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FRONT COVER

Paul Cézanne, *Bathers*, (NG 6359), detail of plate 5,
page 5

TITLE PAGE

Quinten Massys, *The Virgin and Child Enthroned, with Four
Angels* (NG 6282), detail of plate 26, page 73

The Technique and Restoration of *The Virgin and Child Enthroned, with Four Angels* by Quinten Massys

JILL DUNKERTON

The National Gallery's group of nine paintings associated with Quinten Massys and his workshop is remarkably diverse, both in subject matter and in technique, including as it does an exceptionally rare surviving *Tüchlein*, *The Virgin and Child with Saints Barbara and Catherine* (NG 3664),¹ and the small panel painting *The Virgin and Child Enthroned, with Four Angels* (PLATE 1), richly elaborate in its technique and use of gold leaf.

The Virgin and Child Enthroned, with Four Angels was bequeathed to the National Gallery in 1956 by the noted bibliophile Charles William Dyson Perrins. He seems to have purchased it at some time before 1927 from the dealer and restorer Ayerst Hooker Buttery, a member of the well-known dynasty of restorers. Buttery had bought the panel at the Christie's auction on 27 June 1924 of 'Pictures by Old Masters' belonging to the Sneyd family of Keele Hall in Staffordshire. The painting was perhaps acquired by Ralph Sneyd (1793–1870) while travelling in France and the Netherlands in 1828,² but nothing is known of its previous history.

The attribution to Quinten Massys, apparently first made at the Christie's sale, has always been accepted and it has generally been agreed that the painting was painted relatively early in his career,³ a view not contradicted by the results of dendrochronology.⁴ This has established that the last ring of the tree from which the boards of Baltic or Polish oak were cut was formed in 1472, indicating a felling date of 1481 at the earliest, and more probably a few years later. Allowing for seasoning, the painting is likely to have been executed no earlier than 1497, that is, probably after Quinten had left his home town of Louvain for Antwerp, where he is first registered in 1491 as a master of the Guild of Saint Luke. His profession, however, is not given and Quinten's training as a painter remains mysterious; it is quite possible that painting was not his original profession and that at first he followed in the footsteps of his father and elder brother and began as a metalworker. In addition to being a blacksmith, locksmith and clock-maker, his brother Joos became an architect. Similarly, Quinten may have added the craft of painting to the

family trades, and may not necessarily have followed a conventional apprenticeship as a painter. *The Virgin and Child Enthroned* has little in common with the production of Louvain or Antwerp painting workshops of the last part of the fifteenth century in terms of style and design, and several apparently unusual and perhaps even novel features of its technique⁵ might also be indicative of a slightly unorthodox training.

The arch-topped panel is constructed from two boards of oak, butt-joined slightly to the right of centre (PLATE 2). At some point in the past the join has opened up and has been re-glued, but since the two reinforcing dowels can be seen to be still present in the X-radiograph (FIG. 1; see also FIG. 6) the panel cannot have come



PLATE 1 Quinten Massys, *The Virgin and Child Enthroned, with Four Angels* (NG 6282), c.1500. Oil on oak panel, 65.2 × 46.0 cm, painted surface 62.3 × 43.5 cm. Before cleaning.

apart completely and so there is no misalignment of elements of the painted image. In order to strengthen the repair a strip of canvas has been glued along the length of the join. The back edge of the panel is rebated so that it could be slotted into frame mouldings, now lost.⁶ The unpainted borders and the presence of a *barbe* indicate that the frame was constructed around the panel before application of the ground and paint; traces of gold leaf around the edges confirm that the mouldings were gilded.⁷ The two evenly spaced notches along the lower edge, and also two more at the sides, approximately level with the arms of the throne, are therefore likely to be related to the fitting of the painting into another frame at a later date, perhaps with angled wooden pegs.

The painting had not received any treatment since its arrival at the National Gallery and at first sight might not have seemed to be a priority for cleaning as the varnish layers had retained a reasonable degree of transparency and the colours remained saturated. The greyish-yellow discoloration, however, had a deadening effect on the subtle colours, and especially the soft greys and lilacs which were no longer clearly differentiated. As far as could be determined through the thick

varnish, much of the paint film appeared to be in good condition, with the exception of two large (relative to the size of the painting) areas of total loss, easily detected in the X-radiograph (FIGS 1 and 2). These losses, from the draperies and background architecture in the area of the flying angel on the left (PLATE 3) and from the oriental carpet and trailing hem of the Virgin's mantle, appear to be the result of past blistering and flaking of the paint and ground. Since the losses are vertically aligned and there are other smaller flake losses and areas of slightly raised and cupped paint between them, it has to be assumed that a fault in the left board or in its preparation caused expansion and contraction of the wood fibres and subsequent blistering of the ground.

The cleaning (PLATE 4) proved to be unexpectedly complicated since in many areas of the painting up to three layers of varnish were present. The uppermost was a readily soluble soft resin varnish, very probably mastic. This may have been applied soon after 1924, when the painting was bought by Buttery. In a Keele Hall inventory made in 1899 a note was added (not necessarily in the same year) describing the picture as 'part surface perished';⁸ it seems likely, therefore, that Buttery undertook a cleaning and restoration of his purchase before



FIG. 1 X-ray mosaic.



PLATE 2 Reverse.



PLATE 3 Detail before cleaning.

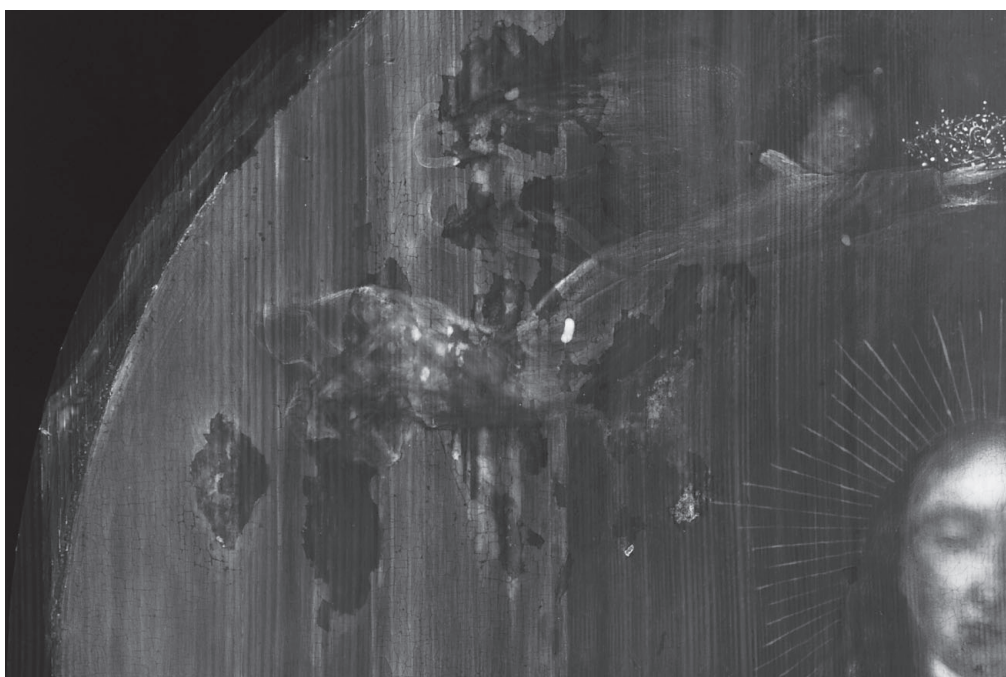


FIG. 2 X-ray mosaic detail.

selling it on to Dyson Perrins.

