felicita, Florence (Florence, Accademia) (see FIG. 43). He was one of the many Florentine painters in the thrall of the Cioni brothers, particularly with regard to his severe figure style, which contrasts so strikingly with his lavish decorative effects.

Technique and construction

The technique of the *Baptism* altarpiece is almost entirely in keeping with the practices described in Cennino Cennini's compendium, *Il Libro dell'Arte*, which, though nearly contemporary, reflected practices of earlier generations.[12] The traditional Florentine workshop techniques of the late trecento and early quattrocento described by Cennino typically follow set procedures, executed with meticulous care, and these are exemplified by the *Baptism* altarpiece.[13]

Support, framing and preparation

The altarpiece is a complex three-dimensional structure consisting of a number of different layers (FIGS 2 and 3). The central main tier panel is made from three boards with the grain orientated vertically.[14] There is no evidence for the use of dowels or tenons to reinforce the simple butt joins between the boards. The panel retains

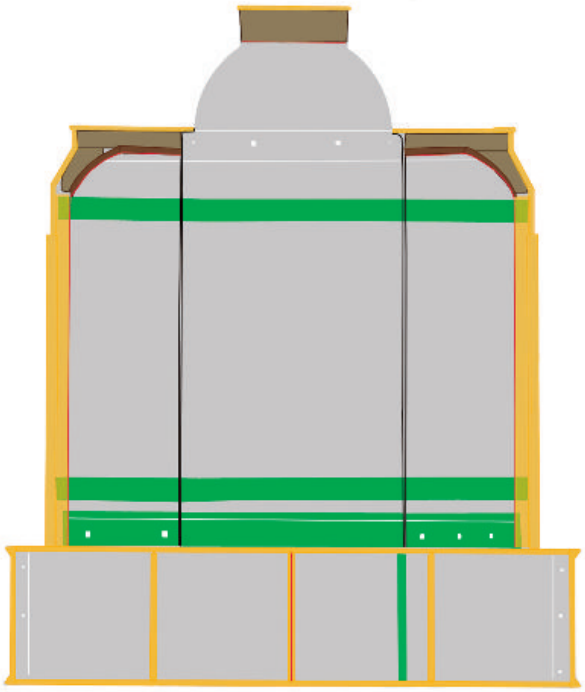


FIG. 2 NG 579, reverse of the altarpiece.
FIG. 3 Diagram of the altarpiece seen from the back, showing aspects of the original construction and extent of later alterations.

Panel key:		
	black lines	original edges on main panels
	red lines	cut edges
	white	position of original battens and nails to fix them
	yellow	non-original frame
	light brown	added wood which looks old and may be recycled original wood
	dark brown	added wood (not recycled)
	green	non-original battens and structural reinforcements

FIG. 4 NG 579, detail of gap between central and side panel (reverse): drips of gesso from the original preparation, running from front to back, confirm that this is an original edge.

FIG. 5 NG 579, X-radiograph detail showing the left edge of the central panel level with the capital of the twisted column: the frayed canvas edge is clearly visible, stopping short of the edge of the panel.

its original thickness (about 2.8 cm), and on the reverse original tool (adze[?]) marks can be seen bringing the planks into plane across the joins.[15] Drips of gesso from the original preparation, running from the front to the back of the panel on both sides, show that the wood has not been reduced in width since the application of the ground (FIG. 4). Shaped pieces of poplar were nailed to the front of the structure, forming the spandrels of the frame, to which decorative mouldings were nailed.[16] Before the application of the gesso ground, the front faces of the wooden panels, i.e. those surfaces that were to be painted or have *pastiglia* applied, were treated with a layer of glue size to reduce absorbency, and then covered with size-soaked canvas, trimmed or torn to shape. The canvas on the central panel (which is visible in X-ray images) has been applied in three pieces: a single section covering the upper portion of the panel, with the lower edge running through the bowl held by Saint John, and two vertical pieces with a central join running the full length of the rest of the panel. The join between these vertical pieces of canvas accounts for the accentuated crack pattern which runs through the centre of Christ's body and ends abruptly just above his head. The edges of the pieces of canvas are frayed and stop about 2 cm short of the outer edges of the panel (FIG. 5). The size and shape of this panel therefore seem to be original, apart from the top edge. The original upper edge of the panel (but not the framing elements on the front) has been cut, and a small board with a horizontal grain has been added behind the angel to bring the top of the panel level with the framing elements.[17]

The two side panels have been more radically altered. Both are made from two boards of poplar with a vertical grain. They have simple butt joins and retain their original thickness. Gesso drips, similar to those seen on the edges of the central panel, are present on the inner edges of both side panels, confirming that these edges are original. The canvas beneath the gesso has been applied in two pieces with the join running horizontally through the head of each saint. Frayed canvas ends are visible in X-ray images of the panels' inner edges (as on the central panel). However, the canvas reaches right to the boundary of the outer edges of the panels, suggesting that these have been cut and reduced by at least 2 cm, removing the frayed canvas and the uncovered extremity of the wood.[18]

The tops of the panels have also been cut, removing a significant amount of original material which has subsequently been built up again with various pieces of scrap wood (see FIG. 3). The cuts, unlike the alterations to the top of the central panel, go through all the layers, including the framing elements. They are symmetrical to each other, the curve of the cuts on the outer sides closely following the arched mouldings which frame the heads of Saints Peter and Paul.

The three panels are now held together with two sets of pegged wooden battens dovetailed into the reverse; these are not part of the original structure and are likely to have been applied when the panels were reframed. Close examination of the reverse reveals more about the original support (see FIGS 3 and 6). Although much evidence has been lost in the alterations to the upper sections of the side panels, certain details about the original cross-battens can be determined. Traces of a shallow horizontal channel can be seen just below the shaped top of the central panel, extending across the upper section of the outer panels.[19] Regularly spaced in a straight horizontal line within the channel are

FIG. 6 NG 579, detail of reverse: traces of a shallow horizontal channel, assumed to be the site of an original batten.

two large square holes and the remains of two nails, revealing the fixing method of the batten, which was attached using nails driven through from the front before the application of canvas and ground. Removing this batten without damaging the painted surface would have required some care.[20] X-ray images also show the presence of the remains of similar nails at the base of the two outer main tier panels.[21] These, along with another irregular shallow channel (now mainly concealed with a cross-grain support and a great deal of worm damage), indicate that a second nailed cross batten was originally present along the lower edge. These two cross battens could have been constructed with a pegged mortise and tenon joint, similar to the current nineteenth-century battens, to allow ease of assembly within the chapel once the separate panels were completed.[22] Joining the panels in this way removed the need to locate dowels between the panels themselves.

The predella has also undergone significant alterations. The painted surface consists of what was once a single poplar panel with horizontal grain formed from two boards, the join located close to the lower edge. There is now a vertical join in the centre of the predella (under the *pastiglia* between the two narrative scenes). X-ray images show that the wood grain on either side of this cut does not match up, indicating that some material has been removed from the centre of the predella (FIG. 7). Although it is impossible to calculate exactly the size of the loss, it is likely that an entire scene has been removed. The painted regions have the same canvas preparation as the main tier panels. None of the current framing is original, but traces of old nails at either end and near the central cut suggest that the predella was originally assembled as a box structure with a series of vertical struts.[23]

The original frame of the altarpiece would have been constructed at the same time as the painted panels and attached to them as part of a fully integrated structure. Once the carpentry was complete and canvas adhered to areas to be painted, gesso was applied to the whole surface, including the frame. Only a single layer of gesso is visible in the paint cross-sections (FIG. 35), and Fourier transform infrared imaging (FTIR) analysis of this layer confirmed the presence of hydrated calcium sulphate.[24]

Little of the present frame is original. Most of what we see now was almost certainly fabricated while the

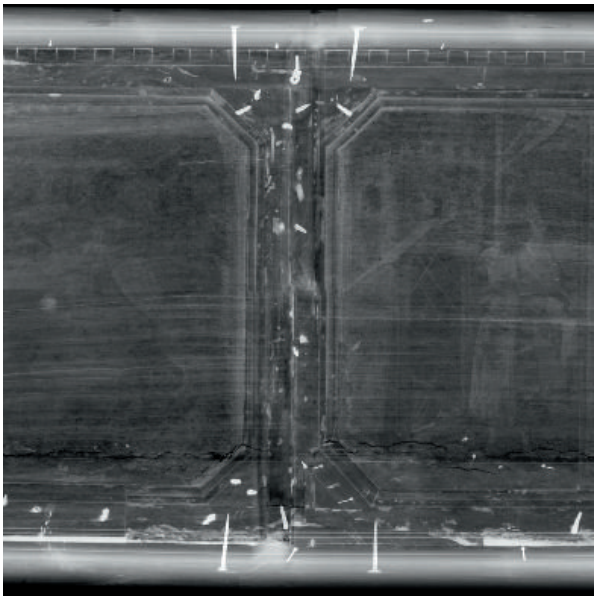


FIG. 7 NG 579, X-radiograph detail of the centre of the predella showing the hidden vertical cut and discontinuous wood grain.

altarpiece was in the Lombardi Baldi Collection, with the exception of the passages of *pastiglia* on the central panel, including the roundel with the angel, which are original and have not been disturbed.[25]

Underdrawing

Infrared reflectography (IRR) reveals a very careful underdrawing in a liquid medium applied with a brush. Where visible in the draperies, the drawing consists of outlines and elaborate hatching to indicate areas of shadow (FIG. 8). The extent to which a similar high level of modelling was present in the underdrawing for the face, hands and feet is not possible to determine, since the green earth and *verdaccio* underlayers in the flesh paint are visible in IRR and mask any underdrawing that may be present. The drawing is closely followed in the paint; there are a few slight modifications to contours but no significant changes.

Palette and binding medium

As with all Italian trecento altarpieces analysed at the National Gallery, the binding medium was found to be egg tempera,[26] and the palette is also typical for the period, including ultramarine, azurite, red lake, green earth, vermilion, red lead, lead white, lead-tin yellow (Type II) and earth pigments.[27] Difficulties in obtaining a suitable sample made it impossible to confirm the type of dyestuff employed in the red lake pigment, but it is most likely to be derived from either lac or kermes.[28]

FIG. 8 NG 579, Central panel, detail from infrared reflectogram showing the drapery of the angel in white.

Water gilding

Lines to demarcate the areas to be water gilded were incised into the gesso ground, thus ensuring that the boundaries remained visible as a guide for the design once the metal leaf was applied. The incised lines generally denote only the outer edges and a few summary details of drapery or facial features, while concentric circles setting out the haloes were incised with the aid of compasses. Closely incised parallel lines are also employed to denote the descent of the dove released by God the Father. Just a few tiny touches are added over this in mordant gilding at the junction of the blue cloud denoting heaven and the gilding below. These last touches were presumably added to augment the spatial effect created by the slight overlapping of the dove and the fingers of God the Father.

