

# National Gallery Technical Bulletin

VOLUME 35

*Joshua Reynolds in the National Gallery and the Wallace Collection*



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#### FRONT COVER

Joshua Reynolds, *Lady Cockburn and her Three Eldest Sons* (NG 2077), 1773 (detail)

#### TITLE PAGE

TOP LEFT: Joshua Reynolds, *Mrs Mary Robinson ('Perdita')*, The Wallace Collection (P 45), 1783–4 (detail).  
TOP RIGHT: Joshua Reynolds, *Colonel Tarleton*, The National Gallery (NG 5985), 1782 (detail).  
BOTTOM LEFT: Joshua Reynolds, *Miss Jane Bowles*, The Wallace Collection (P 36), 1775–6 (detail).  
BOTTOM RIGHT: Joshua Reynolds, *Mrs Susanna Hoare and Child*, The Wallace Collection (P 32), 1763–4 (detail).

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##### NEW HAVEN

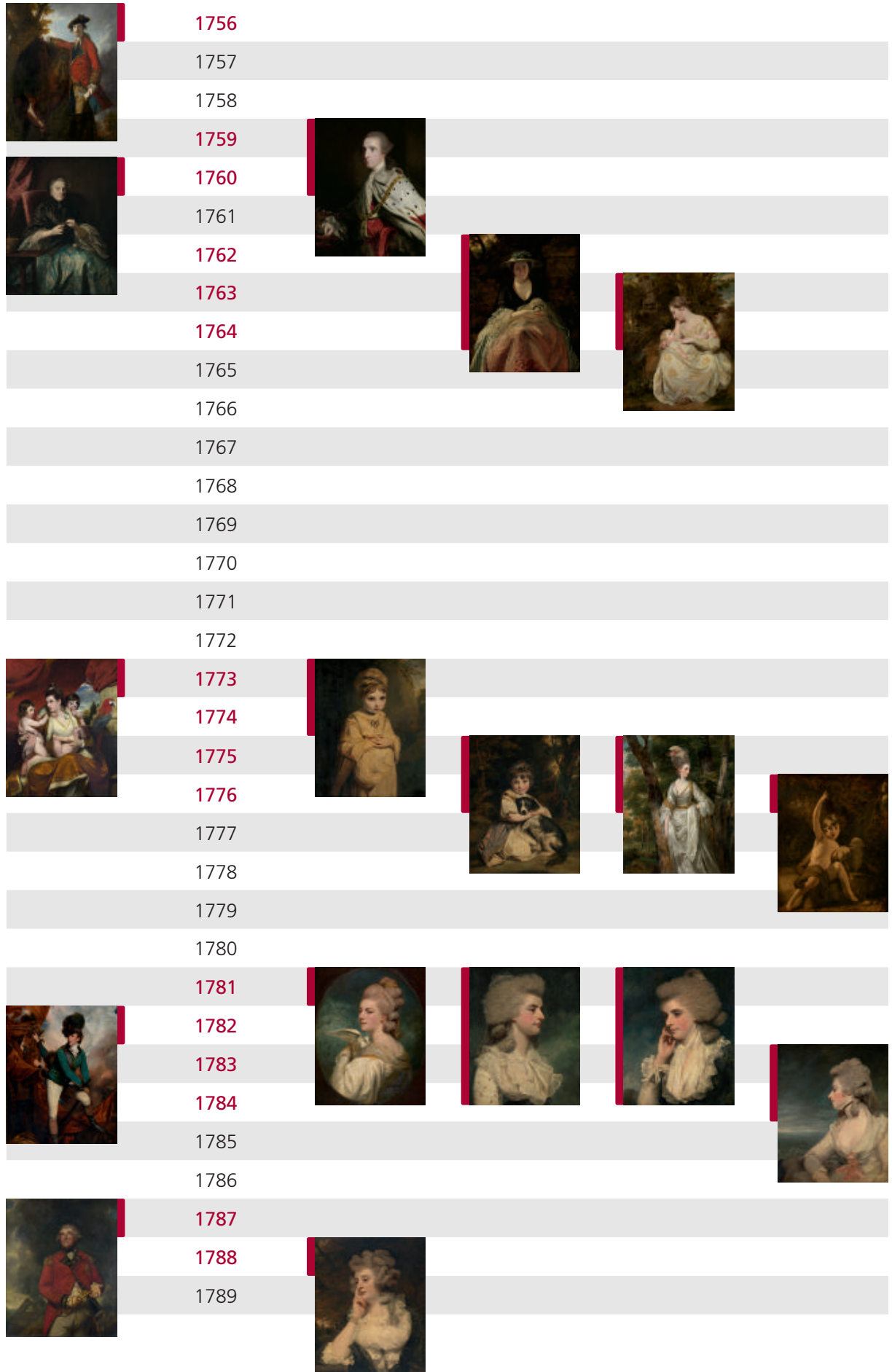
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CAT. 1

*Captain Robert Orme*

The National Gallery (NG 681)

1756, signed and dated

Canvas, 239 × 147 cm (whole-length)

Thread count of canvas: 20 vertical, 17 horizontal threads per cm<sup>2</sup> (twill weave)

The portrait of Captain Robert Orme (FIG. 35) was not a commission. It was probably painted in 1755 after the officer's return from service in the North American Colonies, where he fought against the French, but Reynolds's 'Sitter Book' for that year and the subsequent year are missing. The painting is dated 1756, however, and signed 'J. Reynolds pinxit 1756' in red paint in the lower right corner. Captain Orme is shown in his campaign uniform as an officer of the Coldstream

Guards.<sup>1</sup> The painting remained in Reynolds's studio until it was bought in 1771. Judy Egerton quotes an earlier theory that the source for Captain Orme's pose and compositional relationship with his mount derives from a fresco by Jacopo Ligozzi, which Reynolds sketched in 1752 while on a visit to Florence.<sup>2</sup>

The full-length canvas of twill weave is a notably early example in Reynolds's output as he used plain-weave canvases almost exclusively until the 1770s.<sup>3</sup>



FIG. 35 Joshua Reynolds, *Captain Robert Orme*, 1756. Canvas, 239 × 147 cm. The National Gallery, NG 681.

However, unlike the later twill-weave supports, which are prepared with a thin single application of ground, that for *Captain Orme* fits the pattern seen in the other early paintings from the 1750s and 1760s. It takes the form of a double layer, with a thin coating of glue size between the two applications of ground. The ground is composed of natural calcium carbonate,<sup>4</sup> lead white and a yellow earth pigment; it is therefore similar in appearance and colour to the grounds on *Miss Nelly O'Brien* (CAT. 4) and *Mrs Susannah Hoare and Child* (CAT. 5). The stretcher has a similar construction to *The 4th Duke of Queensberry* (CAT. 2), with corner braces and a horizontal cross-member. A new X-radiograph (FIG. 36) recorded in 2014 shows cusping along the left edge, some effect at the top, and very little weave distortion at the right.

The radiograph shows some changes took place as Reynolds worked, but these are less extensive or radical than in his later work. The clearest modifications are the following: a change in position of the figure's proper right arm resting on the horse, for which a reserve lower down is visible, resulting in the final position being higher (it is painted over sky) and the wrist made visible, the arm is straighter than in the first arrangement;<sup>5</sup> the foliage of the tree extended over the background and more sky was developed at the left-hand edge, covered by a second smaller tree trunk and additional foliage in the final image; there is possibly a different position of the thumb on Orme's proper left hand holding the note and a painted line that seems to indicate a different original placing of the folded paper; there is a curved brushstroke



FIG. 36 *Captain Robert Orme*, X-radiograph.

at the figure's proper left cuff, representing a pentimento visible at the surface. The X-ray image also accentuates the textured quality of Reynolds's brushwork as a whole.

Medium analysis was carried out by Raymond White in 1992, using GC-MS on four samples, and the results published in the *Technical Bulletin*.<sup>6</sup> White impasto touches at the lower right side were found to be bound in poppyseed oil that had not been heat-bodied. Red paint from the background at the lower right-hand side contained partially heat-bodied linseed oil, while the medium of the blue lining of Orme's jacket was also linseed oil, but not heat-treated. Of the samples examined, only brown-green foliage from the middle distance to the right was found to contain a proportion of pine resin (with the main binder being heat-bodied linseed oil), and this is consistent with the UV-fluorescence behaviour under the microscope of a foliage green sample from another area (FIG. 41. See also FIGS 27, 28, p. 25).

A certain amount of pigment identification, and examination of layer structure, has been carried out on the picture. The red fabric of Captain Orme's long jacket is painted in a mixture of vermilion, some red lake, white and black pigment, with a thin, discontinuous, red lake glaze at the surface (FIGS 37, 38).<sup>7</sup> The several shades of blue of the sitter's jacket lining make use of Prussian blue, in more than one layer, the darker tones containing small amounts of vermilion and red lake in addition to the blue pigment (FIG. 39). The sky is also based on a tint of Prussian blue with white, painted over a faintly warm grey underlay of white, charcoal black and traces of fine red earth pigment (FIG. 40). A sample of thick foliage paint from the left-hand edge was both relatively complex in layering and pigment constitution. The mixed paint contains Prussian blue, black, including bone black and charcoal, iron oxide red, and an ochreous yellow (FIG. 41).

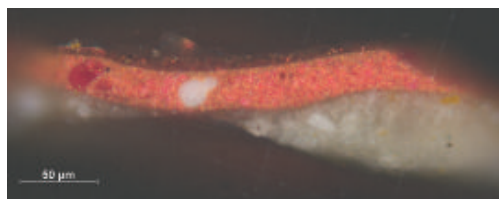


FIG. 37 *Captain Robert Orme*, paint cross-section taken from area of red glaze on sitter's jacket.

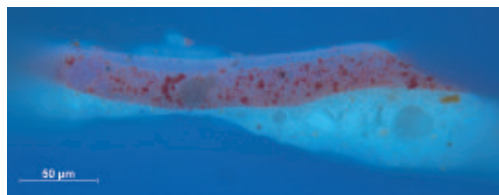


FIG. 38 *Captain Robert Orme*, FIG. 37 photographed under ultraviolet illumination. The red lake pigment is present in both the opaque red underlayer and in the upper glaze where it has a pink fluorescence.

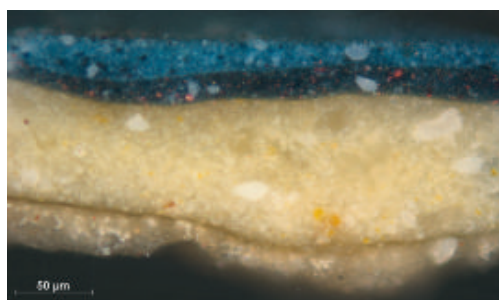


FIG. 39 *Captain Robert Orme*, paint cross-section from blue lining of sitter's jacket, showing two layers of blue paint above the double ground.

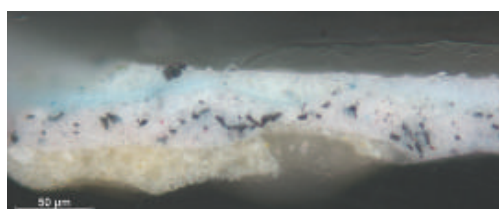


FIG. 40 *Captain Robert Orme*, paint cross-section from the sky.

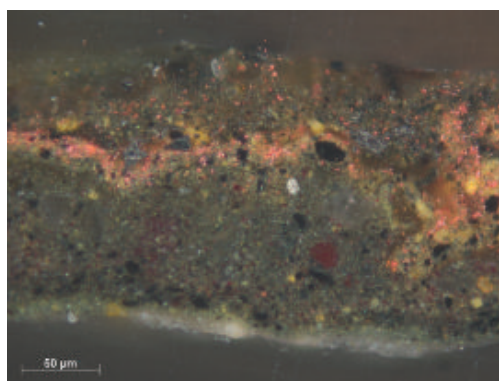


FIG. 41 *Captain Robert Orme*, paint cross-section from thick foliage paint at the left-hand edge of the picture.

