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PLATE 1 Bernardo Daddi, *The Coronation of the Virgin* (NG 6599), *c.*1340. Egg tempera on wood, 112 × 65 cm.

Bernardo Daddi's *Coronation of the Virgin*:
The Reunion of Two Long-Separated Panels

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*T*he *Coronation of the Virgin* (NG 6599) was acquired in 2004, the first work by Bernardo Daddi to enter the National Gallery (PLATE 1). Bernardo Daddi (active by 1320–died 1348) was not only a highly gifted artist, but also one of the most prolific and influential painters of fourteenth-century Florence. The beautiful, extensively decorated panel of the Coronation originally constituted the principal scene of a larger painting, completed in the lower part by *Four Musical Angels* now at Christ Church Picture Gallery in Oxford (PLATE 2). The latter panel complements the image of the Virgin and Christ with four kneeling angels playing music and a fragmentary saint standing at either side: on the left is Saint John the Baptist – identified by the camel skin worn under his cloak – and on the right a deacon saint holding a book and a banner, almost certainly Saint Stephen.[1] Both panels have undergone substantial alteration: the *Coronation* has been cut on all sides, and modern replacements have been added to form the top of the

PLATE 2 Bernardo Daddi, *Four Musical Angels*, *c.*1340. Egg tempera on wood, 44 × 53 cm. Oxford, Christ Church (JBS5).

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arch, the left edge, and on the darker pink strip of textile along the base. Its current frame is also modern, a fine reproduction of a fourteenth-century design (see PLATE 19). *Four Musical Angels* has been visibly reduced in size, and in its present state is considerably narrower than the London fragment.[2] The acquisition of *The Coronation of the Virgin* by the Gallery provided the opportunity temporarily to reunite the two fragments, and to conduct extensive technical and scientific investigation on both panels. The reunited panels were shown in the Room 1 exhibition at the National Gallery, *Reunions: Bringing Early Italian Paintings Back Together* (12 November 2005–29 January 2006), and at Christ Church, Oxford (11 February–9 April 2006). The outcome of the investigation discussed in this article has brought to light new information on the original appearance of the *Coronation of the Virgin* and the history of its dismemberment, as well as on Daddi's painting technique.

History

The authorship of the two panels was until recently the subject of debate. Although there are important exceptions, Daddi's fame rests mainly on the production of small-scale devotional works, and this is perhaps why in the last century scholars variously ascribed the *Coronation* to Florentine artists of the younger generation: in the 1944 Christie's sale the *Coronation* was catalogued as by Nardo di Cione;[3] Richard Offner described it as 'Close to the Assistant of Daddi' and the *Four Musical Angels* as by the 'Assistant of Daddi', a personality he himself designated, and to whom he ascribed over twenty paintings;[4] Klara Steinweg, the art historian we must credit for making the connection between the two fragments, believed the compositional innovations of the reunited panels indicated the involvement of Andrea di Cione (elder brother of Nardo and Jacopo di Cione).[5] Following Steinweg's association of the panels, the old attribution of the Christ Church picture to Taddeo Gaddi was abandoned,[6] and James Byam Shaw cautiously described both panels as 'Florentine School'.[7] Most modern scholars, endorsing the view expressed by Miklós Boskovits and Enrica Neri Lusanna, now consider the *Coronation* with *Four Musical Angels* to be by Daddi, and date the work between 1340 and 1345.[8] Strong stylistic similarities can be traced between the reunited *Coronation* and several autograph paintings, such as the Uffizi *Triptych* of 1328[9] the Orsanmichele *Maestà* of 1347,[10] and particularly the so-called San Pancrazio Altarpiece of about 1338–40 (which in fact came from the

Florence Duomo, Santa Reparata).[11] The small *Marriage of the Virgin* (PLATE 3) in the Royal Collection, originally part of the San Pancrazio predella, has a number of similar features to this *Coronation* with *Four Musical Angels,* such as the bright palette (especially the deep reds and vivid greens), the rendering of facial features, the generous modelling of the drapery, and the decorative motif of the hems. Additional stylistic indication of Daddi's authorship of NG 6599 is the rare punch mark seen in two of the angels' haloes in the Christ Church panel (PLATE 4). The fantastic creature squeezed into a round lozenge – generally referred to as the dragon punch – recurs only in works associated with Daddi and his workshop (so far it has been traced in the border of the *Assumption of the Virgin* from the Lehman Collection in the Metropolitan Museum of Art, New York, and in the halo of San Crescenzio in the *Coronation of the Virgin* from the Galleria dell'Accademia, Florence).[12]

Although the painting's original destination is unknown, it may be significant that, as Dillian Gordon pointed out, two lost paintings signed by Daddi were recorded in S. Maria a Quarto, near Bagno a Ripoli (outside Florence): a panel in the choir dated 1340, and one on the high altar dated 1341.[13] Regrettably the records do not describe the subjects of these paintings, but the fact that S. Maria a Quarto was in the parish of Santo Stefano might explain the prominent positioning of Saint Stephen in *Four Musical Angels*. The painting's known history starts at the beginning of the last century, when it appears to have been an object of interest to artists and connoisseurs: it is almost certain that it was in the collection of Herbert Horne,[14] and thanks to Caroline Elam, we now know it was perhaps the 'fine Coronation of the Virgin round Orcagna or Gaddi' Charles Ricketts saw at the dealers Robinson & Fisher's on 13 May 1904.[15] In his diary Ricketts writes that he would have bought the picture had Herbert Horne not arrived on the scene,[16] thus suggesting that NG 6599 may have entered Horne's collection at this point. *The Coronation of the Virgin* next appears on 31 March 1944, in the sale of the Property of the late John Pierpont Morgan;[17] on this occasion it was bought by Mrs M.H. Drey, and in 1955 it passed into the hands of the renowned Swiss collector Heinz Kisters[18] in Meersburg (near Lake Constance), where the American connoisseur Richard Offner was able to study it closely. Following Kisters' death in 1977, the painting remained in Switzerland (Kreuzlinglen) with his wife and son, until it was purchased at Sotheby's by the National Gallery.[19]

The reunion

In the entry for the *Coronation of the Virgin* in the 1958 volume of his *Corpus of Florentine Painting,* Offner wrote: 'A composition of this theme current at the time certainly continued downwards sufficiently to afford room for kneeling angels. Since the surviving fragment transcribes corresponding portions of the Academy Coronation by the Assistant of Daddi, it is more than likely that the lower part showed angels in similar attitudes. This hypothetical panel, thus extended, served as the central leaf of a polyptych of which the lateral panels were filled with groups of sainted worshippers.'[20] Offner thus established that, in all likelihood, the National Gallery *Coronation* was a fragment of a larger ensemble depicting angels and saints. For the indefatigable American connoisseur this was a natural conclusion to reach: the Coronation of the Virgin was without doubt one of the most popular subjects in fourteenth-century Florentine painting, and many of the surviving depictions of this theme followed Offner's description. The best-known example is probably the altarpiece painted in about 1328 by Giotto and workshop for the Baroncelli Chapel in Santa Croce, Florence[21] (see PLATE 5). The latter appears to have provided a prototype for numerous other Coronations, such as Daddi's polyptych in the Galleria dell' Accademia**,** Florence, of about 1340–5[22] (see PLATE 6); Allegretto Nuzi's polyptych in

PLATE 4 *Four Musical Angels*. Detail of the 'dragon punch-mark' in the halo of the angel playing the violin.

Southampton Gallery, dated to about 1350 (its two side panels are in the Museum of Fine Arts, Houston, Texas);[23] the triptych, attributed to Puccio di Simone, once formed by the now lost panel from the Cenami Spada Collection in Lucca and the panels in the Galleria Nazionale di Parma (probably about 1345–50);[24] the polyptych by Giovanni del Biondo in San Giovanni, Val d'Arno, dated to about 1370;[25] and the National Gallery altarpiece by Jacopo di Cione and workshop (NG 569) painted in 1370–1 for the church of San Pier Maggiore, Florence.[26]

PLATE 3 Bernardo Daddi, detail of *The Marriage of the Virgin* (predella scene from the Santa Reparata Altarpiece), *c.*1330–42. Egg tempera on wood, 25.5 × 30.7 cm. The Royal Collection (RCIN 406768).

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PLATE 5 Giotto, *The Coronation of the Virgin*, *c.*1328. Egg tempera on wood, 185 × 323 cm. Florence, Santa Croce, Baroncelli Chapel.

PLATE 6 Bernardo Daddi, *The Coronation of the Virgin*, *c.*1340–5. Egg tempera on wood, 186 × 270 cm. Florence, Galleria dell'Accademia (3449).