Water gilding on a red bole generally 15–20 μm thick (FIG. 9) was employed for the backgrounds, haloes and other areas where metal leaf was to be applied in advance of the paint layers, such as for Saint John's cross, the guard and pommel of Saint Paul's sword, Saint Peter's keys and also for the *sgraffito* decoration imitating lampas silk which is employed as a floor covering for the two side panels and hung vertically in the predella panels. The haloes, in particular, are elaborately tooled (FIG. 10); the tool punch types are described in detail elsewhere.[29] This intricate tooling functions to vary the reflective qualities of the surface, producing shimmering effects which would have been enhanced in the original candle-lit location. This variation in reflective qualities is used to good effect for the shadow of the magnificently patterned textile covering the steps bearing Saints Peter and Paul. Here, punched work is employed above the incised line of the step, while below, the lack of punchwork helps to emphasise the shadow of the vertical face. This difference is underscored by use of the more intense red pigment vermilion in the shadow, while the lighter and more orange cast of red lead is employed above (FIG. 11). Details of the elaborate *sgraffito* pattern of phoenixes in flight and peacock heads and tails are completed in natural ultramarine. *Sgraffito* was also employed

for the inscriptions below Saints Peter and Paul, and for the original inscription beneath the central scene. The original *sgraffito* of the central inscription is now obscured by a later repainting of the entire inscription (see p. 27) and can only be partially seen in strong specular light (and as such cannot be easily transcribed); it was observed during the recent conservation treatment when an iron plate covering the inscription was removed.[30]

For Saint Paul's sword blade, silver leaf was applied over a red bole. The metal leaf was then decorated with linear details in black paint.[31]

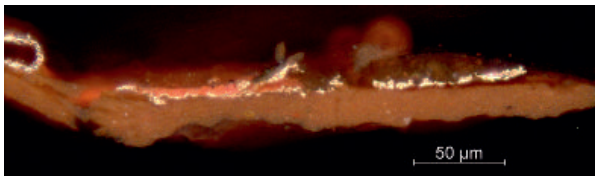


FIG. 9 NG 579, paint cross-section taken from the *sgraffito* on the right main tier panel (Saint Paul) showing water gilding over red bole. A vermilion paint layer is present on top of the gold leaf.

FIG. 10 NG 579, detail of Saint Peter showing elaborate tooling of the halo.

FIG. 11 NG 579, detail from the left main tier panel (Saint Peter) showing the use of the more intense red pigment vermilion for the shadowing of the lampas silk on the vertical face of the step, with the lighter and more orange red lead pigment employed above.

Flesh painting

The skilful use of green earth underpaint and *verdaccio* modelling in the flesh tones is demonstrated in samples taken from Christ's flesh. This technique, precisely as laid out in Cennino's instructions, is clearly visible at high magnification, in infrared, and in cross-sections (FIGS 12, 13 and 14). Although the pigments used for the upper layers of flesh are standard for this period (lead white, vermilion and earth pigments), they have been combined in varying proportions to produce very different tones: the pale pink flesh of Christ and the angels, made from a little vermilion combined with lead white, contrasts strongly with the much ruddier flesh of John the Baptist and the saints on the side panels, where a mixture of earth pigments with a lead pigment, probably lead white, was employed.[32]

It is interesting to note that a layer of *verdaccio* is also present beneath the purple drapery of the midwife in the left scene of the predella (FIG. 16), demonstrating that *verdaccio* undermodelling was not used solely for flesh painting. *Verdaccio* is also employed for the water at Christ's feet, where it is modulated with the addition of lead white and glazed with green earth.

Drapery painting

The solid, monumental figure style is offset by the rich *cangiante* shot-colour effects within the draperies. The intense green of Saint Paul's robe is composed of azurite combined with lead-tin yellow, over which a layer of ultramarine with lead-tin yellow type II, identified by X-ray diffraction (XRD), has been applied (FIG. 15). Though it is relatively common to find ultramarine combined with red lake to form purple, it is much less commonly combined in mixtures with yellow to make green. This particular combination has, however, been identified in the green drapery of the Evangelist in Nardo di Cione's altarpiece, *Saint John the Baptist with Saint John the Evangelist (?) and Saint James* of about 1365 (NG 581).

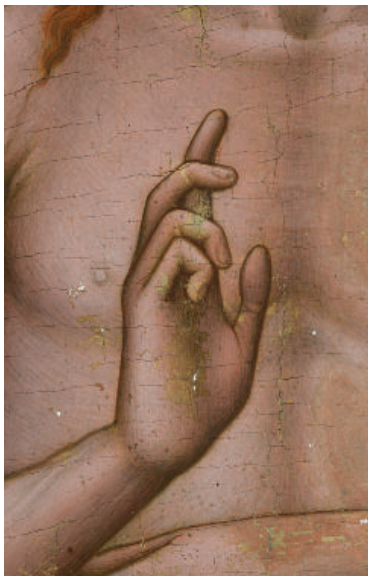


FIG. 12 NG 579, detail of Christ's flesh, taken after cleaning but before restoration. The use of green earth underpaint and *verdaccio* modelling are clearly visible in areas of old damage.

FIG. 13 NG 579, detail from infrared reflectogram of the central panel showing the same area as in FIG. 12

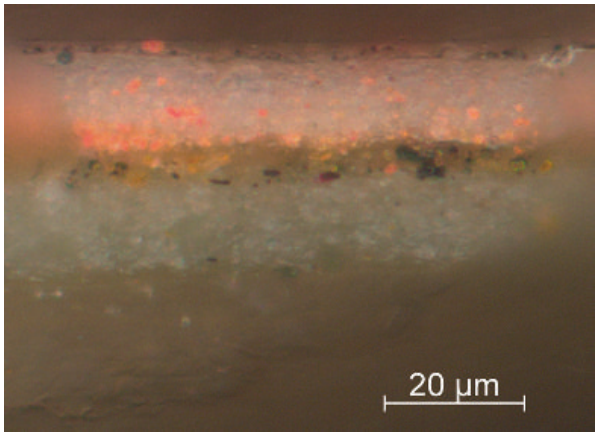


FIG. 14 NG 579, paint cross-section taken from Christ's flesh, showing modelling in *verdaccio* over a layer of green earth. The uppermost paint layers consist of lead white combined with vermilion. The gesso ground is visible at the base of the paint sample.

FIG. 15 NG 579, detail of Saint Paul's green drapery.

Natural ultramarine combined with red lake to produce a rich purple colour, as mentioned above, was extensively employed in the *Baptism* altarpiece. The red lake pigment from this mixture has faded in some areas, such as in Saint Paul's cloak, which now appears a mid blue, except in the very depths of the shading, where the purple colour survives. The extent of the fading of the red lake can be seen by comparing a sample taken from an area protected beneath the mordant gilding of the decorative border of the drapery with a sample taken from an unprotected area (FIGS 17 and 18). By contrast, a distinctive rich purple colour survives exceptionally well on the predella, where it was used extensively for draperies, architectural details and elsewhere (FIG. 19). In a sample taken from the purple drapery of the midwife in the left predella scene, a thick glaze of red lake combined with ultramarine is clearly visible over a more opaque layer of the same pigments combined with lead white (see FIG. 16). The exceptionally good survival of the red lake in this purple pigment mixture on the predella is curious, but serves to provide a clear indication of the original intensity of Saint Paul's robe and the extraordinary vibrancy this must have produced when juxtaposed with the intense green under-robe. The excellent condition of the red lake glaze in the sample from the predella may be due to a number of factors. It is possible that the predella may have been separated from the main altarpiece at some time and kept in a less well lit position. What seems more likely, however, is that the

predella, being considered less important than the main panels, may have been cleaned less frequently and less thoroughly in the past, thus leaving surface accretions protecting the underlying glazes.

By contrast, azurite combined with red lake, and sometimes also with a few particles of ultramarine, was employed for the more muted purple of Saint Peter's robe (FIGS 20 and 22). Samples taken from Saint Peter's yellow cloak suggest that this was modelled with a fine yellow earth combined with lead-tin yellow and a few particles of red earth, and with lead-tin yellow combined with a little yellow earth for highlights (see FIGS 20 and 21). In Jacopo di Cione's *The Crucifixion*, of 1368–70 (NG 1468), lead-tin yellow type II is combined with yellow earth and yellow lake. No yellow lake has yet been identified in the *Baptism* altarpiece.

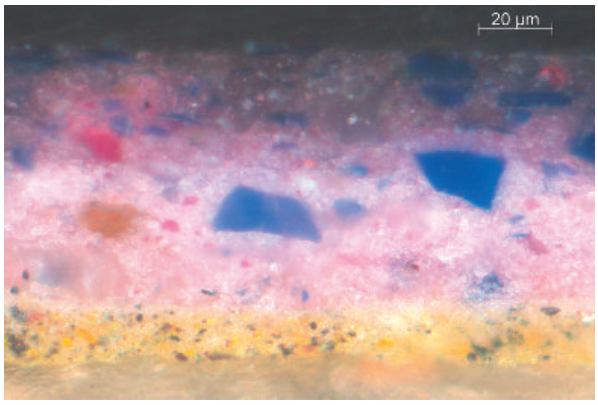


FIG. 16 NG 579, paint cross-section taken from the purple drapery of the midwife in the predella. A layer of *verdaccio* below the purple paint layers confirms that *verdaccio* undermodelling was employed for drapery in this area, as well as for flesh elsewhere. The gesso ground is visible at the base of the paint sample.

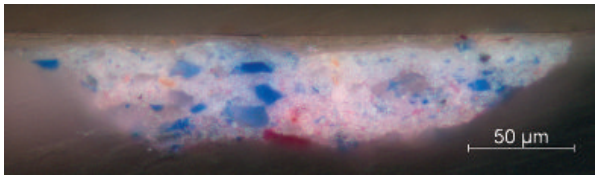


FIG. 17 NG 579, paint cross-section from Saint Paul's cloak. Natural ultramarine has been combined with red lake, lead white and a little red earth to produce a purple colour. The extent of the fading of the red lake in the upper portion of the paint layer is evident. The cloak now appears a mid-blue, except in the very depths of the shading, where the purple colour survives.