CAT. 2

*The 4th Duke of Queensberry ('Old Q') as Earl of March*

The Wallace Collection (P561)

1759–60

Canvas, 91.8 × 71.3 cm (kit-cat)

Thread count of canvas: 11 warp (horizontal), 13 weft threads per cm<sup>2</sup> (plain weave)

The portrait of William Douglas, later 4th Duke of Queensberry, was painted between 1759 and 1760 (FIG. 42). Five appointments with Lord March are recorded in Reynolds's 'Sitter Book' in June and July 1759, with a final appointment on 27 March 1760, and towards the end of April a note to 'Finish Lord March'. Reynolds received payment for the portrait on 16 December 1760.<sup>1</sup> The sitter is shown wearing the badge and collar of the Order of the Thistle, which he was not awarded until 13 April 1763. These attributes are painted rather clumsily over the robes and it seems unlikely that the portrait was returned to Reynolds's studio for the badge and collar to be added.<sup>2</sup>

The plain-weave canvas is a kit-cat size and retains its original tacking margins in spite of being lined. There are selvages at the top and bottom of the canvas. Cusping is visible, except on the left side where the ground layer continues right up to the cut edge

(FIG. 44), indicating that the canvas was primed at a greater width and then cut to size. The canvas was sized before a beige-coloured double ground was applied. This consists of calcium carbonate, lead white, yellow and red earth pigments and a little black (probably charcoal), bound in heat-bodied linseed oil (FIGS 45, 46).<sup>3</sup> The lower ground layer is thicker and has coarser pigment particles, including large agglomerations of lead white. The two layers are separated from one another by a thin layer of glue size.<sup>4</sup> In the X-ray image, horizontal and vertical bands can be seen that appear to relate to the application of the ground layer, while examination of the surface under the microscope revealed a series of small grooves.

There are two repaired holes to the right of the sitter, visible in the X-ray image (FIG. 43). The more recent damage pierces both original and lining canvases and was repaired in July 1946.<sup>5</sup> The earlier hole is in the



FIG. 42 Joshua Reynolds, *The 4th Duke of Queensberry ('Old Q') as Earl of March*, 1759–60. Canvas, 91.8 × 71.3 cm. The Wallace Collection, Inv. P561.

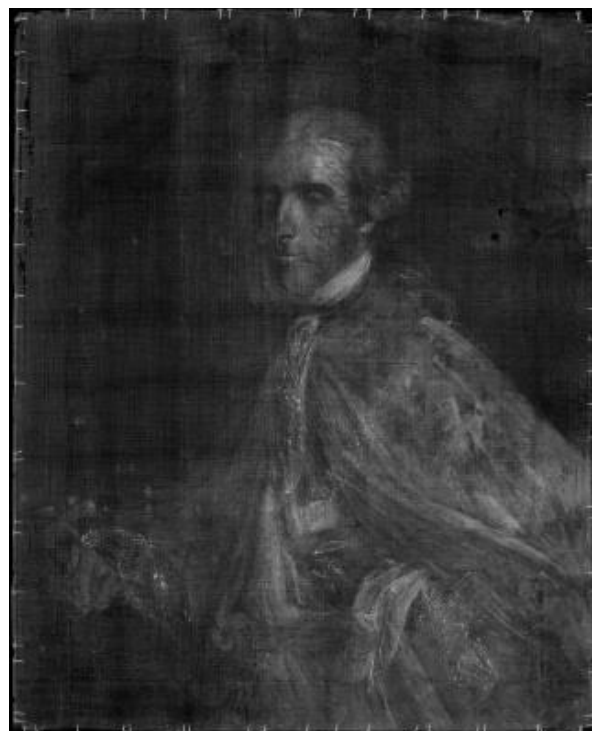


FIG. 43 *The Duke of Queensberry*, X-radiograph.



FIG. 44 *The Duke of Queensberry*, detail of left-hand tacking margin showing ground layer extending to cut edge.

FIG. 45 *The Duke of Queensberry*, paint cross-section showing double ground layer with an intermediate layer of glue size.

FIG. 46 *The Duke of Queensberry*, FIG. 45 photographed under ultraviolet illumination.

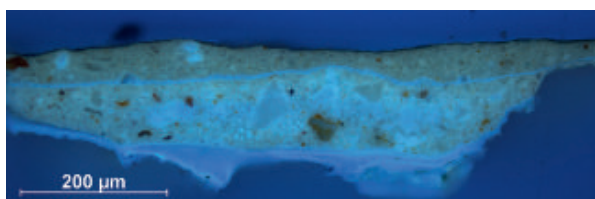


FIG. 47 *The Duke of Queensberry*, reverse.

original canvas alone and may have been the reason for lining. The two canvases have been fixed to the stretcher independently with two sets of tacks, which suggests a cold paste lining. This method was employed in England in the eighteenth century but seems to have fallen out of favour by the early nineteenth century.<sup>6</sup> The stretcher, which appears to date from the time of lining, has a construction consistent with a late eighteenth or very early nineteenth-century date (FIG. 47).<sup>7</sup>

The background is affected by an extensive network of drying cracks, which can be seen most clearly in the infrared reflectogram (FIG. 48). The widest cracks surrounding the sitter's face had been filled with a restorer's putty and retouched.<sup>8</sup> However, in an earlier attempt to obscure the cracks, a paint layer was applied over the whole of the background. The broad brushstrokes visible at the surface relate to this repaint, which is separated from the original by two thin varnish layers (FIGS 49, 50). We know from Reynolds's 'Technical Notes' that paintings sometimes cracked while still in the studio and were retouched, either by himself or by his assistants.<sup>9</sup> However, in this case the repainting of the background may have been carried out some time

after the painting had left Reynolds's studio. Along the edge of the ermine cape the murky green upper paint layer overlaps the ribbon at the sitter's shoulder (part of the collar added after 1763), indicating that the repaint post-dates this change. This layer is also continuous across the repair to the earlier of the tears and so may be linked to the restoration of this damage, perhaps carried out at the time of the lining.<sup>10</sup> However, the pigments present in the upper layers are all similar to those used in the original paint, with bone black, earth pigments and a little vermilion identified by microscopy and SEM-EDX. On the other hand, cross-sectional samples show that the tonality of the repainted background is shifted from that of the original paint layers, which appear to be a cooler darker grey. It has not been possible to determine if the shadowy image of a pillar or corner to the right was part of the original composition, although it is worth noting that a similar demarcation of space is present at the right edge of the background in *Anne, 2nd Countess of Albemarle* (CAT. 3).<sup>11</sup>

The original paint of the background consists of an initial layer of bone black, applied over the ground.<sup>12</sup> The subsequent paint layers vary across the background,





FIG. 48 *The Duke of Queensberry*, infrared reflectogram.

but samples in the cross-section from the severely cracked left side each contain a thick, translucent brown layer, which appears medium-rich and exhibits some fluorescence in ultraviolet light. This layer contains large particles that, by analysis, consist mainly of aluminium in the form of hydrated alumina with a small amount of sulphur, probably present as sulphate (FIGS 49, 50).<sup>13</sup> The most likely source of this material relates to the use of a lake pigment, although the type of lake and indeed the original colour remain unknown. It is relevant, however, that particles of a red lake that still appear pink are also visible in this layer, suggesting that two different types of lake were originally combined. The brown colour of the other particles suggests that the second pigment may have been a yellow lake.<sup>14</sup> The translucent brown paint seems to have been used to adjust the tone and perhaps add shading to the background, although it was subsequently covered with a further original layer of grey paint (in which several rounded translucent grains of starch were observed in cross-section). This layer seems to be fairly consistently present over the background, and appears also in samples from the right-hand side. Presumably the additional layer of paint over the thick, medium-rich glaze, which contains poorly drying lake pigments, contributed to the formation of the drying cracks.



FIG. 49 *The Duke of Queensberry*, paint cross-section from background upper left. The original paint is applied in several layers: a layer of bone black is followed by a yellow paint layer, a thick translucent brown layer and a mixed grey layer. In this sample the repaint is similar in colour to the upper layer of original paint.

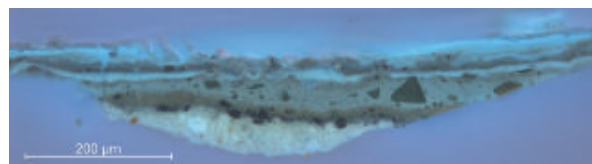


FIG. 50 *The Duke of Queensberry*, FIG. 49 photographed under ultraviolet illumination, showing the large particles of hydrated alumina, thought to be a lake pigment, in the translucent brown layer of paint. The two thin, fluorescent varnish layers are again visible separating the original paint from the repaint.

As with many paintings of this period of Reynolds's career, the flesh tones have faded. A small sample was obtained from a wide crack in the proper right hand, which shows that the pale flesh paint contains a red lake pigment and some black mixed with the lead white (FIG. 51). Although some of the larger red lake particles have retained their colour, the upper part of this layer appears pale and faded with a greater proportion of small, pink particles visible towards the bottom of the layer. In this flesh sample there is also a scumble of yellow paint over the surface.

The sitter's robes are less faded than the flesh paint, although they too rely on a potentially fugitive red lake pigment, identified as cochineal lake by HPLC analysis.<sup>15</sup> A cross-sectional sample from the red drapery at the lower edge shows that the paint has been built up in several layers that vary in colour from a dark pinkish grey underpaint, succeeded by lighter pink mixtures, and finally glazed with a richly-coloured red lake (FIG. 52). The final glaze used for the coronet at the left edge of the painting contains a mixture of red lake with some brown particles that exhibit a similar fluorescence under ultraviolet light to the putative lake particles in the background described above (FIGS 53, 54). This pigment may be a similar yellow lake combined with the red to give a darker more subdued tone, in order to

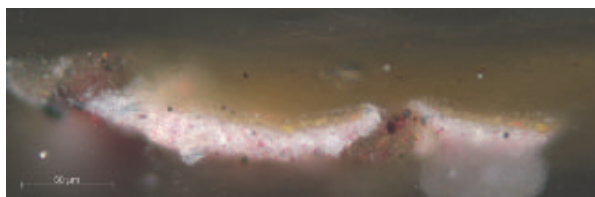


FIG. 51 *The Duke of Queensberry*, paint cross-section from proper right hand.

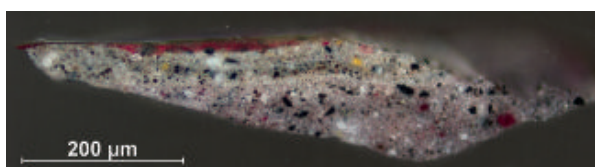


FIG. 52 *The Duke of Queensberry*, paint cross-section from red drapery.

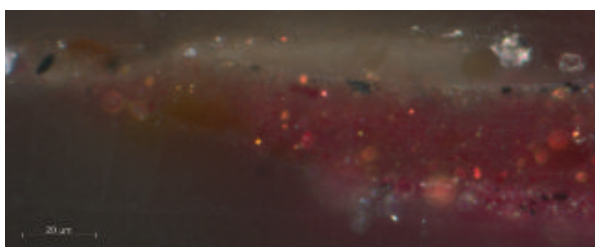


FIG. 53 *The Duke of Queensberry*, paint cross-section from coronet.



FIG. 54 *The Duke of Queensberry*, FIG. 53 photographed under ultraviolet illumination.

represent the coronet in shadow.

The preliminary design stage was carried out as a 'dead colouring' of the costume and may have been the work of a drapery painter or assistant.<sup>16</sup> Numerous adjustments have been made, especially to the ermine, presumably when the painting was returned to Reynolds's own easel. The hand in deep shadow resting on the sitter's hip was placed after the initial painting of the drapery was completed. No reserve was left for the hand in this position and a strong diagonal fold can be seen running through the hand in the X-ray image. This must have necessitated some change to the bunched

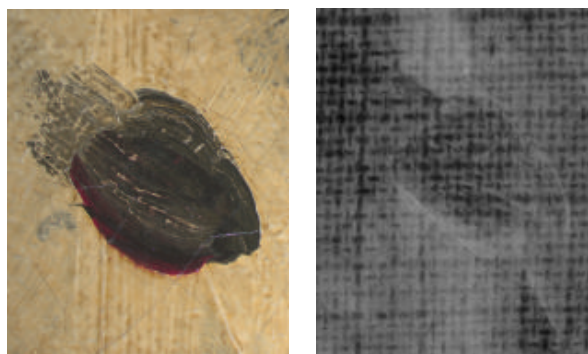


FIG. 55 *The Duke of Queensberry*, photomicrograph showing spot on ermine.

FIG. 56 (Right) *The Duke of Queensberry*, detail of X-radiograph.

fold above the hand and the whole passage seems to have undergone some considerable adjustment. The most obvious change is the repositioning of the spots on the robes, which can be seen more clearly in the infrared reflectogram. The lively brushstrokes of thick white paint used to obscure the spots cannot have dried completely when the second set was applied. The dark dab of paint for one of the new spots has wiped away some of the paint from the underlying white brushstroke and the smudge mark is visible in the X-ray image (FIG. 56). Some paint from the red glaze is visible at the edge of this moved spot, so it is likely that these adjustments were made at the same time as the final lake glaze was applied to the drapery (FIG. 55).