When cleaning the painting, however, he seems to have left extensive residues of an earlier varnish. In places, notably on the purple wings of the standing angel on the right, the residue was disturbingly opaque and under magnification had a crazed fractured appearance, almost like crystallised honey (PLATE 5); it seems likely to be the remains of the 'perished' varnish noted in the late nineteenth century. Although clearly quite old, there was no question of it being original to the painting since at the left edge it covered old putty

and restorations (PLATE 6). Here it was exceptionally thick and discoloured. This varnish seemed to contain a high proportion of drying oil as well as resin and was not readily soluble. It is possible that an attempt at its removal with a strong alkali resulted in the abrasion to the grey paint of the platform, with the loss of paint most marked along the tops of the raised cracks. A cleaning test made with a powerful reagent perhaps also accounts for the damage to the upper green paint layer from an area of the sleeve of the angel with a harp on the right (PLATE 7). Removal of these varnish residues



PLATE 4 Detail during cleaning.

was desirable since they were very disturbing, especially over darker colours where their opacity was most apparent. Fortunately, it proved possible to soften and swell them with solvent mixtures and then to remove the swollen jelly with a scalpel working under magnification with a stereobinocular microscope. Buttery's presumed retouchings of the losses and split were fairly readily soluble, but they were found to be only the last of a sequence of earlier restoration and fillings which often covered areas of original paint, both around the edges of losses and as small islands of paint within the large losses. All the old restorations and fillings were removed. For some unaccountable reason, the lowest layer in many of the damaged areas was a thick coating of Prussian blue paint, confirmation that all the repairs removed dated from the eighteenth century at the earliest.

Unexpectedly, following removal of these old restorations and the residues of the second varnish, examination under ultraviolet light revealed that there were still extensive patches of fluorescent material over much of the surface. Except in the few areas where it had been damaged by cleaning in the past, the paint surface was unusually saturated and glossy, barely needing more varnish. There was no question of any further cleaning since there was little evident discoloration and the removal of the upper varnishes had achieved the aim of opening up the design, filling it with light and recovering the sense of depth and space. In particular, the illusion of distance between the little flying angels and the architectural setting increased as a result of the recovery of the distinction between their shot purple



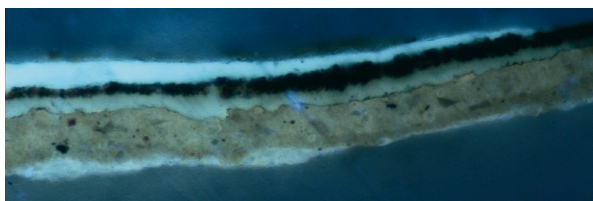
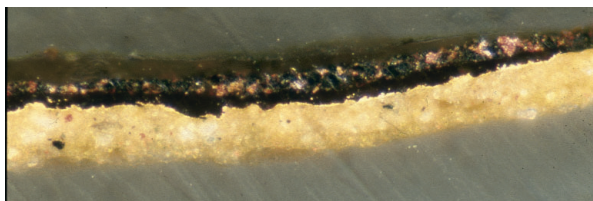
PLATE 5 Macro photograph of the wing of the angel with a harp, during cleaning and showing residues of an opaque old varnish.



PLATE 6 Macro photograph of the left edge, during cleaning. An old varnish lies beneath the most recent restoration (some retouching remains at the upper left), but covers the putty and earlier restorations.



PLATE 7 *The Virgin and Child Enthroned*, after cleaning before restoration.



PLATES 8 and 9 Cross-section of a sample from the gilded throne, under normal (PLATE 8) and UV illumination (PLATE 9). The thin gold leaf is over a yellow-brown mordant layer containing yellow earth, lead white, lead-tin yellow and a little red and black. On top of the gold is a translucent brown layer, fluorescent in UV light, and then an opaque brown layer consisting of a coarse black pigment with vermilion. This is a hatched line of modelling. Finally there is another translucent brown layer, strongly fluorescent in UV and taken to be the original varnish. Photographed at a magnification of 500×; actual magnification 440×.

tunics and the grey wall; previously they appeared linked by the similar greyish-yellow tones of the varnish (see PLATES 3 and 4).

The fluorescent coating still present following removal of the upper varnish layer seems also to have been applied over the gilded throne; it features at the surface in a cross-section taken from one of the dark lines applied over the gilding to indicate the architectural detail of the throne (PLATES 8 and 9). As is usually the case with Northern European paintings, the gold leaf (confirmed as gold by analysis) was laid over an oil mordant, pigmented in this instance with yellow earth, lead white, lead-tin yellow and a little red and black.⁹ In ultraviolet light it can be seen that in fact there are several layers above the gold leaf. A translucent yellow-brown layer, unpigmented and less strongly fluorescent in ultraviolet than the varnish layer, was applied first, before the lines and hatched shading of the architecture. In areas where the architectural detail has flaked away from the gilding it can be seen that this first translucent layer is missing as well, leaving the bright gold leaf exposed (PLATES 7 and 10). Since this layer is unpigmented and apparently unmodulated its function is not clear. Perhaps it was to provide a more amenable surface than gold leaf for painting the fine lines of the mouldings, executed with black and brown paint, the brown consisting of a mixture of coarse black pigment with vermilion. In the cross-section it can be seen that over the brown paint is another translucent yellow-brown



PLATE 10 Macrophotograph of a ray of the Virgin's halo with traces of gold leaf on the raised mordant. Flake losses from the black and brown hatched lines and the oil and resin varnish layers on the throne expose areas of bright gilding.

layer, with a strong yellowish-white fluorescence in ultraviolet light. Since this is present in several of the samples taken after cleaning (see, for example, PLATE 16) and fluoresces in much the same way as the coating observed on parts of the picture surface, it seems likely that it represents the residue of either a very early varnish or perhaps an original surface coating.

Only one small sample of this layer was available for analysis by Fourier transform infrared microscopy (FTIR). This gave spectra consistent with a drying oil and a natural resin. Some peaks associated with calcium oxalate were also seen. This was probably present in the form of a mineralised crust, a further indication of the considerable age of the surface coating. Unfortunately, the sample size was insufficient to allow further characterisation by gas chromatography-mass spectrometry (GC-MS) and so the resin type could not be identified.¹⁰ Since this is the first analysis of what may be an original varnish on an early Netherlandish painting at the National Gallery, we have no directly comparable results.¹¹ In addition, the relative lack of written sources on painting practice in Northern Europe at this date means that there are not the varnish recipes to confirm the identification of these materials as is the case with Italy in the same period.¹²

Further studies also need to be made of the layer structure of other paintings with architectural detail painted over gilding – a technique in Northern European painting that goes back at least to the fourteenth century¹³ – to see whether they too have a translucent glaze or varnish applied over the metal leaf before the painting of the lines and hatched shading of the architectural elements, or whether this was a peculiarity of Massys's painting technique.¹⁴

Certainly several aspects of his technique seem unusual and perhaps idiosyncratic. Although the infrared