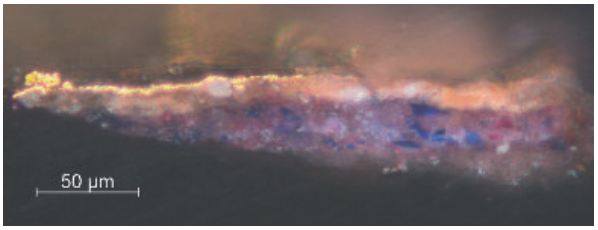


FIG. 18 NG 579, cross-section of a sample from Saint Paul's cloak taken from an area of the purple paint protected beneath the mordant gilding of the decorative border of the drapery (FIG. 15). The red lake has faded to a noticeably lesser degree than in the sample from an unprotected area shown in FIG. 17. In this sample the ultramarine and red lake mixture retains a strong purple colour. Over this is a pale pinkish mordant and gold leaf.

Mordant gilding

A sample was taken from an area where the gilded detailing of the hem overlays Saint Paul's green robe in the *Baptism* altarpiece. The distinctive salmon pink mordant, which has been used for the decorative borders on all the robes and which contains earth pigments, lead white and calcium carbonate, is clearly visible at the top of the sample (FIG. 23).[33]

Early varnish

Previously, it was thought that trecento paintings were not originally varnished, and thus any existing varnishes were often removed and sometimes replaced with waxy coatings, which were considered to be more sympathetic. However, evidence gleaned during the 1990s conservation of the San Pier Maggiore altarpiece has proved the presence of an original varnish. Indeed in that instance there is contemporary documentary evidence confirming that the altarpiece was varnished, as well as analytical results detailing the nature of its constituents.[34]

In one paint sample taken from the *Baptism* altarpiece there is also evidence of what may be an original varnish, from an area protected by an early repainting of the original inscription (FIGS 24 and 25). The sample clearly shows the ultramarine blue paint of the background of the original *sgraffito* inscription. Over this is what appears to be an original varnish, possibly tinted with a little red lead pigment.[35] The repainting of the inscription was also undertaken in natural ultramarine, but in this case applied over a grey underpaint. A much later phase of repair and repainting was undertaken in Prussian blue (available from 1704–10).

During the course of cleaning the *Baptism* altarpiece the conservators further noted what appear to be much

FIG. 19 NG 579, detail of the *Birth* scene on the predella showing the surviving purple colour used for draperies and architectural details.

FIG. 20 NG 579, detail of Saint Peter's draperies.

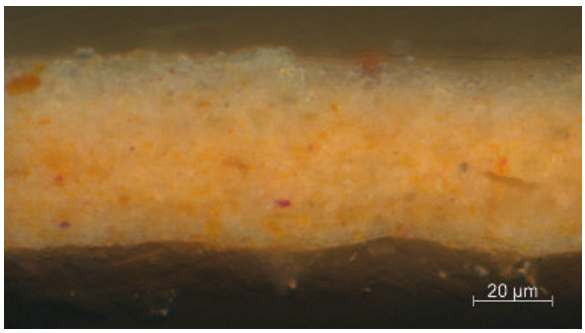


FIG. 21 NG 579, paint cross-section from the palest yellow of Saint Peter's sleeve. The palest highlight of the sleeve is painted in lead-tin yellow with a few particles of yellow earth. This has been applied wet-in-wet over a layer of lead-tin yellow combined with yellow earth and a little red earth. The gesso ground is visible at the base of the paint sample.

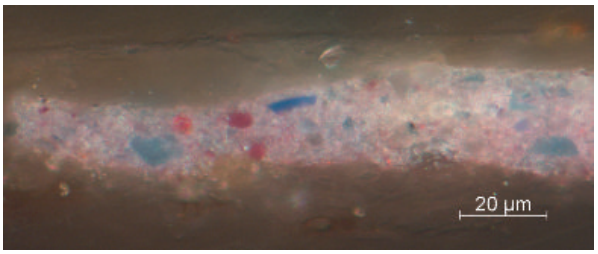


FIG. 22 NG 579, paint cross-section from the muted purple of Saint Peter's robe. Azurite has been combined with red lake, lead white and a little ultramarine and red earth.

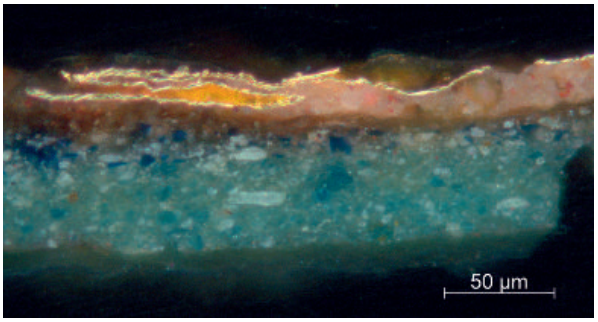
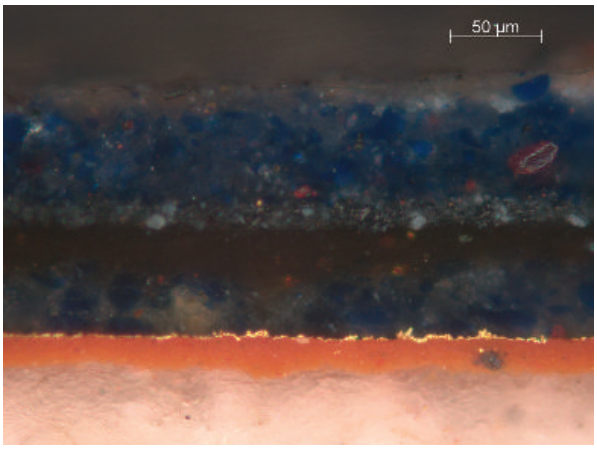
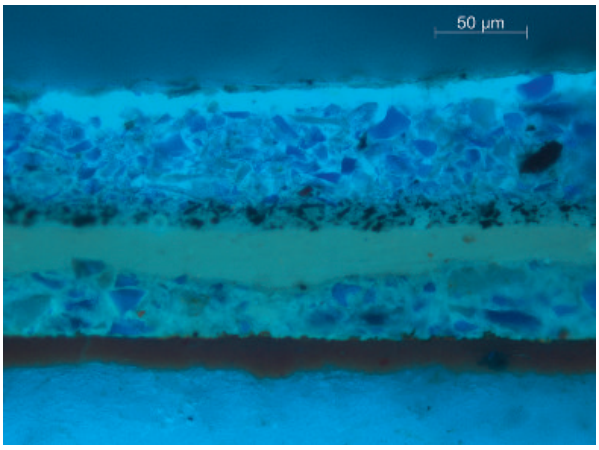


FIG. 23 NG 579, paint cross-section from the mordant gilding of the hem of Saint Paul's green drapery. The distinctive salmon pink mordant is clearly visible at the top of the sample. The green drapery is composed of two layers: the uppermost consisting of ultramarine combined with lead-tin yellow, applied over azurite combined with lead-tin yellow. A trace of the gesso ground is visible at the base of the paint sample.

more extensive remains of a possible early varnish. These traces are most clearly seen where water-gilded passages are juxtaposed with painted areas. Typically, in this type of painting, the gilding would have been left unvarnished so as not to compromise its reflective properties, whereas the paint is likely to have been varnished in order to saturate the colours. UV fluorescence images (FIGS 25 and 27) clearly show areas where the varnish has strayed over onto the gold surface when the figurative areas were varnished. This is particularly distinct at the base of the tree to the left of Christ and just above Saint Paul's proper left shoulder (FIGS 28, 29, 30 and 31), where 'brushmarks' are clearly visible on the gilding. A cross-section taken from a similar area to the left of Saint Peter's purple cloak shows a small fragment of fluorescent material over gold leaf and red bole on the right side of the sample (FIGS 32 and 33). When this and other similar areas are viewed closely, the surface appears slightly wrinkled (FIG. 28). It is clear from the presence of an oxalate-incorporating dirt layer over this varnish that it is of considerable age (FIG. 34).

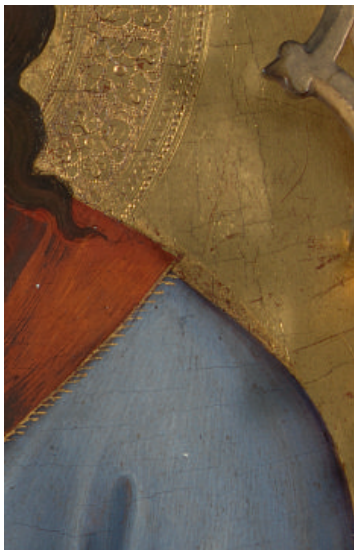




FIGS 24 AND 25 NG 579, paint cross-section from the inscription below the central main tier panel. The ultramarine blue paint of the background of the original *sgraffito* inscription is clearly visible, and above it there appears to be an early varnish. This varnish layer is particularly clearly visible in UV fluorescence (FIG. 25). When the inscription was repainted, a grey ground was applied over the varnish layer and another layer of ultramarine with a little red earth applied on top.

FIG. 26 NG 579, detail of Saint Peter. Visible light photograph, after cleaning before restoration (losses filled with white putty).

FIG. 27 NG 579, detail of Saint Peter. UV fluorescence photograph, after cleaning before restoration. The brushy application of the early (original?) varnish – undisturbed during the cleaning – is clearly visible.



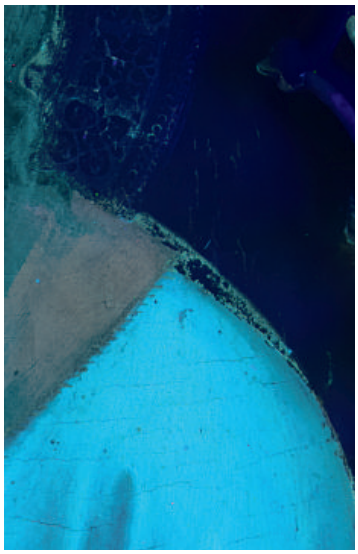


FIG. 28 NG 579, detail, Saint Paul's proper left shoulder, visible light photograph, after cleaning. The gold leaf around the contour of the shoulder (where early, possibly original, varnish has strayed onto the gilding) exhibits wrinkling.

FIG. 29 NG 579, detail, Saint Paul's proper left shoulder, UV fluorescence photograph, after cleaning. Early (original?) varnish (now somewhat abraded) has clearly strayed onto the gold surface around the contour of the shoulder.

