

IDENTIFICATION INFORMATION

| | |
|-----------------------------|--|
| Artist | Lucas Cranach the Elder (c.1472-1553) |
| Title | Study of Three Female Heads |
| Date | 1530-32 |
| Signature | Not signed |
| CIA Number | CIA 2002 |
| Owner | Royal Cornwall Museum, Truro |
| Collection Accession No. | TRURI: 1828.4 |
| Dimensions | 125mm × 267mm × 2mm (at edges) / 4mm (maximum depth) |
| Frame | Plain black/dark grey matt painted wooden frame with mitred corners, with gilded moulding around the sight edge. (max. dimensions: 300mm × 445mm × 52mm) |
| Examiner | Hannah Tempest |
| Date | January 2009 |

INTRODUCTION

This painting is a small-scale study on paper, mounted on wooden panel, by the German artist Lucas Cranach the Elder and is thought to have been executed in 1530-32. The painting is from the collection of the Royal Cornwall Museum, Truro, Cornwall. It has recently been included in the Royal Academy's exhibition of paintings by Lucas Cranach the Elder (March-June 2008). In parallel with the conservation treatment, technical examination will be carried out. Conservation decisions will be made in consultation with curatorial staff at the Royal Cornwall Museum.

SUMMARY OF CONDITIONS AND RECOMMENDATIONS*General Assessment of Condition*

The painting is in a stable condition. However, the paper support is brittle, and the oak panel onto which it is mounted is thin and fragile. The paint layers are quite abraded and a significant amount of now-discoloured retouching has been carried out previously. There is a large retouched loss to paint and paper in the top left and several minor losses and damages elsewhere. There is a thick discoloured natural resin varnish overall.

Recommendations for Treatment

The painting should be surface cleaned in order to remove surface dirt. The thick, discoloured natural-resin varnish should be removed if possible, in order to improve appearance, and allow the stabilisation and reintegration of damages more satisfactorily. Areas where the paper is delaminating from the oak panel at the edges should be consolidated. Overpaint removal may be carried out; if this is not possible, discoloured old retouching may be reintegrated during the inpainting stage. Losses should be filled, before varnishing and inpainting are carried out. Although the current frame itself is in very good condition, the framing system and fixtures immediately around the object should be reassessed, before reframing in the existing frame is carried out.

CONDITION REPORT

| | |
|--------------------------|---|
| SECONDARY SUPPORT | |
| Type: | Oak panel, approximately 2-4mm deep. Verso left and right edges are chamfered . |
| Condition: | The condition of the wood is stable, and there is no sign of insect damage etc, however it is extremely thin and delicate. |
| Effectiveness: | The wood panel is providing an effective support for the paper primary support. |
| Labels and Inscriptions: | Verso inscriptions: in pencil: "Kranach / Heads by Kranach" in ink: "halifax" in thicker ink (centre top): "X" mainly illegible inscriptions in red chalk/pencil ("8E"(?)), and in white chalk |
| PRIMARY SUPPORT | |
| Type: | The primary support appears to be paper, mounted on oak panel. |
| Colour: | Orange/brown where visible in the shoulders of the three figures and in some parts of the hair, as well as abraded areas of the flesh. |
| General Condition: | The paper is brittle where it overhangs the panel at the top edge. There are minor breaks, tears and losses, particularly right, left and top edges, including a crack running from the top edge into the central figure's head which may extend into the paper support. There are underlying patches (between the paper and wood supports) at the top, which are clearly visible in raking light. A retouched loss of paint and paper is present at the top left. |
| GROUND | |
| Type: | There is no ground. The paper functions as both primary support and ground. |
| PAINT LAYERS | |
| Medium: | Oil paint (untested) |
| Technique: | The paint is thinly applied, with very fine brush strokes. Painted underdrawing is visible in the outlines and features of the faces. The composition adheres relatively faithfully to the underdrawing, but some minor changes are visible such as the shifting of the central figure's proper left ear slightly to the right. The ground is clearly visible in the bottom section of the painting as the garments are only minimally indicated; the ground is also visible in the figures' hair, with fine highlights painted directly over the ground. The details of the headpiece of the left-hand figure are painted on top |
| Defects: | The paint appears to be stable. |
| Condition: | The paint is fairly abraded, with the orange/brown ground visible, particularly in parts of the right-hand head. |
| Losses/Damages: | There is a loss to paint and paper at the top left, which has been retouched previously. There are several minor losses of paint at the edges, in the nose and neck of the right-hand figure and below the neckline of the left-hand figure. Losses and abrasion resulting from frame damage are present at the edges, with some residual gilt. |
| Previous Treatments: | There is a significant amount of discoloured retouching, which is particularly visible in the flesh paint. |

| SURFACE COATING | |
|-------------------------|---|
| Type: | Natural resin varnish |
| Extent: | The thick natural resin varnish is present overall but appears to have been thinned previously in some areas. This is particularly clear under ultraviolet light, over and around the left-hand head, and to a lesser extent around the head on the right. Varnish is thickest around the edges of the painting, where residues from many different varnish campaigns appear to be present. |
| Condition: | The varnish appears to be discoloured and is bloomed at the centre of the left edge. Bloom is removable with saliva, and to a lesser extent with deionised water. |
| Surface Dirt: | Minor surface dirt may be present over the varnish. There appears to be some dirt in the interstices of the brushstrokes, under the varnish. |
| FRAME | |
| Frame: | Plain black/dark grey matt painted wooden frame with mitred corners, with gilded moulding around the sight edge. Glazed with Tru Vue Museum Glass, with a hardboard backboard. Solid, heavy frame. |
| Condition: | Very good condition. Minor paint cracking along the mitred joints. |
| Labels and Attachments: | Verso: Tru Vue brand label on backboard verso "Royal Academy of Arts, London / Cranach / 8 March 2008 to 8 June 2008 / Lucas Cranach the Elder / Key No. 105 / Cat No. 85 / Study of Three Female Heads / Royal Cornwall Museum, Royal Institution of Cornwall, Truro" (modern printed white paper label, bottom member in centre) |
| Fixtures: | Backboard attached with flat framers' tacks and taped over with brown paper tape. The frame is hung using two mirror plates attached at the right and left edges. The painting is mounted within the frame in a top-hinged (with linen tape), acid-free cardboard mount within the frame. |

Plate 1: Before treatment – recto, incident light:

Plate 2: Before treatment – recto, raking light (from right):

Plate 3: Before treatment – recto, UV light:

Plate 4: Before treatment – verso, incident light:

Plate 5: Before treatment – verso, raking light (from right):

Figure 1: Before treatment – recto, in frame, incident light:



Figure 2: Before treatment – verso, in frame, incident light:



Figure 3: Before treatment – recto, incident light:



Figure 4: Before treatment – recto, ultraviolet light:



Figure 5: Before treatment – verso, incident light:



Before treatment - photographic details:



Figure 6: Detail showing head-piece of the left-hand figure and retouched loss at left top.



Figure 7: Detail showing underdrawing in the neck of the right-hand figure, and damages in the neck and nose.



Figure 8: Detail showing face of central figure, with abrasion in face and neck and some underdrawing visible.



Figure 9: Detail showing damage below neckline of left-hand figure and abrasion from frame (bottom left).



Figure 10: Detail showing frame abrasion, bottom centre.



Figure 11: Detail showing reattached paper fragment, top centre-left, raking light.

Before treatment – photomicrographs showing condition:



Figure 12: Photomicrograph taken at $\times 30$ magnification, showing fibrous nature of paper support.



Figure 13: Photomicrograph taken at $\times 30$ magnification, showing top verso – thick patch on verso paper support (between paper and panel) is visible, with edge of original paper behind.



Figure 14: Photomicrograph taken at $\times 6$ magnification, showing retouched loss at left top.



Figure 15: Photomicrograph taken at $\times 10$ magnification, showing loss to paper support at bottom right corner with wood panel visible beneath.



Figure 16: Photomicrograph taken at $\times 6$ magnification, showing crack in paint and possibly paper support extending from top edge into central figure.



Figure 17: Photomicrograph taken at $\times 10$ magnification, showing damage in nose of right-hand figure.



Figure 18: Photomicrograph taken at $\times 10$ magnification, showing damage in neck of right-hand figure.



Figure 19: Photomicrograph taken at $\times 20$ magnification, showing abrasion in eyebrow of right-hand figure, with paper and underdrawing visible beneath paint.

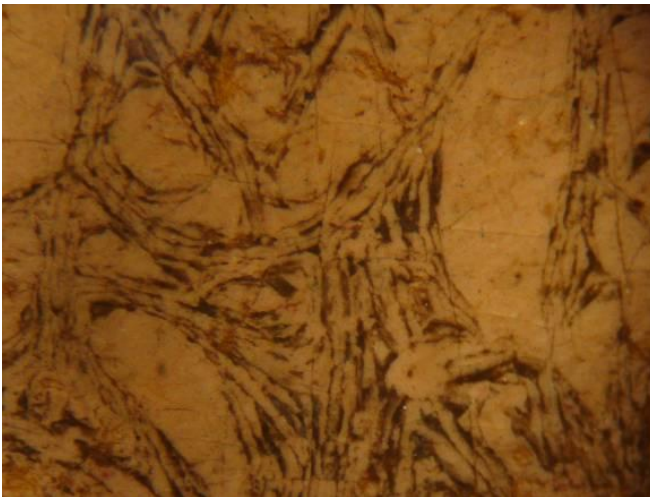


Figure 20: Photomicrograph taken at $\times 30$ magnification, showing dirt in the interstices of brush-strokes in right-hand face.



Figure 21: Photomicrograph taken at $\times 10$ magnification, showing discoloured retouching in left-hand forehead.