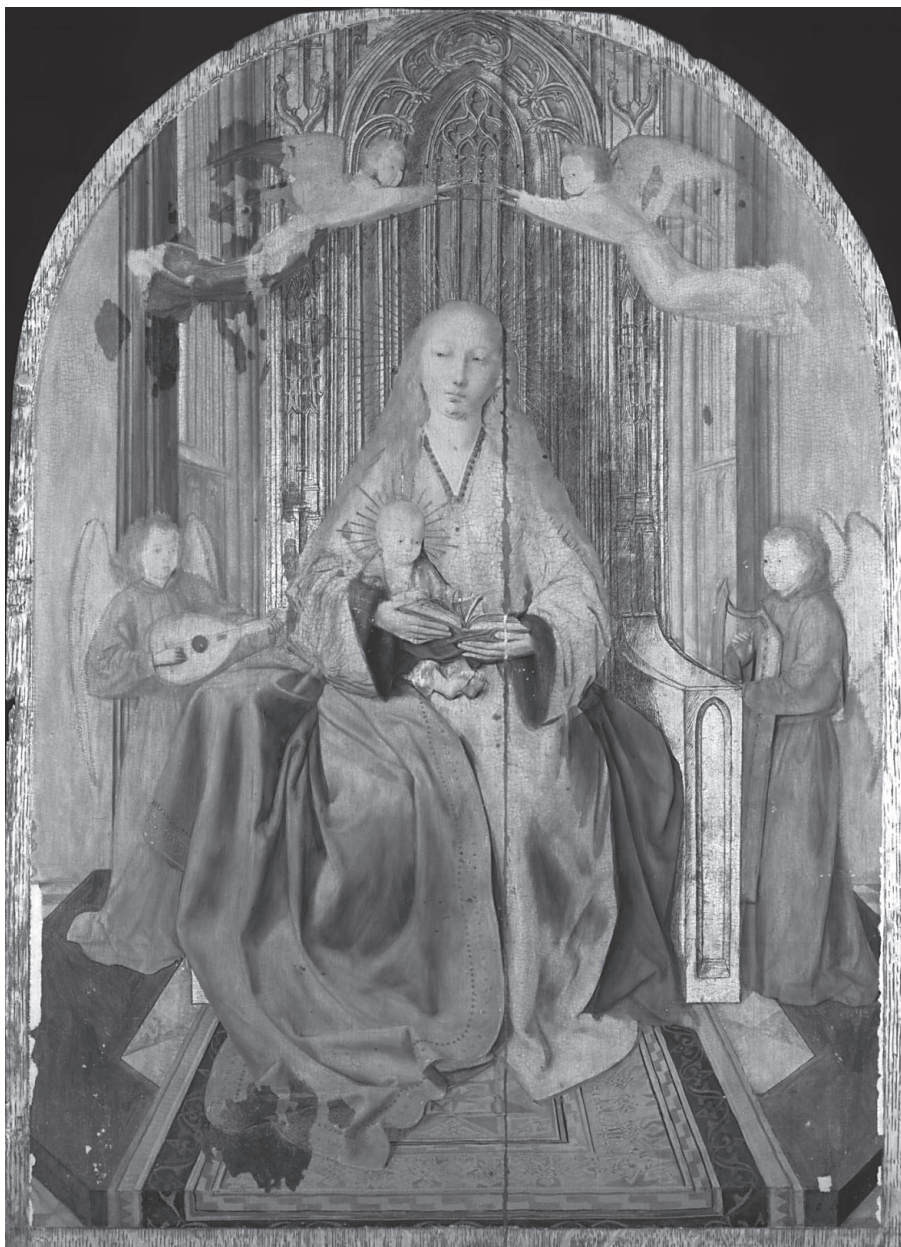


FIG. 3 Digital infrared reflectogram.

reflectogram does not reveal an extensive underdrawing, the small amount visible is distinctive and varied in its character. The little flying angels were sketched in a summary fashion with relatively fine lines that can be detected only faintly in the reflectogram. In the angel on the left a narrower sleeve with curved creases or folds was indicated, and the profiles of their faces are no more than flattened ovals; in the painting the heads were both moved a little further inwards. In the harp-playing angel a broader line seems to have been used, most evident around the back of his head (which now appears much larger because of his frizzy mass of hair), along the underside of his sleeve, originally lower – or possibly this line indicated the gathering of his tunic at his waist – and on his right thumb, rather bigger than

that in the final painting. Around his wings, and also those of his counterpart on the left, is a yet broader line, drawn with a material that produces a curious craquelure in the infrared image, although there is no noticeable difference in the cracking of the paint surface.¹⁵

The most detailed underdrawing to be seen in the reflectogram is on the Virgin's proper right sleeve where the drapery is indicated with a confusion of scratchy short lines, often fanning out from the turn of a fold. Most of the lines are faint and only just legible, but at the lower edge they are much darker, perhaps because of a change in drawing material. Alternatively the greater part of the underdrawing may have been executed directly on the chalk ground and these darker



FIG. 4 Digital infrared reflectogram detail.



FIG. 5 Digital infrared reflectogram detail.

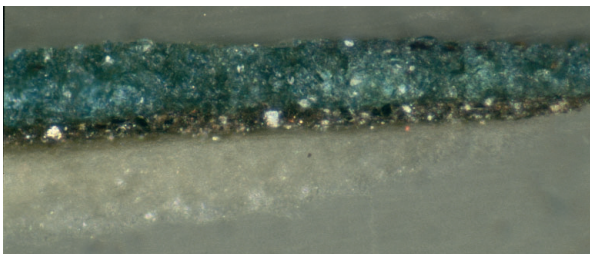


PLATE 11 Cross-section of a sample from a deep shadow of the Virgin's blue dress. Over the chalk ground is a thin medium-rich priming containing a little lead white, followed by dark grey shading, containing black (possibly coal) with a little lead white and a red pigment, and then natural azurite, of relatively small particle size, mixed with a little lead white and red lake. No varnish is present. Photographed at a magnification of 500x; actual magnification 440x.

lines could represent final adjustments made over the thin priming of lead white with a large amount of oil medium that can be detected in the cross-sections. Similarly, in the area of the Virgin's left sleeve most of the drawing is faint, but running down the contour of her shoulder is a rapid zig-zagging line, presumably an annotation for her wavy hair, which is again much darker than the rest of the underdrawing. A faint suggestion of hatched diagonal lines can be seen on the shadowed area between her arm and body and on the lower part of her left sleeve. The elaborate folds of her mantle may well have been drawn and shaded with an extensive hatched underdrawing similar to that discovered in the drapery of the enthroned *Virgin and Child* in the *Musées royaux des Beaux-Arts*, Brussels (Inv. no. 1497), much larger than the National Gallery panel and one of the few works by the painter for which a technical examination has been published.¹⁶ On this work the lines and hatching often exhibit the same irregular and scratchy quality as the drawing of the Virgin's sleeve in the small painting; there is also reinforcement with heavier lines for adjustments and reworkings. The painting technique of the London panel, however, means that all traces of any such underdrawing on the Virgin's skirt and mantle are obscured in infrared.

As can be seen clearly in the infrared reflectogram, the deep folds along the shadowed side of the skirt of her blue dress were laid in with a dark warm grey paint consisting of a black pigment, probably powdered black coal, with a little lead white and a red pigment (PLATE 11). Although this layer is present only in the shadowed areas, it lies over the priming and is perhaps better considered as part of the painting process. The dark colour is clearly intended to provide a base for the layers of blue pigment above but it also defines the volumes of the folds in a strongly sculptural way. The blue layers, containing natural azurite of relatively small particle size and a notably greenish hue mixed with a little lead white and red lake (presumably added to deepen the blue in the shadows), provide sufficient coverage for the dark grey underlayer to have a relatively minor optical function.