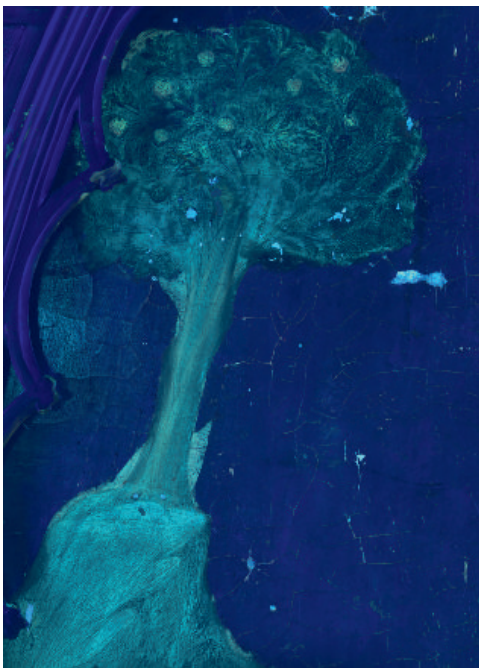
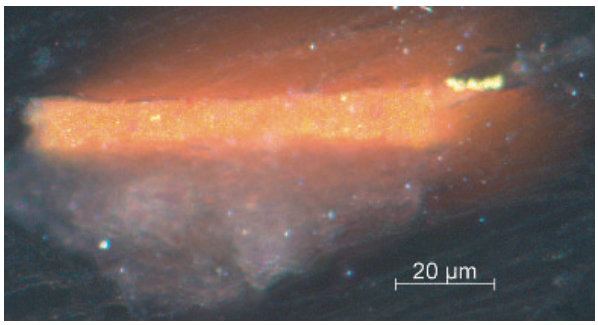


FIG. 30 NG 579, visible light photograph, after cleaning. Detail showing tree in the upper left of the main tier panel.

FIG. 31 NG 579, UV fluorescence photograph, after cleaning. Detail showing tree in the upper left of the main tier panel. Varnish has clearly strayed on to the gold surface at the bottom of the trunk.



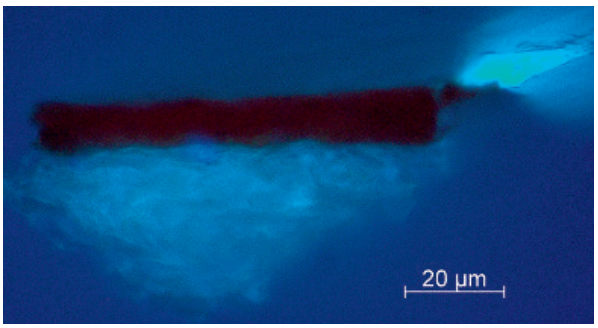


FIG. 32 AND 33 NG 579, paint cross-section from an area where varnish appears to have strayed over the gold background just below Saint Peter's left arm (FIG. 32). At the right side of the sample a trace of gold leaf is visible over the red bole. When the sample is viewed under UV illumination (FIG. 33), the material over the gold leaf fluoresces strongly.

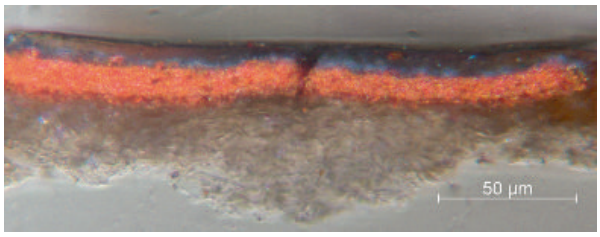


FIG. 34 NG 579, paint cross-section from the bedclothes in the *Birth* scene on the predella (FIG. 19). In this area the vermilion paint layer has altered, forming a pale grey chlorine-rich crust on the surface of the red paint. A varnish layer is present over the grey 'crust'. Analysis also confirmed the presence of an oxalate-rich dirt layer over the varnish.

Conservation history

National Gallery conservation records state that although the altarpiece had been repaired whilst in the possession of Signori Lombardi and Baldi before it entered the National Gallery Collection in 1857, by 1866 it was very dirty and blistered in many places.[36] It was therefore surface cleaned and repaired. In 1886 it was surface cleaned, repaired again and also varnished. In 1938 it was surface cleaned for a third time. The conservation dossier records that on this occasion it was, 'washed by [Helmut] Ruhemann and his assistant with a soap made by Ruhemann'. This soap contained a very small proportion of ammonia to remove the surface dirt which had settled on the picture during the 18 months it had been shown unglazed. The ammonia evaporated leaving a wax coating over the picture.[37] The necessity for such relatively frequent surface cleaning is unsurprising given the notoriously high levels of pollution in London during the nineteenth and early twentieth centuries, largely resulting from the burning of high-sulphur sooty fuels (coal).[38] In 1852, shortly before the acquisition of the *Baptism* altarpiece, William Russell, Trustee, informed the Board that, 'the constant deposit from atmospheric and other sources … leads to a dull appearance in the pictures which amounts to a denial of enjoyment of them to the public'.[39] Most paintings in the collection would be backed and glazed in subsequent years to protect them. Shortly after his appointment as Scientific Advisor, F.I.G. Rawlins conducted the first study of pollution inside the National Gallery, and in the same year, 1936, the *Baptism* altarpiece was deglazed. Rawlins's study gives a good sense of the deleterious effect of the pollution on the (mainly glazed and backed) paintings, reporting that, 'the experience is not very cheering… the amount of dust, both on the inside of the glass and on the picture itself, was extraordinarily large'.[40] Carbonaceous particles were collected from the polluted air and examined under the microscope. The particles were described as 'thin, buckled plates, greasy-looking and quite soft',[41] and it was suggested that this might cause them to adhere more easily to the painting surface. Given what was well known about the extent and effects of particulate pollution, the 1936 deglazing is somewhat surprising,[42] and it is not difficult to understand why the painting became dirty again so quickly.

The effects of gaseous pollution were also beginning to be understood at this time. Rawlins refers to recent research carried out by Dr Stout, describing the role of varnish layers in diminishing 'direct chemical action' upon pigments, and listing wax (a significant component of the surface coating on the *Baptism* altarpiece), as the least resistant to penetration by gaseous pollutants.[43] The chloride content of the brown coal burned at this period is particularly significant since this has been implicated in the alteration of vermilion,[44] a degradation process which has significantly affected the vermilion-containing red passages in the *Baptism* altarpiece. Chlorine was found in all samples taken from the painting. For example, in a sample taken from Christ's flesh, the X-ray map for chlorine shows high levels in all paint layers, but particularly at the surface (FIGS 35, 36 and 37).

The 1938 surface cleaning procedure, although uncommon by modern standards, was fairly typical for the period. Ruhemann discouraged the use of 'soap and water', believing that it might penetrate cracks in the paint film and dissolve the ground. Instead he advocated the use of an alkaline wax emulsion. This would have been applied fairly thinly across the surface and left for a short time, before gently agitating with a swab or soft brush to help lift the dirt. Dirt and excess paste would then have been removed with clean swabs. Finally, the surface would have been buffed or polished once any residues were dry.[45] In the case of the cleaning procedure employed for the *Baptism* altarpiece, the ammonia soap is stated to have 'evaporated leaving a wax coating over the picture',[46] indicating that a significant amount of wax residue was left. The use of wax polishes was relatively widespread at this time and seen as a sound method of protecting or reviving a varnish.[47]

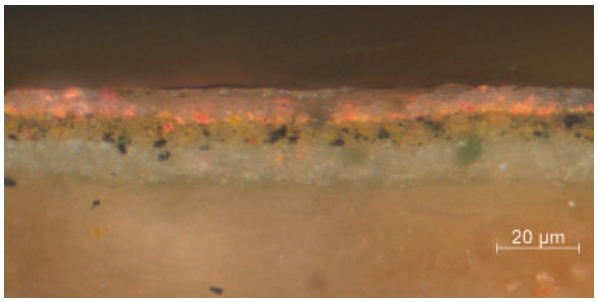


FIG. 35 NG 579, paint cross-section from the flesh of Christ's ribcage, centre main tier panel (FIG. 12). Here modelling in *verdaccio* is visible over an underpaint of green earth. The uppermost flesh tone consists of vermilion combined with lead white. The gesso ground is visible at the base of the paint sample.

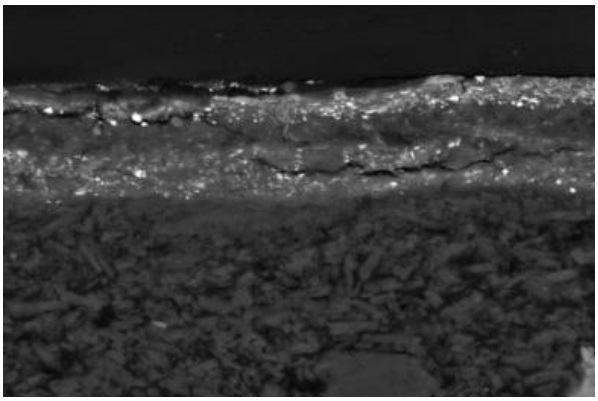


FIG. 36 NG 579, backscattered electron image of the cross-section shown in FIG. 35. Only a single layer of gesso is evident.

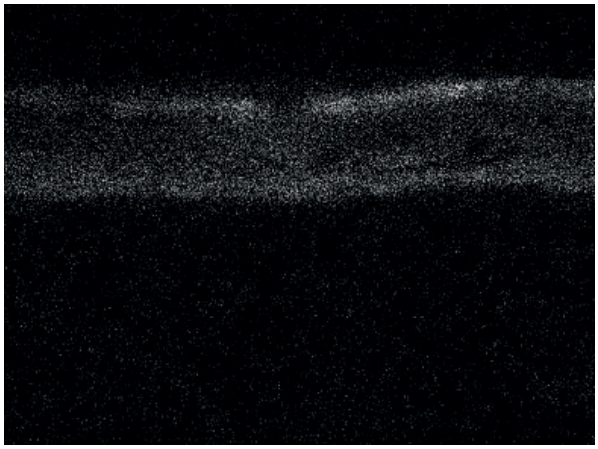


FIG. 37 NG 579, X-ray mapping of the area shown in FIG. 36 revealed chlorine to be present throughout the paint layers and focused at the surface of the sample.