In 1961 Klara Steinweg,[27] Offner's close collaborator, identified the missing angels in the brightly coloured picture at Christ Church (see PLATE 2).[28] The subject of the painting, as well as the fact that it had been significantly cut down in size, made *Four Musical Angels* an ideal candidate as the *Coronation*'s lost fragment, and several stylistic similarities persuaded

Steinweg that the two panels originally belonged together: these include the monumentality of the figures, the treatment of the drapery, the 'toothcut motif' (a row of dentils in the gable and base of the throne),[29] and the S-shaped mordant gilding traceable on the hem of Saint John the Baptist's robe, the front of Saint Stephen's robe, and the edge of Christ's blue

cloak. Steinweg also observed faint traces of circular segments on the painted surface on the bottom left-hand corner of the Virgin's mantle, and at the bottom right-hand corner of Christ's cloak. Scientific endorsement of her hypothesis was given by the X-radiograph of the *Coronation* panel, which showed the outlines of two fully punched haloes around the bottom edges, and a hand just below the Virgin's mantle. The two haloes clearly correspond with the two truncated saints in the Christ Church panel, and the hand with that of Saint John the Baptist gesturing upwards to the main scene. Steinweg published a diagram drawn by her colleague Brigitte Klesse, reconstructing the two panels (FIG. 1). Klesse differentiated between what was found in the X-radiograph – indicated by tiny dots – and what she completed with dotted lines. Steinweg also suggested that a trefoil depicting God the Father, similar to the one in the top medallion of Daddi's *Coronation* in the Galleria dell'Accademia (PLATE 6), was missing from the Kisters *Coronation*.[30]

New technical and scientific examination at the National Gallery

As part of the preparatory work for the *Reunions* exhibition, the *Coronation of the Virgin* and *Four Musical Angels* were extensively studied: new X-radiography was carried out on both panels; for the first time a full survey was made using infrared reflectography;[31] the paintings were studied under a microscope and paint samples were analysed to build up a picture of the materials and techniques used.[32]

Painting technique

The construction of the panel and many aspects of the manner of execution follow an established tradition of Florentine panel painting, many features of which are recorded in *Il libro dell'Arte*, Cennino Cennini's invaluable treatise on the practice of art, and, specifically, the practice of painting.[33] Although written at the end of the fourteenth century, the book describes the traditional methods of panel painting which would have been familiar in Giotto's time. In fact Cennini had been the apprentice of Agnolo Gaddi, son of Giotto's own pupil Taddeo Gaddi, and Bernardo Daddi, a probable associate of Giotto, would have followed in this tradition. The materials and techniques of Trecento painting have been surveyed more generally in a National Gallery publication of 1989, but no picture from around the 1340s was available for study at that date and the work concentrated on a somewhat earlier period, and dealt more comprehensively with the techniques employed rather

FIG. 1 Reconstruction by Brigitte Klesse of *The Coronation of the Virgin* with *Four Musical Angels*. According to Klara Steinweg's hypothesis, this panel would have measured 150 × 70 cm (excluding the top missing gable).

later, from the mid-1360s in the Florentine workshop of the di Cione family.[34]

The *Coronation of the Virgin* was painted on a panel of poplar wood 1.9 cm thick, and, judging from the tool marks on the reverse, the panel is still of its original thickness. It was prepared with a white ground of true gesso, but there is no reinforcing canvas embedded in the ground, or beneath it, as occurs on many Trecento panels.[35] The design was drawn onto the panel using a liquid material applied with a brush or pen. The drawing is simple, only outlines and important folds are drawn and there are no attempts to indicate modelling or the fall of light and shade, apart

from some short hatched lines in some of the deeper folds (FIG. 2). The contours where paint was to abut gold, such as the Virgin's profile, were then incised. Incisions have also been used for straight lines in the architecture and tiled floor, and for details such as the pole of Saint Stephen's banner and the organ pipes (PLATE 7). There are no major alterations to the underdrawing or changes between the drawing and painting in the *Coronation* panel. However, infrared reflectography of the *Four Musical Angels* did reveal a change to the angel holding the tambourine; this angel was initially drawn supporting the instrument with her left hand underneath, the tips of her fingers curling up to touch the front of it (FIG. 3).

The examination of several samples as paint cross-sections revealed that Bernardo Daddi did not always conform to the painting methods generally seen in panels of the mid-fourteenth century: he applied a thin layer of pure lead white paint to the ground, presumably to provide a more reflective and smoother surface than a polished layer of gesso could offer.[36] This pure white paint has been detected beneath the Virgin's drapery, and beneath the pink-patterned cloth of honour on the throne and Christ's pale pink robe (see PLATES 13 and 15); it seems likely that it is in fact present beneath all painted areas on the panel, although the underlayer revealed in samples from the tiled pavement in the Christ Church panel shows the lead white in this part to have been tinted with a little azurite. A similar technique of underpainting with white has been noted for the Virgin's (darkened) ultramarine robe in the Orsanmichele *Maestà* (Florence, Orsanmichele).[37]

Analysis has shown the binding medium for the paint layers to be pure egg tempera, as was usual for Italian paintings of this period.[38] Drying oil is present, but not as a paint binder, appearing rather in the various oil-based adhesives, often containing pigment in addition, used for decorative mordant gilding in the design.[39] In the *Coronation of the Virgin* mordant gilding plays a prominent part in the design, accounting for the final decorative features worked in gold leaf and paint of the Virgin's mantle (PLATE 9), the edging of Christ's ultramarine blue cloak (PLATE 8) and the fleur-de-lis pattern covering the entire pink cloth of honour (see PLATE 18). This gilding technique also functions in a more subdued role as the gold threads on the orange and green fringe around the edges of the cloth of honour, with its outer band of mordant gilding (PLATE 11),[40] in the gilded textiles of the robes of the music-making angels, and for the linear designs of the coloured tile pavement in the lower fragment of the painting (PLATE 10). This elaborate use of
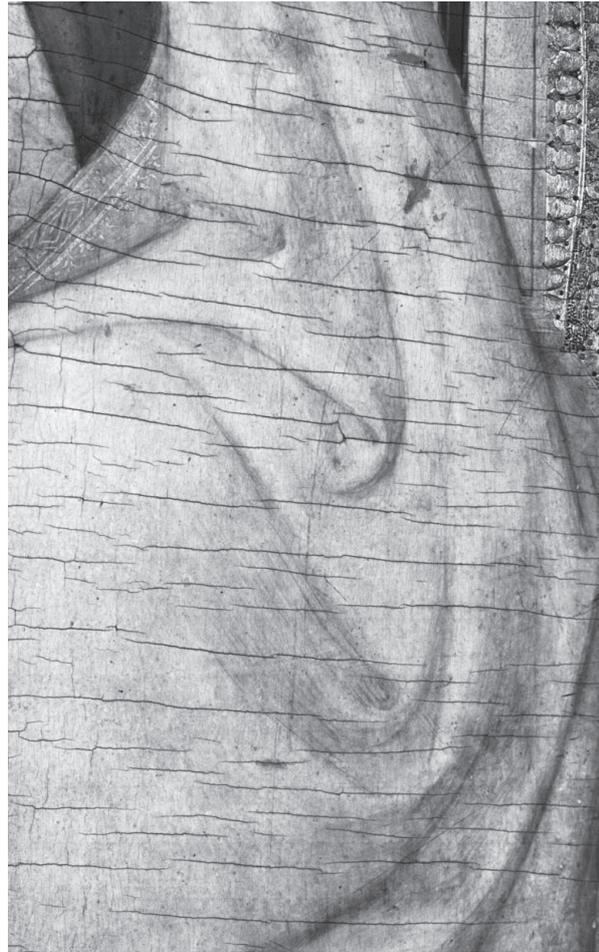
FIG. 2 *The Coronation of the Virgin.* Infrared reflectogram detail showing underdrawing in Christ's cloak.

PLATE 7 *Four Musical Angels.* Detail of organ pipes to show incisions and use of silver leaf.

FIG. 3 *Four Musical Angels*. Infrared reflectogram detail showing pentimento in the angel holding a tambourine.

PLATE 9 *The Coronation of the Virgin*. Detail showing mordant gilding decoration on the off-white mantle of the Virgin.

PLATE 8 *The Coronation of the Virgin*. Detail showing mordant gilding decoration on edge of Christ's blue cloak. The dark brown areas are the lining, where silver leaf was covered in translucent green which has now discoloured.

PLATE 10 *Four Musical Angels*. Detail showing mordant gilding decoration on the tiled floor pattern (also showing part of gilded decoration on angels' robes).

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PLATE 11 *The Coronation of the Virgin*. Detail showing mordant gilding decoration on the orange and green fringe around the edge of the cloth of honour.