On the Virgin's red mantle (PLATE 12), on the other hand, there is a full monochrome undermodelling of the folds which plays an important role in the final effect. Essentially the entire drapery was executed as a grisaille using a warm grey paint containing lead white and a warm black pigment, perhaps the same coal black noted in the sample from the blue dress. The tonal range extends from pale almost white highlights, to a deep grey in the shadowed folds to the right. All colour comes from the superimposition of a pure red lake glaze,¹⁷ blotted with a woven textile in order to



PLATE 12 Detail, after cleaning before restoration.

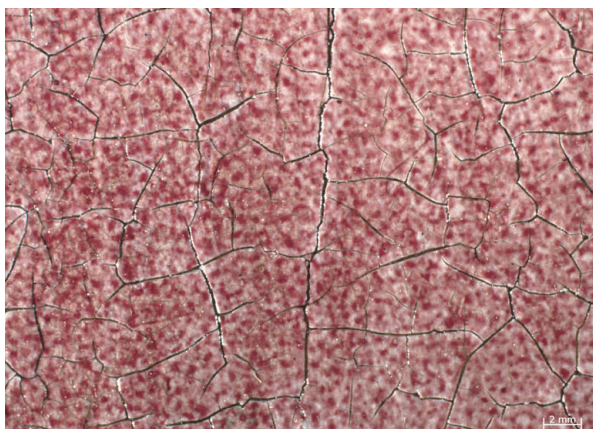


PLATE 13 Digital macrophotograph of the Virgin's mantle, showing blotting of the red lake glaze over the monochrome undermodelling.

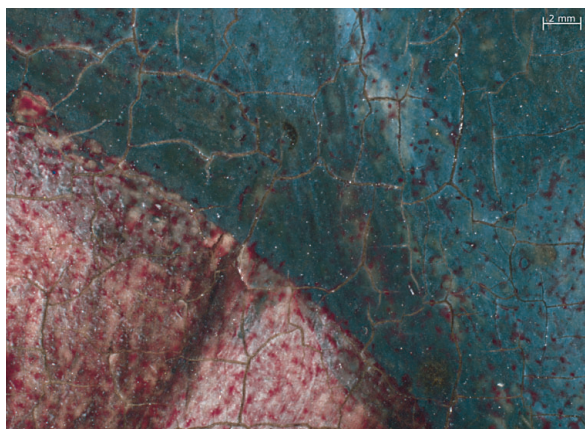
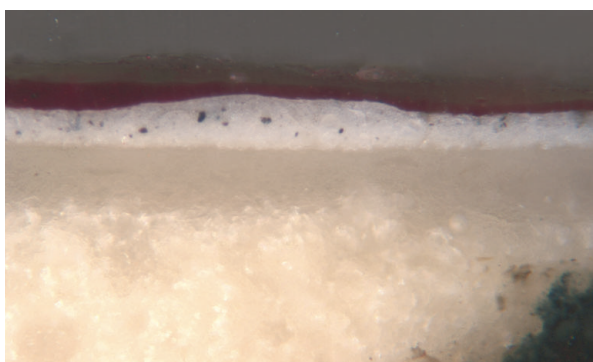
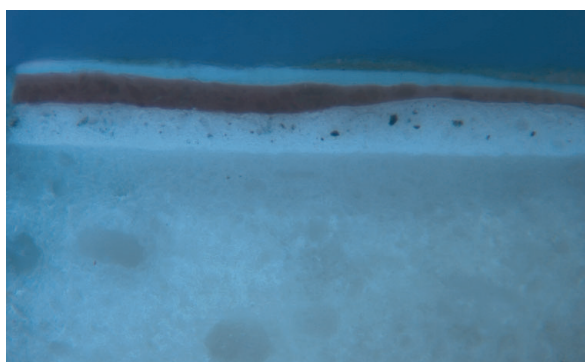


PLATE 14 Digital macrophotograph of the junction between the Virgin's mantle and her right sleeve showing spots of glaze accidentally transferred to the blue paint.



PLATES 15 and 16
Cross-section of a sample from the Virgin's red mantle, under normal (PLATE 15) and UV illumination (PLATE 16). Over the chalk ground are a thin lead white priming (more visible in UV light) and then a



grey underpainting containing lead white and a warm black. The red lake glaze does not fluoresce in UV light but the translucent yellow varnish above it is strongly fluorescent. Photographed at a magnification of 400x; actual magnification 350x.

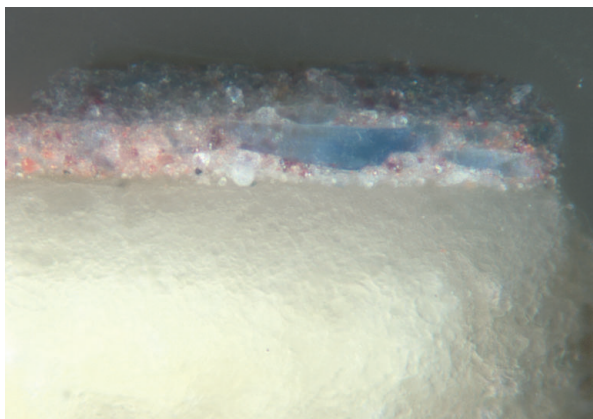


PLATE 17 Cross-section of a sample from the deep purple shadow of the drapery of the flying angel on the left showing two layers of purple over the chalk ground and lead white priming. The lower layer contains lead white, coarse azurite, vermilion and possibly some haematite. The upper darker layer contains finely ground azurite mixed with red lake and a little lead white. The presumed original varnish is also present. Photographed at a magnification of 400x; actual magnification 350x.

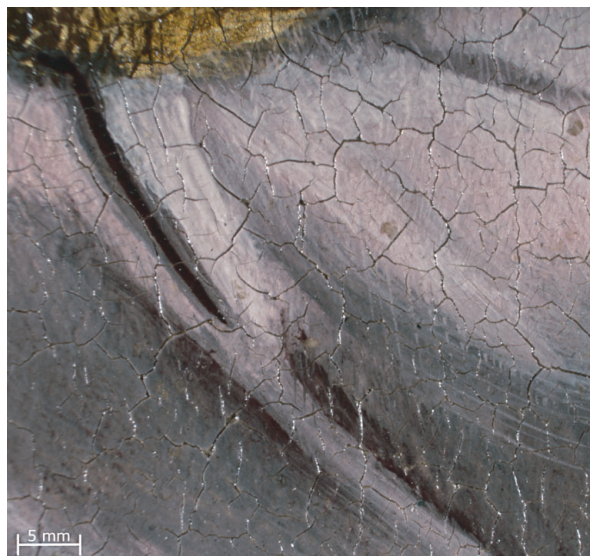


PLATE 18 Digital macrophotograph of the sleeve of the flying angel on the right.

achieve an even thickness across the whole drapery. The regular pattern of little dots of glaze is easily visible under magnification, including where a few spots have been accidentally transferred to the Virgin's blue sleeve (PLATES 13 and 14). The glaze in the area around the large loss in the hem of the Virgin's cloak, which had been covered by old overpaint and excessive filling, has been protected from light and therefore remains a rich unfaded red and is more even in its finish. The samples (PLATES 15 and 16) also include the surface coating which exhibits the same fluorescence as on the gilded throne. The execution of a red lake drapery in this way is very unusual and may be peculiar to Massys.