Recent cleaning, 2010

Although the altarpiece was in comparatively good condition for its age, its appearance was greatly impaired by a thick greyish surface coating. This obscured the colours and markedly reduced the contrast between lights and darks so that it appeared dull and flat. The reflective properties of the gilded background were particularly compromised (FIG. 38). Furthermore, the initial cleaning tests indicated that this coating consisted of several different types of material, including wax incorporating a considerable amount of imbibed dirt, which would not be straightforward to remove using standard solvent mixtures.[48] The presence of wax on the surface was unsurprising given the 1938 conservation treatment of the painting, described above, and is most likely to be a residue of the 'wax soap' applied by Ruhemann.[49]

The mixed and intractable nature of the surface coatings suggested the use of solvent gels. These can combine a number of different actions (for example, organic solvents of differing polarities with a surfactant and water) and are thus a useful tool for solubilising layers consisting of several different materials.[50] This is particularly desirable on fragile surfaces where one wishes to keep mechanical (swab) action to a minimum and reduce the need to return to the same area numerous times with different cleaning agents. There is also far less solvent penetration than with free solvents, and a high degree of control. This method of cleaning was extremely effective at removing the mixed surface coatings,[51] while ensuring that a lower (early) varnish layer next to the paint layer was left intact (FIGS 39 and 40).

Although most of the painting was cleaned using this solvent gel formulation, particularly vulnerable areas, such as those containing vermilion, were not.[52] Here, most of the surface material was left untouched to ensure that the paint remained protected from any further exposure to external pollutants, which may lead to further alteration.

During cleaning, candle burn marks were discovered on the main tier: one on Saint Peter's proper right hand sleeve (FIG. 41), and one on Saint Paul's proper left shoulder. Canon law stated that two candlesticks and a crucifix were the minimum requirement for the celebration of Mass, and the height of these burns suggests that the candles would have been large and impressive. Also during cleaning, two symmetrically positioned areas of loss (previously overpainted) were

discovered in the predella: one to the right of the angel's head in the left-hand predella scene, and one to the left of Herodias' head in the right-hand predella scene (FIG. 42). This strange pattern of loss suggests that the damage was caused by repetitive impacts over time, probably from the bases of two candlesticks. However, it seems clear from examination and possible reconstructions of the altarpiece that these marks are unlikely ever to have aligned with the burn marks above.

The cleaning also revealed that the painting has been subject to a number of other events and processes. Firstly, in a case of religious superstition rather than iconoclasm, the altarpiece has been subject to deliberate attack (see FIG. 42 overleaf). The faces of the villains (those involved in the beheading of the Baptist: Herod, Salome and Herodias) have all been badly scratched. The full extent of the damage only became apparent during the cleaning. There were at least two separate restoration campaigns on top of the faces, suggesting that the damage is rather old, certainly pre-nineteenth century. Other scratches and damages to the altarpiece are assumed to be accidental.

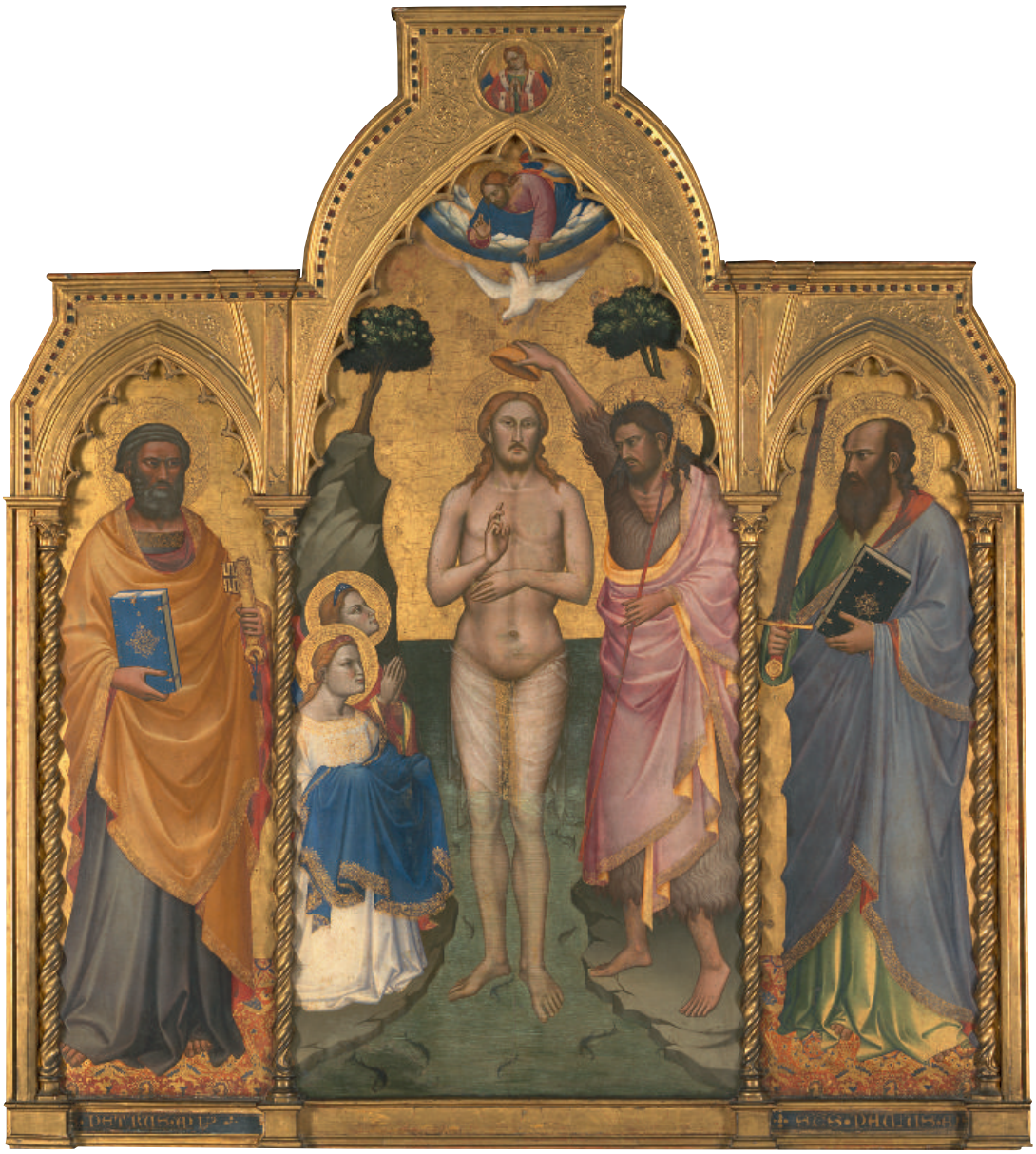


FIG. 38 NG 579, main tier before cleaning and restoration.

FIG. 39 NG 579, visible light photograph of Saint Paul during cleaning.

FIG. 40 NG 579, UV fluorescence photograph of the area shown in FIG. 39.

FIG. 41 NG 579, detail of Saint Peter's sleeve showing the candle burn, after cleaning and before restoration.

FIG. 42 NG 579, detail of the right main scene of the predella showing large area of loss, probably caused by repetitive impacts over time, and the damage to the faces of the villains, caused by deliberate attack.

The original design of the altarpiece

When the *Baptism* entered the National Gallery from the Lombardi Baldi Collection, attached to it were three pinnacles from an entirely different altarpiece by Giovanni da Milano (NG 579.6–8), unconnected with either Santa Maria degli Angeli or San Giovanni Decollato del Sasso.[53] The dimensions of these pinnacles, which were dowelled into the nineteenth-century frame, exactly fitted the tops of the *Baptism* altarpiece, which must have been adjusted to accommodate them.[54] The altarpiece must therefore have lost its original pinnacles by the time it entered the Lombardi Baldi Collection, or it would not have been necessary to attach pinnacles by a different painter.

The original central pinnacle is almost certainly a panel of the *Blessing Redeemer* (62.5 × 39.8 cm; Munich, Alte Pinakothek, inv. 644).[55] The original pinnacles on either side are almost certainly the kneeling *Annunciating Angel* (61 × 36.8 cm) holding a lily, and the *Annunciate Virgin* (61.1 × 36.5 cm) holding a book, both now in the Richard Feigen Collection, New York.[56]

If the association of these pinnacles with the *Baptism* altarpiece is correct, then placing them on the altarpiece reconstructed as a triptych would result in the proportions of the whole being unbalanced and the relationship of the pinnacle panels to the main tier panels below uncomfortably tight.

In fact, a number of factors suggest that the altarpiece was originally a pentaptych. In its current nineteenth-century frame the main tier of the altarpiece is narrower than the predella, as pointed out by Laurence Kanter.[57] As discussed earlier, X-radiography has revealed that the continuous horizontal board which originally formed the predella has been cut and that a significant section of wood is missing from the centre.

Further evidence that the original altarpiece was a pentaptych is to be found from examining X-radiographs and the carpentry of the main tier panels. As described on page 30, the canvas beneath the gesso of the panel with Saint Peter does not reach the edge of the panel and has frayed edges on the right, while on the left it continues to the edge of the panel and has been cut. Drips of gesso on the right-hand edge of the panel indicate that this is an original edge. Similarly the canvas on the panel with Saint Paul is frayed at the left and cut at the right, while drips of gesso are to be found on the left edge of the panel.

Furthermore, the twisted columns at the outer edges of both panels are not placed centrally under their capitals, while those at the inner edges are. Moving the twisted columns to their correct position shows that about 2 cm has been cut from the left side of the panel with Saint Peter, and likewise from the right side of that with Saint Paul. This is confirmed by the fact that in each case the *sgraffito* inscription with their names along the bottom of the panel has been curtailed left and right respectively (covered by the bases of the displaced columns).

The evidence that the outer edges of the side panels have been cut, added to the evidence of the truncated predella, suggests that there was originally another saint to the left and right of Saints Peter and Paul respectively. The additional saints are likely to have been the name

saints of the patrons: Saint Michael Archangel (?) and Saint Philip. They could have been on separate panels the same size and shape as those for Saints Peter and Paul, but it is more likely that each pair was on a single unified surface, approximately 80 cm wide.

The central main tier panel has not been reduced in width (see p. 30). If the altarpiece is reconstructed as a pentaptych, the gap below the central panel in the predella would accommodate a narrative scene the same size as the remaining narrative scenes, probably bordered on either side by decorative strips of *pastiglia*. The Naming of the Baptist is missing chronologically from the scenes from the life of the Baptist. Alternatively, Kanter has suggested that the missing scene may have depicted the Adoration of the Magi, given that the feast of the Baptism and Epiphany coincide on 6 January.[58]

Examination of the reverse of the altarpiece shows that the cutting of the panels with Saint Paul and Saint Peter closely follows the curve of the arched mouldings framing the heads of the saints on the left and right respectively, but then continues to the far side of each panel in a near-horizontal straight line (see FIG. 3). The gilded inner edges of the arches have never been separated from the painted panels: attempting to remove the panels from these framing elements would have caused a great deal of damage to the background gilding where it is continuous onto the frame, and this has not occurred. These cuts through the entire structure of the altarpiece could be explained by the removal of secondary elements of the altarpiece such as quatrefoils painted with prophets, which were common in Florentine altarpieces at this period (FIG. 43).