PLATE 12 *The Coronation of the Virgin*. Detail showing the Virgin's crown against her halo.

mordant-gilded detail is set against the more solid gold look of punched and decorated water-gilding as the background to the throne, the haloes of the Virgin and Christ, and the four water-gilded and deeply punched haloes of the angels in the Christ Church painting. The haloes with their densely stippled sections, and the coloured glazes representing the jewels of the Virgin's crown, and those embellishing the punched cross within Christ's halo, must have been intended to convey a three-dimensional effect. The placing of the crown with its black outline drawn over the halo is also an attempt at three-dimensionality (PLATE 12). This technique, also used in the *Coronation of the Virgin* from S. Maria Novella (Florence, Galleria dell'Accademia), is not taken as far as the literal three-dimensional carved and gilded vine pattern pastiglia work employed by Daddi in the haloes of the later Orsanmichele panel.[41]

An even more striking decorative counterpoint of the London *Coronation of the Virgin* would originally have been provided by the shimmering quality of silver leaf beneath translucent green glaze: the lining of Christ's blue cloak and of the Virgin's mantle was executed, unusually, in silver leaf attached by means of an oil mordant (PLATE 14).[42] Sadly this effect has been

lost as a result of the drastic darkening and turbidity of the copper-containing glazes laid over the silver substrate (see PLATE 8).[43] In this case it is the paint that has discoloured rather than the metal having tarnished; the silver is in fairly good condition, unlike that of the exposed silver leaf representing the organ pipes in the lower fragment, where the technique is of a more conventional kind, with silver leaf laid on a red-brown bole containing an aqueous binder, that is, the equivalent of water-gilding (see PLATE 7).[44]

With pictures of the age of the *Coronation of the Virgin* one must consider to what degree colour change may have occurred, whether as fading or darkening, in various parts of the painting, and the overall impact this would have had.[45] Perhaps the most serious distortion is the darkening of glazes over silver leaf in the linings of the mantles of Christ and the Virgin, as noted above. There is some darkening, also, in the glazes used to depict the jewels on the water-gilded and mordant-gilded parts, but these areas are more difficult to assess since there is a certain amount of retouching and repair here as well. Microscopical examination of the Virgin's off-white drapery revealed no evidence of serious colour change (see PLATE 9): there are very subtle transitions in colour between the lightest possible grey in the shadows (where minor quantities of carbon black pigment are combined with lead white) and a very pale pink, rendered as a thin scumble of red earth pigment mixed with white over a pure white underlayer as described above. Since none of these pigments – neither the white, the black nor the red – is vulnerable to light, it is clear that the paint cannot have faded; any distortion of colour is more likely to be connected with the wearing of the paint layers and the yellowish-grey tone that has

developed in the present varnish on the picture. A very similar light-coloured drapery was used by Daddi for the Virgin in the *Coronation* triptych in Florence (Galleria dell'Accademia) of roughly the same date and presumably involves the same technique. In the London painting the mordant-gilded repeating pattern on the Virgin's drapery contains small lozenges of ultramarine blue, substantially unchanged, and a more curvilinear part of the design in reddish brown (see PLATE 9). The latter is vermilion-containing paint which has darkened slightly at the surface and it is noticeable that in the small vertical section of recon-structed drapery at the left edge of the panel, the equivalent areas of the pattern, matched with restorer's vermilion, remain a brighter red.[46]

The pink textile cloth of honour, on the other hand, contains notably light-sensitive materials, specif-ically a red lake pigment which forms the solid pink colour (PLATES 13 and 16). This is made up of several layers of lead white mixed with a deep pink lake, applied over a thin reflective layer of white. The

design was roughly incised into the wet pink paint (see PLATE 18) and then the blue, green and gold pattern in paint (natural ultramarine and green-toned mineral azurite – see PLATE 16) with gold leaf was applied directly, possibly aided by a stencil, over the pink background colour: paint first, then lastly the gilding over a dark brown mordant layer. Examination of the red lake pigment protected from light beneath the layers that make up the pattern has demonstrated that the degree of fading of the red lake has been minimal. The pale pink areas of Christ's robe, also containing a red lake with white, appear rather more faded, however. In this drapery, the mauvish-blue shadows comprise a thin glaze of natural ultramarine partially protecting the pink underlayer, and the same technique is employed for the drapery of the trun-cated figure of Saint John the Baptist in the Christ Church fragment (PLATE 17).

Some of the observed colour changes are less disturbing. The orange-coloured parts of the fringe of the throne's canopy (see PLATE 11), which is painted in
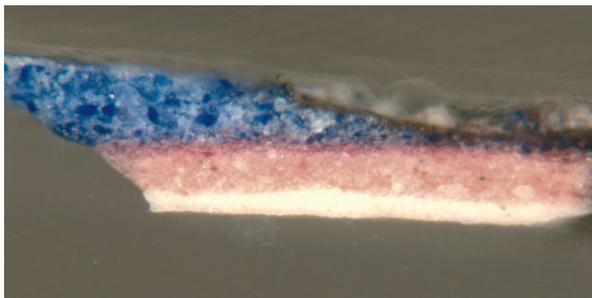
PLATE 13 Paint cross-section from blue design on pink of cloth of honour, showing a layer of natural ultramarine with white, over the pink background of red lake pigment mixed with white. The thin *imprimitura* of lead white lies beneath. No gesso is present in the sample. Original magnification 240×; actual magnification 215×.
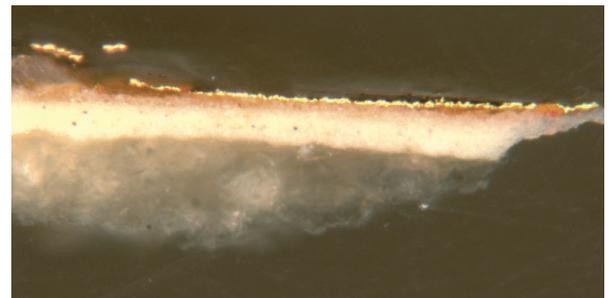
PLATE 15 Paint cross-section from gilded design on the Virgin's mantle: gold leaf has been attached to the faintly pink paint of the drapery with a very thin layer of mordant. The pink textile consists of a thin scumble of fine red earth pigment over the white *imprimitura*. The gesso is beneath. Original magnification 230×; actual magnification 205×.
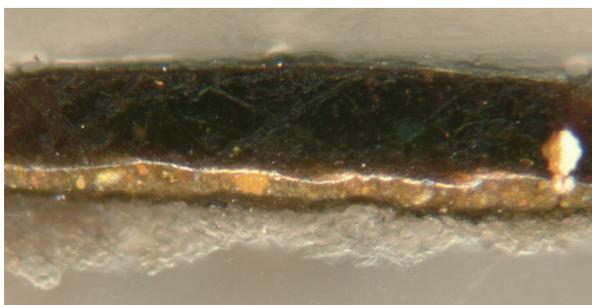
PLATE 14 Paint cross-section from the lining of the dark brownish-green lining of Christ's mantle, consisting of a discoloured copper green glaze (probably oil-based) over silver leaf. The metal leaf is attached by means of a brownish mordant containing earth pigments. Original magnification 190×; actual magnification 170×.
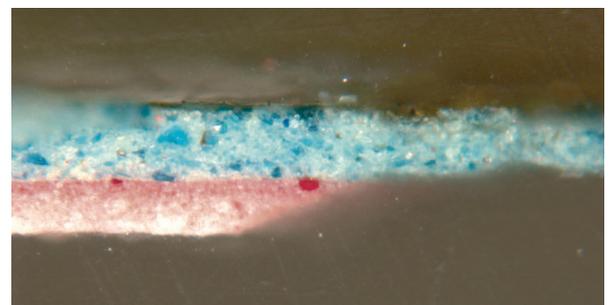
PLATE 16 Paint cross-section from green of design on the cloth of honour consisting of greenish azurite with white over the pink background of red lake pigment combined with white. A trace of the white *imprimitura* is present beneath, but there is no gesso in this sample. Original magnification 225×; actual magnification 200×.
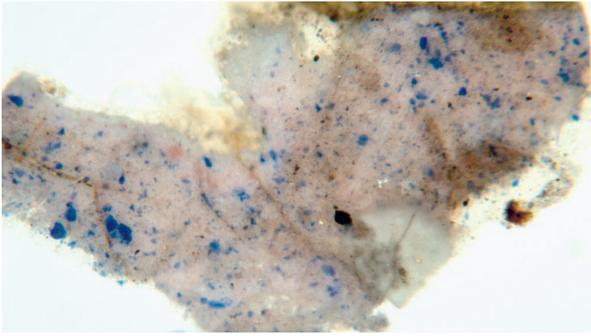
PLATE 17 Paint sample, top surface of an unmounted frag-
ment, from the lilac drapery of Saint John the Baptist in
Four Musical Angels (see PLATE 2). The paint contains natural
ultramarine with white and red lake pigment (rather faded).
Original magnification 220×; actual magnification 195×.

PLATE 18 *The Coronation of the Virgin.* Detail showing mordant
gilding decoration on the pink cloth of honour.

red lead (*minium*; lead tetroxide),[47] a pigment often
employed in Florentine Trecento painting, has light-
ened to some degree, although where the same
pigment has been used for the bright orange
diamond-shaped tiles in *Four Musical Angels* the paint
appears unchanged (see PLATE 10). In the same lower
portion of the panel, the vermilion draperies of the
two angels playing portative organs show only the
most minor darkening of the surface pigment,
although in paintings in egg tempera this material
sometimes exhibits a much more serious form of
darkening.[48] The green and yellow *cangiante* draperies
of the two other angels, which combine lead-tin
yellow (the early, vitreous form of the pigment, 'type
II', that is, *giallorino*),[49] with natural azurite, and glazes
of natural ultramarine in the deepest shadows, are also
well preserved through the use of pigments that are
stable in egg-tempera medium. These materials, and
their uses, are summarised in Table 1 (see p. 25).

The new reconstruction

As well as providing new information about Daddi's
working methods, technical examination has served to
confirm Steinweg's thesis, and revealed additional
material that allows us to propose a new reconstruc-
tion for the missing parts of the panel.