The paint medium of the red lake glaze used on the drapery was identified as heat-bodied walnut oil, and this was also identified in the white paint of the ermine. Untreated linseed oil was used for the pinkish grey underpaint of the robes.<sup>17</sup> Traces of copalic acid, a marker compound for resins from the Leguminosae family, were identified in the sample of the underpaint, in addition to a little mastic, which suggests that some resin may have been incorporated into the paint medium.<sup>18</sup>

Although *The 4th Duke of Queensberry* is afflicted by fading and paint drying faults, the removal of discoloured varnish during the recent conservation treatment has reinstated the effect of the bold chiaroscuro in this portrait, revealing a highly accomplished example of Reynolds's male portraits from this period and a cooler tonality that is surely closer to the painter's original concept.

CAT. 3

*Anne, 2nd Countess of Albemarle*

The National Gallery (NG 1259)

About 1760

Canvas, 126.5 × 101 cm (half-length)

Thread count of canvas: 14 vertical, 15 horizontal threads per cm<sup>2</sup> (plain weave)

The sitter, born 24 June 1703, was the younger daughter of Charles Lennox, 1st Duke of Richmond (1672–1723). Reynolds records eleven appointments with Lady Albemarle between September 1757 and June 1759,

most occurring in 1759.<sup>1</sup>

The painting (FIG. 57) was cleaned and restored at the National Gallery in 1959. Initial technical studies (using cross-sections particularly) were undertaken in



FIG. 57 Joshua Reynolds, *Anne, 2nd Countess of Albemarle*, about 1760. Canvas, 126.5 × 101 cm. The National Gallery, NG 1259.

1992, the summary results of which were published in *The British Paintings*.<sup>2</sup> Some further work was carried out in 2013 as part of the present Reynolds survey studies.

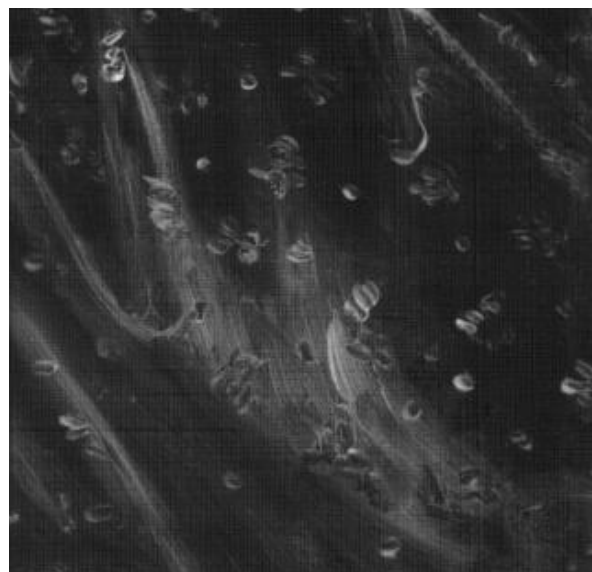
The plain-weave canvas shows cusping along all edges, although its effect is minimal at the left side. The original tacking edges have been removed, but the overall size remains more or less a standard half-length. The ground has been applied as two layers, with an intermediate thin layer of glue size. Unusually among the paintings studied here, the ground is of a mid-grey tone, and consists of lead white, calcium carbonate and

a black pigment with coarse and finer particles, some of which show the clear characteristics of wood charcoal (FIG. 61).

Although the pattern of sittings suggests an elaborate work-up of his composition, judging from the X-ray image (FIG. 58) Reynolds made fewer radical adjustments than is sometimes the case. Some features of the development of the design may be listed as follows: no reserve for the table was allowed for, and it was painted over drapery, which had been taken to an advanced state since both pattern and folds are visible in



FIG. 58 *Anne, 2nd Countess of Albemarle*, X-radiograph.



FIGS 59, 60 *Anne, 2nd Countess of Albemarle*, detail of highlight on black shawl and corresponding area of the X-radiograph, showing disturbance of wet underlying layers by the surface brushstrokes of the floral design.

the X-ray image beneath the table in the finished painting; there are changes to the folds of the curtain; brushstrokes register that relate to the sketched position for drapery and sleeves; there is an elongated oval shape between the sitter's hands which may be a first position of the bobbin; the top of the sitter's cap is delineated by brushwork; the dark floral design on the black shawl was painted while the underlying paint layers remained wet (FIGS 59, 60); there is an adjustment to the proper left hand with a change to the position of the index finger and addition of the thumb; there may be a change to the angle of the proper left arm, with cracking visible in the X-ray image in this area, perhaps because of the pentimenti; the corner of black shawl over the sitter's lap is painted over the folded edging on her skirt.

The degree to which this portrait may have faded has been commented on from time to time, and was the principal reason for preliminary technical examination.<sup>3</sup> The face is almost dead white, and rendered perhaps even cooler in tone by the influence of the grey ground beneath (FIG. 33, p. 29). The assumption had always been that some form of red lake – most probably of the fugitive cochineal-based variety known to have been employed by Reynolds – had lost its colour. The lake pigment used for the curtain has been identified by HPLC as containing cochineal-derived dyestuff,<sup>4</sup> and based on the appearance of the lake in cross-section samples, it is assumed that the same pigment was employed in the flesh paints. In Lady Albemarle's forearm, where it is protected from light by a mid-toned opaque greenish

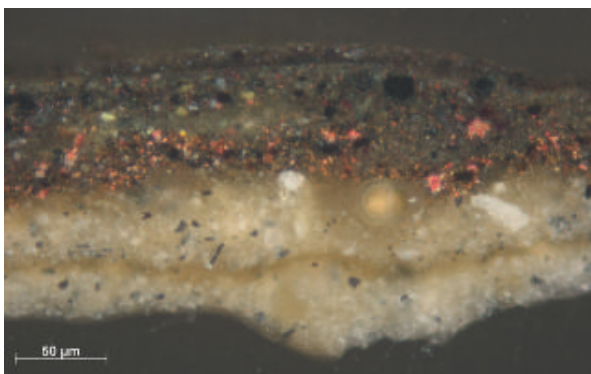


FIG. 61 *Anne, 2nd Countess of Albemarle*, paint cross-section from dark background, upper right edge. Black pigment, probably charcoal, is present in the ground layers.



FIG. 62 *Anne, 2nd Countess of Albemarle*, paint cross-section from sitter's face, showing fading of the red lake pigment.



FIG. 63 *Anne, 2nd Countess of Albemarle*, paint cross-section from yellow-green shadow on sitter's proper left arm.

yellow scumble used to create a half shadow, the lake pigment is in relatively good condition (FIG. 63). Traces of apparently very faded lake, combined with lead white, have been detected in a single sample from the flesh of the face (FIG. 62), and it is clear from evidence – both direct and indirect – that Reynolds’s portrait represents a genuine case of substantial loss of colour in the face.<sup>5</sup> The paint of the curtain and, presumably, the chairback, while much less noticeably affected by light, shows a stronger colour, more purple-red in tone, in the strip of paint at the left edge that has been under the frame rebate (FIGS 64, 65). The folds of the curtain are constructed with thick brushstrokes of an opaque pink paint and finished with a glaze containing red lake, in a similar manner to the drapery in the *The Duke of Queensberry*. Black pigment occurs in the shadow values of these paints, and the glaze-like surface red of the chairback passes over brown underpaints in the darker parts, which modify the surface colour.

The principal colouring component in the embroidered satin skirt of Lady Albemarle’s dress is Prussian blue, combined with more or less white, in several layers (FIG. 66). There is some fading of the blue pigment, as demonstrated by protected paint along the lower edge, which is a common phenomenon for this pigment, particularly in eighteenth-century paintings.<sup>6</sup>

The opaque yellow pigment used in shadows of the flesh (noted above), and as highlights on the tacks along the edge of the chairback, has been shown to be lead-tin-antimony yellow, a pigment also used in *Lord Heathfield* (CAT. 15), and perhaps elsewhere, as a variant of the more familiar eighteenth-century staple, Naples yellow (lead antimonate).<sup>7</sup>

Reynolds’s paint binding medium for *Anne, 2nd Countess of Albemarle* seems rather straightforward, and this presumably accounts for the portrait’s relatively well-preserved state, other than the fading noted above. There are some cracked areas, although not severely so, in some of the darks and in sections of the background.<sup>8</sup> Analysis of samples by GC–MS showed the use of walnut oil in white paint (perhaps slightly heat-bodied, or untreated), and heat-bodied linseed oil in blue paint from the dress. The ground was found to be bound in heat-bodied linseed oil.

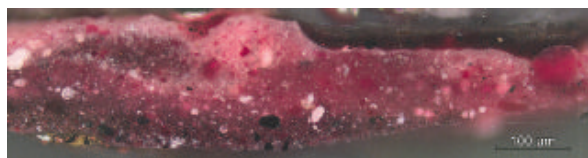


FIG. 64 *Anne, 2nd Countess of Albemarle*, paint cross-section from the curtain, taken at the left edge underneath the frame rebate, where the paint had been protected from light. The final red lake glaze visible at the right-hand end of the sample retains a strong pink colour.

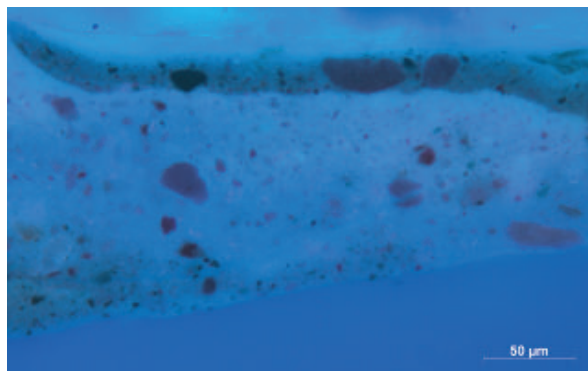


FIG. 65 *Anne, 2nd Countess of Albemarle*, detail of FIG. 64 photographed under ultraviolet illumination, showing the red lake glaze layer at the right end of the sample.

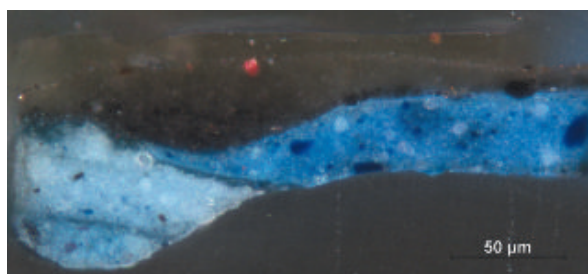


FIG. 66 *Anne, 2nd Countess of Albemarle*, paint cross-section from brightest blue highlight of dress.

CAT. 4

*Miss Nelly O'Brien*

The Wallace Collection (P38)

About 1762–4

Canvas, 126.3 × 110 cm (half-length)

Thread count of canvas: 17 vertical, 11 horizontal threads per cm<sup>2</sup> (plain weave)

Nelly O'Brien was a courtesan and mistress of the 2nd Viscount Bolingbroke, to whom she bore a son in 1764. Although numerous appointments with Nelly O'Brien are noted in Reynolds's 'Sitter Books' between 1760 and 1767, it is not possible to associate these appointments with specific paintings, Reynolds probably using Nelly O'Brien as a model as well as painting her portrait.<sup>1</sup> The Wallace Collection painting has been dated to 1762–4 on stylistic grounds (FIG. 67).<sup>2</sup> The portrait of Nelly O'Brien in the Hunterian Art Gallery is also thought to

date from this period and is of a comparable size, with the sitter seated in a similar pose and gazing directly at the viewer.

The support is a single piece of plain-weave canvas. The original tacking margins are missing, except along the lower edge where part of the tacking margin has been flattened into the picture plane.<sup>3</sup> The canvas was prepared with a double ground that contains calcium carbonate and lead white with a little yellow earth.<sup>4</sup> Between the two applications of ground is a thin



FIG. 67 Joshua Reynolds, *Miss Nelly O'Brien*, about 1762–4. Canvas, 126.3 × 110 cm. The Wallace Collection, Inv. P38.

translucent interlayer, apparently a layer of glue size. Several changes have been made to the figure during painting. The proper left hand was originally placed next to the proper right hand: the thumb can be seen below the dog's nose in the X-ray image (FIG. 68). The fingers of the proper right hand were pointing further downwards, and the thumb was positioned where the index finger is now. In this earlier position the sitter would have held the dog with both hands, whereas in the final arrangement she cradles the dog in her arms. An X-ray-dense area below the sitter's neck indicates that only a V-shaped portion of flesh was laid in at first and the low, scooped neckline and cleavage were developed as the painting progressed. A single cross-section of flesh paint taken from the highlight on the sitter's proper right arm shows a very pale pink underlayer containing lead

white, vermilion and some almost colourless smalt. A scarcely pigmented oil-resin glaze layer containing vermilion and yellow earth had been applied over this and appears to be an original layer.<sup>5</sup>

The X-ray photograph also reveals features related to early stages of painting as the composition was laid in. The outline of the overskirt on the proper left side initially formed a smooth arc before the shadowed folds of the blue and white striped fabric were added. There are several curved brushstrokes at the sitter's proper right elbow indicating the position of the frilled cuff. Curved brushstrokes on either side of the sitter's head roughly mark the position of the lace cap. Under the brim of the hat, on the proper left side, fluid drips and runs are visible in a thinly constituted underpaint layer (FIG. 24, p. 22). There are also drips present in the



FIG. 68 *Miss Nelly O'Brien*, X-radiograph.