The use of black as an underpaint for azurite (a pigment with relatively poor coverage, especially when used with little or no lead white) was common in polychromy of sculpture in the Netherlands, Germany and Spain in the fifteenth century and unmodulated black layers beneath azurite have also been reported on Spanish paintings.¹⁸ Modelled black and grey underpaintings for blue draperies, however, seem associated more particularly with Italian painting in this period.¹⁹ Among Netherlandish paintings in the National Gallery a related technique occurs on Gossaert's *Adoration of the Kings*, painted probably about a decade after Massys's little panel. Here the Virgin's blue dress has a modelled grey underpainting completed with layers of azurite and ultramarine, producing a darker less brilliant blue than that of the mantle, painted with the same blue pigments. The deep plum-coloured velvet cloak of Caspar in this painting also has a dark grey underpaint-

ing, but in this instance it appears to be unmodulated, with the relief of the folds established instead during application of the superimposed layers of red paint, resulting in a different effect to that on the little Massys panel.²⁰ That Massys continued to exploit the optical effects of black and grey underpaintings is confirmed by examination of cross-sections from his later *Virgin and Child with Saints Barbara and Catherine* (NG 3664), which in spite of being a *Tüchlein* – a type of picture generally painted with a more direct technique – was built up in layers with black and grey underpaints for the darker blue, green and red draperies.²¹

It is true that Quinten began his career as a painter at a time when other artists both north and south of the Alps were exploring more fully the possibilities of extending the chromatic range obtainable with the relatively limited number of pigments available at the time, yet *The Virgin and Child Enthroned, with Four Angels* does seem exceptional in its complete avoidance of intense primary colours based on pure unmixed pigment. Even where a single pigment is used, such as the azurite for the Virgin's dress, the grade of pigment chosen is unusual for its small particle size and for its greenish hue.²² The possibility that the pigment was chosen for its softer more green-blue tint is suggested by the fact that elsewhere on the painting, in the cool lilacs of the flying angels (PLATES 17 and 18), a coarsely ground azurite with a true blue colour was used in the paint mixtures since a greenish azurite would result in brownish and rather muddy purples. The angels' shot silk tunics are extraordinarily complex in their partially

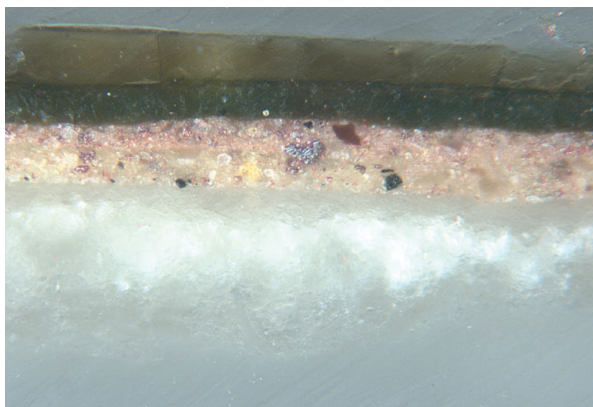


PLATE 19 Cross-section of a sample from the dull green dress of the angel playing the harp on the right. Over the chalk ground and lead white priming are two layers of underpainting: the first is a yellowish orange, containing lead white, yellow earth, a little lead-tin yellow and black and an opaque red, possibly haematite, and the second is more red, consisting of opaque red, probably haematite, lead white and a little yellow pigment. The paint layer structure is completed with a green verdigris glaze, slightly brown at the interface between paint and varnish. The presumed original varnish is present. Photographed at a magnification of 400x; actual magnification 350x.

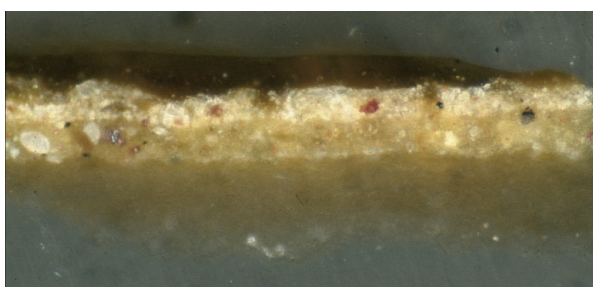


PLATE 20 Cross-section of a sample from the yellow brown of the sleeve of the lute-playing angel on the left. The chalk ground and priming (visible only in UV light) are present. Over these are two layers of warm yellow based on yellow earth, lead tin yellow, lead white, a little iron-containing pigment (probably haematite) and perhaps some yellow lake. The drapery is completed with an unidentified brownish yellow glaze containing some copper. The presumed original varnish can be distinguished in UV light. Photographed at a magnification of 500x. Actual magnification 440x.

interlayered mixtures of different shades of purple, some more pink and containing vermilion with lead white and azurite, and others cooler and more blue, combining red lake with the azurite. Instead of the simplified Italian *cangiante* technique, with a reddish purple in the shadows and pale blue in the lightest areas, here the highlights can be either pale blue or a rosy pink. The mid-tones are subtly varied by scumbling cooler more blue mixtures over warmer pinkish purples. The shadows are finally picked out with a deep purple, essentially just red lake and azurite.

The two musician angels are even more restrained

in colour. It might be thought that the dull green of the angel on the right is the result of alteration of copper-green pigments, and indeed there is slight discoloration at the upper surface of the verdigris in the sample (PLATE 19). The green, however, can never have been very bright for it is glazed over a warm reddish-brown underpaint, visible before restoration in the area of damage on the shadowed side of the angel's sleeve (see PLATE 7). In the paint sample this is shown to consist of two layers, an upper layer of an opaque red pigment with the appearance of haematite mixed with a little lead white applied over a first more yellow brown, containing lead white, yellow earth, small amounts of lead-tin yellow and black, and some opaque red, probably also haematite. Haematite is not a common pigment in early Netherlandish painting²³ but its soft maroon hue was perhaps more appealing to Quinten's colour sense than the bright opaque red of vermilion.

The rich golden brown of the costume of the lute-playing angel is an unusual colour for draperies in paintings of this period, but a similar colour does occur in other paintings by Massys, notably in the tunic of the child on the left offering a flower to his mother in the centre panel of the Saint Anne Altarpiece (Brussels, Musées royaux des Beaux-Arts; inv. no. 2784). In the National Gallery painting (PLATE 20) the colour has been achieved by underpainting with two layers of warm yellow based on yellow earth, lead-tin yellow, lead white, a little iron-containing pigment (probably haematite) and perhaps some yellow lake. Over this is a rich yellow-brown translucent layer that, rather surprisingly, has been shown by analysis to contain copper.²⁴ The colour, however, is not typical of a discoloured copper glaze that has altered from green and there are no signs of any particles of verdigris that have retained some of their green colour. In addition, the fact that the drapery of the angel on the right has a copper-containing glaze (almost certainly derived from verdigris in oil) which is still green makes it improbable that the costume of the lute-playing angel was once a similar colour. This is even less likely in the case of the child in the Saint Anne Altarpiece, who is surrounded by figures dressed in different shades of green. It would seem, therefore, that the copper-containing material used for the drapery of the lute-playing angel was probably a brown pigment, although it cannot be defined further as the copper compound that was present originally has reacted with the oil binding medium to form copperfatty acid soaps.²⁵ It has been suggested that *kesselbraun*, mentioned in documentary sources from this period and also later, might sometimes be a brown copper-containing material, and it may be that this was the pigment used in the painting by Massys.²⁶



FIG. 6 X-radiograph of the Virgin's face.



PLATE 21 Digital macrophotograph of the Virgin's face.



PLATE 22 Digital macrophotograph of the head of the flying angel on the right.