Figure 22: Photomicrograph taken at $\times 6$ magnification, showing bloomed varnish at left-hand edge.

HISTORICAL CONTEXT AND BACKGROUND

Provenance and History

Study of Three Female Heads, 1530-2, entered the collection of the Royal Institution of Cornwall having been presented between 1818 and 1821 by Dr L. H. Potts, one of the first two secretaries of the Institution.¹

An article written by Campbell Dodgson in 1908 records that, by the early twentieth century, the study was mounted on the oak panel to which it remains attached, and that the damage at the top left and the reattached loss at the top between the heads of the left and central figures had already occurred. The same article states that, apart from the two aforementioned damages, “the surface is in good condition and absolutely free from repainting.”² However, in the same article Dodgson also writes of the work as a panel painting rather than a study on paper mounted on oak panel, and comments on the “yellowish brown underpainting”, which is, in fact, on microscopic examination, clearly the paper support. It may therefore be that the painting had been retouched at this stage, but the inpainting had not yet discoloured and was not visible to the level of examination available to the author.

Figure 23: reproduction of the painting taken from the 1908 *Burlington Magazine* article by Campbell Dodgson (p.135), showing the same major damages as today:



¹ Dodgson, 1908, p.133.

² *Ibid.*, p.133.

Lucas Cranach the Elder: Biographical Information

Lucas Cranach the Elder was born in c.1472 in Kronach, Franconia, the son of a painter. After training in the traditional sixteenth-century workshop manner, Cranach went to work in Vienna during the first years of the sixteenth century. Cranach was appointed as Wittenberg court painter in 1505. He ran a very successful workshop and remained a sought-after painter throughout his career. Consequently, there are a great many workshop and “follower” paintings in existence. Cranach temporarily lost his job as court painter to the Elector of Saxony in 1547-50, after which he was reappointed. Cranach ran a large-scale workshop, and both his sons, Hans (d.1537) and Lucas the Younger (1515-1586), worked with him. Cranach retired Weimar in 1552, and died in October 1553.

This painting dates from 1530-2, when Cranach was working for the Elector of Saxony Johann the Steadfast (d.1532).³

The Three Graces and Other Related Works

Study of Three Female Heads can be linked to a more finished painting depicting the three Graces, often referred to as the Law Graces, in a private collection (fig. 24). The exact relationship of the *Three Graces* and the study has been debated over the years. In 1994, Dr Johannes Erichsen, Head Conservator at the Haus der Bayerischen Geschichte, wrote: “I guess that the drawing was copied from the panel in order to document the composition for further use. There must have been a number of drawings in the workshop, but the Truro drawing seems to be the only surviving drawing which can be related to a certain panel.”⁴ However, close inspection of a high resolution photograph of the Law Graces (fig. 28-29) reveals that the underdrawing of the Graces corresponds more closely with the lines of the study than the finished composition, suggesting that the study preceded the Law Graces and was a basis for, rather than a record of, the more finished composition. This was also the conclusion reached by Foister after a brief examination and comparison of the two paintings in 1994,⁵ including an x-ray, was carried out at the National Gallery, London, in preparation for Grimm, Erichsen and Brockhoff’s catalogue raisonné of Cranach the Elder’s work.⁶

The study measures c.27 cm horizontally and the painting of the Graces measures 38 cm, so the scale is comparable, and a tracing of the study laid over 1:1 scale image of the *Three Graces* fits perfectly, except for the tops of the heads of the girls on the right and centre, and the nose and mouth of the girl on the right (fig. 29). It is feasible that the study was transferred directly to the panel, by tracing or other means. It is believed that paintings were copied and underdrawing transferred in the Cranach workshop by means of blackening the reverse of a sheet with charcoal dust and tracing the outline.⁷ This was often subsequently strengthened with a painted underdrawing, so can be hard to distinguish from an original drawing. Without the opportunity to carry out a more in-depth technical examination of the *Three Graces* it is impossible to confirm this possibility. It is recorded that the London-based art dealer who sold the *Three Graces* in 1993-4, Derek Johns, had infra-red reflectography carried out on the painting.⁸ However, there is, unfortunately no record of this in the dealer’s archives today.

Dodgson also suggests a more unlikely link with a painting entitled *Saxon Princesses Sibylla, Emilia and Sidonia*, c.1535, in the Kunsthistorisches Museum, Vienna (fig. 26), theorising that the study may show the three young women at a slightly earlier age. Alternatively, he proposes that the three girls may be Cranach’s daughters Ursula, Barbara and Anna, whose ages would correspond approximately with the date of the painting, fitting with the intimate nature of the study.⁹

³ See Bomford (ed.), 2002, p.144; Heydenreich, 2006, p.17.

⁴ Letter from Dr Erichsen to Dr Susan Foister, National Gallery, 1/2/94. National Gallery technical files.

⁵ Letter from Foister to Erichsen, 8/3/94, National Gallery technical files.

⁶ Grimm, C., Erichsen, J., Brockhoff, E. (eds), *Lucas Cranach: Ein Maler-Unternehmer aus Franken*, exhibition catalogue, Ausberg: Veröffentlichungen zur bayerischen Geschichte und Kultur Nr. 26/94, 1994.

⁷ Heydenreich, G., *Painting Materials, Techniques and Workshop Practice of Lucas Cranach the Elder*. London: Courtauld Institute of Art, PhD Thesis, 2002. p.79

⁸ Letter from Erichsen to Foister, 8/2/94, National Gallery technical files.

⁹ Dodgson, C., “The Cranach at Truro – A Postscript” in *The Burlington Magazine for Connoisseurs*, Vol. 14, No. 72. London: The Burlington Magazine Publications Ltd, March 1909. p.359

Related compositions:

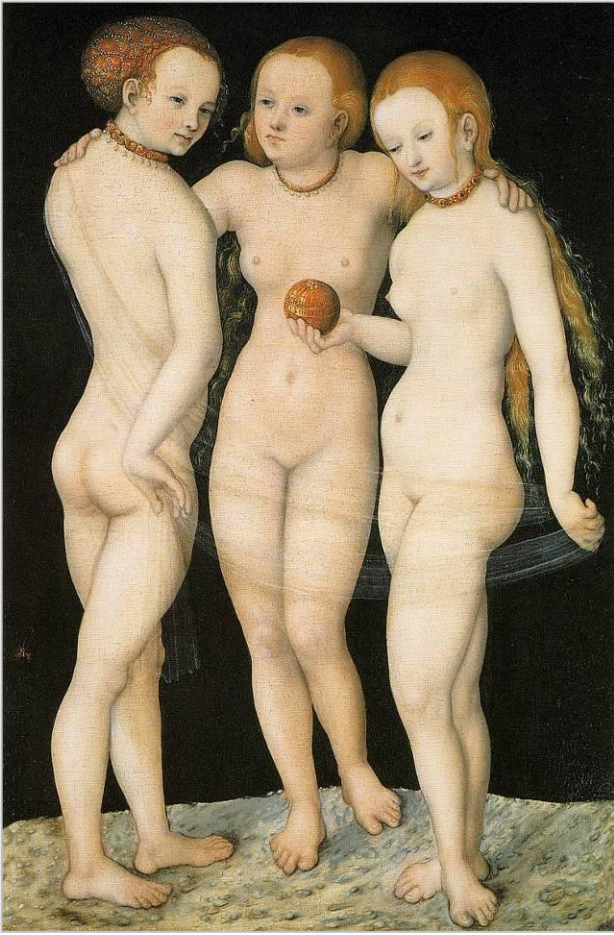


Figure 24: Lucas Cranach the Elder, *The Three Graces* (also known as "the Law Graces"), c.1530, oil on panel, 575mm x 380mm. Private Collection.



Figure 25: Lucas Cranach the Elder, *The Three Graces*, 1535



Figure 26: Lucas Cranach the Elder, *Saxon Princesses Sibylla, Emilia and Sidonia*, c.1535, oil on lime, 620mm x 890mm. Kunsthistorisches Museum, Vienna.



Figure 27: Lucas Cranach the Elder, *Venus*, 1532, oil on beech, 370mm x 250mm. Städel Museum, Frankfurt.

Figure 28: Detail of the *Three Graces*:

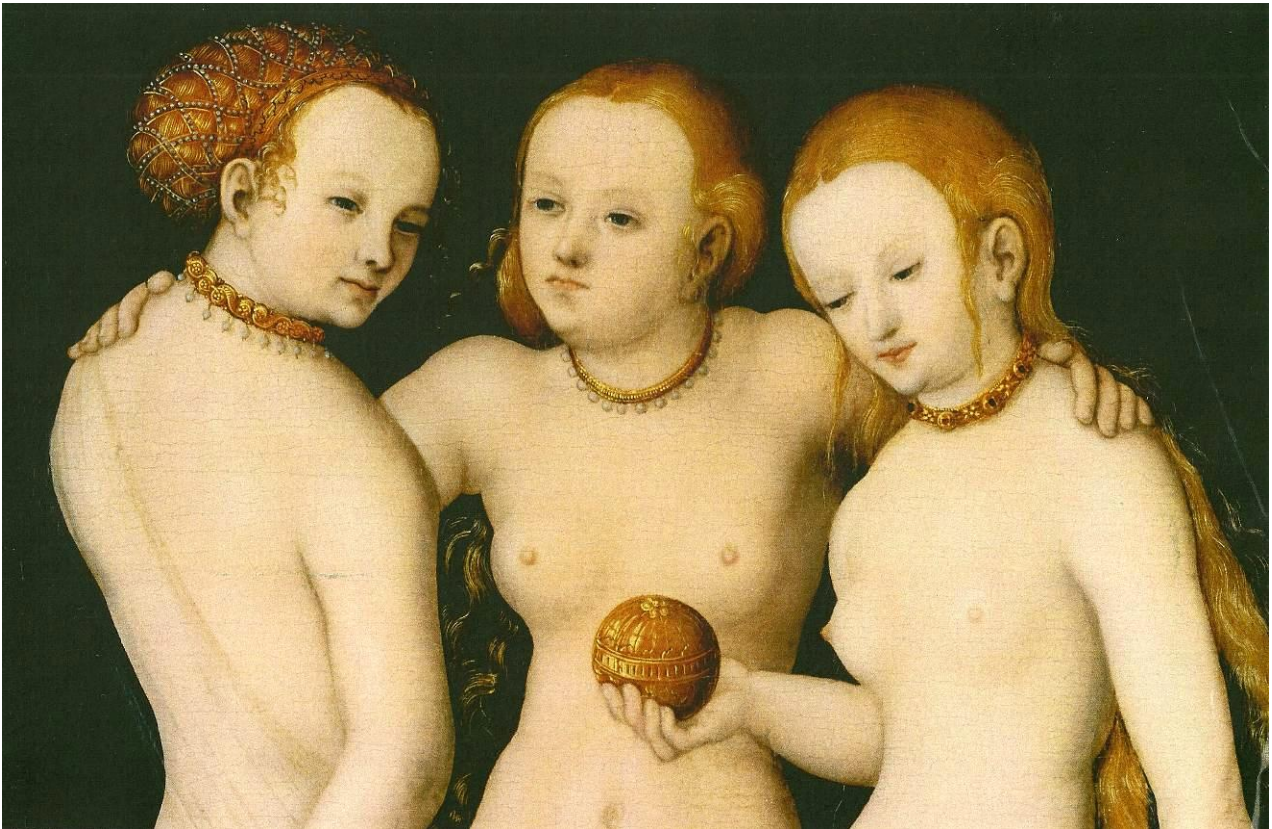
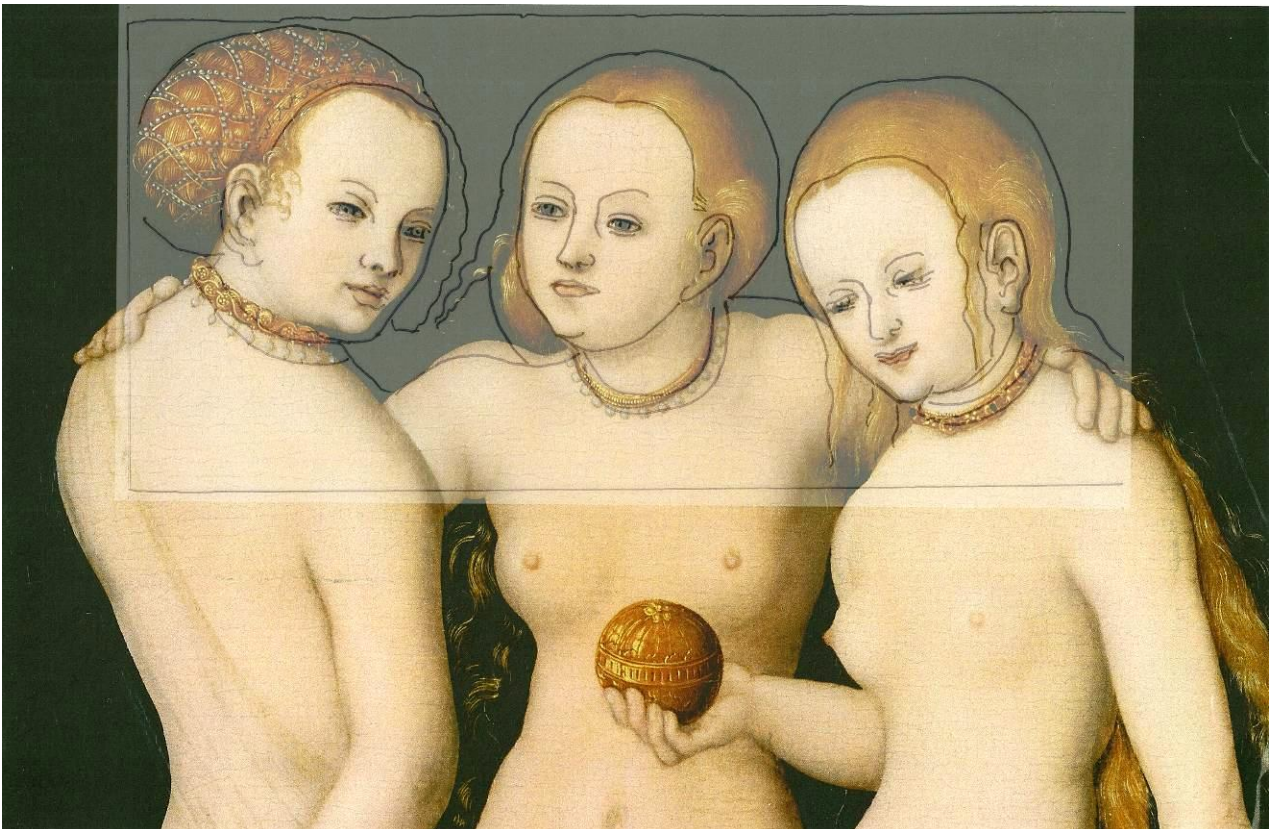


Figure 29: Detail of the *Three Graces* with overlay showing composition of *Study of Three Female Heads*:



Studies, and works on paper and parchment by Cranach the Elder:



Figure 30: Cranach the Elder, *Portrait of Hans Luther (father of Martin Luther)*, 1527, oil on paper, 196 x 183mm. Herzog Anton Ulrich Museum, Braunschweig, Germany.



Figure 31: Cranach the Elder, *Portrait of a Man in a Black Cap*, 1520, oil on paper, possibly over black chalk, 250 x 195 mm. Thaw Collection, The Pierpont Morgan Collection, New York.



Figure 32: Cranach the Elder, *Three young boys playing; all naked, one on stilts*, 1487-1553 (?), pen and black ink, with grey-brown wash, heightened with white; on red-brown prepared paper, 217mm x 179mm. British Museum Dept of Prints & Drawings, London.



Figure 33: Cranach the Elder, *St James wearing a pilgrim's hat and standing in a landscape: study for an altarpiece (Verso: St Thomas holding a spear and standing within an architectural niche)*, c.1520-25, Pen and brown ink with grey and pink wash on paper, 157mm x 58mm. British Museum Dept of Prints & Drawings, London.

Costume

The costumes of the sitters are largely unfinished. The girl on the left wears an ornamental covering over her hair, known as a *caul* or *calotte*, which was fairly typical of German fashion of the period:

“The calotte was a close network made of gold or silver cord stretched over a cap of gold or silk... Pearls and precious stones, sewn on where the threads of the net crossed each other, were a favourite form of ornamentation with people who could afford it.”¹⁰

Similar headwear is represented in numerous paintings by Cranach depicting women at this time, for example *Venus*, 1532 (Städel Museum, Frankfurt), *A Generalised Portrait of a Woman*, c.1525 (fig. 35). The other sitters in the study have their long hair loose, suggesting the informal context in which the painting may have been executed.

The girls also wear necklaces which have been finished to varying degrees. The most highly finished necklace is worn by the girl on the left and consists of a twisted band, with pearls hanging from it; the central figure has a similar style of necklace, also with pearls; the right-hand girl has a simple band, marked out in a reddish paint. These details of costume remain in the more highly finished painting, *The Three Graces*: each Grace has the same style of necklace as the study in a more worked-up form, and the left-hand Grace retains the same headwear as the study.



Figure 34: An example of a caul, as worn by the left-hand sitter.

Source: <http://lynnmcmasters.com/>



Figure 35: Cranach the Elder, *Portrait of a Woman*, c.1525, oil on beech, 376mm x 266mm.

National Gallery, London.

¹⁰ Köhler, C., *A History of Costume*. New York: Dover Publications, 1963. p.255

MATERIALS & TECHNIQUES

Support and Preparation

The paper support appears to be orange-brown laid paper: laid lines are clearly visible, running in the vertical direction, c.1 mm apart. No watermarks or collectors' stamps have been identified. Similar laid paper supports are used in numerous other studies and drawings by Cranach the Elder (fig. 30-33).

In cross section (sample 3a) there is an indication of fungal hyphae in the upper parts of the paper support, suggesting the presence of a proteinaceous animal glue size preparation. A stain test for protein supports this (Amido Black sol. 2, sample 3a). Consistent with other known paintings by Cranach on paper and parchment, there is no ground layer (see fig. 30-33). The paper support functions as a ground for painting on as well as the primary support.¹¹

Underdrawing

Brushed underdrawing, discernible in places to the naked eye, is clearly visible under magnification and on investigation with infra-red reflectography (figs 47-54). It appears that this was applied directly to the sized paper support. The underdrawing appears to be composed of a carbon black pigment in a liquid medium. The drawn image appears consistent in medium and technique of underdrawing in a number of other paintings by Cranach the Elder as investigated by Gunnar Heydenreich:

The majority of paintings examined were underdrawn by Cranach the Elder using a painted brush and a black pigment in a liquid medium. Depending on the format he chose different size brushes and on a few small panels it is difficult to distinguish the brush from a quill pen. Sandner assumes that the black liquid medium is a drawing ink derived from lamp or candle soot. It is however also conceivable that *carlof rahm* (chimney soot) or *kienruß* (pine soot), frequently mentioned in invoices were used.¹²

Underdrawing is used to mark the outlines of the heads and facial features, with little hatching or modelling. For the most part, the painted image adheres closely to the preliminary drawing. No major changes in composition appear to have taken place. At the left side, faint indications of the proper right hand of the central girl can be observed on the shoulder of the left-hand girl, consistent with the position of the hand in the *Three Graces* (fig. 36-37).