FIG. 69 *Miss Nelly O'Brien*, detail of infrared reflectogram.

area of the skirt, which seem to relate to a paint of similar fluidity.

A series of dark curved brushstrokes are visible in an infrared reflectogram (FIG. 69), on the underside of the brim of the hat on the left side. These are now barely visible on the painting and can only be seen on close scrutiny of the surface, but were recorded in engravings derived from the painting, and must have been originally more pronounced, presumably to convey the texture of the woven straw hat.<sup>6</sup>

Nelly O'Brien wears an elaborate and beautiful costume; Reynolds's depiction of the different colours, textures and fabrics is one of the defining glories of the work. Her petticoat is built up in several layers of varying shades, including a pink mid-tone, pale pink highlights and darker pink shadows to suggest the folds. The diamond pattern of the quilting was first marked out in a light-coloured paint, even in the shadowed portion of the drapery at the centre, and registers as a series of diagonal white lines in the X-ray image. The dark pink lines, indicating the creases along the seams of stitching, have been added after this initial marking of the pattern and were presumably executed in a mixture containing some black pigment since they are clearly visible in the infrared reflectogram.

Samples in cross-section from the lower edge indicate that the pink paint contains a mixture of lead white, a red lake pigment based on cochineal dyestuff, and vermilion with a little bone black.<sup>7</sup> A sample taken from one of the paler highlights also includes a small amount of smalt in the upper paint layer, although a large particle identified by SEM–EDX is almost colourless (FIG. 70). The surface paint layer appears paler in colour in the upper portion, indicating that a degree of

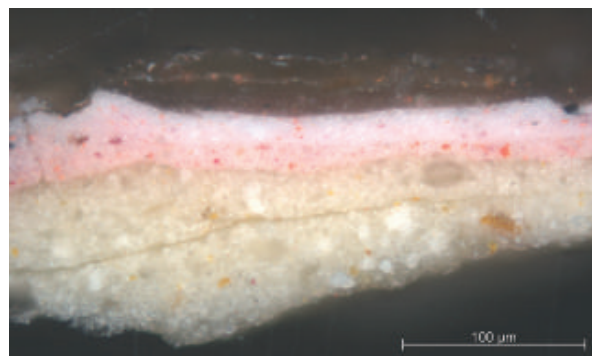


FIG. 70 *Miss Nelly O'Brien*, paint cross-section from highlight on pink skirt.

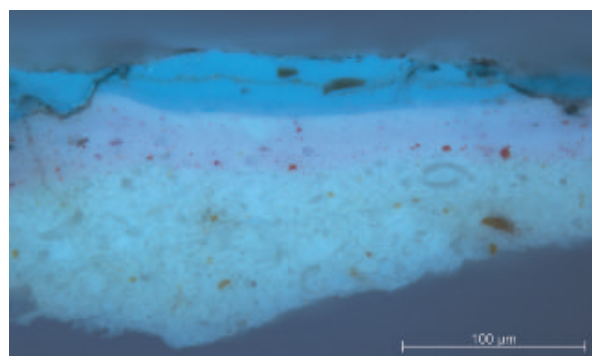


FIG. 71 *Miss Nelly O'Brien*, FIG. 70 photographed under ultraviolet illumination.

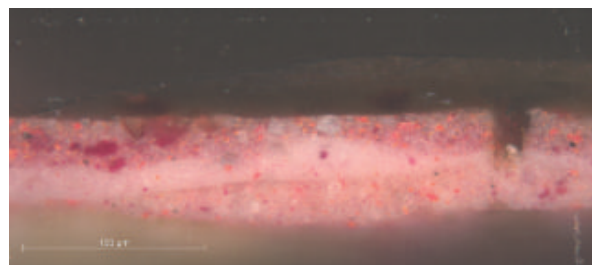


FIG. 72 *Miss Nelly O'Brien*, paint cross-section from darker area of pink skirt.

fading of the red lake pigment has taken place. A very thin glaze is also present, although it is barely visible now except in ultraviolet light (FIG. 71). This is almost colourless and must contain a very faded component, presumably a red lake pigment. In the darker parts of the drapery the paint contains a greater proportion of a red lake and a significant amount also of vermilion (FIG. 72). Although there may have been a degree of fading here too, many of the lake particles retain some bright colour and the admixture with vermilion has meant that overall the drapery still appears pink in these shadowed parts.

The contrasting blue stripes of the dress are painted

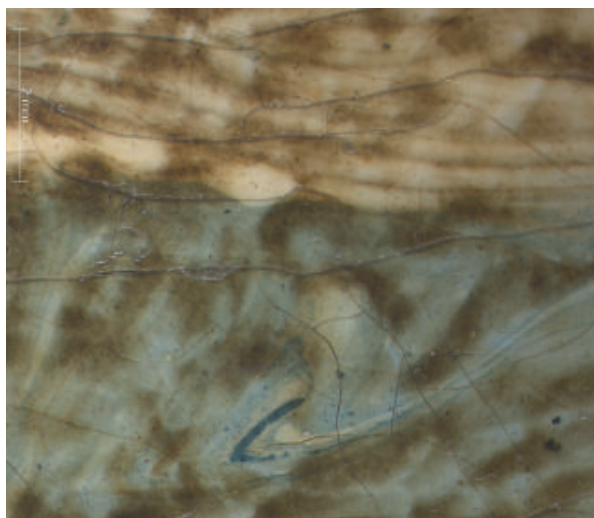


FIG. 73 *Miss Nelly O'Brien*, photomicrograph of blue and white striped drapery, showing the dark glaze on the surface.

with mixtures of lead white and Prussian blue. A little yellow earth has been added and a few particles of bone black are visible in cross-section. Prussian blue is a pigment also vulnerable to light, although it is difficult to assess the degree of fading involved. It is likely that the blue stripes were originally a more intense colour. Examination of the surface under the stereomicroscope shows a thin layer of dark glaze applied to create the shading over much of the blue and white drapery. This material was caught in the texture of the paint, giving a rather uneven appearance that may have been exacerbated over time since the medium rich layer will have both darkened and become rather worn (FIG. 73).

The dark foliage in the background has suffered from more extensive drying cracks than any other part of the painting. The most profound drying defects are localised in particular passages and correspond with certain brushstrokes, such as those depicting the rounded leaves on either side of the sitter. In these areas the paint has been built up with layers of semi-translucent brown and green glazes applied over a more opaque yellow or green underlayer. The upper layers have cracked and the poorly dried underpaint has oozed out onto the surface, creating islands of raised paint along the lines of cracking (FIG. 74). A sample in cross-section from a similar area illustrates the complex layer structure (FIGS 75, 76). Over the ground, Reynolds's initial paint layer contains a mixture of orpiment, bone black, vermilion and lead white. The succeeding layer of green paint, containing Prussian blue mixed with



FIG. 74 *Miss Nelly O'Brien*, photomicrograph of foliage showing cracking and small blobs of paint, where the poorly dried under layers have exuded onto the surface.

lead white and some orpiment, appears less dense and is highly fluorescent under ultraviolet light.<sup>8</sup> This is also the case for the subsequent layer of strongly coloured yellow earth, in spite of the fact that an earth pigment might be expected to 'quench' fluorescence to a degree. The presence of additional fluorescent materials in the paint medium is therefore indicated. The semi-translucent brown paint is made up of several layers, and this is seen most clearly under ultraviolet light. Paint containing black and an iron oxide red pigment has been applied in at least two medium-rich layers separated by an unpigmented interlayer of varnish, which shows a stronger blue fluorescence.<sup>9</sup>

Medium analysis of a sample of these brown glaze layers identified heat-bodied walnut oil with some copaiba balsam. The identification of copaiba is based on the detection by GC-MS analysis of a characteristic component with a kaurane structure, which has been identified previously in samples of copaiba produced by the *C. Langsdorfii* L. species.<sup>10</sup> This component was not identified in any of the samples of varnish from the painting and it can be concluded that the copaiba balsam must therefore be related to the paint layers. The sample also contained both mastic and pine resin, but it is more difficult to determine the significance of these materials since the same resins were present in samples of varnish and could also be connected with the fluorescent interlayer visible in the cross-section. A sample of the lower layer of yellow paint that had protruded onto the surface gave similar results: a medium based on heat-bodied walnut oil with some copaiba balsam,

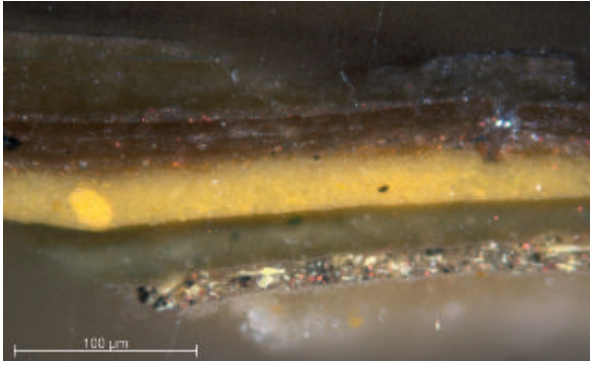


FIG. 75 *Miss Nelly O'Brien*, paint cross-section from foliage.

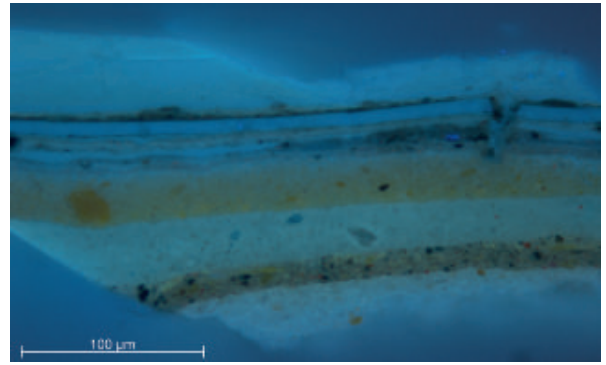


FIG. 76 *Miss Nelly O'Brien*, FIG. 75 photographed under ultraviolet illumination.

mastic and pine resin. It is highly likely that the cracking associated with these passages is connected to the use of these resinous materials and to the complicated layering used to build up the translucent glaze-like effects.

Medium analysis of a sample from the sky at the top left gave comparable results. Copaiba balsam and pine resin were found in addition to the oil, although no mastic was detected in this particular sample. It is relevant that this area has also been glazed extensively with brown and green paint over the pale underlayer.

For the most part the paint medium seems to be based largely on walnut oil, although heat-bodied

poppyseed oil may have been used for the white paint of the sky.<sup>11</sup> However, heat-bodied walnut oil was identified in a sample from the white paint of the striped drapery, so there may not be a consistent use of poppyseed oil for white paint throughout the painting.

Although the colour relationships in *Miss Nelly O'Brien* have inevitably changed over time, especially in the pink and blue drapery, the subtle depiction of light and shade and the fall of light on the figure are executed with great refinement and effect. It is justifiably one of Reynolds's most admired images.

CAT. 5

*Mrs Susanna Hoare and Child*

The Wallace Collection (P32)

1763–4

Canvas, 134.5 × 107.8 cm

Thread count of canvas: 14 vertical, 15 horizontal threads per cm<sup>2</sup> (plain weave)

Susanna Cecilia (née Dingley) was first painted by Reynolds in 1762, preceding her marriage to Richard Hoare, a partner in Hoare's Bank.<sup>1</sup> The portrait *Mrs Susanna Hoare and Child* (FIG. 77) was most likely painted in 1763, although the 'Sitter Book' for that year is missing, and there is a single appointment noted for 6 January 1764.<sup>2</sup> An unfinished painted sketch related to the composition is now in the collection of the Museum of Fine Arts in Boston (FIG. 78).<sup>3</sup>

The canvas does not conform to a known standard size, being slightly larger than half-length proportions, but smaller than a bishop's half-length.<sup>4</sup> The beige ground has been applied in two layers, separated by a thin translucent layer, likely to be glue size. The composition of the ground is very similar to that on *Miss Nelly O'Brien* (CAT. 4): it includes calcium carbonate, lead white, a little yellow earth and a few particles of a carbon black that are more concentrated in the lower



FIG. 77 Joshua Reynolds, *Mrs Susanna Hoare and Child*, 1763–4. Canvas, 134.5 × 107.8 cm. The Wallace Collection, Inv. P32. (This picture is currently undergoing cleaning and restoration.)