Even in his technique for painting areas of flesh, Massys differs from the general approach of many Netherlandish painters of the later fifteenth and early sixteenth centuries. Flesh painting in works by Dirk Bouts and Memling, for instance, is usually thin and translucent allowing the luminosity of the chalk ground, often primed with lead white, to play a part in the final effect. Appreciable amounts of lead white feature only in the highlights. This can result in a characteristic image in X-radiographs, with the areas of flesh appearing comparatively dark as a result of their lack of X-ray opacity, except for highlights on prominent features such as noses, brows and cheekbones.²⁷ The heads in Quinten's National Gallery panel, on the other hand, appear as dense relatively flat areas of lead white in the X-radiograph, particularly so in the case of the mask-like face of the Virgin (FIG. 6). The same effect can be observed in X-ray images of the *Tüchlein*, in spite of its different medium and support.²⁸ No paint samples could be taken from the flesh tints in *The Virgin and Child Enthroned*, but under magnification (PLATE 21) it is evident that the Virgin's face was first fully worked up with a substantial white and grey monochrome undermodelling, her features established from the beginning (hence their clarity in the radiograph). The pink flesh tints were then skimmed over the underpainting with the lightest of touches – in a small area to the left of the nose the upper layer has flaked revealing the pale grey beneath. Curiously this seems to be a reversion to an older technical tradition, and in particular to that of Robert Campin and his workshop and followers.²⁹ Campin's now lost *Virgin and Child in an Apse*,³⁰ with its angels playing the lute and harp on either side, is clearly one of the sources for Quinten's composition.

In *The Virgin and Child Enthroned* there are reminiscences too of Van Eyck, including the handling and manipulation of the oil medium: the binder in samples from a range of colours, including the grey architecture,³¹ the green tunic of the angel on the right, the Virgin's blue dress and the red lake glaze on her mantle, was identified as heat-bodied linseed oil in every case.³² A particular trick that Massys exploited was to take a dry brush and drag it lightly across juxtaposed shades of still soft paint, pulling fine threads of one colour across another, thereby blurring the transition between tones; this is particularly evident in the lilac tunics of the flying angels (PLATE 22 and also PLATE 18).³³ For the hair of the angels, on the other hand, he made use of the tendency for fine strokes of paint (in this case of pink and pale yellow, probably lead-tin yellow) to be repelled by a fully dry underlayer (an unmodulated warm golden brown) forming interrupted and beaded lines that give the hair its delightful soft fluffy texture.³⁴ His masterly



PLATE 23 Digital macrophotograph of the crown held by the angels.

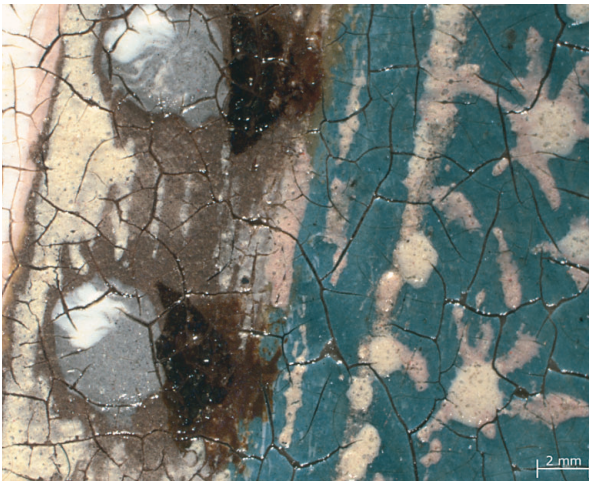


PLATE 24 Digital macrophotograph of the Virgin's embroidered neckline.

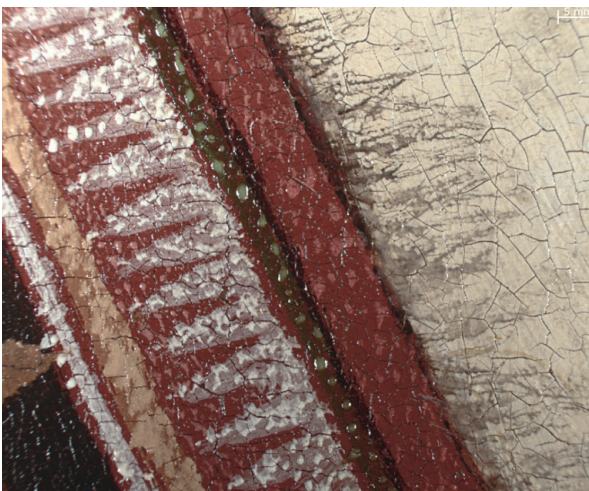


PLATE 25 Digital macrophotograph of the edge of the carpet.

touch is also demonstrated by the rapid flicks and dots made by the brush when depicting jewels and highlights on the Virgin's crown held by the angels (PLATE 23) and in the gold threads of the embroidered borders of her robes (PLATE 24), picked out with the same pale pink and yellow as for the angels' hair.³⁵ The painting of the oriental carpet (PLATE 25), with its fringes of broken brushwork, seems methodical and precise, with tiny blobs of paint representing the individual tufts, but it too was painted with speed and confidence, its complex pattern executed unerringly over a red-brown base colour, containing vermilion, red lake, a little black and possibly another opaque red pigment.

The information gained from the technical examination was crucial to decisions made as to how to restore the little panel. Any easily visible method of retouching was never seriously considered, since this would disrupt the newly recovered sense of space and light, and conflict with the extraordinarily refined execution. Moreover, the survival of some of the original surface coating means that parts of the painting surface are exceptionally well preserved, even by the standards of early Netherlandish painting. The decision was taken, therefore, to reconstruct the missing areas, including those in the gilded throne.

In the areas of total loss from the throne the new fillings were underpainted with watercolour to match the light brown of the original pigmented mordant and then gold leaf was laid using a reversible mordant of 'Paraloid B-72'; this was painted on in solution, and the leaf (in the form of transfer gold) laid over it while it was still tacky. Preliminary toning of the new gold was carried out in watercolour, all before the application of the first brush coat of varnish, which was a very thin coat of 'Regalrez 1094'. In addition, tiny scraps of new gold leaf were applied (also over a 'Paraloid B-72' mordant) to the rays of the haloes of the Virgin and Child. Under magnification (see PLATE 10) traces of the original gilding, most of which had been rubbed off the raised lines of mordant, could be seen. It was felt that it would be misleading to leave the lines without any visible gilding, and, in addition, the replacement of some gold leaf, albeit deliberately much worn, allows the rays of the Virgin's halo to come forward in front of the gilding of the throne. The reconstruction of the losses to the architectural detail of the throne, which was carried out with 'Gamblin Conservation Colours',³⁶ presented few problems since details could be copied across from one side to the other.

The losses from the flying angel on the left and from the carpet and hem of the Virgin's cloak proved more challenging. The recovery of fragments of original paint from beneath the old restorations showed that



PLATE 26 *The Virgin and Child Enthroned with Four Angels*, after restoration.

the previous reconstruction of these areas was illogical and needed to cover parts of the original in order to succeed; moreover, in the case of the angel the number of triangular crumpled folds was clearly excessive (see PLATE 3). Massys did not construct draperies with the folds following the general formula of interlocking triangles used by many Netherlandish painters of the time; instead, they resemble real draped fabrics. Jointed lay figures were therefore set up in the poses of the seated Virgin and the flying angels (the undamaged angel on the right is the reverse side of the angel on the left). They were dressed in fine linen fabric soaked in glue,³⁷ which could be arranged in folds that correspond with those visible in the surviving areas of paint and allowed to set, in a sense a reversal of the Renaissance practice (more commonly associated with Italian artists) of soaking fabric in liquid gesso, chalk or clay and then making studies from the resultant folds. These models provided plausible solutions to the arrangement of the fabric in the large areas of loss, especially in the flying angel. Following trial reconstructions in water-colour on prints from digital photographs, the losses were then restored on the painting, repeating exactly the layer structure revealed in the cross-sections.³⁸

The reconstructed drapery folds – and the surviving original fragments – of the flying angel on the left are notably different from those of the angel on the right, very probably drawn from the reverse side of the same dressed manikin, but this is in keeping with Quinten's tendency to challenge our expectations of compositional symmetry. Contrary to the norms of centralised perspective, it is the Virgin's head that is located along the central axis of the panel and not the architecture of the throne, which is shifted to the right, while the carpet follows the central alignment of the Virgin. The crown carried by the flying angels, on the other hand, is centred on the throne, and therefore to the right. Most strikingly, the lute-playing angel stands well back behind the throne and so is on a smaller scale than his counterpart on the right and there is a space between him and the frame, whereas the harp-playing angel has his wings cut by the sight edge.