Before discussing what might be missing from the
original painting it is first necessary to establish
exactly what remains. The *Coronation of the Virgin* is
painted on a large, irregularly shaped wooden panel
(PLATE 20). None of the edges we see now is original.
At some date before 1828 the lower section depicting
angels and saints was cut from the bottom; this
conclusion is based on the fact that Fox-Strangway's
gift of *Four Musical Angels* to his former college, Christ
Church, occurred in 1828. Not only was the
Coronation of the Virgin cut at the bottom to remove
the angels, but it was also cut horizontally above
Christ's halo and at both lateral edges. Presumably to
make a more marketable object, additions were
attached to the remaining fragment: a narrow strip
(3.2 cm wide) on the left, with the repainted arm of
the throne behind the Virgin; a larger strip across the
bottom (7.8 cm deep), painted in a darker pink than
the textile strip just above it, perhaps in order to
resemble the riser of a step; and a polygonal piece at
the top (28.2 cm high), completing the throne with a
pointed arch. The extent of the original paint shows
clearly in the X-radiographs, and is identifiable by its
very distinct pattern of horizontal cracks, which do
not occur in any of the added parts (FIGS 4, 7 and 8).
X-radiography also shows that the additions were
attached using half-lap joins, the new wood overlap-
ping the original by about 6.5 cm at the back for both
the top and bottom joins (resulting in two horizontal
bands across the X-radiograph where the two bits of
wood overlap).

Samples of paint were taken for analysis from the
fleur-de-lis pattern on the lower section of the
Coronation panel in order to shed light on the date this
addition had been applied. The deep pink colour on
the addition forming the background to the pattern
was painted in a mixture of lead white, vermilion and
red lake, matching the original pink colour applied as
several layers of red lake and white over the white
lowermost layer (PLATE 13). The deep green parts of
the addition contain the nineteenth-century pigment
combination known as 'chrome green' (a manufac-
tured mixture of chrome yellow [lead chromate] and
Prussian blue [ferric ferrocyanide]); 'chrome green'
was not available until some time after 1818. In this
case it had been used, rather successfully, to match the
original deep green paint based largely on azurite. The
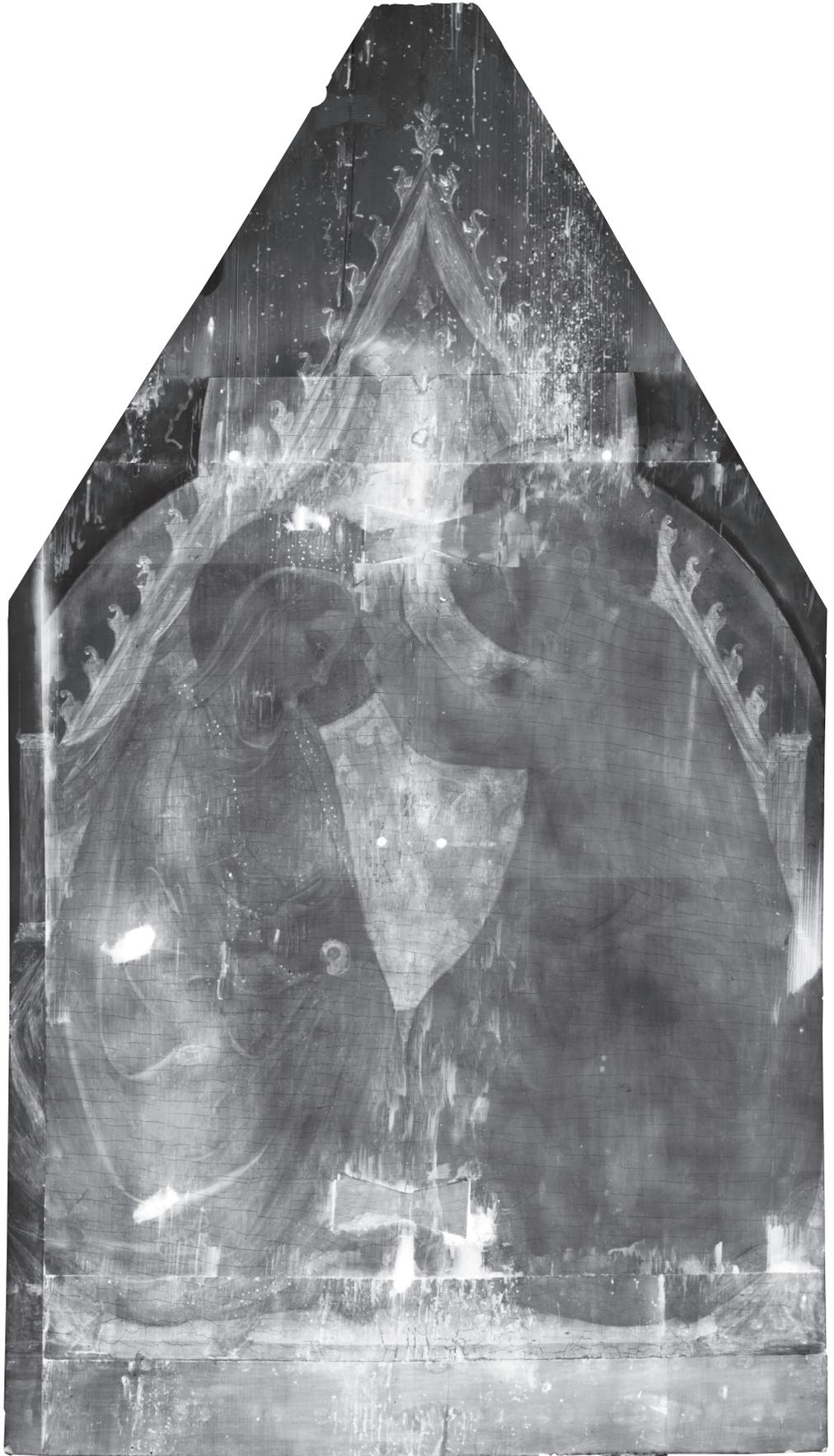
FIG. 4 *The Coronation of the Virgin*, X-ray mosaic.

FIG. 5 *The Coronation of the Virgin,* shown with previous frame (as reproduced in 1944 Christie's sale catalogue).

PLATE 19 Follower of Daddi, *The Virgin and Child enthroned with Saints and Angels.* Egg tempera on wood, 56 × 33.5 cm. Siena, Pinacoteca.

blue parts of the added-on section are painted with French (that is, synthetic) ultramarine containing a little added Prussian blue (PLATE 21). This paint matches the colour of the original lapis lazuli ultramarine (see PLATE 13), but its constitution establishes that it could not have been applied before 1828, and in fact probably dates from after 1830.[50]

It is therefore possible to say with certainty that modern interventions took place at two separate stages: first, at some date before 1828, the panel with the four musical angels was cut from the base of the Coronation scene; subsequently, most probably after 1830, new pieces of wood were added to the Coronation fragment and the repainting occurred. It must have been around this time that, before presenting the now smaller *Coronation of the Virgin* on the market, a new frame was made. This frame, shown in the 1944 Christie's sale catalogue, follows exactly the shape and decorative motifs of the throne depicted in

the painting (from the leaves along the border to the indentation on the inside border) (FIG. 5).[51] That this is not the original frame is proved by the fact that it was clearly designed to fit the cut fragment. In addition, the style and craftsmanship of this frame also suggest that it was manufactured in the nineteenth century, probably soon after the London *Coronation* was altered to its present state. The current frame of the *Coronation* is a modern, remarkably good imitation of a fourteenth-century engaged frame: it was made after 1944, and it appears to be an exact copy of the frame of a triptych by a follower of Daddi at the Pinacoteca di Siena,[52] of which it faithfully reproduces every feature, including the engraved foliage on the spandrels (PLATE 19).

On the London *Coronation* panel, the only evidence of an original edge is found around the outer curved edge of gold behind Christ. Here the gesso ends with a raised barb in places, indicating that

gesso and gilding would have continued up onto the raised moulding of an engaged frame. Originally the wood beyond this barb would not have been painted but covered by the frame moulding. The diagonal panel edge we now see was created when the top addition was added, and subsequently the brown paint was applied continuously from the addition onto the original unpainted wood (PLATE 20).

That the panel with the four musical angels was once part of the *Coronation of the Virgin* can be confirmed by studying the X-radiographs and infrared reflectography of NG 6599. *Four Musical Angels* shows the fragmentary figures of John the Baptist on the left and a deacon saint, almost certainly Saint Stephen, on the right. These figures are cut off at the neck, but at the bottom of the *Coronation* panel, in the left and right corners, are traces of haloes. In the X-radiograph these are discernible as areas with curved edges, and outlines of fully punched borders, inside which the cracking is different from elsewhere (see FIGS 7 and 8, p. 19). With the lower part of the panel removed, these fragmentary heads had to be suppressed so as not to detract from the main composition. This was done by scraping out the areas covered by the gold of the haloes (removing both gesso and gold leaf) and the paint of the faces, applying a new ground, and fill-ing in these parts of the composition with draperies and the throne textile (see PLATES 24 and 25, p. 19). The left hand of Saint John the Baptist originally extended up so that his fingertips overlapped the hem of the Virgin's robe. This hand therefore also needed to be suppressed. This time a thick layer of paint was applied over the back of the hand and decorated with gold, green and blue to replicate the cloth of honour. The fingertips were painted out using thinner paint, and some of the lines around the fingers were used to form part of the pattern on the Virgin's dress (see PLATE 22, p. 18). The fingertips are now visible, and the area of the rest of the hand stands out in a differ-ent colour from the surrounding pink (although it must have matched when first painted out). Infrared reflectography clearly shows the outline around the hand continuing under the creamy repaint (see FIG. 6, p. 18). One other detail of the original composition extended onto the upper panel – the banner held by Saint Stephen. This was merely painted over, and traces of the red paint of the banner can be seen under repaint at the hem of Christ's blue robe and the throne covering below.