Paint Layers

A stain test for oil using Rhodamine B (sample 3a) confirms the binding medium as oil.

There is little overlap between compositional elements. The bodies and costumes of the sitters are generally un-painted, with the orange-brown of the paper serving as a mid-tone. In places, the black background appears to extend over the flesh paint, while in other areas hair and flesh extend over parts of the black, suggesting a more complex order of painting than is immediately evident.

The most worked-up area is the caul worn by the left-hand girl. The pearls are indicated with mixtures of lead-white, chalk, with a little carbon black and earth pigments, with highlights of pure lead white. The reddish-brown paint beneath, contains lead white, calcium carbonate, vermilion, red lake and earth pigments (fig. 39; sample 1). The red-brown of the hair appears to be composed of similar pigment mixtures to the base paint of the caul, with highlights of lead-tin yellow (fig. 38, 55a and b).

Flesh paint is composed predominantly of mixtures of lead white and vermilion, as seen in cross section (sample 2, 3a and b), with some earth pigments and carbon black. Surface microscopy indicates the additional presence of a red lake and azurite in some areas (fig. 40-41). These pigments and combinations are typical of Cranach the Elder. Heydenreich has observed flesh mixtures in Cranach's paintings ranging from simply lead white and vermilion, to more complex mixtures with up to six or seven pigments, including azurite in the shadows as observed in this painting.¹³ The flesh paint in the central figure extends down beyond the necklace, while in the other two figures the flesh only extends as far as the neckline.

¹¹ Heydenreich, G., *Painting Materials, Techniques and Workshop Practise of Lucas Cranach the Elder*. PhD dissertation. London: Courtauld Institute of Art, 2002. p.224

¹² Ibid. p.78

¹³ Ibid. p.146, pp.167-8

Traces of verdigris are often included in carbon black passages of Cranach the Elder's paintings; the copper green is added to function as a siccative.¹⁴ EDX analysis of sample 4a found no evidence of this in the black background.

There is a small area of pale paint in the upper right corner which may be the traces of an inscription (fig. 42) beneath the black paint of the background, but not enough is visible to confirm this. An inscription may be unusual on a study, but this painting is much more worked-up than other examples of studies by Cranach (fig. 30-33), which may account for the possibility. Also in the upper right of the painting, there is an area which is slightly more opaque in the x-radiograph. A cross section taken from this area (sample 5), appears to show an additional paint layer on the reverse of the paper support, which may account for the difference visible in the x-radiograph.

Surface Layers

There is evidence in cross section that the study may have remained unvarnished for a long time, as surface dirt is visible under the thick natural-resin varnish layers (sample 1). After varnish removal, this was more evident, particularly in the pale flesh paint. Under magnification, a very thin layer of a waxy substance with imbibed dirt was visible, which is slightly thicker in the interstices of brushstrokes and paint texture, resulting in an uneven disfigures appearance (fig. 20, 57a). This would seem to confirm the nature of this study or working drawing which was evidently used as a guide in later workshop compositions and was not intended as a finished work.

The varnish was thickest at the very edges, where residual material has not been removed during previous campaigns of varnish removal (sample 4; plate 3, before treatment UV photograph), and multiple layers of natural resin varnish were present before treatment.

¹⁴ Ibid. P. 136

TECHINICAL EXAMINATION

Surface examination and microscopy



Figure 36: Detail of traces of underdrawing at left edge, showing positioning of central girl's right hand (proper), which corresponds closely with the composition in the *Three Graces*.



Figure 37: Detail of left edge of the *Three Graces*, showing positioning of central girl's right hand (proper).



Figure 38: Photomicrograph taken at $\times 25$ magnification, showing lead-tin yellow wisp of hair over black background.



Figure 39: Photomicrograph taken at $\times 15$ magnification, showing brushwork in the caul of the left-hand figure.

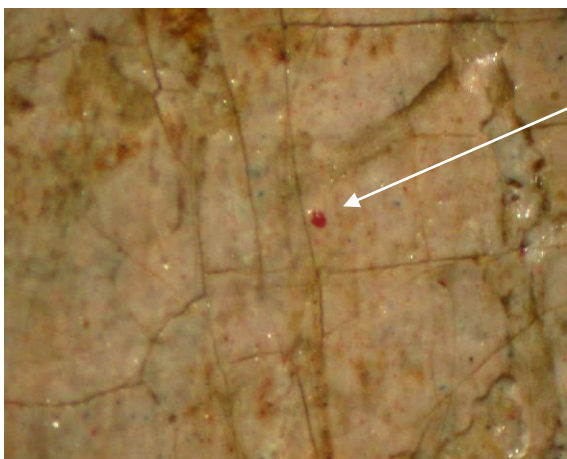


Figure 40: Photomicrograph taken at $\times 45$ magnification, showing red lake particle in the cheek of the girl on the left.

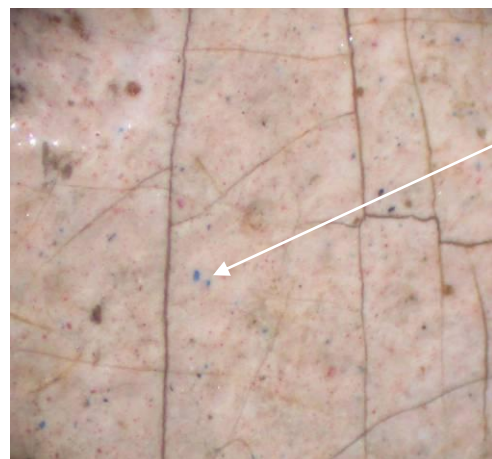


Figure 41: Photomicrograph taken at $\times 45$ magnification, showing azurite particles in the face of the girl on the right.



Figure 42: Photomicrograph taken at $\times 10$ magnification, showing possible traces of an inscription under the black paint of background.

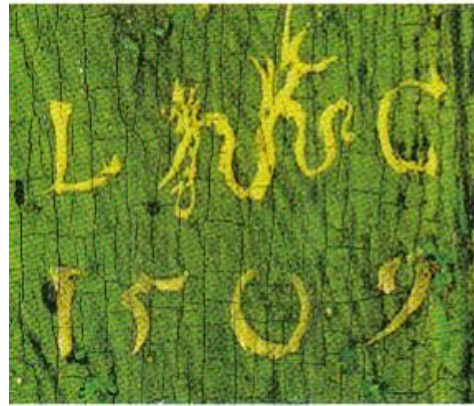


Figure 43: Detail of inscription from *Christoph Scheurl*, 1509, for comparison.



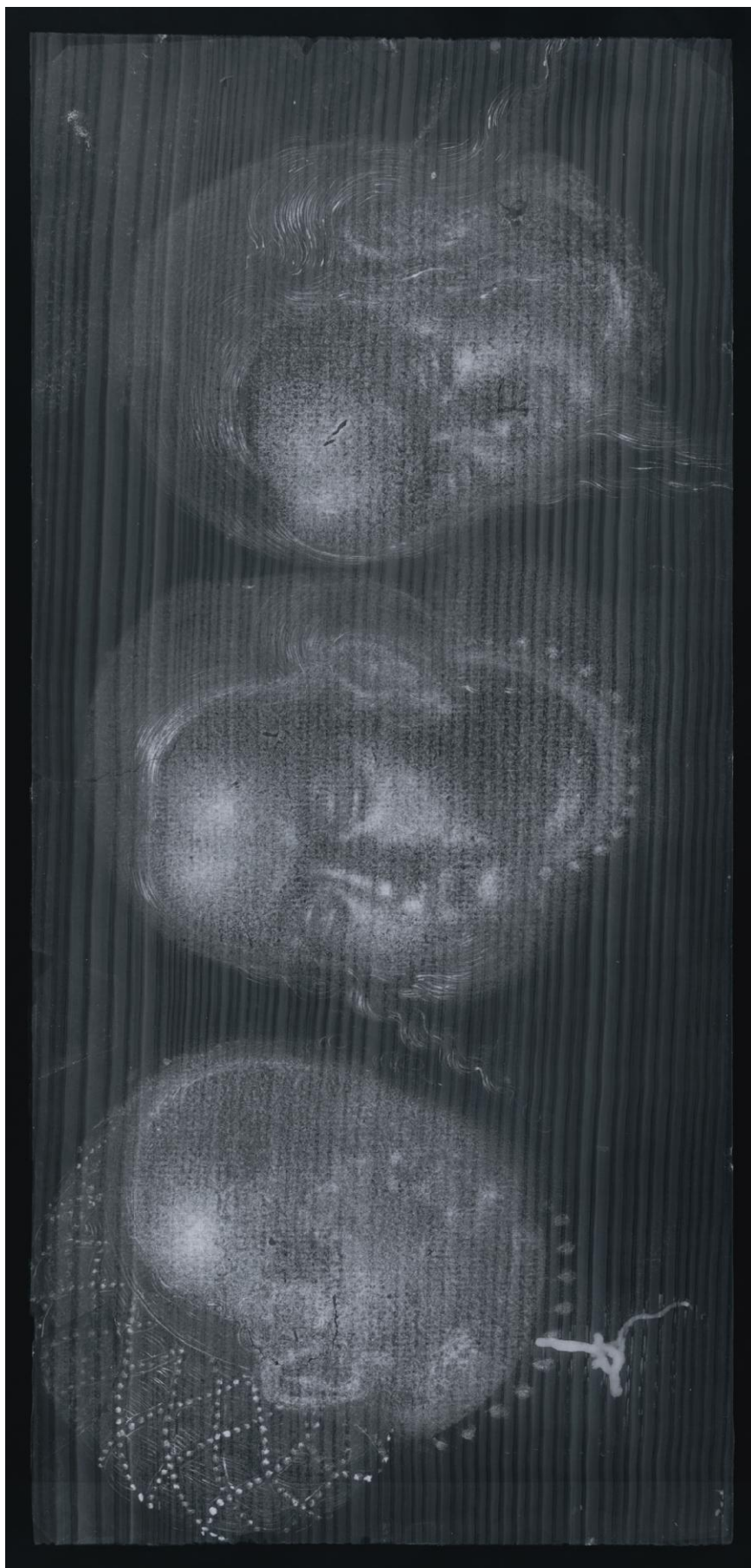
Figure 44: Detail of inscription from *Martin Luther*, 1534, for comparison.