The profiles of the shoulders of the panels with the paired saints cannot be established with any certainty.

Separate pinnacle panels of the type suggested above, with the Annunciating Angel, Blessing Redeemer and Annunciate Virgin, commonly crowned altarpieces with concave shoulders, as for example in the altarpiece by Giovanni dal Ponte from San Giovanni Evangelista, Pratovecchio, now in the National Gallery (NG 580, FIG. 44).[59] Christoph Merzenich sees this type of altarpiece as exclusive to the years 1404 to 1409,[60] and it is true that the dated examples are confined to those years.[61] However, enough examples of late fourteenth-century Florentine altarpieces survive to demonstrate that concave shoulders were common in designs by Niccolò di Pietro Gerini and his circle (FIG. 45), including works by Niccolò himself, Lorenzo di Niccolò, with whom Niccolò collaborated in 1401 (see FIG. 43), and Mariotto di Nardo (documented 1388–1424) who was much influenced by Niccolò.[62] The combination of concave shoulders in lateral panels with convex shoulders in the central panel, as found in the *Baptism*, occurs in a single surviving altarpiece by Mariotto di Nardo, dated 1424 (Prato, Fondazione Cassa di Risparmio, formerly in the Serristori Collection, Florence, FIG. 46).[63] This altarpiece was restored in 1880, and Sonia Chiodo warns that the concave and convex profiles must be treated with caution.[64] However, given the number of surviving altarpieces with either concave or convex shoulders, it is not unreasonable to suppose that the restorer, who presumably had no reason to invent the design, followed what was originally there.

It is therefore possible that the *Baptism* altarpiece was similar in design to the altarpiece by Mariotto di Nardo in having a central panel with convex shoulders and side panels with concave shoulders (FIG. 47).

Alternatively, the altarpiece could have had three sets of matching convex shoulders (FIG. 48), given that the profile of the side panels of the main tier of Florentine altarpieces commonly repeated that of the central panel (see FIGS 43 and 45). It may be significant that the arc of the curved raised areas added in the nineteenth century where the side panels meet the central frame is the same

FIG. 43 Niccolò di Pietro Gerini, Spinello Aretino and Lorenzo di Niccolò di Martino, *The Coronation of the Virgin with Angels,* and *Saints Felicity and Andrew, John the Baptist and Matthew, John the Evangelist and Peter, James and Benedict.* Predella*: Eight half-length saints.* Quatrefoils*: The Prophets Jeremiah and Daniel.* 1401. Egg tempera and gold on wood, 280 × 278.2 cm. Florence, Galleria dell'Accademia, inv. 1890 n. 8468. Formerly Florence, Santa Felicita.

FIG. 44 Giovanni dal Ponte, *The Ascension of Saint John the Evangelist with Saints*; predella: *Scenes from the life of Saint John the Evangelist*; pinnacles: *The Annunciating Angel, The Trinity*, and *The Annunciate Virgin* (NG 580.1–NG 580.12), *c.*1420–4 (?). Egg tempera on wood, 277.5 x 257 cm. Formerly Pratovecchio, San Giovanni Evangelista.

FIG. 45 Niccolò di Pietro Gerini, *The Virgin and Child enthroned with Angels*, and *Saints Anthony Abbot, John the Baptist, Lawrence and Julian*; quatrefoils: *Saints Peter and Paul*, 1404. Egg tempera on wood, 183 x 285.6 cm. Florence, Galleria dell'Accademia, inv. 1890 n. 8610. Formerly Florence, San Benedetto fuori della Porta Pinti, later Santa Maria degli Angeli.

FIG. 46 (above right) Mariotto di Nardo, *The Virgin and Child enthroned with angels*, and *Saints James, John the Baptist, Andrew and Bernard*; predella: *scenes from the lives of those saints and the Adoration of the Magi*; pinnacles: *The Annunciating Angel, Blessing Redeemer and Annunciate Virgin*; quatrefoils: *David and Moses*. 1424. Egg tempera and gold on wood, 315 x 275 cm; predella 38 x 275 cm. Prato, Fondazione Cassa di Risparmio.

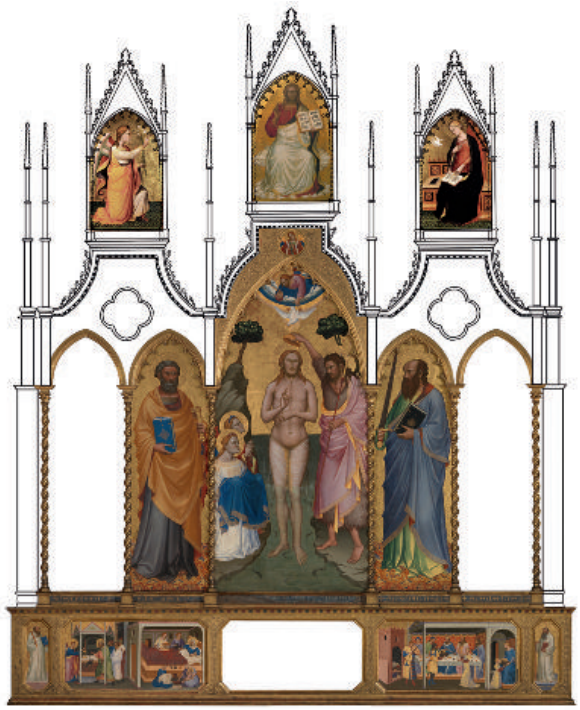


FIG. 47 Hypothetical reconstruction 1: central panel with convex shoulders and side panels with concave shoulders.

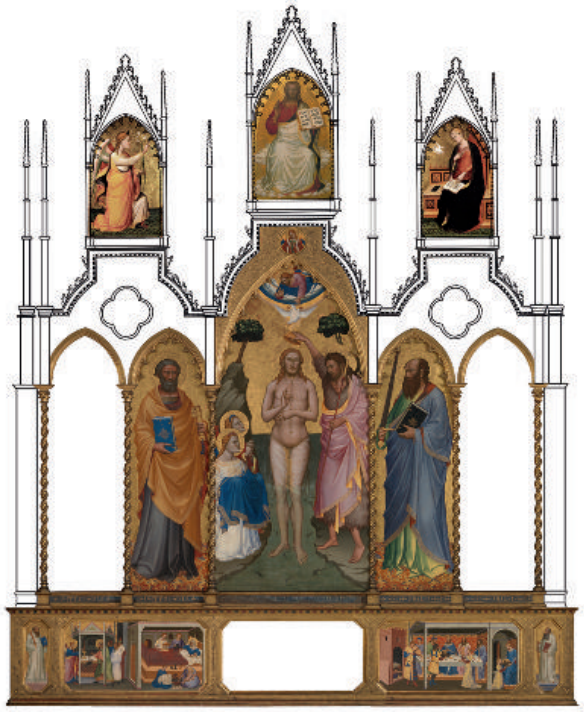


FIG. 48 Hypothetical reconstruction 2: three sets of matching convex shoulders.

as the arc of the curves forming the shoulders of the central panel.

The hypothetical width of the main tier panels in relation to the hypothetical width of the predella allows for lateral pilasters, possibly decorated with *pastiglia*.

At what stage the altarpiece was reduced to a triptych is impossible to say. It may be that this happened when the altarpiece was moved to San Giovanni Decollato. The (hypothetical) main tier onomastic saints would no longer have been relevant, whereas Saints Peter and Paul had universal relevance. Removing two of the main tier panels would have necessitated reducing the predella, and eliminating the central predella scene would have had the advantage of bringing the narrative showing the beheading (decollation) of Saint John, i.e. the scene reflecting the dedication of the monastery, into a more central and thus more prominent position.

However, given the very specific shaped cutting of the tops of the side panels, probably to preserve marketable painted pieces (see discussion above), it seems most likely that the changes were made after the polyptych had left San Giovanni Decollato and when it was in the hands of a dealer. The two outer saints may have been removed because they were more valuable if sold individually, leaving a highly marketable, and perhaps more manageably sized triptych, or perhaps they were badly damaged and not saleable. It seems likely that this was done when the altarpiece was in the Lombardi Baldi Collection, although there is an interim period between 1808, when San Giovanni Decollato was suppressed,[65] and around 1838, when the formation of the Lombardi Baldi Collection began,[66] when the location of the altarpiece is not known. There remains the tantalising possibility that more fragments may one day come to light.

Acknowledgements

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Notes

1 D. Gordon, *National Gallery Catalogues, The Italian Paintings before 1400*, National Gallery, London 2011, p. 405.

2 Monna Agnola's will (ASF, Diplomatico, Firenze, Santa Maria degli Angioli, 1363 Agosto 13) is available online. See also G. Bent, *Santa Maria degli Angeli and the Arts: Patronage, Production and Practice in a Trecento Florentine Monastery*, PhD, Stanford University 1993, Ann Arbour 1998, vol. 2, docs 40–2, pp. 653–6; and Gordon 2011 (cited in note 1) p. 407, notes 25 and 27.

3 See the record of Federigho's will and date of death in the registers kept by the monks of Santa Maria degli Angeli in the *Registro Vecchio* (Florence, ASF, Corporazioni religiose soppresse dal governo francese, 86, 95, f. 42), and the *Registro Nuovo* (Florence, ASF, Corporazioni religiose soppresse dal governo francese, 86, 96, f. 17 verso).

4 See the *Registro Vecchio* (Florence, ASF, Corporazioni religiose soppresse dal governo francese 86, 95, f. 41 verso), which was repeated almost verbatim in the *Registro Nuovo* (Florence, ASF, Corporazioni religiose soppresse dal governo francese 86, 96, f. 17 verso); transcribed by Bent (cited in note 2) (1993) 1998, Doc. 41, pp. 654–5.

5 The altarpiece came into the National Gallery as School of Taddeo Gaddi (as written on the non-original parts of the frame); it was catalogued as such in 1858; the attribution was changed in the MS catalogue (NG 10/3; see Gordon 2011 (cited in note 1), note 22, p. 406) to Agnolo or 'some able follower'. See M. Davies, *National Gallery Catalogues: The Earlier Italian Schools*, London 1961 (rev. edn of 1951), Appendix I, pp. 565–7, for the Lombardi Baldi Collection.