FIG. 78 Joshua Reynolds, *Mrs Richard Hoare holding her Child*, about 1763. Oil on canvas. 75.9 × 63.5 cm. The Museum of Fine Arts, Boston, Inv. 1982.138.

layer (FIG. 79).<sup>5</sup> The surface has a finely grooved texture related to the method of application (FIG. 80).

The similarity of this ground layer to others in the pictures described here suggests that the canvas was commercially prepared. However, the ground has been modified by the application of a thin, pinkish-red priming. This is the only example of a final coloured priming layer in the group of paintings studied here and seems to be an unusual technical feature.<sup>6</sup> The layer is present across the whole canvas, but samples in cross-section from different points suggest that it ranges in tonality from a strong red colour to a much paler pink, with varying proportions of lead white and a red iron oxide pigment.<sup>7</sup> The priming is just visible at the top right corner where the blue paint of the sky does not quite reach the edges, and catches the tops of the ground

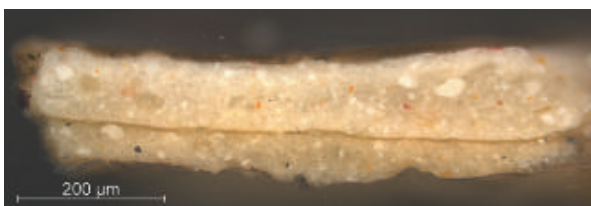


FIG. 79 *Mrs Susanna Hoare and Child*, paint cross-section showing double-ground layer with an intermediate layer of glue size.

texture (FIG. 80). However, in the samples from the main body of the picture it seems to be an application sufficiently substantial to completely cover the ground.<sup>8</sup>

Reynolds made a large number of small adjustments to the composition as he painted. Brush marks for a sketched outline of the drapery are visible in the X-ray image (FIG. 82). A few brushstrokes cross the child's legs, indicating that the first sketch was executed before the position of the child's limbs was finalised. The drapery was painted leaving the child's legs and upper arm in reserve, with adjustment of the edges of the limbs as the drapery was completed. Some significant changes were made to the child's proper right arm. The top edge of the arm was widened over the drapery, while the lower side was covered with the thick, textured paint of the skirt. The child's hand was originally painted with all four fingers showing and the index finger hooked into a fold of fabric. This was altered later by painting out the little finger and changing the index finger into an extended thumb. In the X-radiograph this arm appears denser than the child's legs, indicating that the paint layer is thicker, probably as a result of the adjustments.

A triangle of drapery between the child's head and raised arm has been painted out and so has the edge of the drapery at the sitter's proper right shoulder. This alteration must have been made when the painting was at an advanced stage. The textured drapery paint can be seen in these areas below the overlying dark foliage of the background and registers also in the X-ray image. It has been noted that these areas of drapery are depicted in the Boston sketch.<sup>9</sup> The sketch is clearly unfinished and depicts only a section of the full-sized painting, with similar scale figures on a smaller canvas. A digital



FIG. 80 *Mrs Susanna Hoare and Child*, photomicrograph of the top edge showing the edge of the blue sky with some pink priming visible and the textured ground layer.

overlay of the two images shows that there is a close correlation between the two compositions. However, when the profile of Mrs Hoare is aligned in the two pictures, the legs and lowered arm of the child are offset, which may indicate that the image was transferred using a tracing.<sup>10</sup> The two paintings may have been worked on concurrently, with the sketch perhaps being used to work out aspects of the more finished composition. The changes to the Wallace Collection painting suggest the sketch was probably finished before the full painting was completed.<sup>11</sup>

The flesh paint appears relatively well preserved and there is less evidence of fading than in some of the other early portraits. One small sample of flesh paint was obtained from a pale pink area of the child's knee. Here the upper layer of paint contains both vermilion and a

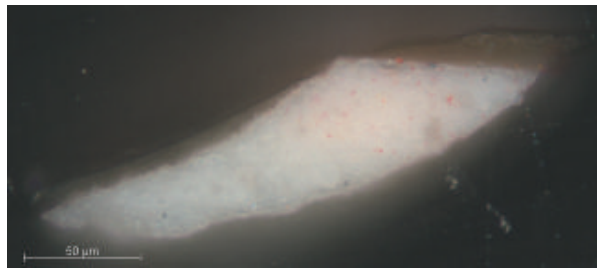


FIG. 81 *Mrs Susanna Hoare and Child*, paint cross-section from the child's knee.

little iron oxide red pigment (FIG. 81). A blue grey underpaint has been used to construct the modelling in the flesh that remains visible in the shadows, especially around Mrs Hoare's chin, neck and mouth. On the back of the sitter's proper right hand the grey underpaint is



FIG. 82 *Mrs Susanna Hoare and Child*, X-radiograph.

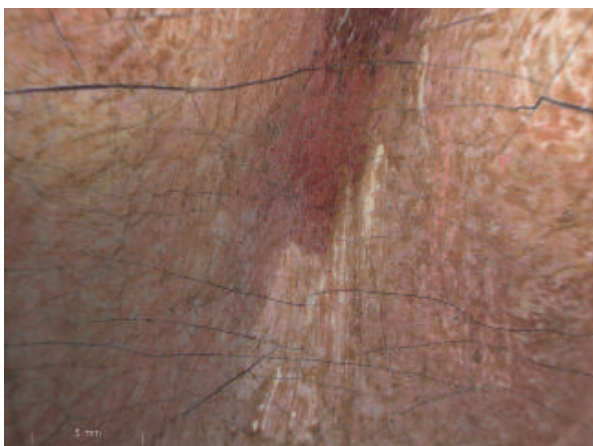


FIG. 83 *Mrs Susanna Hoare and Child*, photomicrograph showing grey underpaint below pink flesh paint on the back of the sitter's hand.

visible where the upper pink layers are slightly worn over the tops of the canvas weave (FIG. 83).

Mrs Hoare wears a white dress decorated with golden flowers. The textured paint of the dress is almost pure white but contains a few particles of smalt, bone black and ultramarine, along with some very fine red particles. In a cross-section from the greyish shadow on the sleeve, a final thin layer has been applied to create the shading, which also contains both smalt and particles of ultramarine mixed with a little black. The flowers are painted with two different yellow pigments –

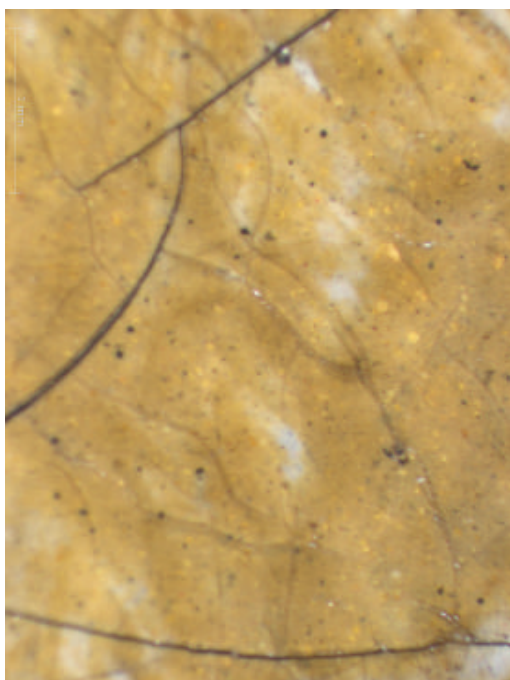


FIG. 84 *Mrs Susanna Hoare and Child*, photomicrograph of a yellow flower on drapery.

Naples yellow and a strongly coloured yellow earth (FIGS 84, 85). The darker flowers from the shadowed folds of the dress contain, in addition, a little black pigment and register in an infrared reflectogram.

Naples yellow was also used in the mixed paint layers of the landscape background, which is built up in several layers (FIGS 86, 87). The pigment mixtures, although complicated and varied in the different areas, seem to be dominated by an intensely coloured iron oxide red pigment, very similar to that used in the priming. This is combined with Naples yellow, lead white, both bone black and a vegetable black, and Prussian blue in varying proportions. A few particles of vermilion were also identified and, in some of the mixed paint layers, a few large particles of red lake. Greener parts of the background contain more Prussian blue and touches of a yellow earth. Several samples indicate that final glaze-like applications of paint were used to complete the background. A cross-section from the green area in the lower right foreground, for example, has an upper rather translucent brown layer with particles of bone black and a little vermilion, completed with a scumble of yellow earth pigment (FIG. 87).

The blue pigments used in small quantities in the off-white paint of the dress were also found in the blue and white sky. Ultramarine and smalt were mixed together in the same paint layer, with a little of the iron oxide red pigment (FIG. 88).<sup>12</sup> The final layer on the sky contains Prussian blue and has been brushed broadly over the whole area, overlapping the foliage of the trees.

There is less evidence of extensive drying defects seen on some of the other paintings studied here. The flesh paint and the drapery display a prominent network of brittle cracks, and some of the thicker parts show some wrinkling, but these effects are not general. The paint medium is based on heat-bodied oil, and GC-MS

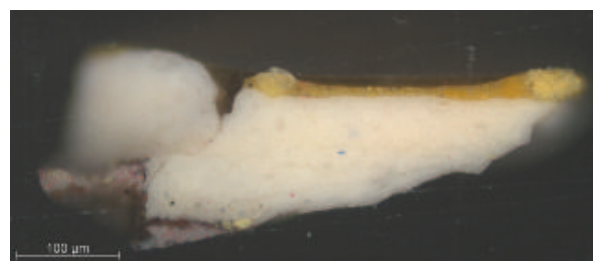


FIG. 85 *Mrs Susanna Hoare and Child*, paint cross-section from a yellow flower on the drapery, at left edge where the dress overlaps the landscape. The lowest layers in the sample, containing mixtures of lead white, iron oxide red, Naples yellow and a little ultramarine, relate to the underlying background landscape.

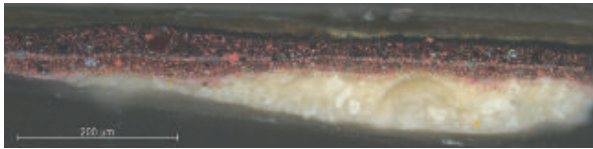


FIG. 86 *Mrs Susanna Hoare and Child*, paint cross-section from dark green paint of foliage at the left edge.

analysis showed some variation in the type of oil used in different passages. Heat-bodied linseed oil was identified in the yellow and green paint from the landscape, while heat-bodied walnut oil appears to have been used for the pale blue layers of paint in the sky and for the white dress.<sup>13</sup> A sample from the blue sky, which also contained the upper glaze of Prussian blue, and a sample of the brown underpaint from the landscape, gave intermediate results with palmitate to stearate ratios falling at the boundary between the values expected for linseed oil and walnut oil. There is some evidence to suggest that a little resin may have been included in the medium of the blue glaze in the sky, since some pine resin was detected by GC–MS.<sup>14</sup>

Although the paint defects associated with the complicated layering of different paint media are not so evident as on some of the later paintings, cross-sections from the background do show evidence of medium-rich glaze layers and, in a few samples, translucent inter-mediate layers are present which emerge under

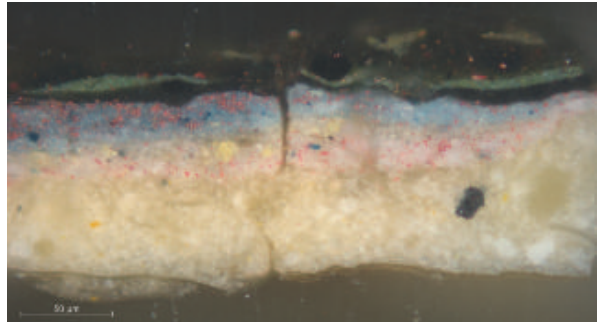


FIG. 87 *Mrs Susanna Hoare and Child*, paint cross-section from green paint of the foreground, lower right.