Figure 45: Detail of inscription from *Penance of St Jerome*, 1502, for comparison.

X-radiography

Figure 46: Scan of x-radiograph:



Digital infra-red reflectography

Figure 47: recto, infra-red reflectogram:

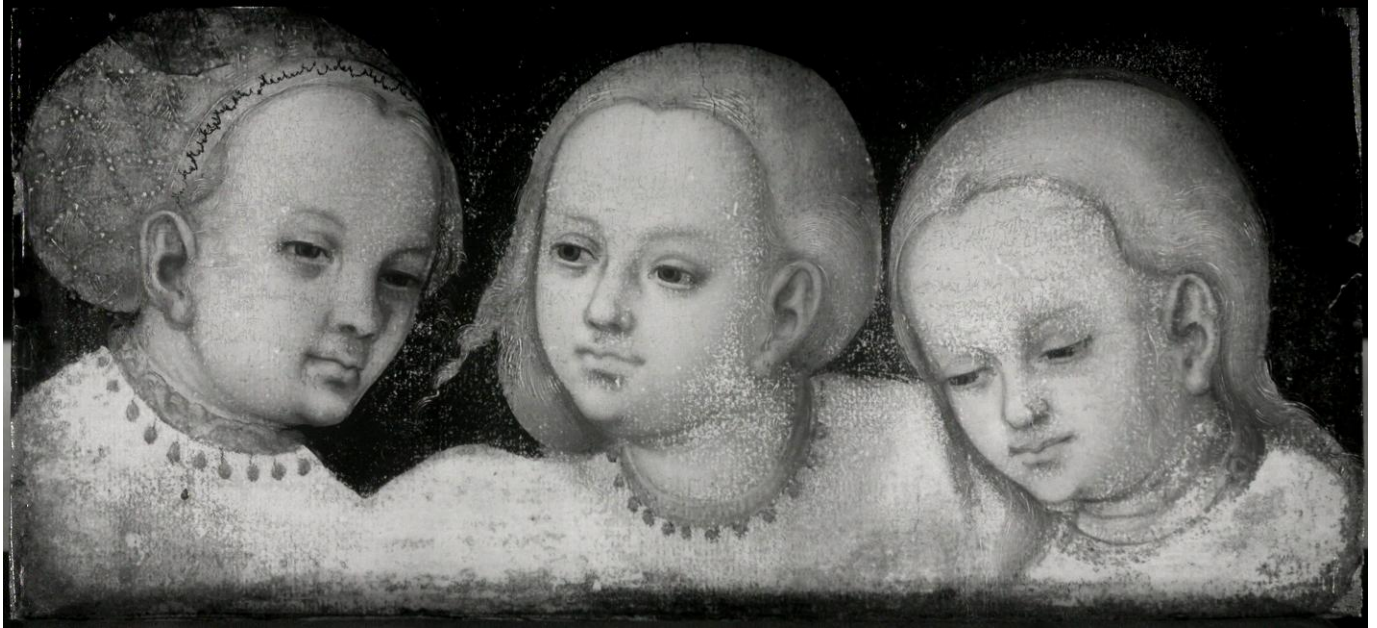


Figure 48: verso, infra-red reflectogram:





Figure 49: Infra-red detail showing underdrawing in the outlines of features in the right-hand face.



Figure 50: Infra-red detail showing underdrawing in the outlines of features in the central face.



Figure 51: Infra-red detail showing underdrawing in the outlines of features in the left-hand face.



Figure 52: Infra-red detail showing underdrawing in the face and neck of right-hand figure.



Figure 53: Infra-red detail showing underdrawing in the collar of the central figure.



Figure 54: Infra-red detail showing underdrawing in the ear of the left-hand figure.

Cross Section Analysis

Map of recto with sample sites:

Sample 5

Samples 4a & b



Sample 2

Sample 1

Samples 3a & b

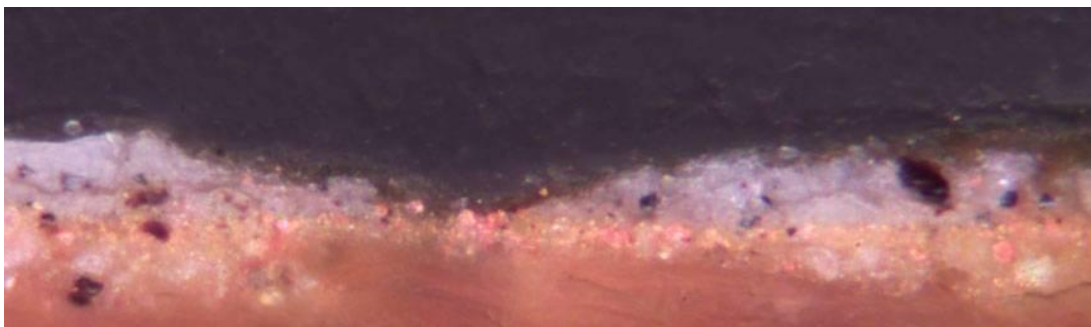
Sample 1

Taken from the edge of the large damage, top left, comprising the paper support, pinkish-brown paint of the bonnet, and the highlight of a pearl, with dirt and degraded varnish on top.

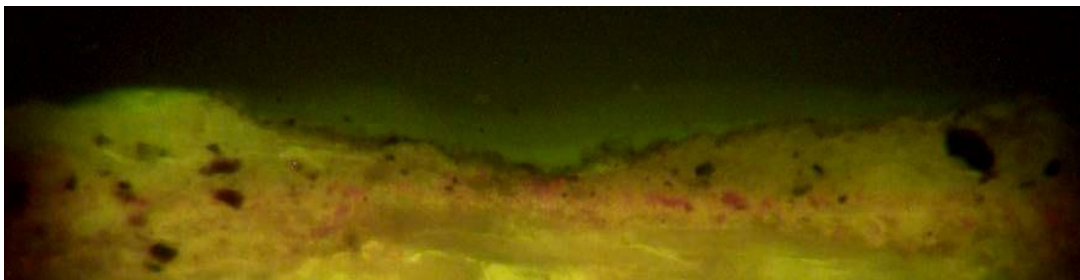


| | | |
|---|--------------------------------------|--|
| 1 | Varnish layer(s) | Degraded natural-resin varnish |
| 2 | Surface dirt | Particulate material |
| 3 | Highlight of pearl | Lead white, calcium carbonate, carbon black, earth pigments |
| 4 | Pink-brown paint of caul (2+ layers) | Lead white, calcium carbonate, vermilion, red lake, earth pigments |
| 5 | Support | Paper |

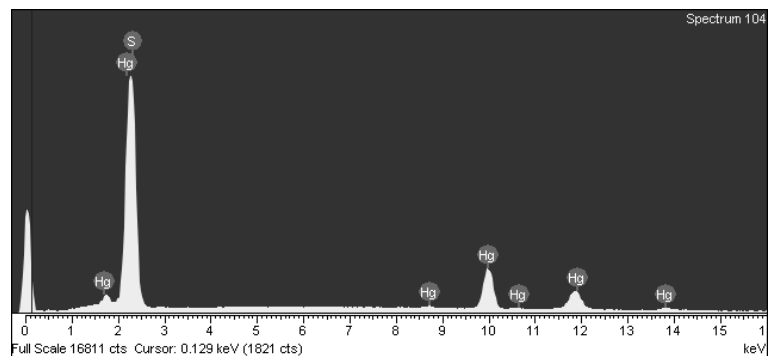
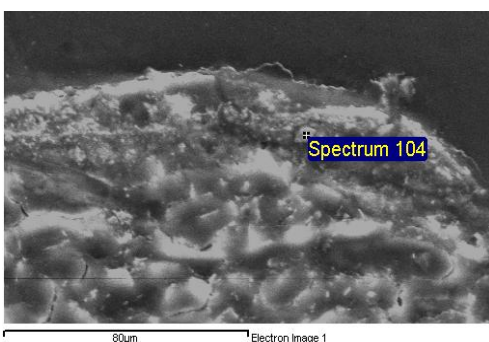
Sample 1, photographed at x40 (x8) in normal light:



Sample 1, photographed at x40 (x8) in ultraviolet light:



EDX showing vermilion particle in brown paint layer of caul:



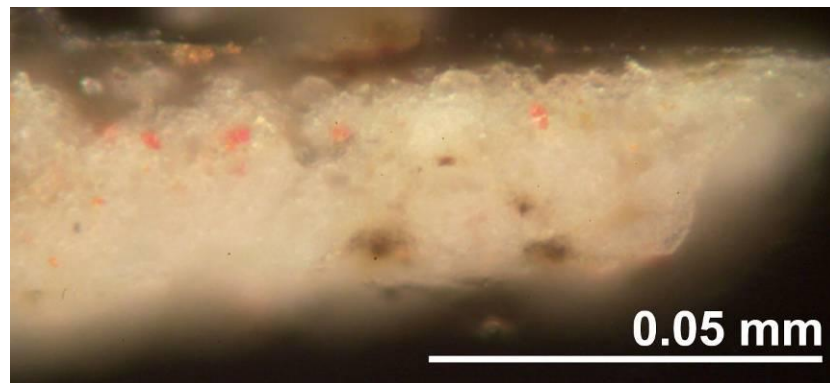
Sample 2

Taken from the edge of a damage in the left-hand girl's face, to the right of the ear.