6 NG *Annual Report* of 1858 (NG 17/2), p. 62, XXIII.18.

7 Davies 1961 (cited in note 5), p. 388 and note 11.

8 NG 579 is not mentioned in Stefano Rosselli, *Sepoltuario Fiorentino* of 1657 (ASF, Manoscritti 625, ff. 1322–1326), which records the inscriptions on several of the altarpieces in Santa Maria degli Angeli. Rosselli was apparently incorporating information from a *Sepoltuario* of 1580 (see f. 1322), so NG 579 may have been moved from Santa Maria degli Angeli before 1657, possibly before 1580. Nor is NG 579 mentioned in the *Sepoltuario* of Biscioni, who records the arms of families on altarpieces in Santa Maria degli Angeli (ASF, Manoscritti 626, ff. 170–171), and on f. 171 says he is using a 'sepoltuario antico', possibly the same one used by Rosselli.

9 See note 8 above.

10 G.B. Mittarelli and A.Costadoni O. Camald., *Annales Camaldulenses Ordinis Sancti Benedicti*,1760, V, pp. 308–9; and Mittarelli and Costadoni 1761, VI, p. 264.

11 For Niccolò di Pietro Gerini see M. Boskovits, *Pittura Fiorentina alla vigilia del Rinascimento 1370–1400*, Florence 1975, pp. 58–60, 98–101 and pp. 402–415 for a list of attributions; also R. Fremantle, *Florentine Gothic Painters from Giotto to Masaccio: a Guide to Painting in and near Florence 1300 to 1450*, London 1975, pp. 313–22. A useful biography is given in C.B. Strehlke, *Italian Paintings 1250–1450 in the John G. Johnson Collection and the Philadelphia Museum of Art*, Philadelphia 2004, p. 151.

12 For an overview of the numerous editions and translations of Cennino's compendium, see T. Burns, 'Cennino Cennini's *Il Libro dell'Arte*; a historiographical review', *Studies in Conservation* 56, 1 (2011), pp. 1–13.

13 A detailed examination of the close relationship between Cennino's text and the technique of Nardo di Cione's altarpiece with *Saint John the Baptist, Saint John the Evangelist (?) and Saint James* is given in J. Plesters and A. Roy's appendix, 'The materials and technique: Cennino Cennini's treatise illustrated' in D. Gordon, D. Bomford, J. Plesters and A. Roy, 'Nardo di Cione's "Altarpiece: Three Saints"', *National Gallery Technical Bulletin*, 9, 1985, pp. 21–37. See also D. Bomford, J. Dunkerton, D. Gordon and A. Roy, *Art in the Making: Italian Painting before 1400*, exh. cat., National Gallery, London 1989, pp. 126–39.

14 The exact dimensions are published in Gordon 2011 (cited in note 1) p. 396.

15 Also evident on the reverse are repairs of knot damage, made during the original construction, with a filling material made from glue and sawdust, as prescribed by Cennino Cennini for the treatment of small defects in wooden panels. See Cennino Cennini, *The Craftman's Handbook 'Il Libro dell'Arte'*; translated by D.V. Thompson, Jr, New York 1960, p. 69.

16 This type of structure has been illustrated previously, see construction diagram of vertical units from the Santa Croce altarpiece, National Gallery, London, in Bomford et al. 1989 (cited in note 13), fig. 77, p. 114.

17 It is unclear why the panel was cut, when the framing elements including the roundel and the *pastiglia* on the front were preserved. As parts of the panel, including the upper section, have some relatively severe woodworm damage, it is possible that the panel was damaged during the removal of a pinnacle, which was likely to have been constructed with inserts designed to penetrate this upper section of the panel.

18 If the canvas was wider than required, it seems unlikely that one side would be exposed by up to 2 cm, whilst the other had an excess. The canvas in these types of construction does appear to be pre-cut or torn before application, as narrower strips could always be used in other regions of the construction such as mouldings, *pastiglia* or pilaster panels.

19 What remains visible is a roughly cut groove, with unfinished edges and varying in depth across the central panel, in places not biting into the surface at all. The original tool marks across the joins show that the panels were not highly finished on the reverse, which supports the suggestion that rather than making a true dovetail channel, the wood has been roughly flattened in the area of the batten, simply to ensure that the batten could lie flat.

20 The batten was removed before the nineteenth-century reframing. Whilst the two outer nails were probably accessible enough to be able to be sawn through, in the centre, where the batten was slightly embedded into the panel, this would not have been possible without causing a great deal of damage. It was necessary to cut a fairly large hole in the reverse to allow the nail head to be removed. This hole was not filled, and it is possible to see the gesso at the back of the painted image.

21 The corresponding region on the central panel was covered with an iron plate at the time of the X-ray (see note 30), thus masking any similar evidence from this region.

22 As illustrated in Bomford et al. 1989 (cited in note 13), figs. 74 and 75, p. 113.

23 There would have been at least four vertical struts, located at either edge and at either end of the (now missing) proposed central narrative scene.

24 A mixture of the anhydrite and hydrated forms of calcium sulphate had been identified by X-ray diffraction (XRD) in Nardo di Cione's altarpiece *Saint John the Baptist, Saint John the Evangelist (?) and Saint James*, see Gordon et al. 1985 (cited in note 13), p. 27.

25 In the main tier, the whole outer frame, including the dentil decoration, is new. The twisted columns may be original and certainly reflect what was originally there, although their capitals and bases have been replaced. On the central panel the status of the arch mouldings is less clear and the cusped decoration is almost certainly not original, but these probably reflect the original frame. Less of the original frame decoration remains on the side panels. All the decoration now visible above the arches is replacement, and although clearly modelled on the original decoration remaining on the central panel, there are some curious anomalies: the front faces of the arched mouldings project forward of the painted surface the same distance as that on the central panel, but the mouldings then step down, so that the surface on which the *pastiglia* pattern is placed is not as far forward

as its equivalent in the centre. The positions of the arches have not changed; indeed the lack of damage to the original gilding at their inner edges shows that the basic construction has not been adjusted; however, the stepped mouldings and cusped decoration have been added on top. Where the central panel frame decoration meets that of the side panels, there is a built-up area with a curved profile that echoes the equivalent triangular-shaped area decorated with *pastiglia* on the central panel. Between the two triangular areas, and bridging the gap between the two panels, is a narrow rectangular column which is definitely not original. The original frame would probably have had a construction above the capital of the twisted column to support a finial.

26 Scrapings were taken from the main panel and the predella and analysed with both FTIR and GC–MS; a sample of white paint from the robe of the kneeling angel to the left of Christ on the main panel gave FTIR absorption bands consistent with lead white pigment in a proteinaceous binder, while the GC–MS result confirmed the use of egg as the binder [A/P 0.3; P/S 2.1]. The sample from the predella was taken from the architecture in the centre left scene; GC–MS [A/P 0.2; P/S 2.5]. See also Bomford et al. 1989 (cited in note 13), p. 29, for other examples.

27 A letter from Niccolò di Pietro Gerini discusses the arrangements for making payment for pigments for his projects in Prato. See J.A. DeLancy, 'Shipping Colour: *Valute*, Pigments, Trade and Francesco di Marco Datini', in *Trade in Artists' Materials: Markets and Commerce in Europe to 1700*, J. Kirby, S. Nash and J. Cannon (eds), London 2010, pp. 74–85, esp. p. 82.

28 There have been relatively few dyestuff analyses of red lake pigments from early Italian works in the National Gallery Collection. However, analyses of slightly later works suggest a predominance of lakes derived from lac or kermes. See, for example, Lorenzo Monaco (NG 216) and Zanobi Strozzi (NG 1406) in J. Kirby and R. White, 'The Identification of Red Lake Pigment Dyestuffs and a Discussion of their Use', *National Gallery Technical Bulletin*, 17, 1996, pp. 56–80.

29 Gordon 2011 (cited in note 1), p. 398.

30 The central inscription was covered by an iron plate after it had entered the National Gallery Collection. See Davies 1961 (cited in note 5), p. 387.

31 The metal leaf has now tarnished, making the sword look rather crude, though IRR reveals that it was originally more elaborate, with two bevelled edges, a central section and a decorative motif, possibly an armourer's mark.

32 This area was analysed using a handheld X-ray fluorescence (XRF) device which provides a profile of the elements present.

33 Mordant gilding in trecento painting is discussed in Bomford et al. 1989 (cited in note 13), pp. 43–7.

34 This varnish was found to consist of heat-bodied linseed oil with a sandarac-type resin. A few tiny particles of red lead were also identified in the varnish layer, and these were probably incorporated to aid drying. The analysis, undertaken by Raymond White, is reported in Bomford et al. 1989 (cited in note 13), pp. 182–4. During conservation, traces of a transparent orange-coloured oleo-resinous varnish were found along the left and right edges of the *Pentecost* and around the edges of other panels of the altarpiece that were not extensively cut during its dismemberment. It seems likely that in those cases the original varnish survived where it had been protected by the frame from early campaigns of cleaning. The documentary evidence for varnishing in Italy and technical evidence from the San Pier Maggiore altarpiece is detailed in J. Dunkerton, J. Kirby, and R. White, 'Varnish and Early Italian Tempera Paintings', in *Cleaning, Retouching and Coatings*: Preprints of the Contributions to the Brussels IIC Congress, 3–7 September 1990, J.S. Mills and P. Smith (eds), London 1990, pp. 63–9.

35 It is interesting to note that particles of red lead were also identified in the traces of original varnish from the San Pier Maggiore altarpiece, where it is thought they were incorporated to aid drying. ATR–FTIR analysis was performed on the cross-section in an effort to gain more information on the organic composition of this layer. The presence of oil / resin was suggested by a broad carbonyl band (centred around 1713 cm^{-1}) together with a strong ester band (at approximately 1170 cm^{-1}) and methyl asymmetric and symmetric scissor bands (1452 cm^{-1} and 1384 cm^{-1} respectively) with a strong C–O stretching band (1251 cm^{-1}).

36 Flaking paint appears to have been a particular problem for the *Baptism* altarpiece, with at least nine recorded blister-laying treatments between the painting being acquired and 1961. In this year air conditioning was installed in the room where the painting hung, creating a far more stable environment. Air conditioning was first introduced into Room 29 in 1950 (P. Hendy, 'Director's Survey 1938–54', *National Gallery 1938–1954 (Annual Report)*, pp. 23–4. See also T.R. Keeley and F.I.G. Rawlins, 'Air conditioning at the National Gallery, London: Its influence upon the preservation and presentation of pictures', *Museum*, Vol. IV, No. 3, 1951, pp. 194–7). Air conditioning was gradually extended to other gallery rooms, so that by 1961 'very nearly half of the Rooms' on the main floor were air conditioned (P. Hendy, 'Director's Report', *National Gallery 1958–1959 (Annual Report)*, pp. 17–18). The air conditioning systems also incorporated particle filters, greatly reducing dust levels (G. Thomson, 'Air Pollution – A Review for Conservation Chemists', *Studies in Conservation*, 10, 1965, pp. 147–67; esp. p. 160).