With this information it is possible to align the Christ Church fragment with fair precision. It seems that very little has been lost between the two pieces, not much more than the width of the saw cut, which

PLATE 20 Bernardo Daddi, *The Coronation of the Virgin* (NG 6599), unframed.
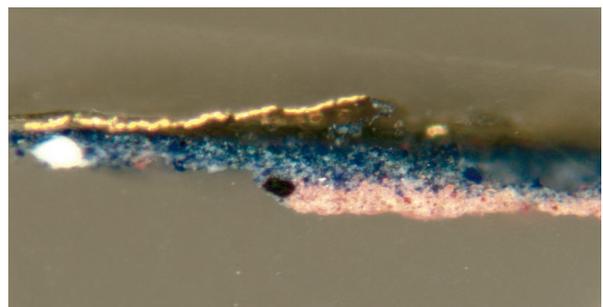
PLATE 21 Paint cross-section from blue pattern on recon-structed strip beneath the throne with false mordant gilding. The blue underlayer for the gold leaf contains French (synthetic) ultramarine with white and some Prussian blue. The false pink background consists of vermilion with white. Original magnification 240×; actual magnification 215×.

was not perfectly horizontal. The slight angle of the cut is most clearly seen at the top edge of *Four Musical Angels*, where there is a narrow strip of white (becoming slightly wider from left to right (see PLATE 2), presumably part of the marble throne. This white area bears traces of a gold fringe, visible near the figure of Saint Stephen (PLATE 23). This indicates that the cloth of honour originally ended with a gold fringe exposing a little strip of throne before the wooden structure, in front of which the angels sit, began.

As has already been established the *Coronation of the Virgin* panel does not retain its original lateral edges, consequently there is no proof of exactly how wide it was. However, an attempt to reconstruct the missing parts of the two saints, using similar depictions of saints in other works by Daddi as models, showed that the panel must have been wider on both sides if the saints were shown as complete figures, not cut by framing elements. Further study of the X-radiograph revealed another unexpected indication of how much may have been lost: in the bottom right corner, above and to the right of Saint Stephen's halo, are traces of a fully punched second halo (FIG. 8). Strangely this second halo was not noticed by Steinweg, but since it is very close to the edge of the panel it is possible that her X-radiograph did not include the edges, or they were covered by a frame. It indicates that there must have been a second figure (saint or angel) standing behind Saint Stephen. Multiple figure groups with overlapping figures often feature in works by Daddi (see PLATE 6), but it is rare for him to cut foreground figures, so a reconstruction was made extending the panel far enough to the right to fit a second standing figure (see PLATE 26). Extending the panel a matching width to the left also provided enough room for another figure behind the Baptist, a necessary addition since the balance of figures in Daddi's compositions is always symmetrical. That there is no longer any trace of this figure's halo is due to the fact that the area on the extreme left which would have had the second halo has been cut. Since we do not know who the outer figures were, they are here shown as generic saints.

The addition of the two extra saints results in a satisfactory composition with a half-circle of figures around the base of the throne. The blank areas above the saints' heads would probably have been filled with the arms of the throne and the completion of the draperies of Christ and the Virgin, although it is not impossible that more saints or angels might have been placed here. The proportions of the panel as proposed in this reconstruction turn out to be similar to those used elsewhere by Daddi. Indeed, when the inner

PLATE 22 *The Coronation of the Virgin*. Detail showing the area at the edge of the Virgin's mantle where the Baptist's hand has been painted over leaving the tips of the fingers visible.
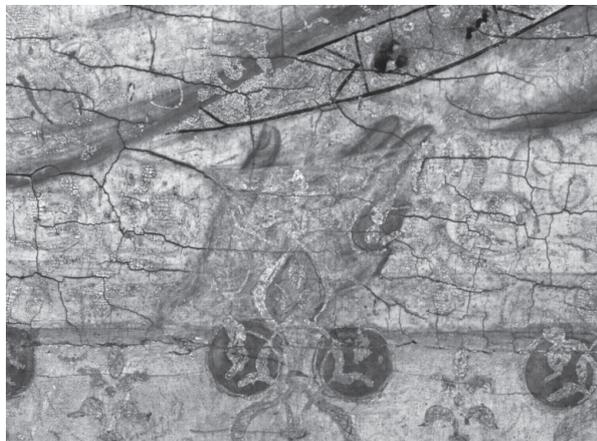
FIG. 6 *The Coronation of the Virgin*. Infrared reflectogram detail showing Saint John the Baptist's hand.

PLATE 23 *Four Musical Angels*. Detail showing traces of gold fringe at the top of the panel near Saint Stephen.
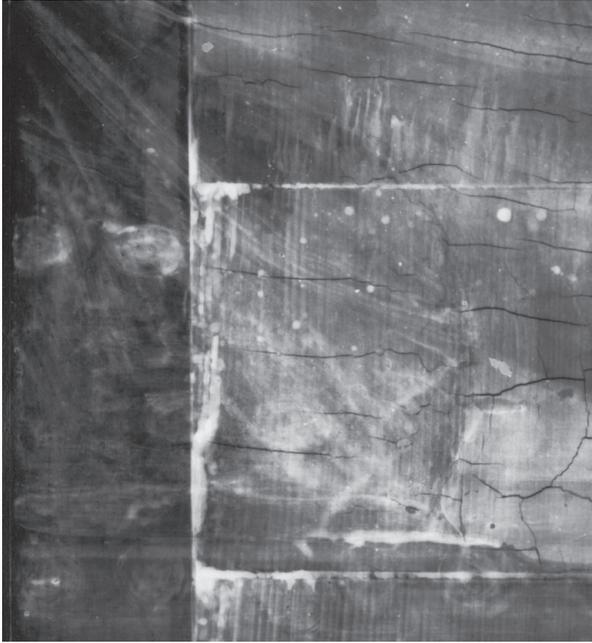
FIG. 7 *The Coronation of the Virgin.* X-ray detail from bottom left corner, showing additions to the panel and punch marks around the edge of the Baptist's halo.
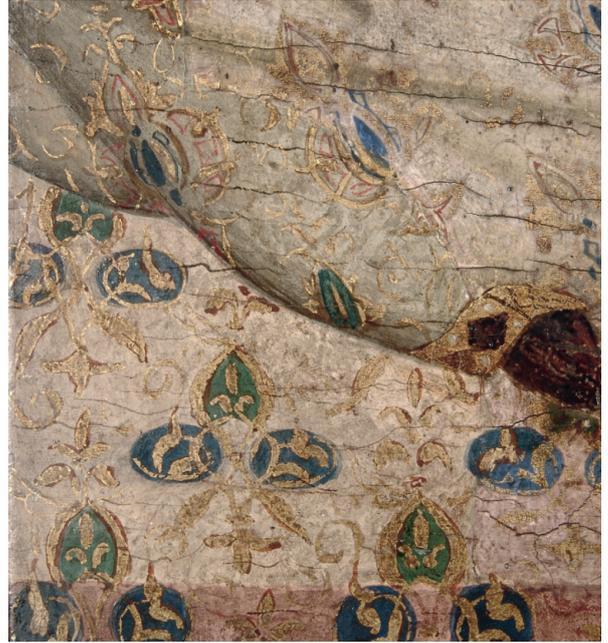
PLATE 24 *The Coronation of the Virgin.* Detail of bottom left corner showing repainting where the Baptist's head would have been.
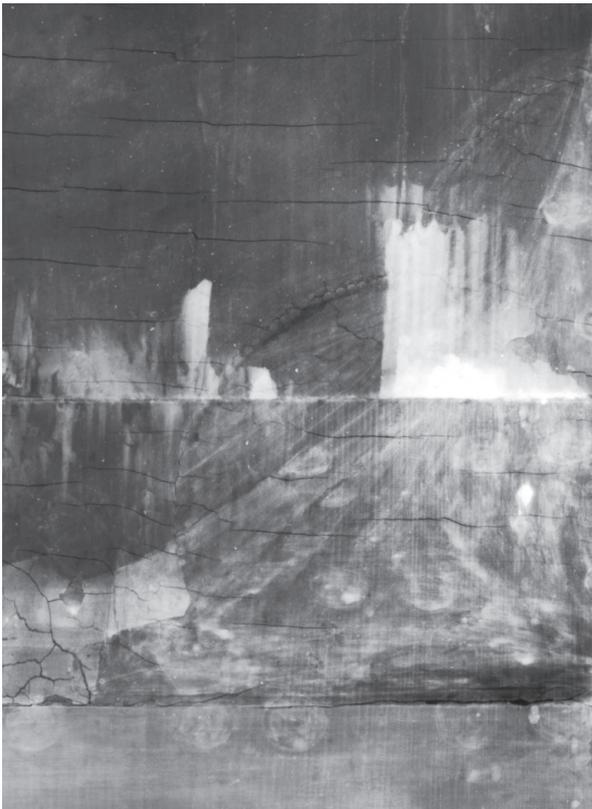

FIG. 8 *The Coronation of the Virgin.* X-ray detail from bottom right corner, showing addition to the panel and punch marks around the edges of two haloes.