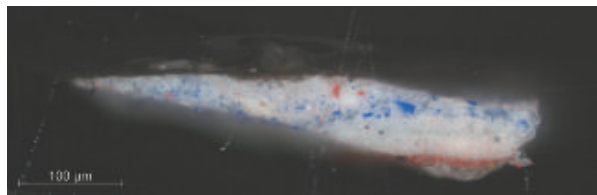


FIG. 88 *Mrs Susanna Hoare and Child*, paint cross-section from sky, containing both ultramarine and smalt in the same thick layer of blue paint. This sample does not include the final Prussian blue glaze present elsewhere on the sky. The thin priming, containing iron oxide red mixed with a little lead white, is visible above the ground.

ultra-violet illumination. This may suggest more widespread resinous additions to the paint medium than indicated by the limited amount of GC–MS analysis carried out.<sup>15</sup>



CAT. 6

*The Strawberry Girl*

The Wallace Collection (P40)

After 1773

76.6 × 63.7 cm (bust or three-quarter-length)

Thread count of canvas: 15 vertical, 17 horizontal threads per cm<sup>2</sup> (plain weave)

The 'fancy painting' composition of *The Strawberry Girl*, which was repeated by Reynolds a number of times, was considered by him to be one of the most original images he produced. The idea derives from an earlier portrait, thought to be of Reynolds's niece Theophila Palmer.<sup>1</sup> There are two variations of *The Strawberry Girl* composition, which have been designated 'type A' and 'type B'. Of the extant paintings, that at Bowood House, bought in 1774 by Lord Carysfort, is a 'type A' composition, while the Wallace Collection picture is regarded as 'type B' (FIG. 89).<sup>2</sup> A version of *The Strawberry Girl*, presumably the first of this design, was exhibited at the Royal Academy in 1773. An engraving was produced by Thomas Watson in 1774, which depicts a 'type A' *Strawberry Girl* and was probably based on the exhibited painting (FIG. 90). The Wallace Collection version remained in Reynolds's possession and was sold in his studio sale.<sup>3</sup> A further *Strawberry Girl* composition was revealed by X-ray photography

beneath *The Age of Innocence* (Tate, N00307).<sup>4</sup>

The Wallace Collection painting is roughly a standard bust or three-quarter-length canvas. Strong cusping can be seen only at the upper and lower edges in the X-ray image, indicating that the canvas was most likely cut to size after preparation (FIG. 91).<sup>5</sup> The ground layer is almost pure white and contains lead white with some calcium carbonate.<sup>6</sup> Fairly regularly spaced horizontal striations across the whole surface, visible in the X-ray image, probably relate to the method of application of the ground.

Technical investigation of the Wallace Collection painting showed that it was initially considerably closer to the 'type A' composition. The X-ray image reveals that the headdress the girl is wearing originally had fringing at the front, similar to that visible in the Bowood House painting and the Watson print. This was later painted over when the sitter's hair was added at her forehead. The paint of the fringing on the cap was applied thickly



FIG. 89 Joshua Reynolds, *The Strawberry Girl*, after 1773. Canvas, 76.6 × 63.7 cm. The Wallace Collection, Inv. P40.



FIG. 90 Thomas Watson, after Joshua Reynolds, *The Strawberry Girl*, 1774. Mezzotint, 37 × 27.6 cm. The British Museum, Inv. 1840,0808.130.



FIG. 91 *The Strawberry Girl*, X-radiograph.



FIG. 92 *The Strawberry Girl*, infrared reflectogram.

and the impasto can be seen through the overlying paint layers, especially where the paint has been damaged during lining. The shape of the headdress was also adjusted to render it closer to the shape of a turban, but originally the cap slumped further to the right, beyond the line of the face. The X-ray image also shows that the sitter's shoulders were more hunched initially and her face was a little narrower.<sup>7</sup> Furthermore, it appears that the background followed more closely the 'type A' format. An expanse of sky was painted at the right side, but this was subsequently reduced by adding more trees in the distant landscape.<sup>8</sup>

Since the painting remained in the studio, it is possible that Reynolds sought to alter and change the composition over a long period. One may speculate that Reynolds adapted the painting in response to other portraits painted in the studio. In fact, the heart-shaped face, the white highlight in each eye and the gold embellishment on the shoulder of the dress, none of which is evident in the 'type A' composition, all resemble, for example, the portrait of Miss Jane Bowles (CAT. 8), which was painted only a few years after *The Strawberry Girl* was originally exhibited.

In contrast to all the other paintings examined here, *The Strawberry Girl* was found to have an under-drawing. The thin lines, which are visible in an infrared

reflectogram (FIG. 92), can be seen most clearly where they outline the hands (FIG. 93), the handle of the basket and delineate the folds of the drapery. In some areas, such as the handle, the lines are very thin and their appearance in the infrared image suggests the use of a dry drawing medium. However, in other places, such as the hands and drapery, the lines appear slightly broader as if applied in a fluid medium with a brush. The style of the drawing is comparable to Reynolds's surviving sketches.<sup>9</sup> It may be that the drawing seen in the infrared reflectogram relates to the transfer of this image, which Reynolds reused on the canvas. James Northcote records how Reynolds recommended 'as a



FIG. 93 *The Strawberry Girl*, detail of infrared reflectogram.

good mode of study, that a painter should have two pictures in hand of precisely the same subject and design, and should work on them alternately'.<sup>10</sup> If the drawing lines do relate to the process of transferring an existing design, this could indicate that the Wallace Collection painting was begun after the first painted version.

In many areas the impasto and paint texture have been badly flattened, and it appears that the varnish was not removed before the picture was lined.<sup>11</sup> The pushed down texture of the paint gives it a pitted appearance when viewed under magnification, which is especially striking in areas of thick paint on the child's apron (FIG. 94). Varnish is present over the flattened tops of the brushstrokes and thick discoloured varnish has collected in the hollows of the paint texture. Analysis of the white paint from this passage, however, identified only heat-bodied walnut oil as the binder rather than a medium that might be expected to be particularly vulnerable to the heat and pressure of early lining procedures. Even so, we conclude that in this case the effects of lining are more responsible for the present condition of the paint than some feature of Reynolds's painting technique. In other areas of the painting, the upper layers may have been partially removed by cleaning or lining: for instance, the final layer of dark blue paint of the bow on the sitter's dress is now very fragmentary (FIG. 95). The placement of the bow visible in the X-ray photograph appears closer in shape to the 1774 print, and so the somewhat asymmetrical form of the bow as it appears now is likely to be a result of later adjustment by Reynolds.<sup>12</sup>

There is no recorded conservation treatment, since the picture was acquired by the 4th Marquess of Hertford in 1856 and it is unlikely that any cleaning has been carried out for well over a hundred years.<sup>13</sup> The examination of cross-sections reveals multiple layers of varnish, which are now heavily degraded, producing an unsaturated light-scattering surface.<sup>14</sup> The discoloration of the varnish means it is difficult to discern any variation in the tonality of the apron, caught up over the girl's arm, or the underskirt, but these sections of the drapery may have appeared originally distinctly different from one another.<sup>15</sup> A cross-section from the lower edge (FIG. 96) shows that the skirt is constructed with an underpaint containing lead white mixed with Naples yellow, bone black and earth pigments.<sup>16</sup> The thick upper layer of paint contains mainly lead white but has a pale pinkish colour and appears faded towards the upper

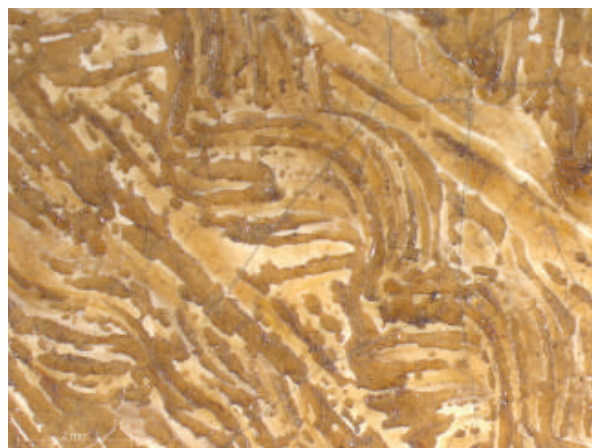


FIG. 94 *The Strawberry Girl*, photomicrograph of apron showing squashed texture of paint.



FIG. 95 *The Strawberry Girl*, photomicrograph of bow showing the remains of an upper paint layer.

fraction of the layer. No lake pigment has been identified positively but may be included; if it is present, the particles must be extremely fine. A little earth pigment and a few particles of smalt were also noted in the mixture.

The skirt has been completed with a glaze layer, visible in cross-section under ultraviolet illumination (FIG. 97). The glaze is not as fluorescent as the varnish layers on top, or the response to UV of the thin layer, presumably also a varnish, that separates it from the underlying paint. It includes some large particles in which aluminium was detected, presumably in the form of hydrated alumina, suggesting the presence of a lake pigment.<sup>17</sup> These particles are close in composition to the lake particles identified in the background of *The 4th Duke of Queensberry* (CAT. 2), providing a clear indication that this layer is original. A small separated fragment gives a sense of the quantity of pigment in this glaze

(FIG. 98). When viewed in transmitted light it is evident that a few particles retain a translucent bright red colour, while many of these particles appear an orange-brown, suggesting there may be a mixture of both red and yellow lakes present.<sup>18</sup> This layer was perhaps applied to adjust the colour and thus give some additional shading to the skirt, or as some kind of toning to give the impression of a rich, aged surface coating. On more than one occasion in his ledgers, Reynolds notes that he has glazed a painting either with varnish or oil often incorporating a yellow pigment, sometimes specified as a yellow lake.<sup>19</sup>

A similar glaze is also present in the cross-section from the dark background, which is built up in several layers containing mixtures of bone black, a vegetable carbon black and earth pigments including some umber

(FIGS 99, 100). The binding medium of this dark paint was identified as heat-bodied linseed oil, as opposed to heat-bodied walnut oil, as identified in the paler paint of the blue sky and the white apron.<sup>20</sup>

In Reynolds's 'Technical Notes' there is a reference from around 1778 to *The Strawberry Girl* that states 'cera. Sol.' (wax only).<sup>21</sup> Not only does this tell us that Reynolds was still experimenting with *The Strawberry Girl* composition some four years after exhibiting the painting; it also suggests that there is a version that was painted, although perhaps only partially, using wax in the medium. No evidence from analysis confirms that this note can be related to the Wallace Collection painting, since no wax was identified in any of the samples analysed by GC-MS.

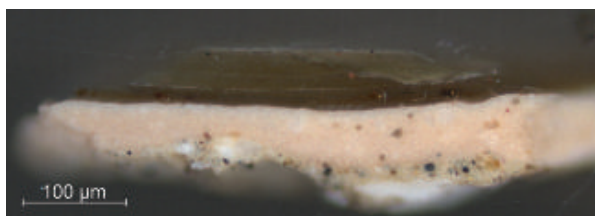


FIG. 96 *The Strawberry Girl*, paint cross-section from skirt near lower edge.

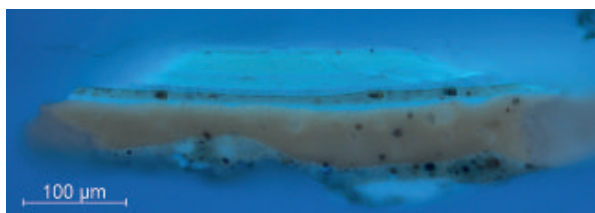


FIG. 97 *The Strawberry Girl*, FIG. 96 photographed under ultraviolet illumination.

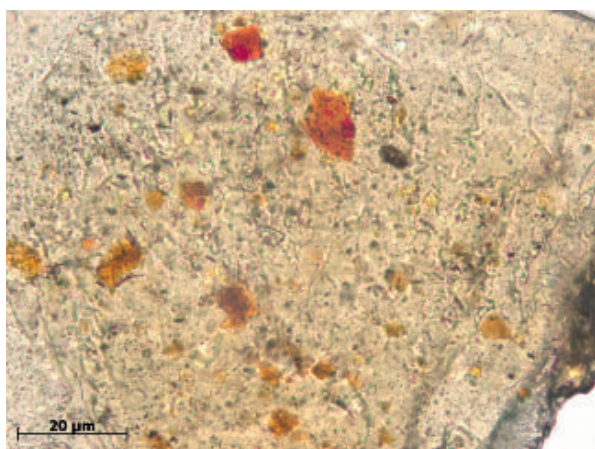


FIG. 98 *The Strawberry Girl*, unmounted sample of glaze from skirt photographed in transmitted light using extended focus.



FIG. 99 *The Strawberry Girl*, paint cross-section from background at left edge.



FIG. 100 *The Strawberry Girl*, FIG. 99 photographed under ultraviolet illumination.