The discoveries made during the treatment and examination of *The Virgin and Child Enthroned* all contribute to the impression of a painter of subtle intelligence and refined technique, whether working on a miniature scale as here or on the massive altarpieces now in Antwerp and Brussels. His distinctive palette and exploitation of complex underpaintings for certain effects distance him from other painters active in the Netherlands at the turn of the century. The fact that these underpaintings were often monochrome, together with the possibility that he studied three-dimensional

models in the form of manikins dressed in stiffened fabrics,³⁹ reinforce the associations with the practices of sculpture that are suggested by his work as a medalist and by his origins in a family of metalworkers.

Acknowledgements

This article could not have been written without the assistance and encouragement of Lorne Campbell. I am also grateful to my colleagues in the Scientific Department: Marika Spring for her work on the pigments and cross-sections, and for her contribution to their discussion; and Catherine Higgitt, David Peggie and Rachel Morrison for their analysis of the paint medium and varnish layer. The digital infrared reflectogram was supplied by Rachel Billinge.⁴⁰ I would also like to thank Susan Foister for her patient support during the long process of cleaning and restoration of the painting, and H el ene Verougstraete for her helpful comments and suggestions, including important references now incorporated into the notes.

Notes

- 1 A. Roy, 'The Technique of a *T uchlein* by Quinten Massys', *National Gallery Technical Bulletin*, 12, 1988, pp. 36–43.
- 2 This information on provenance and also the biographical details are based on notes compiled by Lorne Campbell in preparation for the volume of the National Gallery Catalogues on the sixteenth-century Netherlandish Schools.
- 3 See M.J. Friedl ander, *Early Netherlandish Paintings*, Vol. VI, *Quinten Massys*, 1971, pp. 19–20, and L. Silver, *The Paintings of Quinten Massys with Catalogue Raisonn * Oxford 1984, p. 70–1 and p. 194, cat. no. 1.
- 4 The dendrochronological analysis was carried out in 1997 by Dr Peter Klein of the Ordinariat f ur Holzbiologie, Universit t Hamburg.
- 5 Unfortunately, there have been relatively few detailed technical studies of early Netherlandish paintings of the time when Massys was beginning to paint and so it is not yet possible to determine the extent of the originality of his technique.
- 6 For diagrams showing this form of frame fitting, see H. Verougstraete-Marcq and R. Van Schoute, *Cadres et supports dans la peinture flamande aux 15e et 16e si cles*, Heule-le-Romain 1989, pp. 50–1.
- 7 The painting is now displayed in a reproduction gilded frame, the mouldings derived from those of the period.
- 8 See note 2.
- 9 The pigments were identified by energy dispersive X-ray analysis (EDX) in the scanning electron microscope (SEM) and evidence for the presence of oil was found by Fourier transform infrared (FTIR) microscopy using a diamond cell in transmission mode. Yellow ochre, together with fast drying lead-containing pigments such as red lead and lead white, ground in linseed oil, were the usual ingredients of recipes for oil mordants given in German and Netherlandish documentary sources; see L. Campbell, S. Foister and A. Roy, eds, 'The methods and materials of Northern European painting 1400–1550', *National Gallery Technical Bulletin*, 18, 1997, p. 31 and note 122.
- 10 Analysis of the varnish and the paint medium was carried out by Catherine Higgitt, David Peggie and Rachel Morrison.
- 11 Oil and resin coatings have been identified on the thirteenth-century English Westminster Retable (see M.L. Sauerberg, A. Roy, M. Spring, S. Bucklow and M. Kempinski, 'Materials and techniques', *The Westminster Retable: History, Context and Conservation*, eds P. Binski and A. Massing, with M.L. Sauerberg, forthcoming) and a late fifteenth-century Spanish altarpiece (see S. Hodge, M. Spring and R. Marchant, 'The construction and painting of a large Castilian retable: a study of techniques and workshop practices', *Painting Techniques. History, Materials and Studio Practice*, Contributions to the Dublin Congress of the International Institute for Conservation, 7–11 September 1998, ed. A. Roy and P. Smith, London 1998, pp. 70–6). In these cases it was possible to identify the resin as a pine resin and perhaps its use in oil varnishes, instead