PLATE 25 *The Coronation of the Virgin.* Detail of bottom right corner showing repainting where the saints' heads would have been.

PLATE 26 New digital reconstruction of *The Coronation of the Virgin* and *Four Musical Angels* in the light of new technical evidence (produced digitally by Rachel Billinge).

PLATE 27 Second digital reconstruction incorporating possible frame (produced digitally by Rachel Billinge).

frame of the Bigallo Tabernacle,[53] dated 1333 (Florence, Museo del Bigallo), with a similarly shaped top, was scaled to fit the *Coronation of the Virgin,* the proposed reconstruction was found to fit exactly (PLATE 27). This is not to suggest that the *Coronation of the Virgin* would necessarily have had a frame like that of the Bigallo triptych, which is much smaller and intended for a very different use. In fact all that can be deduced from the reconstruction is that there was a raised, gilded moulding attached to the frame around the curved edges of the gilding above the throne.

Conclusion: is the reconstruction complete?

The newly found evidence, however, does not entirely solve the question of the painting's original appearance: was this a single panel or a polyptych? In other words, is the recent reconstruction (PLATE 26) complete, or are there further missing panels? The answer to this question must be sought in the comparison with other Coronations of the Virgin painted at this time. As has been already established, in depictions of the Coronation from the first part of the fourteenth century saints are always relegated to the lateral compartments, as if they were side spectators of the celestial ceremony (see PLATES 5 and 6). This is the composition that Richard Offner, unaware of the soon-to-be-found musical angels and fragmentary saints, proposed for the missing parts of the London *Coronation.* Following the discovery of the Christ Church picture, Klara Steinweg made the suggestion – subsequently accepted by a number of scholars – that the painting was in fact a single, free-standing panel, originally made for a small chapel or to hang on a pillar.[54] According to Steinweg, the inclusion of saints in the central part of the composition created a complete scene, making additional panels with saints superfluous. While Steinweg was correct in stating that there are no surviving examples of polyptychs

from the first half of the fourteenth century showing the Coronation of the Virgin with saints in the central panel, it is also true that we do not know of single panels of the same period with this composition.[55] Indeed, the only example mentioned by Steinweg of a single panel with saints being part of the main scene is Jacopo di Cione's *Coronation of the Virgin* in the Galleria dell'Accademia, dated to after 1373 and therefore not strictly comparable.[56]

Searching for an answer in Daddi's own work, we find that the artist did produce Coronations featuring saints in the same space as the Virgin and Christ. In the Lindenau Museum, Altenburg (PLATE 28), and the Galleria Sabauda, Turin, are the central panels of two small Coronation triptychs, and in the Gemäldegalerie, Berlin, is a similar work still retaining its side panels.[57] Nevertheless, it is crucial to stress that, in spite of the undoubted iconographic similarity with NG 6599, these are smaller, very different types of work, which, as the Berlin painting shows, were

PLATE 28 Bernardo Daddi, *Coronation of the Virgin*, c.1340–5. Egg tempera on wood, 64.5 × 39.5 cm. Altenburg, Lindenau Museum (13).

once flanked by narrative scenes. Judging by Daddi's surviving body of work, the present painting is the only large-scale Coronation (with or without side panels) with saints in the central panel. There are therefore no surviving comparable examples to help us firmly establish whether the reunited National Gallery and Christ Church fragments originally formed a single panel or were part of a larger ensemble. At this stage the only observation that can be made is that, if one relies on the traditional format of Coronations produced in Daddi's time, and also on the large size of the recently reconstructed London *Coronation*, the earlier theory placing NG 6599 and *Four Musical Angels* in the centre of a polyptych still seems plausible. According to this hypothesis, the four central saints would have originally led a host of their companions in the side panels, and their place of honour immediately beneath the Virgin's throne would have been a sign of their importance to the patron or to the church itself.

Although the question of the original appearance of the National Gallery *Coronation of the Virgin* is still open, what has emerged with increasing clarity from recent research is that with this work Daddi invented a new, highly original, iconographic formula. It is no coincidence that, shortly after NG 6599 was painted, younger Florentine artists started to experiment with its unusual composition: among the several surviving examples that testify to its impact are Coronation scenes by Daddi's disciple Puccio di Simone (see PLATE 29), by the Master of San Lucchese (both in the Lindenau Museum, Altenburg), by an unidentified Florentine artist (Christ Church) and, most notably, the later, strikingly similar panel attributed to Mariotto di Nardo, now in the Fitzwilliam Museum, Cambridge (see PLATE 30).[58]

Simona Di Nepi, Ashok Roy and Rachel Billinge

PLATE 29 Puccio di Simone, *Coronation of the Virgin*, *c.*1360. Egg tempera on wood, 69 × 38.5 cm. Altenburg, Lindenau Museum (16).

PLATE 30 Mariotto di Nardo, active 1394–1424, *Coronation of the Virgin*. Egg tempera on wood, 80.7 × 52.1 cm. Cambridge, Fitzwilliam Museum (M.28).

Notes

1   The two most commonly represented deacon saints are Stephen and Lawrence. Lawrence is usually shown holding a gridiron or palm of martyrdom, neither of which is held by the saint in the Christ Church panel. Stephen is usually identified by rocks on his head, the part of the figure now missing. Comparison with other saints by Daddi revealed that in all other occasions where he depicted a deacon saint with a banner and a book the figure also had the rocks of Saint Stephen on his head. This, taken together with the fact that the figure does not have either of the usual attributes of Saint Lawrence, makes Stephen the most likely identification.

2   When the Christ Church panel was cut, only part of the standing saints was removed so as to leave the angels intact.

3   London, Christie's, 31 March 1944, lot 136: 'The Property of the Late J. Pierpont Morgan… removed from Wall Hall, Aldenham, Herts'.

4   For the attribution of NG 6599 see R. Offner, *A Critical and Historical Corpus of Florentine Painting*, New York 1958, Section III, Vol. VIII, p. 150; *Four Musical Angels* in *Corpus*, New York 1947, Section III, Vol. V, pp. 115–16. Most modern scholars consider paintings attributed by Offner to the Assistant of Daddi to be late works by Daddi, with workshop assistance.

5   Klara Steinweg, 'Rekonstruktion einer orcagnesken Marienkrönung', in *Mitteilungen des deutschen Kunsthistorischen Institutes in Florenz*, Vol. 10, part II, December 1961, pp. 122–7. According to Steinweg, Andrea di Cione provided the model for the *Coronation of the Virgin* at the Galleria dell'Accademia, Florence (PLATE 6), probably by Bernardo Daddi and workshop.

6   J. Byam Shaw, *Paintings by Old Masters at Christ Church, Oxford*, Oxford 1967, pp. 31–2.

7   Also adding: 'If we could suppose that the "Assistant" was a young disciple, and if, as Berenson suspected, Orcagna was Daddi's pupil, then there might be some ground for considering our Coronation an early work of Andrea Orcagna himself.' Byam Shaw 1967 (cited in note 6), p. 32.

8   See M. Boskovits and E. Neri Lusanna, *A Critical and Historical Corpus of Florentine Painting*, Florence 1989, Section III, Vol. III, p. 45, note 52; G. Freuler, *Manifestatori delle cose miracolose: Arte Italiana del 300 e 400 da collezioni in Svizzera e nel Lichtenstein*, Lugano-Castagnola, Thyssen-Bornemisza Foundation, 7 April–30 June 1991, pp. 168–70, cat. no. 62; A. Tartuferi, *Bernardo Daddi. L'Incoronazione di Santa Maria Novella. Galleria dell'Accademia*, Livorno 2000, pp. 30 and 58; Everett Fahy and Andrea De Marchi have expressed similar opinions (see Sotheby's catalogue entry, *Old Master Paintings*, London, 7 July 2004, lot 38, p. 128).

9   See Boskovits and Neri Lusanna 1989 (cited in note 8), pp. 110–21.

10   For a recent illustrated study of the Orsanmichele *Maestà* see L. Bertani and M. Vervat, *La Madonna di Bernardo Daddi negli 'horti' di San Michele*, Livorno 2000.

11   See Boskovits and Neri Lusanna 1989 (cited in note 8), pp. 231–70. Although Daddi's authorship of the so-called San Pancrazio Altarpiece is not documented, this painting is universally agreed to be a fully autograph work. Byam Shaw and Freuler have emphasised the resemblance between the angels in the Christ Church panel and those in the central panel of the San Pancrazio Altarpiece (both the kneeling angels and those looking down on the Virgin from the spandrels). Byam Shaw 1967 (cited in note 6), p. 32; Freuler 1991 (cited in note 8), p. 170.

12   See note 22 for a discussion of the attribution of the *Coronation of the Virgin* from the Galleria dell'Accademia. For detailed images of the Lehman Collection fragment and the Galleria dell'Accademia *Coronation* see Tartuferi 2000 (cited in note 8), p. 58. E.S. Skaug produced a study of the punch marks used by Daddi and workshop in *Punch Marks from Giotto to Fra Angelico. Attribution, Chronology, and Workshop Relationship in Tuscan Panel Painting, ca. 1330-1430*, Oslo 1994, Vol. I, p. 102 and p. 112, note 181; Vol.