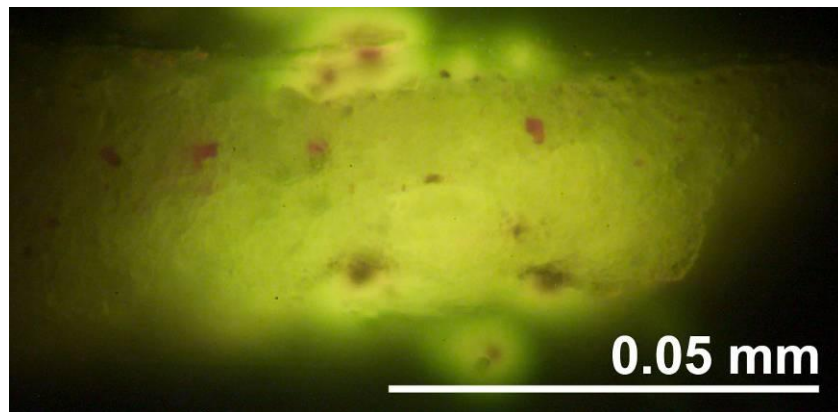
| | | |
|---|-------------------|---|
| 3 | Varnish layer(s) | Degraded natural-resin varnish |
| 2 | Paler flesh paint | Mostly lead white |
| 1 | Pink flesh paint | Lead white, carbon black (or brown mould?), vermillion, earth pigments, |



Sample 2, photographed at x100 (x8) in normal light:



Sample 2, photographed at x100 (x8) in ultraviolet light:



Sample 3a

Taken from the edge of a damage in the left-hand girl's face and bonnet, at the very edge of the ear.

Sample 3 sheared: 3a comprises supports and lower layers; 3b comprises upper layers.

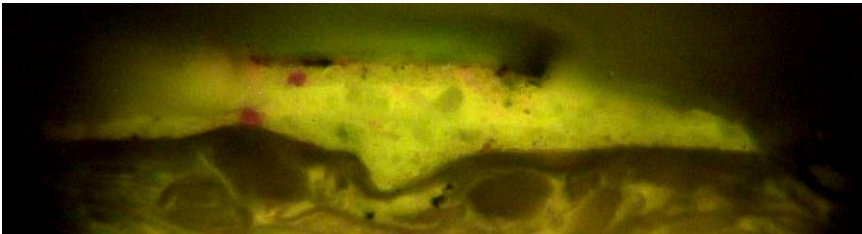


| | | |
|---|------------------|--|
| 5 | Varnish layer(s) | Degraded natural-resin varnish |
| 4 | Surface dirt | Particulate material |
| 3 | Pink flesh paint | Lead white, vermilion, earth pigments |
| 2 | Mould | Fungal hyphae (indicates presence of proteinaceous size layer) |
| 1 | Support | Paper |

Sample 3a, photographed at x40 (x8) in normal light:

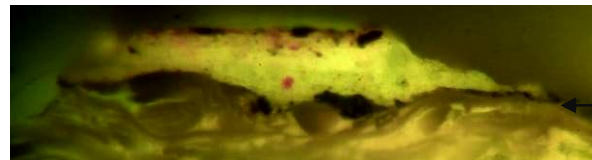
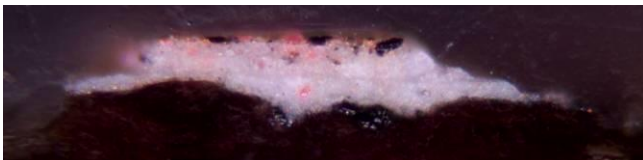


Sample 3a, photographed at x40 (x8) in ultraviolet light:



Stain tests for oil/protein

Stain for protein using Amido Black Solution 2:



Protein

Stain for oil using Rhodamine B:



Oil

Sample 3b

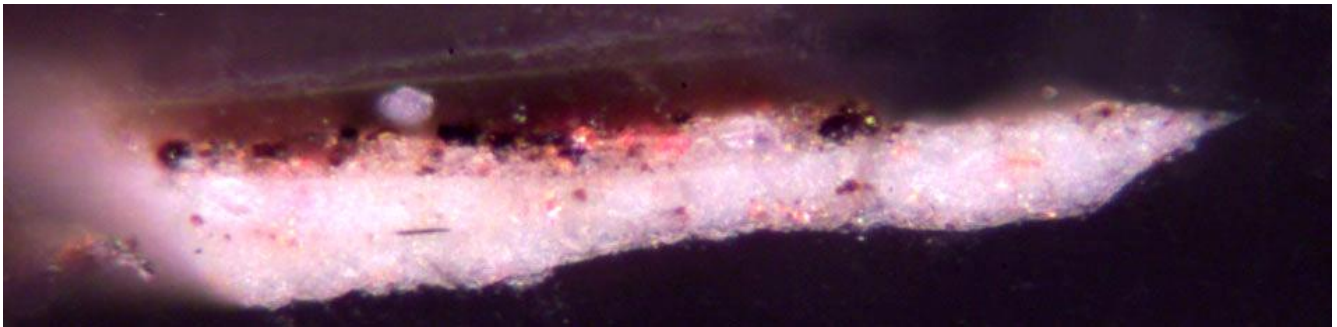
Taken from the edge of a damage in the left-hand girl's face and bonnet, at the very edge of the ear.

Sample 3 sheared: 3a comprises supports and lower layers; 3b comprises upper layers.

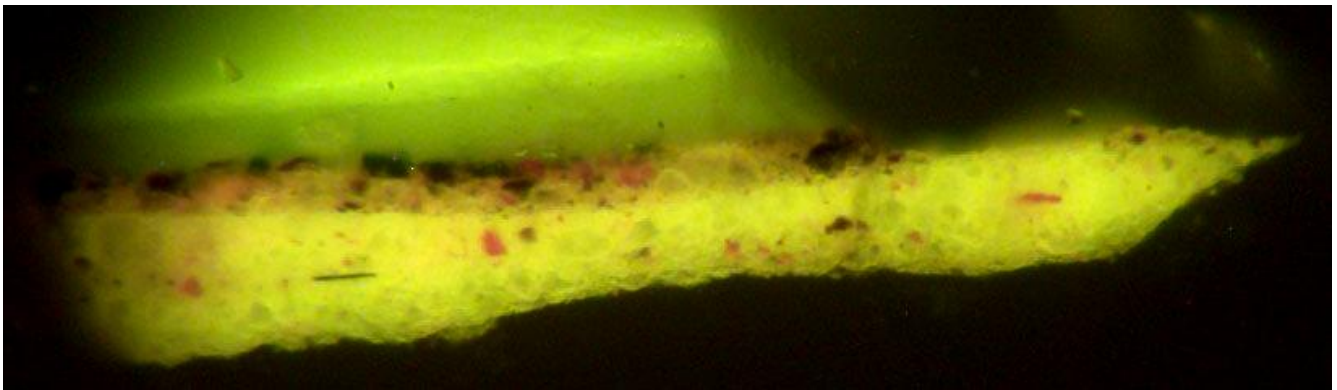


| | | |
|---|------------------------------|--|
| 4 | Two (or more) varnish layers | Degraded natural-resin varnish |
| 3 | Surface dirt | Particulate material |
| 2 | Pink-brown of caul/hair | Lead white, vermilion, red lake (fluoresces – poss. madder), earth pigments |
| 1 | Pink flesh paint | Lead white, vermilion, a little lake (fluoresces – poss. madder), earth pigments |

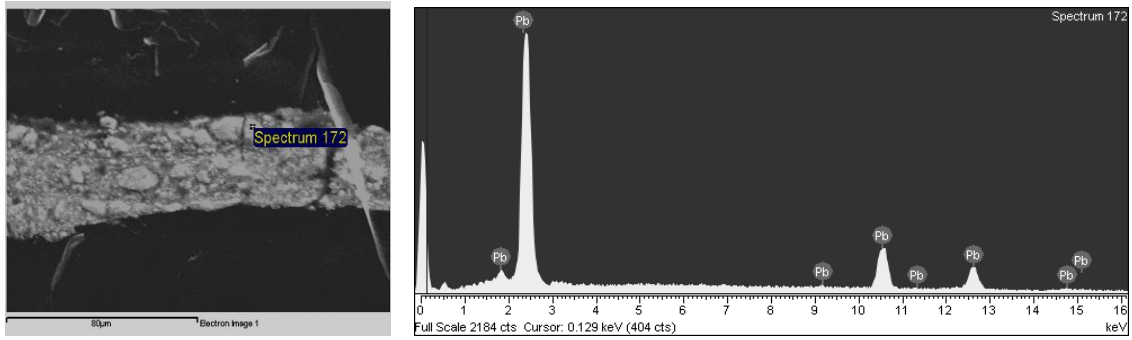
Sample 3b, photographed at x40 (x8) in normal light:



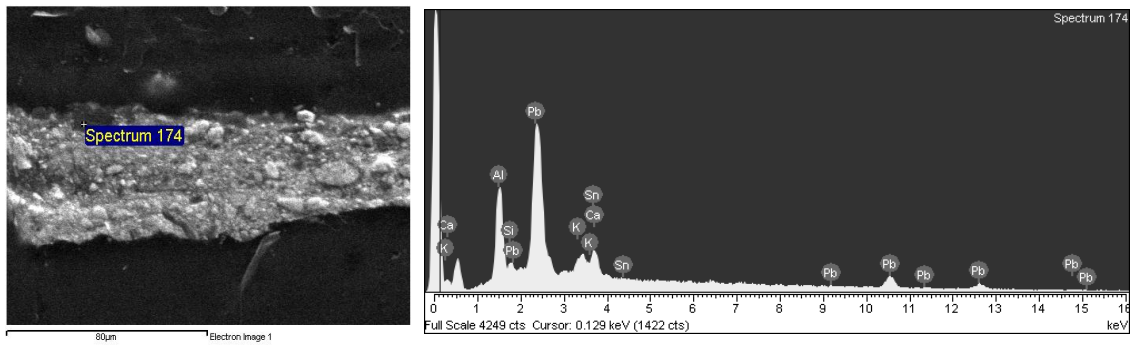
Sample 3b, photographed at x40 (x8) in ultraviolet light:



EDX showing lead white in upper brown paint layer:



EDX of fluorescent lake in upper brown paint layer, showing aluminium and a little tin:



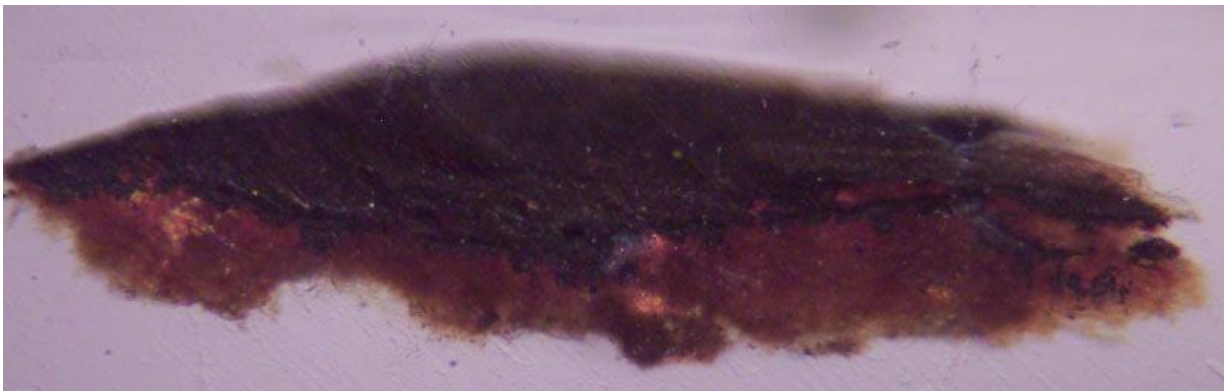
Samples 4a and b

Taken from the black background at the right edge of the painting, next to a reattached fragment with some paint loss around it.

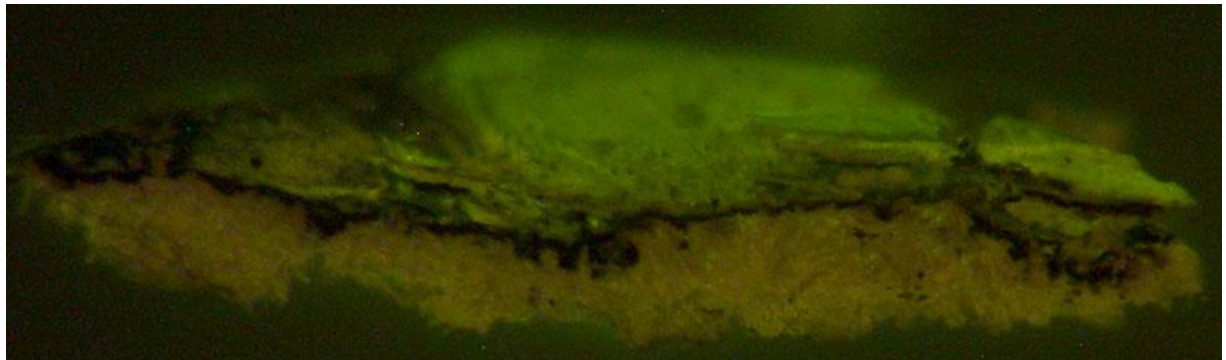


| | | |
|---|--|---|
| 3 | Several varnish layers with imbibed dirt | Degraded natural-resin varnish and particulate dirt |
| 2 | Black paint of background | Carbon black |
| 1 | Support | Paper |

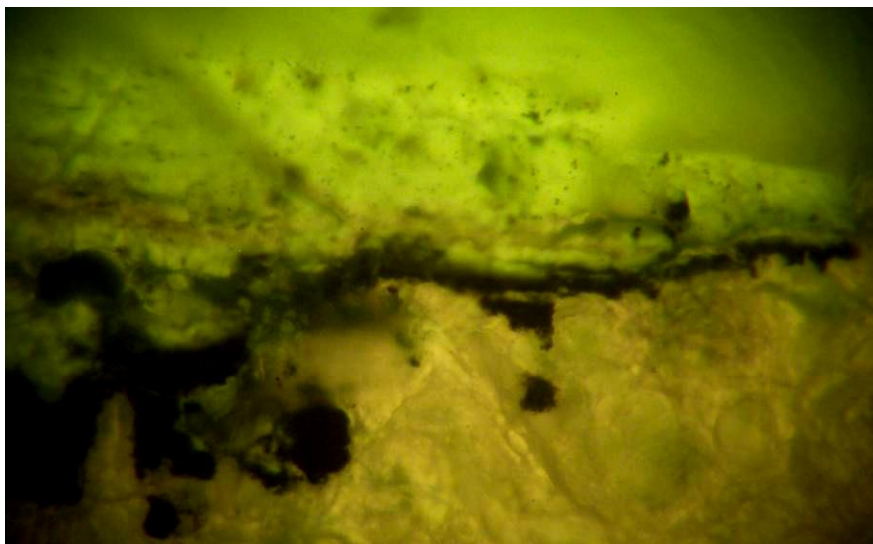
Sample 4a, photographed at x5 (x8) in normal light:



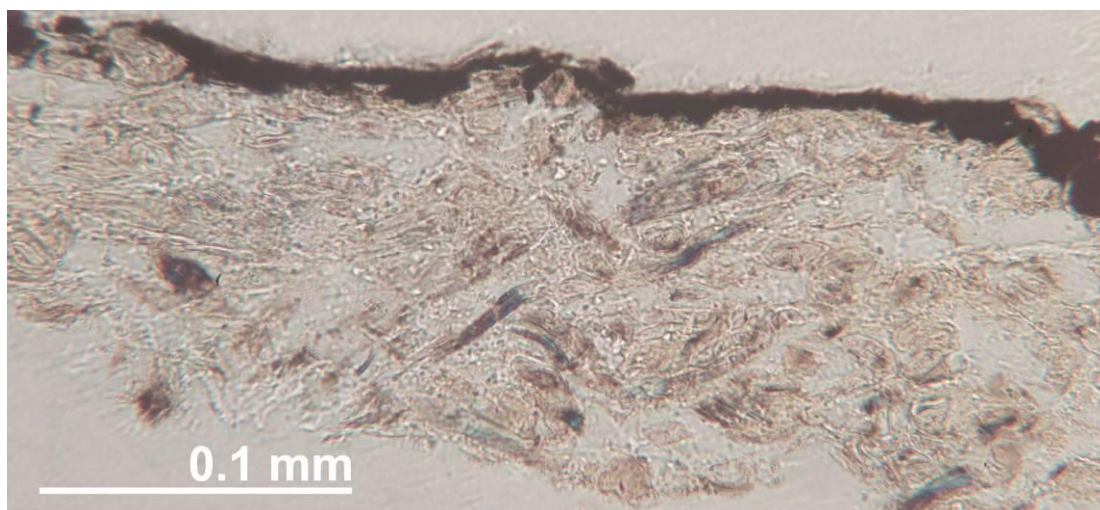
Sample 4a, photographed at x5 (x8) in ultraviolet light:



Sample 4a, photographed at x40 (x8) in ultraviolet light:



Sample 4b – thin cross section, photographed at x40 (x8) in transmitted light:

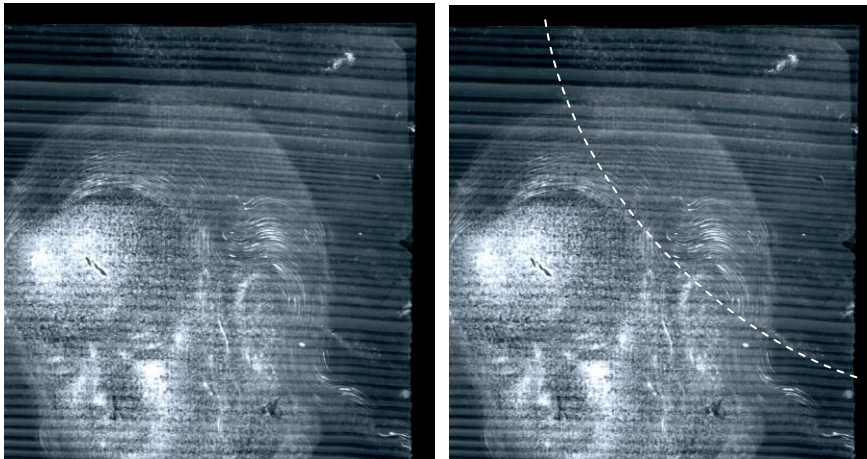


Sample 5

Taken from the black background at the top right corner of the painting, in order to investigate the slightly opaque appearance of this area in the x-radiograph.