CAT. 7

*Lady Cockburn and her Three Eldest Sons*

The National Gallery (NG 2077)

1773

141.5 × 113 cm (bishop's half-length)

Thread count of canvas: 16 vertical, 16 horizontal threads per cm<sup>2</sup> (plain weave)

There were twelve sittings for either Lady Cockburn or her sons between September and November 1773 (FIG. 101).<sup>1</sup> Sir James Cockburn, who had commissioned the painting, also attended the penultimate appointment on 24 November, presumably to view the almost completed painting. The bill for the painting and frame was paid in March 1774.<sup>2</sup> Reynolds, evidently pleased with the composition, incorporated the date and signature into a decorative border on the edge of Lady Cockburn's cloak, which although not immediately obvious on the picture is more clearly readable in an infrared reflectogram (FIG. 103). It has long been known that Reynolds based his idea for the composition on Anthony van Dyck's *Charity* (NG 6494, see p. 7), now also in the National Gallery.<sup>3</sup>

The canvas is a standard bishop's half-length, which is slightly larger than a standard half-length, allowing Reynolds greater width to accommodate the portrait group.<sup>4</sup> The support is a plain-weave canvas, which

has pronounced cusping at the left and right sides, but minimal cusping at the upper and lower edges, suggesting that the canvas was prepared as a larger piece then cut to size.

The picture was cleaned in 1986, but although medium analysis was undertaken only limited pigment identification was carried out at that time. The medium results are reported briefly by Judy Egerton, who also notes the presence of a bituminous glaze identified by GC-MS in the red curtain to the right (see below).<sup>5</sup> Further examination has been made for the present study, including interpretation of the X-ray photograph mosaic of the painting made at the time of cleaning (FIG. 102).

The canvas is prepared with a single almost pure white layer, largely of lead white, visible in cross-section (FIG. 107). Slight banding, caused by small variations in the thickness of the ground layer, is visible in the X-radiograph at the left and right edges and is related to



FIG. 101 Joshua Reynolds, *Lady Cockburn and her Three Eldest Sons*, 1773. Canvas, 141.5 × 113 cm. The National Gallery, NG 2077.



FIG. 102 *Lady Cockburn and her Three Eldest Sons*, X-radiograph.

the cusping. Many of the light-coloured areas of paint have suffered from wrinkling and a variety of types of drying cracks. Where the wrinkling is in underlayers it can be seen clearly in the radiograph: for example, in the foliage (FIG. 104) and in the shadowed area below the boy cradled in Lady Cockburn's lap. The paint defects in *Lady Cockburn* are widespread and various in character, but not so immediately evident as to be particularly disturbing to the image. The pink tone of the flesh paints, particularly in Lady Cockburn's face, seems rather well preserved, and may be based on vermilion rather than red lake, or at least not on red lake alone.<sup>6</sup> Although the picture, unusually, contains bituminous glazes, these may be confined to the shadows of the red curtain, and, there at least, have not produced a notably disrupted paint surface.<sup>7</sup> A sgraffito technique has been used in yellow paint to represent the gold fringe of the curtain at the top edge, showing an emulation of Rembrandt's fondness for this surface flourish.

The radiograph shows Reynolds's habitual tendency



FIG. 103 *Lady Cockburn and her Three Eldest Sons*, detail of infrared reflectogram showing the artist's signature.



FIG. 104 *Lady Cockburn and her Three Eldest Sons*, detail of X-radiograph showing wrinkling of the paint in background foliage between the pillar and the figure group.

to modify his compositions in significant ways during the course of execution, and one may presume that the larger the number of sittings and the greater the number of figures involved (animals included), the more likely it was that he found some considerable recasting to be necessary. James Northcote recounts that, as the figure group was offset to one side, Reynolds struggled with the balance of light in the painting. After many trials, the landscape (by which Northcote probably meant the trees and sky), the red curtain and the macaw, a favourite pet in the Reynolds household, were finally added to adjust the upper right quadrant.<sup>8</sup> The X-radiograph reveals some alterations to the drapery and shows clearly that the macaw was added at the base of the column without any reserve allowed for in the design. An infrared reflectogram shows that the mouth of the boy peering over his mother's shoulder was painted first as closed, but modified to appear open in the final painting (FIG. 105).

Other features of the X-radiograph include the following: a reserved outline around Lady Cockburn's nose visible in the X-ray, although the face, apart from the cheek, is not dense in the X-ray image (FIG. 106); a reserve along the top of the left arm of the boy on the lap (with the thick white of the drapery painted up to the edges of the head and limbs); some brush marks in the area of Lady Cockburn's lap may well relate to the position of her proper right knee and the earlier form of the drapery that lies beneath the final folds in the fabric; the thumb of the proper left hand of the boy behind

Lady Cockburn may be a late addition by Reynolds.

As noted above, medium analysis was carried out in 1986 by Raymond White using GC–MS, and reported in the *Technical Bulletin*.<sup>9</sup> The results are quite complex. In the red curtain, at the upper left, the binder was found to be walnut oil with some pine resin, with heat-bodding of the oil. The pure white of the sleeve of the boy with his arms around his mother’s neck has a binder of poppyseed oil, possibly partially heat-treated, whereas the greyish-white edge of Lady Cockburn’s gown seems to involve more than one type of drying oil, and perhaps a little pine resin. Orange-yellow from this same drapery was determined as containing heat-bodded linseed oil with pine resin. The shadow values of the red curtain in the upper part of the picture are particularly interesting in

that the binder is relatively conventional, consisting of partially heat-bodded linseed oil with some pine resin, but the colouring matter of the dark glaze yields, by analysis, compounds indicative of Reynolds’s use of bitumen.<sup>10</sup>

The palette overall is not particularly elaborate, although, as usual, some of the layer structures are. The patterned red-brown curtain wrapped around the upper part of the column at the right is painted in mixtures of vermilion, black pigment and red lake, with white in the lighter parts. The lower portion of Lady Cockburn’s yellow-brown drapery takes its strongest colour from orpiment (FIGS 107, 108, 109),<sup>11</sup> which is suspended in a translucent golden-brown matrix, and applied over a thick translucent layer seemingly rich in medium,



FIG. 105 *Lady Cockburn and her Three Eldest Sons*, detail of infrared reflectogram, showing modification of the child’s mouth.



FIG. 106 *Lady Cockburn and her Three Eldest Sons*, detail of X-radiograph.

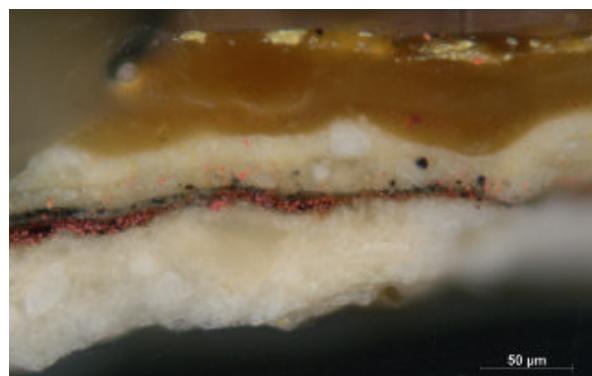


FIG. 107 *Lady Cockburn and her Three Eldest Sons*, paint cross-section from yellow-brown drapery at the left edge, showing the ground layer. The lowest paint layer consists of a rather typical mixture of iron oxide red, black and a little lead white. This is followed by a thin dark grey layer below the more substantial layers of creamy paint. The orpiment highlights are applied over a very thick, translucent layer which contains some red pigment in the lower part.

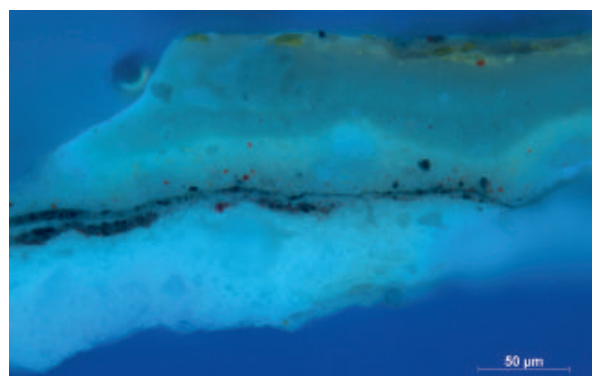


FIG. 108 *Lady Cockburn and her Three Eldest Sons*, FIG. 107 photographed under ultraviolet illumination. A thin fluorescent layer is visible between the two lowest layers of paint. The thick translucent yellow-brown glaze is inhomogeneous, but not as strongly fluorescent as might be expected for such a medium-rich layer.



FIG. 109 *Lady Cockburn and her Three Eldest Sons*, detail of yellow-brown drapery with orpiment highlights.

and possibly tinted also with a yellow-brown lake. These glaze-like upper layers pass over an opaque cream-coloured understructure, which registers as light with moderate intensity in the radiograph, and, on the picture itself, gives the appearance of more solid and weighty substance to the drapery paint. The brightest blue surface of the sky is rendered with finely ground ultramarine, and the grey areas, devoid of blue pigment (FIG. 111), consist of white tinted with a black pigment, primarily bone black. As elsewhere, Reynolds laid in the paint in multiple applications, starting with a dull grey blue, then a red-brown colour with vermilion, black and earths, followed by a second grey-blue of white, Prussian blue and black. Another brighter blue followed, perhaps discontinuous in this case, containing white, ultramarine and a little vermilion, followed by several grey layers (FIG. 112). The strongest blue of the macaw's intensely coloured plumage is painted in fine ultramarine with a little white, and the duller parts of the feathers with Prussian blue mixed with some vermilion and white (FIG. 110). From its colour, and from the X-ray image, the macaw's bright red plumage must be largely vermilion.



FIG. 110 *Lady Cockburn and her Three Eldest Sons*, detail of the macaw.



FIG. 111 *Lady Cockburn and her Three Eldest Sons*, detail of the sky.

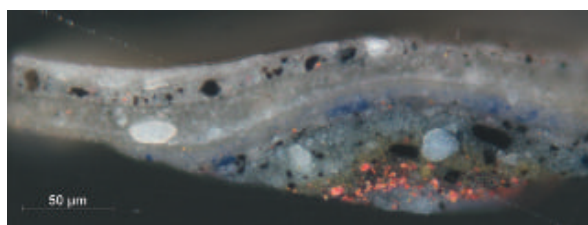


FIG. 112 *Lady Cockburn and her Three Eldest Sons*, paint cross-section from a greyish-blue part of the sky showing a multi-layered application of paint.



CAT. 8

*Miss Jane Bowles*

The Wallace Collection (P36)

1775–6

92 × 71.3 cm (kit-cat)

Thread count of canvas: 17 vertical, 13 horizontal threads per cm<sup>2</sup> (plain weave)

Miss Jane Bowles was the eldest daughter of Oldfield Bowles.<sup>1</sup> Sir George Beaumont is said to have convinced Mr Bowles to have Reynolds, rather than Romney, paint his daughter, saying ‘even a faded picture from Reynolds will be the finest thing you can have’.<sup>2</sup> As the ‘Sitter Books’ for 1774–6 are missing, there is no record of sittings. However, payments were made on 6 May 1775 and 6 June 1776, suggesting the portrait was painted between these dates (FIG. 113).<sup>3</sup>

The canvas is a standard kit-cat format<sup>4</sup> and has been prepared with a single layer of white ground consisting of lead white and calcium carbonate bound in heat-bodied linseed oil.<sup>5</sup> The ground layer is moderately thin so that the pattern of the canvas remains visible and Reynolds has exploited the texture of the weave while painting. To depict the rays of sunlight that shine through the gap in the trees, a brush was loaded with a small amount of stiff yellow paint, which was then dragged across in swift strokes. The

brushstrokes skip across the surface in broken lines that catch only the top of the weave texture, creating the effect of dappled light from the sun’s rays (FIG. 114).

Comparison of the finished painting with the X-ray image (FIG. 115) and infrared reflectogram (FIG. 116) reveals a number of refinements made to the composition. The X-ray shows that the sitter’s shoulders were originally raised as though in a shrug. Reynolds adjusted their position using a dark paint, which is clearly visible in the infrared reflectogram elongating the line of the sitter’s neck. At the dog’s rump, an area of drapery registers in the X-ray photograph that was subsequently obliterated by the black curls of the tail.<sup>6</sup> The position of the dog’s chest has been moved by adding a dark shadow that also serves to emphasise the outstretched front paw. The dog’s back leg that is caught up into the folds of the dress was added after the drapery had been sketched in with stiff, textured paint, which can still be seen through the overlying paint layers.



FIG. 113 Joshua Reynolds, *Miss Jane Bowles*, 1775–6. Canvas, 92 × 71.3 cm. The Wallace Collection, Inv. P36.