II, 5.3, no. 742 (see also E. Skaug, 'Tecniche ed Estetica nella Pittura del Trecento Italiano', in M. Boskovits, *Da Bernardo Daddi al Beato Angelico a Botticelli: Dipinti Fiorentini del Lindenau-Museum di Altenburg,* Florence 2005, p. 28, fig. 16). A similar dragon motif is also found on the sgraffito decoration on the step of the Virgin's throne in the Orsanmichele *Maestà*; a detail of this decorative motif is illustrated in Bertani and Vervat 2000 (cited in note 10), p. 16, fig. 2.

13 D. Gordon, *The National Gallery Review* (April 2004–March 2005), pp. 16-17. For records of S. Maria a Quarto see Florence, Biblioteca Nazionale, Sepoltuario Strozziane, Col. XXVI, 170, carta 81 v, and carta 166 v. Cited by Offner, *Corpus*, New York 1930, Section III, Vol. III, p. 2 (in 'Authenticated Facts and Dates by Bernardo Daddi')

14 Herr Kisters communicated this information to Richard Offner. Offner 1958 (cited in note 4), p. 150.

15 Caroline Elam has kindly drawn attention to Charles Ricketts's diary entries of 12 and 13 May 1904. London, British Library, Add. Ms 58116, 27 r. This painting was possibly part of the sale of the Horatio Granville Murray-Stewart collection.

16 On his entry of 13 May Ricketts adds: 'Horne warned me off the Coronation'. It is possible that Horne warned off Ricketts because he wanted to buy the picture himself.

17 Christie's sale catalogue, 1944 (cited in note 3). Although the contents of this sale were removed from Aldenham, Herts, the year following the death of J. Pierpont Morgan Jr (the son of the financier and art collector), it is almost certain that the London *Coronation of the Virgin* was acquired by the father (d. 1913), possibly directly from Herbert Horne. Christine Nelson, Drue Heinz Curator of Literary and Historical Manuscripts at the Morgan Library and Museum, kindly confirmed that J. Pierpont Morgan Jr is not known to have purchased any paintings.

18 Kisters owned an impressive collection of Early German and Netherlandish paintings, including a number of works by Lucas Cranach the Elder. His collection (not including Daddi's *Coronation*) was exhibited at the German National Museum in Nuremberg in 1963. See Peter Strieder [Hrsg.] Steingräber, *Sammlung Heinz Kisters, Altdeutsche und Altniederländische Gemälde,* Nuremberg 1963.

19 The statement made by Gaudenz Freuler and in Sotheby's sale catalogue (both cited in note 8) that the painting was on the New York art market in 1924 is incorrect: it relies on Van Marle's description of 'a Coronation of the Virgin and saints for sale in New York', but this description cannot refer to NG 6599 because by 1924 the *Coronation of the Virgin* and *Four Musical Angels* had long been two separate panels. R. van Marle, *The Development of the Italian Schools of Painting,* Vol. III, The Hague 1924, p. 508, note 1.

20 Offner 1958 (cited in note 4), p. 150.

21 In the past scholars have been divided as to whether the altarpiece was painted shortly before Giotto's departure to Naples in 1328, or after his return to Florence in 1333. For an argument in support of the earlier dating see M. Boskovits, in *Giotto: bilancio critico di sessant'anni di studi e ricerche,* Florence 2000, cat. 27.

22 The authorship of this work is somewhat problematic: in the last century scholars ascribed it to a follower of Assistant of Daddi and to Puccio di Simone. The present attribution to Daddi is based on the modern critical approach, which designates as autograph works which may have been painted in part by workshop assistants (for a full history of attribution see Tartuferi 2000 (cited in note 8), pp. 49–51). The close resemblance of NG 6599 to the central panel of the Galleria dell'Accademia altarpiece should not be taken as sufficient evidence as to the autograph status of the National Gallery panel.

23 For a catalogue entry and colour reproduction of the central panel see C. Wright, *Renaissance to Impressionism: Masterpieces from Southampton City Art Gallery,* London 1998, pp. 18–19 and 107–8; for the side panels see C.C. Wilson, *Italian Paintings XIV-XVI centuries in the Museum of Fine Arts, Houston,* London 1996, pp. 52–66, cat. no. 4, and pp. 54–5.

24 For full attribution history of this work see L. Fornari Schianchi, *Galleria Nazionale di Parma: Catalogo delle opere dall'antico al Cinquecento,* Milan 1997, pp. 46-7. (Offner believed this work to be by the so-called Master of the Fabriano Altarpiece. Offner 1947 (cited in note 4), pp. 189–94, Pl.XLI.)

25 Van Marle 1924 (cited in note 19), p. 521.

26 See D. Bomford, J. Dunkerton, D. Gordon and A. Roy, *Art in the Making: Italian Painting before 1400,* London 1989, p. 156.

27 Klara Steinweg began to work as Offner's assistant on the monumental *Corpus* in 1930 and, following his death in 1965, she assumed the supervision of four volumes, until her death in 1973. I. Hueck, 'Obituary', *Burlington Magazine,* CXV, 1973, p. 397.

28 Steinweg 1961 (cited in note 5).

29 This type of decoration also recurs in the so-called San Pancrazio Altarpiece in the Uffizi (see note 11).

30 Steinweg 1961 (cited in note 5), p. 126.

31 The paintings were initially examined in infrared using a Hamamatsu C2400 camera with an N2606 series infrared vidicon tube. The infrared reflectogram images reproduced in this article were recorded using the National Gallery's new digital infrared camera SIRIS which uses a 320 × 256 pixel indium gallium arsenide (InGaAs) array sensor. The infrared reflectograms in this article were recorded at the camera's maximum resolution of 10 pixels per mm. For further details about the camera see D. Saunders, R. Billinge, J. Cupitt, N. Atkinson and H. Laing, 'A new camera for high-resolution infrared imaging of works of art' in *Studies in Conservation,* Vol. 51, No. 4, 2006, pp. 277–90.

32 Paint samples were analysed by standard methods in use in the National Gallery Scientific Department: microscopical examination of samples and cross-sections; analysis by SEM-EDX, and paint media investigations using GC, GC–MS and FTIR.

33 F. Brunello, ed., *Il Libro dell'Arte di Cennino Cennini,* Neri Pozza Editore, Vicenza 1971.

34 D. Bomford, J. Dunkerton, D. Gordon and A. Roy 1989 (cited in note 26), pp. 43–8.

35 D. Bomford, J. Dunkerton, D. Gordon and A. Roy 1989 (cited in note 26).

36 The local application of a thin reflective underlayer of lead white with a surface red lake glaze has been demonstrated in several of the pink draperies on the San Pier Maggiore altarpiece by the di Cione workshop, see, for example, Saint Reparata's pink drapery, recorded in D. Bomford, J. Dunkerton, D. Gordon and A. Roy (cited in note 26), plate 155, p. 180.

37 G. Bitossi, P. Baglioni, L. Dei and M. Mauro, 'Caratterizzazione chimico-fisica dei materiali pittorici', in Bertani and Vervat (cited in note 10), figs 2 and 3, p. 62.

38 Samples for paint medium were examined by Catherine Higgitt. Original paint from NG 6599 and the Christ Church panel was found to be bound in egg tempera (NG 6599: blue of Christ's robe; off-white colour of throne; deep pink of cloth of honour. Christ Church panel: cream colour, top right-hand edge; pale green floor tile). A discoloured glaze over silver leaf from the Christ Church panel gave indications of the presence of (now degraded) drying oil.

39 D. Bomford, J. Dunkerton, D. Gordon and A. Roy 1989 (cited in note 26), pp. 43–8.

40 This exact same use of mordant gilding is seen in numerous works by Daddi: see for example the throne canopy in *The Coronation of the Virgin,* Lindenau Museum, Altenburg, PLATE 28, or in the Orsanmichele *Maestà,* see Bertani and Vervat 2000 (cited in note 10).

41 Bertani and Vervat 2000 (cited in note 10), p. 14.

42 Small details involving mordanted silver leaf with translucent glazes of natural ultramarine have been detected on later paintings, for example the Fra Angelico predella panel in the National Gallery (NG 663.1), probably of the 1420s. See D. Gordon, M. Wyld and A. Roy, 'Fra Angelico's Predella for the High Altarpiece of San Domenico, Fiesole', *National Gallery Technical Bulletin,* 23, 2002, p. 10.