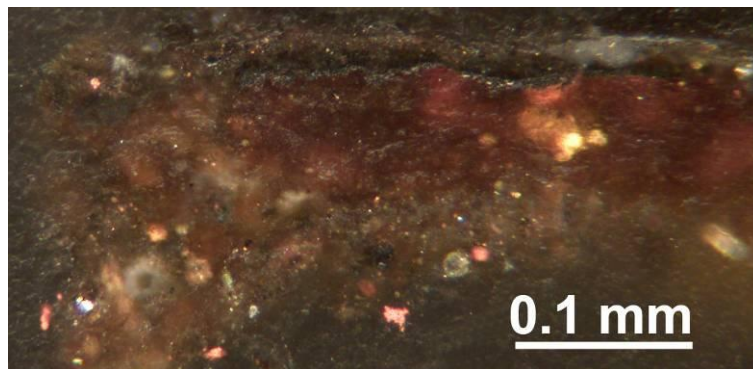


| | | |
|---|--|---|
| 4 | Several varnish layers with imbibed dirt | Degraded natural-resin varnish and particulate dirt |
| 3 | Black paint of background | Carbon black, trace of iron oxide beneath the carbon black – may relate to the paper preparation as seen on verso |
| 2 | Support | Paper |
| 1 | Additional layer on verso paper (filler or tint of paper?) | Earth pigments including red earth, chalk – possible local application may account for different opacity in x-ray |

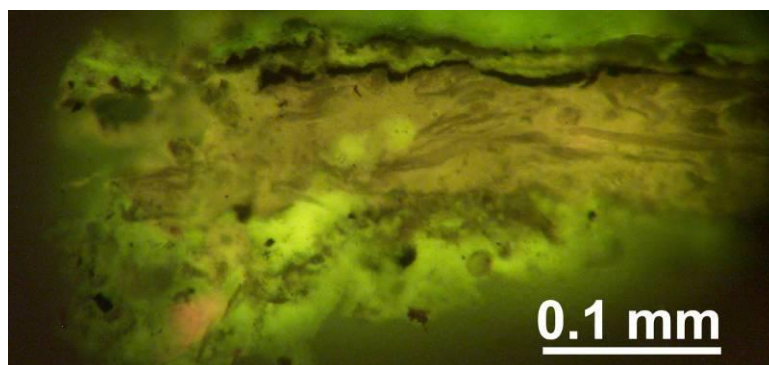


Details of x-radiograph, annotated to show the slightly opaque area:

Sample 5, photographed at x20 (x8) in normal light:



Sample 5, photographed at x20 (x8) in normal light:



TREATMENT REPORT

Surface Cleaning

Surface cleaning was undertaken using saliva, followed by deionised water. Swabs were used fairly dry and care was taken not to flood the surface. Surface cleaning removed brownish particulate dirt and reduced the disfiguring bloom which was particularly noticeable over the dark background at the left edge.

Varnish Removal

The varnish is soluble in acetone, which is preferable for this type of paper object mounted on a solid support, because its volatility means that the solvent remains in the object for the minimum length of time. The black background is fairly matt and underbound, and was sensitive to swabbing directly, but successful removal of the varnish was achieved by using acetone as a free solvent through wet-strength tissue, and allowing the solubilised varnish to wick up into the tissue, minimising the mechanical action of the swab on the surface. Residual varnish and dirt remained in the interstices of brushstrokes, particularly in the lead-tin yellow highlights in the hair and head-dress of the sitters. This was removable, working under magnification, by softening with acetone, and then using the tip of a scalpel (other tools were too large) to remove the residues mechanically.

Further Cleaning

In cross section there is evidence of surface dirt beneath the multiple varnish layers (sample 1). After varnish removal, dark material which was present beneath the varnish appeared more disturbing. Under magnification, a very thin layer of a slightly waxy substance with imbibed dirt was visible, which was slightly thicker in the interstices of brushstrokes and paint texture and in losses, resulting in the uneven appearance. This was removable to an extent. Stoddard solvent was applied to the surface in a small area; the thicker areas of wax and dirt were then gently agitated, mechanically with a scalpel and then removed with a swab.

Consolidation of Paper to Oak Panel

Areas where the paper was detaching from the oak panel were consolidated using wheat-starch paste, and weighted with sand bags until dry.

Filling

Losses were filled using chalk-gelatine (with Mowilith DM427 as a plasticiser). Fills were toned to match the orange-brown of the paper using Lascaux 2035 water re-soluble medium and dry pigments.

Saturating Varnish

A saturating brush coat of Paraloid B72, 25% w/v in Shellsol A was applied to the painting. This saturated the surface, with some localised sinking in small areas of the black background and un-painted shoulder areas.

Inpainting

Losses and abrasion were retouched using Paraloid B72 20% (w/v) in 1-methoxypropan-2-ol and dry pigments. An intermediate spray of Paraloid B72 20% (w/v) in Shellsol A was applied to the surface during retouching to even up and further saturate the surface. A brush coat of MS2A 20% (w/v) in Stoddard solvent was applied to the surface and final retouching and glazing was carried out in MS2A 20% (w/v) in Stoddard solvent and dry pigments.

Final Varnish

A final spray varnish of MS2A 20% (w/v) in Stoddard solvent, with 2% Cosmolloid 80H wax and 2% Tinuvin 292 (both as a % of the resin content) was applied to the surface to modify the final gloss.

Refitting in Frame

Due to time constraints, the painting was refitted in its frame as before. The frame is in very good condition, but it is advisable that the fixtures immediately around the painting should be reconsidered. The painting is a composite object consisting of an oak panel, paper and oil paint; the current system of framing and mounting is ideal for a paper object, but may be less so for a composite object. It is recommended that a system of mounting the painting within the frame should accommodate the small amount of movement of the panel which may occur as environmental conditions fluctuate (although no evidence of movement has been observed during the time the painting has been in the conservation studio).

Plate 6: After cleaning, filling and varnishing, before inpainting – recto, incident light:

Plate 7: After treatment – recto, incident light:

During cleaning details:



Figure 55a: Photo-micrograph, taken at x15 magnification, showing hair of central figure after varnish removal, with residual material in interstices of the lead-tin yellow highlights.



Figure 55b: Photo-micrograph, taken at x15 magnification, showing hair of central figure after localised cleaning using acetone and mechanical removal under magnification.



Figure 56a: Photo-micrograph, taken at x15 magnification, showing bottom left corner after general varnish removal, with residual material still present.



Figure 56b: Photo-micrograph, taken at x15 magnification, showing bottom left corner after localised cleaning using acetone and mechanical removal under magnification.



Figure 57a: Photo-micrograph, taken at x25 magnification, showing dark residues of waxy material and imbibed dirt in interstices of brushstrokes in forehead of left-hand face.

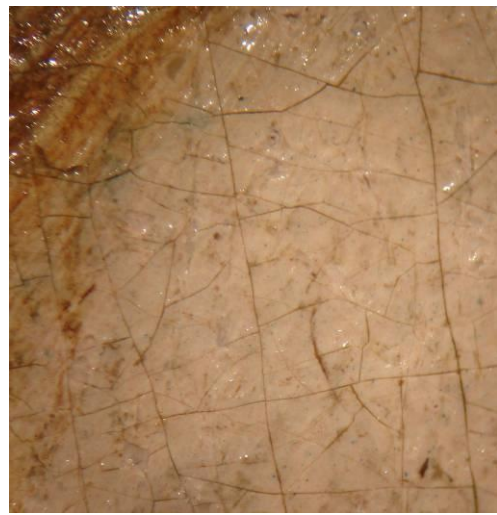


Figure 57b: Photo-micrograph, taken at x25 magnification, showing the same area after localised treatment with Stoddard solvent and mechanical action under magnification (saturated with Stoddard solvent).

Figure 58: After cleaning, filling and varnishing, before inpainting – recto, incident light:



Figure 59: After treatment – recto, incident light:



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MATERIALS LIST

| USE | MATERIAL | COMPOSITION / PROPERTIES | SOURCE / MANUFACTURER | COSHH FORM REFERENCE |
|--|----------------------------|---|------------------------------------|----------------------|
| Varnish removal | Acetone | Polar organic solvent | BDH Chemicals Ltd | CT/220/S |
| Removal of waxy residue | Stoddard solvent | Low-polarity, low-volatility, petroleum-mixture aliphatic hydrocarbon (Mineral spirits) | BDH Chemicals Ltd | CT/240/S |
| Consolidation | Neutral pH wheat starch | Aqueous paste made from refined wheat-starch powder | Lineco Inc. | - |
| Plasticiser for chalk-gelatine fills | Mowilith DM427 | Polyvinyl alcohol stabilized vinyl acetate/dibutyl maleate copolymer aqueous emulsion | Conservation Resources | CT/235/S |
| Filling | Chalk- gelatine fill putty | Calcium carbonate, gelatine | L. Cornelissen and Son, Merck KGaA | - |
| Saturating varnish | Paraloid B72 in Shellsol A | Copolymer of methyl acrylate and ethyl methacrylate (MA/EMA) dissolved in Shellsol A – acrylic resin varnish dissolved in low-volatility, low-polarity, hydrocarbon solvent | Rohm & Haas/Shell | CT/234/S |
| Saturating varnish / inpainting medium | MS2A in Stoddard solvent | Chemically-reduced cyclic ketone resin dissolved in low-polarity, low-volatility, petroleum-mixture organic solvent similar to white spirit | Linden Chemicals/BDH Chemicals Ltd | CT/217/S CT/218/S |