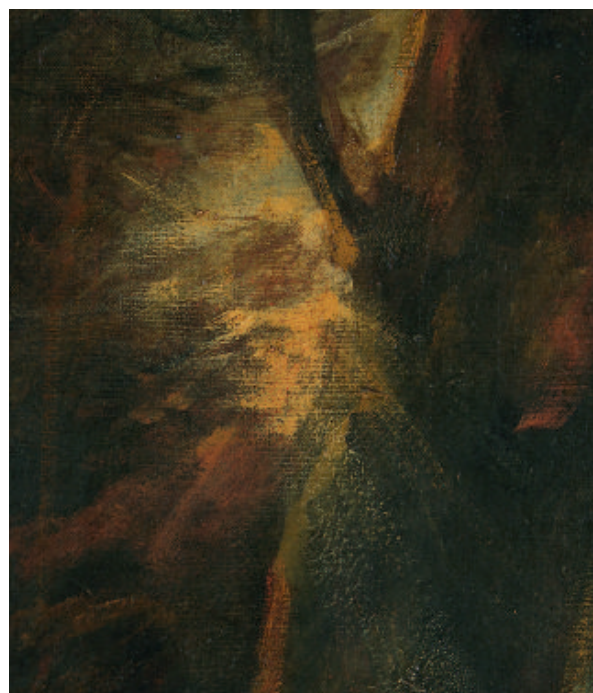


FIG. 114 *Miss Jane Bowles*, detail.



FIG. 115 *Miss Jane Bowles*, X-radiograph.



FIG. 116 *Miss Jane Bowles*, infrared reflectogram.

The undermodelling of the face is clearly visible in the infrared reflectogram, especially along the girl's shadowed proper right cheek. In the finished painting some of the undermodelling has been left exposed, or covered with only a thin scumble of warm-coloured paint. The infrared reflectogram also shows that the irises of the girl's eyes were marked with hooked brushstrokes; however, the dark pupils are less prominently visible. Stereomicroscopic examination appears to show that the pupils were painted using a dark pigment mixture rather than black.<sup>7</sup> In his 'Technical Notes' Reynolds records a mixture of Prussian blue, vermilion and yellow lake that he used in place of black.<sup>8</sup> Although the paint of the pupils was not sampled it seems probable that a similar pigment mixture has been used.<sup>9</sup>

When painting the dog, Reynolds first applied thick white paint to create the texture of the fur. Once the white paint was dry, black paint, with the occasional blue addition, was applied in thin 'washes' and more opaque liquid lines to develop the shape and add the markings.

The white dress has also been painted in a thick impasto. The decoration on the sitter's proper right shoulder was marked out while the textured white paint was still wet, and the first wavy brushstrokes are visible

in the X-ray image where the white paint has been wiped away. Thinner yellow and brown paint was then added in zigzag strokes to build up the design (FIG. 117). A cross-section from the sleeve of the dress reveals that the upper paint layer is almost pure white with very little coloured pigment (FIG. 118). Only a little black is present in the layer, and one large particle of the blue pigment smalt was detected in the sample.<sup>10</sup>

The dark passages of paint in the background of *Miss Jane Bowles* are relatively free from the type of drying defects seen in some of the other paintings studied here. This could be interpreted as evidence of a more straightforward technique for this particular painting. However, evidence from samples in cross-section refutes this. The background, for example, is painted with multiple layers in Reynolds's habitual manner. Solid layers of opaque yellow paint, based largely on earth pigments with some Naples yellow,<sup>11</sup> are interspersed with layers of a more translucent brown paint. This latter has an unusual pinkish orange fluorescence under ultraviolet illumination, as in, for example, a sample from the foliage of the tree at the upper left (FIGS 119, 120). A further thin brown layer is present at the top of the paint sample, which is darker in ultraviolet light and has a noticeably reticulated surface. Thin layers with a similar fluorescence are also



FIG. 117 *Miss Jane Bowles*, photomicrograph of decoration on the sitter's right shoulder.

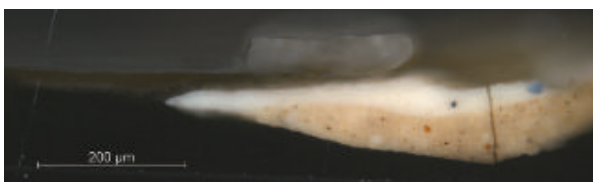


FIG. 118 *Miss Jane Bowles*, paint cross-section from the sleeve. The almost pure white paint of the sleeve is applied over a beige underpaint.

visible in a sample from the reworked black background to the left of the sitter's head.

Other samples in cross-section from the background show that some of the upper paint layers are themselves fluorescent, again suggesting that there could be additional components in the paint medium. A sample from the green foliage near the top edge has a thick transparent interlayer followed by several layers of mixed yellow, grey and greenish paint, all of which exhibit some fluorescence under ultraviolet light (FIGS 121, 122).

Medium analysis was carried out on several samples from the background, but the results were difficult to interpret due to the presence of many subsequent varnish layers.<sup>12</sup> Heat-bodied drying oil was identified, however, in each of the paint samples, with linseed oil detected in the black paint and walnut oil detected in the lighter beige paint of the landscape. The presence of a

little pine resin in a sample from the beige foliage (which appeared relatively free from surface coatings) may indicate that some pine resin is present in the medium of certain paint layers.<sup>13</sup> A sample of the brown paint near the left edge also contained a substantial amount of mastic, which may be connected to the medium of an underlying paint layer.<sup>14</sup> In addition, FTIR analysis of yellow paint from the foliage of the trees suggests the presence of a little beeswax, possibly in the paint.

Many of the cross-sections from this painting contain a substantial unpigmented layer, directly above the paint surface, which appears cloudy and rather opaque (see, for example, the cross-section illustrated in FIGS 119, 120). This seems to be sensitive to the 'odourless kerosene' used to wet the samples for photography and does not polish in the same way as the paint and varnish layers it lies between. It forms a fairly complete layer over the surface, which analysis has shown consists largely of beeswax.<sup>15</sup> Visually this is most evident in the background where it is the cause of a loss of saturation in the dark paint, especially around the sitter's head. It is possible that a layer of beeswax in this context could constitute a surface polishing treatment applied in a later conservation treatment, but its status needs careful consideration. The evidence from cross-sections shows that the beeswax layer is much thicker than a typical restorers' wax polish and is present

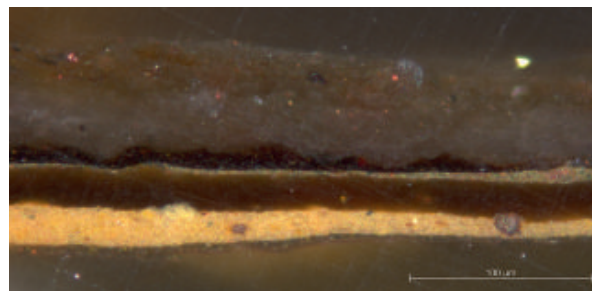


FIG. 119 *Miss Jane Bowles*, paint cross-section from background, upper left.

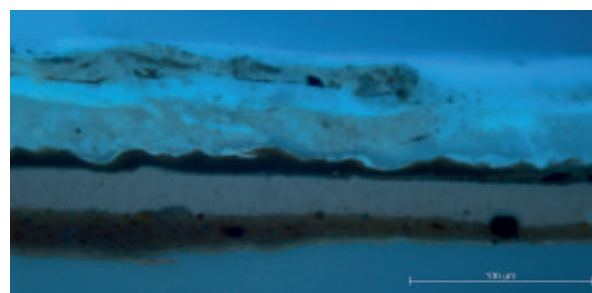


FIG. 120 *Miss Jane Bowles*, FIG. 119 photographed under ultraviolet illumination.

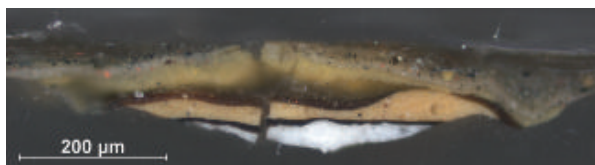


FIG. 121 *Miss Jane Bowles*, paint cross-section from the background near the top edge.

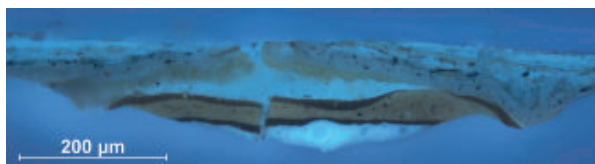


FIG. 122 *Miss Jane Bowles*, FIG. 121 photographed under ultraviolet illumination.

beneath the many layers of varnish, indicating, at the least, that the wax application is old. We know from Reynolds's 'Technical Notes' that he experimented with the use of wax, and he often mentions the use of 'cera solo' or 'cera solamente' (wax alone). In several entries dating from 1775, the probable year *Miss Jane Bowles* was painted, Reynolds uses the word 'cerata' or 'cerato', which can perhaps be translated loosely as 'waxed', and may indicate that a complete layer of beeswax was applied. The notes also indicate that he sometimes continued to work on pictures after applying a wax layer or varnish, as in, for example, the entry referring to the portrait of Mrs Montague (1775, untraced), which states 'Oil then waxed, retouched with white'. This can be interpreted as: painted first in oil, then a wax coating applied, then retouched using white pigment.<sup>16</sup>

In several samples there appear to be glaze layers, thought to be original, applied over the wax coating. For example, a brown glaze has been used to create the

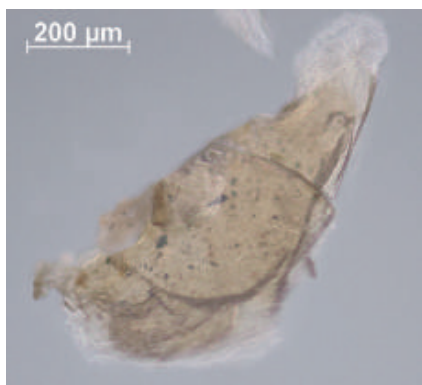


FIG. 123 *Miss Jane Bowles*, unmounted sample of glaze from lining of overskirt photographed under magnification in transmitted light.

shadow of the cream-coloured lining of the overskirt where the folded drapery is depicted at the lower left of the painting. The dark glaze, visible using the stereomicroscope, has collected in the texture of the underlying stiff white paint and fine dark particles are evident at high magnification in an unmounted sample (FIG. 123). In cross-section it is more difficult to see the sparse pigmentation, but there are two thin layers, which are rather darker under ultraviolet illumination than the fluorescent varnishes.<sup>17</sup> It is significant that all these layers are applied over the thick wax layer (FIGS 124, 125). A similar brown glaze has been used to finish the foreground landscape. In places this layer is a little worn along the edges of cracks or over the ridges of textured brushstrokes, which may indicate some vulnerability during past lining and cleaning treatments.

Despite Mr Bowles's evident reservations about commissioning Reynolds to paint his daughter, the portrait remains in very good condition. The flesh paint does not appear faded and there are remarkably few areas where the paint is disrupted by drying cracks. In addition, many of the surface layers and glazes are well preserved and, although it is always difficult to prove conclusively which of the upper layers form part of the original structure of the painting, this may be one example, in fact, where a 'wax varnish' applied in Reynolds's studio still exists.

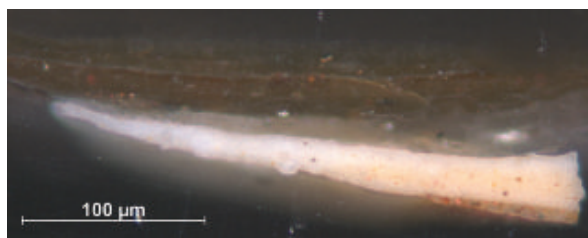


FIG. 124 *Miss Jane Bowles*, paint cross-section from lining of overskirt. The paint is built up in several layers similar to those in the sample from the sleeve in FIG. 118.

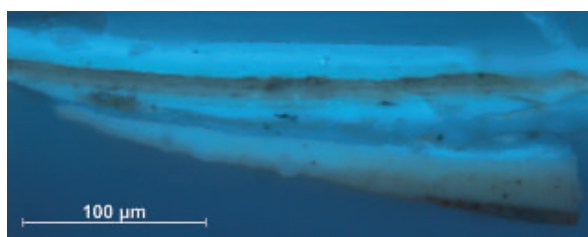


FIG. 125 *Miss Jane Bowles*, FIG. 124 photographed under ultraviolet illumination. The thick wax layer above the paint is less fluorescent than the subsequent layers of varnish. The two glaze layers appear darker and have a weak orange fluorescence.