43 For another possible comparison see the polyptych panels by Simone Martini, Orvieto, Museo dell'Opera del Duomo, ex-S. Domenico, Orvieto. The linings of the mantles of the Virgin and the Magdalen, now black, were executed in a green pigment (copper resinate?) applied over silver leaf and decorated with *sgraffito* work of tiny parallel incisions (G. Testa, 'Simone Martini: Madonna con il bambino tra i santi Domenico, Pietro, Maria Maddalena e Paolo', in *Arte Sacra in Umbria. Mostra dei dipinti restaurati 1976–1981,* Ministero per i beni culturali e ambientali: Quaderni a cura della Soprintendenza ai beni ambientali architettonici artistici e storici dell'Umbria, 1, Perugia 1981, pp. 35–43, here p. 38; G. Testa, 'Simone Martini: Polittico di S. Domenico', in *Dalla raccolta alla musealizzazione. Per una rilettura del museo dell'Opera del Duomo di Orvieto,* Giusi Testa and Raffaele Davanzo ('Conservazione tra teoria e prassi', Orvieto, Palazzo Papale, June–September 1984), Ministero per i beni culturali e ambientali, Soprintendenza per i beni ambientali architettonici artistici e storici dell'Umbria, Todi 1984, pp. 34–42; here pp. 39–42, with further information on materials; C. Hoeniger, *The Painting Technique of Simone Martini,* PhD diss, Princeton 1989, pp. 258–60, identifies the linings as copper green over gold leaf). See also Simone Martini's *Virgin and Child,* Orvieto, Museo dell'Opera del Duomo, ex-S. Francesco, Orvieto. Silver leaf, now abraded and tarnished, was applied over red bole for the lining of the Virgin's mantle, overlaid with 'verde semitrasparente' (copper resinate?), Testa (op. cit.), pp. 46–7. A similar technique appears to have been used for the lining of the Virgin's off-white mantle in Daddi's *Assumption of the Virgin* (fragment of an altarpiece), *c.*1340, Robert Lehman Collection (1975.1.58), Metropolitan Museum of Art, New York. The optical principle is exploited in the use of a green glaze over gold leaf for the lining of the Virgin's deep blue robe in Jacopo di Cione's Crucifixion altarpiece in the National

Gallery (NG 1468), *c.*1368–70, see D. Bomford, J. Dunkerton, D. Gordon and A. Roy (cited in note 26), plate 136, p. 151, and plate 139, p. 153.

44 A similar use of silver leaf over red-brown bole can be seen in the chalices held by the foremost angels in the *Madonna delle Grazie* (Florence, Orsanmichele), and in the same picture there are two decorative bands on the dais of the throne created in *sgraffito* work using paint and silver leaf on an aqueous base. See Bertani and Vervat 2000 (cited in note 10), pp. 6 and 16–17.

45 For example, it has been shown using cross-sectional analysis that the Virgin's very pale mauve drapery in Lorenzo Monaco's *Coronation* (NG 1897), of about 1407–9, has faded considerably. See A. Burnstock, 'The Fading of the Virgin's Robe in Lorenzo Monaco's "Coronation of the Virgin"', *National Gallery Technical Bulletin*, 12, 1988, pp. 58–65. See also G. Hedley and C. Villers, 'Evaluating Colour Change: Intention, Interpretation and Lighting', in G. Hedley, *Measured Opinions: Collected Papers on the Conservation of Paintings*, ed. C. Villers, London 1993, pp. 145–8.

46 For a full description of this phenomenon, see 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.

47 While *minium* (red lead) is sometimes used for draperies in Trecento works, it is most commonly found for the *sgraffito* textiles on which Christ, the Virgin or accompanying saints are depicted, sometimes in conjunction with vermilion to represent the shadowed areas. A good example of the use of *minium* in a *sgraffito* design (with ultramarine and gold leaf) is Nardo di Cione's *Saint John the Baptist with Saint John the Evangelist(?) and Saint James* (NG 581) of about 1365, see D. Bomford, J. Dunkerton, D. Gordon and A. Roy (cited in note 26), p. 133; plate 115, p. 134; plate 116, p. 135; see also p. 32.

48 The bright red draperies painted in vermilion show a faint greyish metallic sheen in places, but discoloration of the surface pigment is very minor. See M. Spring and R. Grout 2002 (cited in note 46), pp. 50–61.

49 For a history of the use of *giallorino*, see H. Kühn, 'Lead–Tin Yellow', in A. Roy, ed., *Artists' Pigments: A Handbook of their History and Characteristics*, National Gallery of Art, Washington DC, Oxford University Press, 1993, pp. 83–112. See also E. Martin and A. Duval, 'Les deux variétés de jaune de plomb et d'étain: étude chronologique', *Studies in Conservation*, 35, 1990, pp. 117–36; D. Bomford, J. Dunkerton, D. Gordon and A. Roy (cited in note 26), pp. 37–9.

50 French (synthetic) ultramarine was invented probably in 1827 and published in 1828; commercial production of the pigment did not begin until 1830 and was not widespread until a few years later. See J. Plesters, 'Utramarine Blue, Natural and Artificial', in A. Roy, ed., *Artists' Pigments: A Handbook of Their History and Characteristics*, Vol. 2, Washington DC 1986, pp. 55–6.

51 Christie's sale catalogue (cited in note 3).

52 P. Torriti, *La Pinacoteca Nazionale di Siena: I dipinti dal XII al XV secolo*, Genoa 1980, p. 230.

53 See Boskovits and Neri Lusanna (cited in note 8), pp. 170–83.

54 Steinweg 1961 (cited in note 5), p.126. In this regard Freuler writes: 'In the fourteenth century it was common to allow donors to decorate church pilasters with frescoes or panel paintings featuring patron saints, as a modest alternative to the decoration of a chapel, as for example in Orsanmichele, Florence.' Freuler 1991 (cited in note 8), p. 168; Sotheby's sale catalogue (cited in note 8), p. 124.

55 It is worth drawing attention to the only other known panel painting, executed by an artist who was active in the first half the fourteenth century, showing saints in the same space as the Virgin and Christ: this is a panel by Vitale da Bologna (1309–1359), last documented in the 1956 Stoclet Collection catalogue (J.P. van Goidsenhoven, *Adolphe Stoclet Collection, Part I,* Brussels 1956, pp. 104–5). Although it is possible that this painting was executed before NG 6599, its smaller size and different composition (with dimensions of 52 × 59 cm, it is about half the height of the London *Coronation*) mean that it would not have provided a model for it.

56 Steinweg 1961 (cited in note 5), p. 126. For an image of this work see G. Bonsanti, *The Galleria dell'Accademia, Guide to the Gallery and Complete Catalogue*, Florence 1987, p. 58.

57 See illustration of the Turin fragment in N. Gabrielli, *Galleria Sabauda, Maestri Italiani,* Turin 1971, Tav. 9, fig. 15; for the triptych in the Gemäldegalerie see M. Boskovits, *Frühe Italienische Malerei, Gemäldegalerie Berlin*, Berlin 1988, p. 251.

58 For illustrations and catalogue entries of Puccio di Simone and the Master of San Lucchese's panels see Boskovits 2005 (cited in note 12), pp. 192–5 and pp. 125–7; for the Christ Church panel see Byam Shaw 1967 (cited in note 6), pp. 33–4 and plate 9; a full entry on Mariotto di Nardo's *Coronation*

of the Virgin is in J.W. Goodison, *Catalogue of Paintings in the Fitzwilliam Museum, Cambridge, Italian School*, Cambridge 1967, pp. 99–100. To these examples we must also add a little known panel by Matteo di Pacino (active in Florence from about 1359), now in the private collection of Raffaele Garofalo in Rome. This painting is generally dated to about 1370–80 on stylistic grounds. See T. Strinati, *La collezione Garofalo, I dipinti*, [Rome] pp. 22–5, no. 12 (also in M. Boskovits, *Pittura Fiorentina alla vigilia del Rinascimento*, Florence 1975, p. 359).

Table 1 Constitution of the paint layers

Bernardo Daddi, *The Coronation of the Virgin* (NG 6599)

Light (pink) area of Virgin's off-white mantle	Thin scumble of red earth + white over white underlayer
Pale grey of Virgin's off-white mantle	White + trace of carbon black pigment
Blue lozenge pattern on Virgin's mantle	Natural ultramarine + white
Red linear design on Virgin's mantle	Vermilion (slightly darkened)
Christ's blue cloak	Natural ultramarine + white
Blueish shadows on Christ's robe	Natural ultramarine glaze over pink underlayer of red lake with white
Deep brown linings of draperies	Darkened copper green glaze over silver leaf
Pink cloth of honour	Several layers of red lake with pure white underlayer
Blue pattern on cloth of honour	Natural ultramarine + white
Green pattern on cloth of honour	Natural azurite (with a strongly green tone)
Deep green edging to cloth of honour	Natural azurite (with a strongly green tone)
Pinkish-orange edging to cloth of honour	Red lead (*minium*; lead tetroxide)

Bernardo Daddi, *Four Musical Angels* (Christ Church, Oxford)

Blue shadows of Saint John the Baptist's cloak	Natural ultramarine glaze over pink underlayer of red lake with white
Deep brown lining of cloak	Darkened copper green glaze over silver leaf (attached with oil mordant)
Organ pipes	Silver leaf (over red-brown bole)
Scarlet of draperies	Vermilion
Yellow highlights on draperies of foreground angels	Lead-tin yellow 'type II' (*giallorino*)
Mid-green shadows of draperies	Lead-tin yellow + azurite
Deepest blue-green shadows of draperies	Natural ultramarine glaze over lead-tin yellow with azurite
Green of floor tile	Natural azurite (with a strongly green tone)
Light yellow of floor tile	Lead-tin yellow 'type II' (*giallorino*)
Orange of floor tile	Red lead (*minium*; lead tetroxide)
Red-brown of floor tile	Iron oxide pigment