- of the sandrac that has been found in Italian examples, was the norm in Northern Europe or areas influenced by the northern technical tradition.
- 12 See, for example, J. Dunkerton and R. White, 'The Discovery and Identification of an Original Varnish on a Panel by Carlo Crivelli', *National Gallery Technical Bulletin*, 21, 2000, pp. 70–6; and also J. Dunkerton, J. Kirby and R. White, 'Varnish and early Italian tempera paintings', *Cleaning, Retouching and Coatings*, Preprints of the Contributions to the Brussels Congress of the International Institute for Conservation, 3–7 September 1990, pp. 63–9.
 - 13 It can be seen in the Walcourt *Annunciation*, a rare pre-Eyckian painting in Namur, Musée des Arts anciens du Namurois. See P. Colman, 'Les panneaux pré-eyckian de Walcourt', *Bulletin de l'Institut Royal du Patrimoine artistique*, 3, 1960, pp. 35–54, esp. p. 39. I am grateful to Hélène Verougstraete for drawing my attention to this example.
 - 14 In some instances translucent yellow glazes over metal leaf were applied to give a yellow colour to cheaper white metals such as silver, but this is not the case with the Massys panel where pure gold leaf was used.
 - 15 The cracking may be associated with the binding medium – perhaps a gum – of the drawing ink. Similar cracking has been observed in underdrawings executed with iron-gall ink see J. Kirby, A. Roy and M. Spring, 'Materials of Underdrawing' in D. Bomford, ed., *Art in the Making: Underdrawing in Renaissance Paintings*, London 2002, pp. 26–37, esp. pp. 31–2.
 - 16 R. van Schoute and H. Verougstraete-Marcq, 'L'exécution picturale chez Quentin Metsys: considérations sur deux de ses œuvres aux Musées royaux', *Bulletin Koninklijke Musea voor Schone Kunsten van België, Brussel/Musées royaux des Beaux-Arts de Belgique, Bruxelles*, 1989–91/1–3, pp. 205–16, esp. p. 207 and p. 214, fig. 10. Little drawing could be detected on the Saint Anne Altarpiece (Brussels, Musées royaux des Beaux-Arts); the authors suggest that its detection by infrared may be blocked by layers of underpainting.
 - 17 Insufficient sample was available for identification of the dyestuff by HPLC, but its lack of fluorescence in UV shows that it is not madder and is more likely to derive from an insect source.
 - 18 See S. Hodge, M. Spring and R. Marchant, 'The Santa Marina retable from Mayorga, attributed to the Master of Palanquinos, c. 1490s', *Hamilton Kerr Institute Bulletin*, 3, 2000, pp. 7–40, esp. p. 25 and p. 27, note 13 (with references to black underlayers in the polychromy of sculpture in the Netherlands and Germany).
 - 19 A famous example being Michelangelo's unfinished *The Virgin and Child with Saint John and Angels* ('*The Manchester Madonna*') (NG 809).
 - 20 L. Campbell, S. Foister and A. Roy, eds, 'Gossaert's "Adoration of the Kings"', *National Gallery Technical Bulletin*, 18, 1997, pp. 87–97, esp. pp. 92–4.
 - 21 Roy 1988 (cited in note 1), esp. pp. 38–42.
 - 22 Finely ground azurite with a greenish cast has also been found in the Virgin's light greenish-blue robes in *The Virgin and Child with Saints Barbara and Catherine*. It has been suggested that the drapery may have altered in colour, although the dull and grubby surface – inevitable for a *Tüchlein* – makes it difficult to judge. However, the likelihood that here too it was a deliberate choice is suggested by the use of a more intense azurite with large particles for the dark blue skirt of Saint Catherine. See Roy (cited in note 1), p. 41.
 - 23 More commonly areas of red contain combinations of vermilion, red lake and lead white, with black pigment added if a browner hue was required. See 'Methods and materials of Northern European painting in the National Gallery, 1400–1550', *National Gallery Technical Bulletin*, 18, 1997, pp. 6–55, esp. pp. 38–9.
 - 24 Copper was found to be the major component of the translucent brown glaze at the surface of the cross-section of the sample from the angel's robe on analysis by EDX in the SEM. This was confirmed by both the EDX maps of the cross-section and spot spectra taken from the layer. The minor amount of calcium detected indicates the presence of some calcium carbonate, possibly the substrate of a yellow lake pigment, but certainly not the main pigment in the layer. A small amount of lead was also present, indicating either that oil containing lead driers had been used or that a small amount of a lead pigment had been added to the paint. This was consistent with the results of analysis by FTIR, discussed in detail in note 25.
 - 25 Analysis of the translucent yellow paint by FTIR microscopy showed that in addition to oil, there was evidence for the presence of a copper pigment (bands typical of copper-fatty acid soaps, copper-resin acid soaps which are likely to be from reaction with the varnish layer lying over the paint, and copper oxalates). This suggests that a copper-containing pigment has reacted with the fatty acids in the oil binding medium to form soaps. Some calcium carbonate was also detected.
 - 26 *Kesselbraun* is mentioned in documentary sources ranging in date from the fifteenth to the nineteenth centuries. The further information given in some of the sources suggests that the name could be used for several different materials (probably of similar colour and properties), including iron-containing compounds, and also copper compounds, the latter being of interest in relation to the brown pigment found in the painting by Massys. See the following for a detailed discussion of this pigment and references to the relevant documentary sources: C. Krekel, U. Haller and A. Burmester, 'Artists' pigments reconsidered: does modern science match the historical context?', in *The Object in Context: Crossing Conservation Boundaries*, Contributions to the Munich IIC Congress, 28 August–1 September 2006, D. Saunders, J. H. Townsend and S. Woodcock, eds, London 2006, pp. 244–8; G. Heydenreich, *Lucas Cranach the Elder, Painting materials, techniques and workshop practice*, Amsterdam 2007, pp. 159–61. I am grateful to Marika Spring for providing the analysis and references in this and the two previous notes.
 - 27 For examples of X-radiographs showing these characteristics by Bouts, see D. Bomford, A. Roy and A. Smith, 'The techniques of Dieric Bouts: Two Paintings Contrasted', *National Gallery Technical Bulletin*, 10, 1986, pp. 39–57, especially p. 53; for Memling, see L. Campbell, *National Gallery Catalogues: The Fifteenth Century Netherlandish Schools*, London 1998, entry for *A Young Man at Prayer* (NG 2594), p. 373, Fig. 3.
 - 28 See Roy 1988 (cited in note 1), p. 42.
 - 29 A grey undermodelling has been identified in the flesh tints of *The Virgin and Child before a Firescreen* (NG 2609) by a follower of Campin, and the X-ray image of these areas is notably dense. See L. Campbell, D. Bomford, A. Roy and R. White, 'The Virgin and Child before a Firescreen: History, Examination and Treatment', *National Gallery Technical Bulletin*, 15, 1994, pp. 21–35, esp. pp. 29–32.
 - 30 For Campin's lost painting see the entry on the National Gallery's version in Campbell 1998 (cited in note 27), pp. 100–3.
 - 31 The pigments for the architecture are a warm brownish black (probably coal) and lead white, with the mouldings shaded with a dark brown, containing the same black, with a little lead white and an opaque red pigment (probably a red earth). For the bluish-grey platform some finely ground blue pigment was added to the basic lead white and warm black pigment. The sample from here is one of the few without the fluorescent coating, which confirms the impression that this part of the painting was cleaned more radically in the past.
 - 32 Medium analysis was carried out using FTIR and GC-MS by Catherine Higgitt and David Pegg. In the green glaze decorating the back of the Virgin's throne some copper-resin acid interaction was found, but whether the pine resin had been added to the paint medium or whether it was from the varnish was not clear. If from the latter, it would indicate that the resin in the apparently original varnish layer is indeed a pine resin.
 - 33 This technique occurs in passages of drapery in the later *Crucifixion* (NG 715), at present attributed to the workshop of Quinten Massys, but in fact very possibly by Quinten himself. The blending of tones by dragging a dry brush across soft oil paint is seen on other early Netherlandish paintings, notably those of Petrus Christus (see H. Verougstraete and R. Van der Schoute, 'La lamentation de Petrus Christus', *Petrus Christus in Renaissance Bruges. An Interdisciplinary Approach*, M. Ainsworth ed., The Metropolitan Museum of Art, New York, New York–Turnhout 1995, pp. 193–204, esp. p. 198). Massys's application of the technique is, however, distinctive, especially when seen under magnification.
 - 34 This 'beading' of strokes of oil paint is also a technique exploited for small details, including wisps of hair, in earlier Northern paintings, but seldom applied consistently for whole passages of painting such as the full heads of hair of the Massys angels.
 - 35 On a much larger scale, the same pink and yellow highlights appear on the jewels in *A Grotesque Old Woman* (NG 5769).
 - 36 Commercially manufactured retouching paints consisting of pigment bound in Laropal A-81, a low molecular weight aldehyde resin.
 - 37 'Resin-W' PVA emulsion, diluted with water.
 - 38 In the loss in the Virgin's cloak the grey monochrome undermodelling was executed in watercolour in order to provide a base for completion with glazes of red lake in 'Gamblin Colours'. Similarly the area of missing carpet was laid in with a flat red-brown colour since this was the original base colour for the superimposed pattern. The blotted red lake glaze of the Virgin's mantle has faded unevenly resulting in a patchy appearance in some areas. Where shapes were formed by areas of better preserved glaze, for example across her lap and right knee, these were blended in by applying tiny dots of red glaze to the surrounding area. The same approach was taken to the area of unfaded red lake around the loss in the hem. The intense colour has not been suppressed; fortunately this area is adjacent to the colourful and busy detail of the oriental carpet. The final sprayed varnish is MS2A.
 - 39 The abbreviated character of underdrawing of the heads of the angels might also suggest the use of wooden models with featureless heads like jointed lay figures.
 - 40 Infrared reflectography was carried out by Rachel Billinge using the Gallery's new digital infrared scanning camera SIRIS which uses an indium gallium arsenide (InGaAs) array sensor.