37 National Gallery Conservation Record for NG 579.1–5 ('Brief History of Condition and Treatment'), p. 5.

38 D. Saunders, 'Pollution and the National Gallery', *National Gallery Technical Bulletin*, 21, 2000, pp. 77–94.

39 Minutes of the National Gallery Board of Trustees, February 1852, Vol. II, pp. 143–4.

40 F.I.G. Rawlins, 'Atmospheric Pollution with special reference to the National Gallery,' *Journal of the Institute of Heating and Ventilation Engineers*, 5, 1937, pp. 400–24; this description appears on p. 402.

41 Rawlins 1937 (cited in note 40), p. 413.

42 Presumably this was for aesthetic reasons: 'That considerable advantage would be gained by removing more glasses, if circumstances permitted, few would deny', Rawlins 1937 (cited in note 40), p. 404.

43 Rawlins 1937 (cited in note 40), p. 403.

44 M. Spring and R. Grout, 'The Blackening of Vermilion: An Analytical Study of the Process in Paintings', *National Gallery Technical Bulletin* 23, 2002, pp. 50–61.

45 H. Ruhemann, *The Cleaning of Paintings: Problems and Potentialities*, London 1968, p. 189. By 1968, Ruhemann was advocating the use of alkaline wax emulsions for the removal of surface dirt, which 'solves the problem of how to remove with a minimum of alkali and moisture all the surface dirt from the top of a varnish, leaving the varnish film intact and refreshed'. One such emulsion, mentioned by Ruhemann, is Robersons CRP (Cleaning, Reviving and Preserving) paste. This product is still available; the recipe, which has remained the same since it was patented, lists beeswax, carnauba wax, distilled turpentine, mineral spirits and ammonium carbonate.

46 National Gallery Conservation Record for NG 579.1–5 (cited in note 37).

47 In excerpts translated from the 'Dossiers de l'Office International des Musées', Paris 1933, quoted by Ruhemann 1968 (cited in note 45), pp. 318–9, it is stated that, '…the Committee recognises that an accord can be reached from the conclusive experiments already made, with an application of resin as first layer, then covered with wax, which fulfils the role of protecting the resin'. Further, it is noted that, 'at the 'Special Committee for the Restoration of Paintings' of the Rome Conference some experts recommend as varnish, resins dissolved in turpentine (with a small addition of oil); others advocate beeswax.' It goes on, 'the

disadvantages of wax as a final coating are negligible compared with the advantages it offers'.

48 A relatively strong fluorescence over the whole surface under ultraviolet illumination indicated the presence of an aged natural resin varnish. However, beneath this thin layer, soluble in propan-2-ol, the surface appeared very waxy and greasy, with the coating having a tendency to repel both aqueous and non-aqueous solvents, suggesting the presence of different components including dirt, varnish and wax. Surface scrapings taken from several areas over the main tier panels and predella contained beeswax (GC–MS analyses showed an odd numbered hydrocarbon envelope peaking at C^{27} and a significant C^{24} fatty acid peak). Elevated azelate levels suggested that some drying oil was also present. No natural resin varnish was detected by GC–MS, probably due to the thinness of this layer. The presence of an oxalate crust was also confirmed by FTIR analysis. An oxalate crust was also clearly observed over a fluorescent layer on top of vermilion in a cross-section analysed by SEM–EDX.

49 Any coatings applied when in the Lombardi-Baldi Collection are a possible source for at least some of the surface material and cannot be discounted. It is interesting to note that all of the paintings originating from this collection which have been cleaned at the National Gallery appear to have required a 'mixed' cleaning approach (aqueous cleaning agents together with mixtures of aromatic and non-aromatic solvents). This may imply that layers of wax were present as well as dirt and varnish. One painting in particular, the San Pier Maggiore altarpiece (NG 569–580), cleaned between 1988 and 1991, was found to have only wax as a protective surface coating. It is only in recent years that evidence for early and original varnishes on trecento and quattrocento paintings has begun to emerge. Previous generations of restorers, however, may have felt that applications of resinous varnishes to early Italian tempera paintings were to be avoided, and waxes (far less glossy) may have been perceived as more sympathetic and more in keeping with original artists' intentions. It would be interesting to analyse coatings on other Lombardi Baldi paintings to ascertain whether this may have been a widespread approach. A third possible source for the wax found on the *Baptism* altarpiece is the residue from previous consolidation treatments (see note 36). Where specified, the consolidant used for blister-laying treatments was wax.

50 Aqueous cleaning methods were introduced to the conservation community in the early 1980s by Richard Wolbers, 'as a tool for solving often complex and difficult cleaning tasks', T.P. Whalen, Foreword, *Solvent Gels for the Cleaning of Works of Art: The residue question*, The Getty Conservation Institute, V. Dorge (ed.), 2004, pp. v–vi.

51 A xylene-IMS-surfactant gel was formulated using the following ingredients: 1 g Carbopol EZ2, 6 ml Ethomeen C12, 35 ml xylene and 10 ml IMS. The gel was removed with a dry swab and cleared with a mixture of white spirits with small additions of xylene and IMS.

52 These passages were lightly cleaned by removing the upper thin varnish with propan-2-ol, then surface cleaning with saliva to help remove some of the dirt and discoloration.

53 For the pinnacles by Giovanni da Milano see Gordon 2011 (cited in note 1), pp. 244–55.

54 Noted as attached in the Lombardi Baldi catalogue (*Collection de Tableaux Anciens*, p. 9, no. 11). The catalogue is not dated, but the copy in the Uffizi Library is marked as dating from 1845.

55 Suggested by Boskovits 1975 (cited in note 11), p. 410. For the *Blessing Redeemer* see C. Syre in *Frühe italienische Gemälde aus dem Bestand der alten Pinakothek*, exh. cat., Bayerische Staatsgemäldesammlungen, Munich 1990, cat. no. 5, pp. 57–60.

56 Formerly with the Matthiesen Gallery (Richard Offner, H.B.J. Maginnis (ed.), *A Critical and Historical Corpus of Florentine Painting, The Fourteenth Century. Supplement, A Legacy of Attributions*, New York 1981, p. 83, as School of Niccolò di Pietro Gerini, and Figs. 154 and 154 A). See L. B. Kanter, *Italian Paintings from the Richard L. Feigen Collection*, New Haven 2010, pp. 31–5. Kanter points out that all three pinnacle panels have been artificially made rectangular through insertions at each corner, which suggests that all three panels remained together for a while after they had been removed from the altarpiece and the framing gable removed. The remains of nails securing a horizontal batten across all three panels could suggest that once they had been removed from the altarpiece they were reconstructed as an independent triptych. Similar remains of nails on the pinnacle panels by Giovanni da Milano cannot be construed in this manner, see Gordon 2011 (cited in note 1), p. 247.

57 See L. B. Kanter, 'Der selige Gerard von Villamagna im Florenz des 14. Jahrhunderts: öffentlicher Kult oder private Frömmigkeit?', in S. Weppelmann (ed.), *Zeremoniell und Raum in der frühen italienischen Malerei*, Petersberg 2007, pp. 184–93, p. 193, note 27.

58 Kanter 2010 (cited in note 56), p. 35, note 7.

59 The frame was refurbished while in the Lombard Baldi Collection, but the basic design is original (see D. Gordon, *National Gallery Catalogues. The Fifteenth Century Italian Paintings*, I, London 2003, p. 112).

60 C. Merzenich, *Vom Schreinerwerk zum Gemälde. Florentiner Altarwerke der ersten Hälfte des Quattrocento. Eine Untersuchung zu Konstruktion, Material und Rahmenformen*, Berlin 2001, p. 93.

61 See the examples cited in note 62 below.

62 An example where the central main tier panel is concave is the *Virgin and Child* dated 1404 which Kanter (L. B. Kanter, *The Italian Paintings in the Museum of Fine Arts, Boston, 13th–15th century*, vol. I, Boston 1994, cat. 29, p. 126, ill. p. 127) attributes to Niccolò di Pietro Gerini. A similar example, with the central main tier panel with concave sides, is the *Virgin and Child* dated 1409 (Florence, Santa Croce, Medici chapel; illustrated in Fremantle 1975 (cited in note 11), p. 394, fig. 804, attributed to Lorenzo di Niccolò. Another altarpiece by Niccolò di Pietro Gerini where the lateral and central main tier panels have concave shoulders is that dated 1401, originally from San Benedetto fuori della Porta Pinti, Florence, now in the Accademia, Florence (see M. Boskovits and D. Parenti (eds), *Cataloghi della Galleria dell'Accademia. Dipinti, vol. II: Il tardo Trecento. Dalla tradizione orcagnesca agli esordi del gotico internazionale*, Florence 2010, cat. 26, pp. 135–140). A complete altarpiece by Mariotto di Nardo, which retains its lateral pilasters painted with small-scale standing saints, is a triptych showing the *Coronation of the Virgin* (Minneapolis Institute of Fine Arts, formerly Hatton Garden church), dated 1408, where the sides of the central main tier panel are concave as well as the sides of the lateral panels (illustrated in B. Berenson, *Italian Pictures of the Renaissance. Florentine School*, (revised lists of 1932), London 1963, I, fig. 520). A polyptych showing the *Virgin and Child with Saints* (Siena, Pinacoteca), likewise complete with its lateral pilasters painted with small-scale full-length saints, painted by Taddeo di Bartolo and dated 1411, is evidently copied from Florentine models (H.W. van Os, *Sienese Altarpieces 1215–1460. Form, Content, Function*, Vol. II, 1344–1460, Groningen 1990, p. 71; ill. fig. 53 on p. 70).

63 Sold Sotheby's, Milan, 6 November 2007, lot 323. Illustrated in colour in S. Chiodo, 'Il polittico Serristori di Mariotto di Nardo' in *Prato. Storia e Arte*, 2007, 102, pp. 9–27, p. 11.

64 Chiodo 2007 (cited in note 63), 102, pp. 9–27, p. 10 and note 2. Merzenich 2001 (cited in note 60), p. 191, also points out that the frame has been considerably redone. Gordon 2011 (cited in note 1), p. 396, is incorrect in suggesting that the rounded shoulders of the main central panel in the *Baptism* belong to a later modification, although the profile was probably trimmed slightly during the reframing.

65 See Gordon 2011 (cited in note 1), p. 409, note 55.

66 See Davies 1961 (cited in note 5), p. 565.